



City of Glendale Local Hazard Mitigation Plan

Public Review Draft

prepared by

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Record of Reviews and Revisions

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Plan Distribution

Date	Plan Version	Method of Distribution (Email, Hard Copy, etc.)	Distributed To (Name and Department/Organization)
5/11/2026	Public Review Draft	Email	Hazard Mitigation Planning Committee
5/13/2026	Public Review Draft	Email	Stakeholder Group

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1 Introduction

The City of Glendale prepared the 2026 Local Hazard Mitigation Plan (LHMP) to evaluate and minimize potential impacts from natural, humanmade, and climate-related hazards that may affect the community. Through this effort, Glendale aims to proactively reduce risk and effectively allocate resources to mitigate the impacts of current and future hazards.

This plan fulfills the requirements established under the Disaster Mitigation Act of 2000, as codified in Title 44 of the Code of Federal Regulations (CFR), Chapter 1, Parts 201 and 206. Since November 1, 2004, jurisdictions must adopt and maintain an approved hazard mitigation plan to remain eligible for funding through FEMA's Hazard Mitigation Grant Program (HMGP) and other related grant opportunities. The Glendale Fire Department led the development of this LHMP in collaboration with other City departments, partner agencies, community stakeholders, and the public.

This introductory section provides an overview of hazard mitigation planning, summarizes applicable regulatory requirements, and presents the organizational structure of the 2026 LHMP. It also includes a brief description of programs and funding opportunities administered by the Federal Emergency Management Agency (FEMA) that support hazard mitigation efforts.

1.1 Purpose of the Plan

Emergency management follows a continuous cycle of mitigation, preparedness, response, and recovery. Mitigation reduces long-term risk, preparedness builds readiness, response addresses immediate needs during an incident, and recovery restores and improves conditions afterward. These phases are interconnected, with mitigation providing the foundation for reducing future impacts. Disasters can result in loss of life, damage to property and infrastructure, environmental impacts, and significant economic disruption. Hazard mitigation seeks to reduce these risks in advance by addressing vulnerabilities before disasters occur.

The City of Glendale, like all communities, faces a range of hazards that can disrupt daily life. While risk cannot be eliminated, the LHMP serves as a framework to reduce vulnerability and strengthen community resilience. The plan evaluates natural, human-caused, and climate-related hazards and establishes coordinated strategies to address them.

The LHMP also provides data, resources, and guidance to support informed decision-making and promotes collaboration among City departments, partner agencies, organizations, and the public. It identifies actions such as public outreach, partnerships, and land use strategies to reduce risk in hazard-prone areas. In addition, the LHMP supports ongoing coordination to prioritize mitigation efforts and aligns the City with federal requirements, helping maintain eligibility for hazard mitigation funding.

1.2 Local Mitigation Planning Requirements

Federal

Hazard mitigation planning is governed by federal law, primarily the Robert T. Stafford Disaster Relief and Emergency Assistance Act, as amended by the Disaster Mitigation Act of 2000 (DMA 2000). This legislation requires state, local, and tribal governments to prepare FEMA-approved hazard mitigation plans to remain eligible for certain federal funding.

These plans establish a framework for identifying hazards, assessing risks and vulnerabilities, and developing strategies to reduce potential impacts. FEMA's requirements are codified in Title 44 of the Code of Federal Regulations (CFR), Part 201, which outlines plan content, development standards, and the review and approval process. This LHMP is organized in accordance with these regulations and FEMA's Local Mitigation Planning Handbook.

To support plan development and review, FEMA provides a Local Mitigation Plan Review Tool. This tool includes a checklist used by FEMA and state agencies to evaluate compliance with 44 CFR § 201.6 and provide feedback. The completed checklist for this LHMP is included in Appendix B and was used to ensure all required elements were addressed prior to submission.

While federal requirements primarily focus on natural hazards, the City of Glendale has also evaluated select human-caused hazards, along with the effect of climate change on the described natural hazards, to provide a more

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comprehensive assessment of risk. Each hazard is described and analyzed to support informed planning and decision-making.

State

At the state level, California law further reinforces the importance of hazard mitigation planning. Under California Government Code Section 8685.9 (as amended by Assembly Bill 2140), the State’s share of disaster recovery funding is capped at 75 percent of eligible costs not covered by federal assistance. However, jurisdictions that incorporate an approved hazard mitigation plan into their General Plan may be eligible for a higher level of state cost sharing.

While FEMA is responsible for reviewing and approving the LHMP, and Cal OES conducts an initial review at the state level, this process does not confer additional authority over local governance. Adoption of the plan does not authorize either agency to direct or control local decision-making, but rather ensures compliance with established standards for hazard mitigation planning.

This LHMP is consistent with guidance provided by the California Office of Emergency Services (Cal OES) and FEMA, and reflects current best available data, planning practices, and community priorities. By meeting state and federal requirements, the plan supports the City’s eligibility for applicable funding and assistance programs.

1.3 Hazard Mitigation Plan Description

The 2026 Glendale LHMP is organized into the following sections:

Section 1: Introduction	Provides an introduction to hazard mitigation planning, related requirements and agencies with regulatory authority, and a description of the LHMP.
Section 2: Planning Process	Describes the planning process for the 2026 LHMP, including preparation process; identification of the Planning Team; engagement with technical experts, stakeholders and the community; involvement of neighboring jurisdictions and relevant agencies; and the inclusion of related plans, reports, and information.
Section 3: Planning Area Description	Describes the built and natural environment of Glendale including geography, land use, demographics, climate and weather, and economic conditions.
Section 4: Hazard Identification	Provides a profile of each hazard of concern for Glendale, including earthquake and seismic, wildfire, floods, extreme heat and wind, drought, and humanmade hazards, including hazardous materials and transportation incidents.
Section 5: Risk Assessment	Evaluates the risk of each hazard to the planning area.
Section 6: Capability Assessment	Identifies and evaluates resources available for hazard mitigation in Glendale.
Section 7: Mitigation Strategy	Identifies and evaluates the current, ongoing, and completed mitigation projects and programs in the City and lists mitigation strategies for reducing potential impacts.
Section 8: Plan Maintenance Procedures	Describes procedures for updating the LHMP to keep it current and for continued public engagement in the planning process.
Section 9: References	List of references cited throughout the LHMP
Appendix A	Details engagement and outreach materials, input, and results throughout the development of the updated LHMP.
Appendix B	Provides the Plan Review Tool (PRT) used by FEMA to determine that each requirement has been met.
Appendix C	Describes the implementation status of all mitigations included in the previous LHMP
Appendix D	Provides the Resolution for Adoption by the Glendale City Council

1.4 Grant Programs with Mitigation Plan Requirements

FEMA administers several grant programs that support hazard mitigation planning and project implementation. Eligibility for most of these programs requires a FEMA-approved LHMP, ensuring that proposed projects are grounded in a comprehensive understanding of local risks and vulnerabilities.

1.4.1 Stafford Act Grant Programs

The following programs are authorized under the Robert T. Stafford Disaster Relief and Emergency Assistance Act and are available to jurisdictions with FEMA-approved mitigation plans:

Hazard Mitigation Grant Program (HMGP)

The Hazard Mitigation Grant Program provides funding to implement long-term hazard mitigation measures following a Presidentially declared disaster. HMGP funding is allocated to states based on a percentage of total disaster recovery expenditures and may be used for projects such as property acquisition, structure elevation, wildfire risk reduction, and infrastructure protection. A FEMA-approved LHMP is required for project eligibility; however, the grant may also be used for updating and adopting hazard mitigation plans.

Building Resilient Infrastructure and Communities (BRIC)

The Building Resilient Infrastructure and Communities program is FEMA's primary pre-disaster mitigation funding source. BRIC supports proactive investments in infrastructure and community resilience to reduce risks from natural hazards. Eligible activities include large-scale infrastructure projects, nature-based solutions, and capability- and capacity-building efforts. Jurisdictions must have a FEMA-approved LHMP to apply for project funding.

Pre-Disaster Mitigation (PDM) Grant Program

The Pre-Disaster Mitigation (PDM) Grant Program provides federal funding to state, local, tribal, and territorial governments to support hazard mitigation planning and the implementation of cost-effective projects that reduce long-term risks to people and property from natural disasters. By investing in resilience before disasters occur, the program aims to minimize future damage, lower recovery costs, and reduce long-term reliance on federal disaster assistance.

Safeguarding Tomorrow Revolving Loan Fund Program

The Safeguarding Tomorrow Revolving Loan Fund (RLF) Program provides capitalization grants to states, tribes, territories, and the District of Columbia to establish revolving loan funds that offer low-interest financing for local hazard mitigation projects. By complementing FEMA's broader Hazard Mitigation Assistance programs, it enables communities to invest in risk-reduction measures, decrease vulnerability to natural hazards, and strengthen long-term resilience while reducing future disaster costs and impacts.

Rehabilitation Of High Hazard Potential Dam (HHPD) Grant Program

The Rehabilitation of High Hazard Potential Dams (HHPD) Grant Program, administered by Federal Emergency Management Agency in partnership with state dam safety agencies, provides federal funding to rehabilitate non-federal dams whose failure would likely result in loss of life. The program supports planning, design, and construction activities that reduce risks associated with aging or deficient dam infrastructure, with the broader goal of protecting downstream communities and critical assets. As a condition of funding, applicants must ensure that dam risk and inundation information is incorporated into the jurisdiction's LHMP, reinforcing the integration of dam safety considerations into comprehensive, long-term hazard mitigation planning.

1.4.2 National Flood Insurance Grant Programs

FEMA also administers mitigation grant programs focused specifically on reducing flood risk through the National Flood Insurance Program (NFIP). Participation in the NFIP and a FEMA-approved LHMP are typically required for eligibility.

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Flood Mitigation Assistance (FMA) Grant Program

The Flood Mitigation Assistance program provides funding for projects that reduce or eliminate long-term risk of flood damage to structures insured under the NFIP. Common project types include property acquisition and demolition, structure elevation, and floodproofing. The program prioritizes repetitive loss and severe repetitive loss properties.

Repetitive Flood Claims (RFC) Program

The Repetitive Flood Claims program provides funding to reduce flood risk to NFIP-insured properties that have experienced repeated flood damage. While smaller in scale and more limited in funding than other programs, RFC supports mitigation activities similar to FMA, including acquisition, elevation, and floodproofing of high-risk structures.

Severe Repetitive Loss (SRL) Program

The Severe Repetitive Loss program focuses specifically on properties that have experienced multiple flood insurance claims with high cumulative losses. The program provides funding for mitigation measures to reduce future claims and overall flood risk. Although SRL has largely been integrated into the FMA program in recent years, it remains a relevant category for understanding FEMA's prioritization of high-risk properties.

Planning Process

2 Planning Process

The LHMP was developed through a collaborative, interdisciplinary process. This section documents how this plan was prepared, who was involved, and what data and information were used. City departments, partner agencies, neighboring jurisdictions, stakeholders, and the public were provided opportunities to participate and contribute input throughout the plan development.

FEMA's requirements for documentation of the LHMP are described in Appendix B. Documentation of the planning process is provided in tables and appendices referenced in this section that include records of planning meetings and outreach activities, such as meeting agendas, presentations, sign-in sheets, surveys, and other supporting materials.

2.1 Plan History

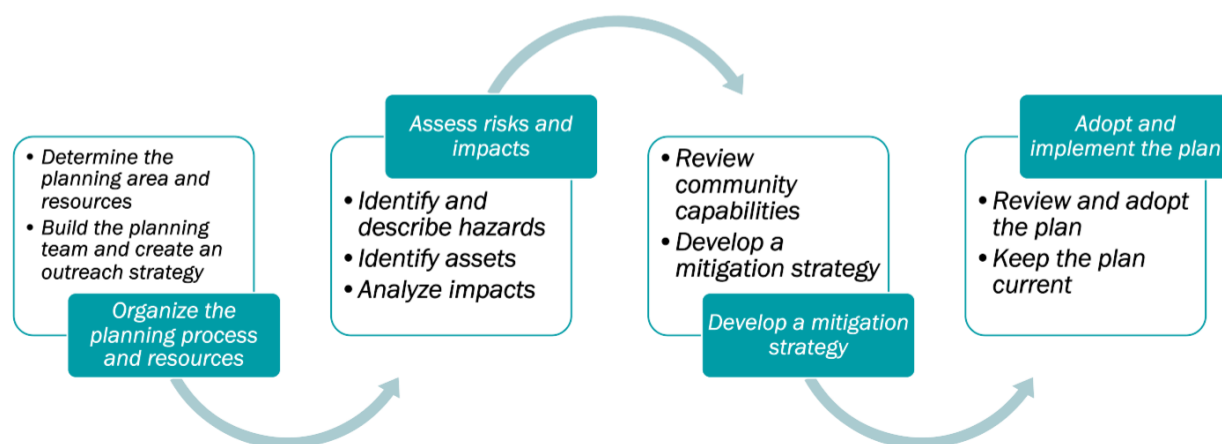
The 2026 LHMP is an update of the 2019 Plan. It reevaluates previously identified hazards, removes pandemic and terrorism from the list of human-caused hazards, and adds drought and extreme weather as hazards of concern. These changes were made based on input from the City of Glendale, the Hazard Mitigation Planning Committee (HMPC), stakeholder group, and community. The 2026 LHMP also contains updated versions of many of the mitigation actions listed in the 2019 version, as they are still ongoing and relevant. Where appropriate, mitigation actions were updated, and new mitigations were added.

2.2 Planning Process Description

The planning process for the 2026 LHMP launched in January 2026 and began with organizing the planning effort, including defining the planning area, assembling the Planning Team, the HMPC, and stakeholder groups (see Section 2.3 below for a detailed description of the different groups convened). The Planning Team also created an outreach and engagement strategy to guide the LHMP update process (see Appendix A).

The HMPC is a standing group of staff from various City departments, neighboring jurisdictions, and key agencies responsible for implementing preparedness and response plans in the City of Glendale. Stakeholders from Glendale-specific businesses, academia, nonprofits, community-based organizations, and community lifelines (e.g., hospitals and assisted living facilities) were invited to participate in the planning process via three stakeholder meetings. Detailed information on the HMPC, stakeholder group, and community engagement activities can be found in Appendix A.

Following initiation, the Planning Team assessed risks and impacts by identifying hazards, evaluating assets, and analyzing potential consequences with input from the HMPC, the stakeholder group, and the public. This informed the development of the mitigation strategy, which included reviewing community capabilities and identifying and prioritizing actions to reduce risk. Finally, the plan was reviewed, adopted, and prepared for implementation, with a commitment to ongoing maintenance and future updates to reflect changing conditions.



At each stage of the update process, participation from the HMPC, stakeholder group, and the broader community was prioritized. The Planning Team emphasized low-barrier, in-person engagement opportunities, particularly for community members who may not traditionally engage in planning processes, by hosting mobile workshops in places where people already gather. Key materials, including the mobile survey, were translated into four languages to reach and solicit input from as many communities as possible. Documentation of participant outreach and public engagement can be found in Appendix A.

2.3 Planning Team Activities

The Planning Team consisted of representatives from the City’s Fire Department and Communications Department, as well as the consultant team. Representatives from the City’s Fire department oversaw coordination with the HMPC and stakeholder group throughout the LHMP update process. The City’s project manager reviewed all outreach materials, distributed meeting notices, and coordinated follow-up requests for input. Documentation for each HMPC and stakeholder meeting, including presentations, attendance, and summaries, can be found in Appendix A.

Hazard Mitigation Planning Committee (HMPC)

The City established a HMPC to guide development of the LHMP by providing input at key milestones. The HMPC supported technical analysis, public and stakeholder engagement, and development of mitigation goals and actions. HMPC membership included representatives from the following City departments, agencies, and neighboring jurisdictions, with participation varying by meeting and input request:

- City of Glendale Departments and Divisions:
 - Fire Department
 - Fire Prevention Bureau
 - Verdugo Fire Communications
 - Public Works Engineering & Traffic
 - Public Works Operations and Integrated Waste
 - Community Development & Planning
 - Community Services & Parks
 - Human Resources and Safety
 - Radio Services
 - Glendale Water & Power
 - Police Department
 - City Manager’s Office
 - Information Technology & GIS
 - Building and Safety
- Partner Agencies and Jurisdictions
 - Los Angeles County
 - City of Burbank
 - City of Pasadena

HMPC members participated in four, virtual 60-minute meetings and provided feedback via email and survey throughout the planning process.

Table 1 below outlines the planning meetings conducted with the HMPC.

Table 1 HMPC Meeting Opportunities

Meeting #	Timeframe	Purpose	Informs LHMP Sections
1 ¹	February 17, 2026	- Review the LHMP update process, scope, and schedule. - Summarize the existing LHMP and status of mitigation actions. - Review hazards of concern and relevant regulatory requirements. - Confirm roles, coordination procedures, and expectations.	LHMP Planning Process
2	March 5, 2026	- Review hazards of concern and relevant regulatory requirements. - Help review vulnerabilities related to City infrastructure, critical assets, communities, and natural resources. - Provide input on hazard profiles, including severity, magnitude, and probability.	Hazard Profiles and Risk Assessment (Hazard Profiles)
3	April 9, 2026	- Review and revise existing LHMP goals - Assess existing mitigation capabilities - Identify, organize, and characterize potential mitigation actions across the prioritized range of hazards. Prioritize mitigation actions based on risk reduction, feasibility, and alignment with City goals. - Support development of an in-person public workshop to solicit public input on the vulnerability analysis.	Mitigation Strategy
4	April 30, 2026	Review draft mitigation actions and suggest refinements.	Mitigation Strategy

¹ Only City Departments were included in the first HMPC meeting.

2.3.1 Stakeholder Group

The City established a stakeholder group to guide development of the LHMP by providing input at key milestones. The stakeholder group provided input on updates to the hazard profiles and risk assessments, helped refine mitigation goals and actions, and reviewed the draft mitigation strategy. Stakeholders included representatives from the following community-based organizations, school districts, hospitals, and neighboring jurisdictions, with participation varying by meeting and input request:

- Pasadena Fire Department
- USC Kick Med. Verdugo Hills
- Glendale Youth Alliance
- Glendale Community College
- Glendale Unified School District
- Glendale Chamber of Commerce
- Montrose Chamber of Commerce
- La Canada Flintridge Chamber of Commerce
- Valley Industry and Commerce Association
- The Walt Disney Company
- Area C Disaster Management Area Coordinator
- Red Cross
- Ascencia non-profit Homeless Services

Stakeholders participated in three virtual, 60-minute meetings, provided feedback via email and survey, and supported public engagement activities throughout the planning process.

Table 2 outlines the planning meetings held with the stakeholder group.

Table 2 Stakeholder Meeting Opportunities

Meeting	Timeframe	Purpose	Informs Sections
1	March 5, 2026	• Updates to hazard profiles, including severity, magnitude, and probability. • Vulnerability assessment for City infrastructure, critical assets, communities, and natural resources.	Hazard Profiles and Risk Assessment
2	April 14, 2026	• Review and revise existing LHMP goals • Identify, organize, and characterize potential mitigation actions across the prioritized range of hazards. Prioritize mitigation actions based on risk reduction, feasibility, and alignment with City goals.	Mitigation Strategy
3	April 23, 2026	• Review draft mitigation actions and suggest refinements.	Mitigation Strategy

The draft LHMP was provided for public review from June 1 through June 30, 2026. Comments from the HMPC members and stakeholder group were received as part of this public review and incorporated into the final LHMP.

2.4 Community Engagement

An outreach and engagement strategy was developed to maximize meaningful and inclusive participation throughout the LHMP planning process. Key components of the outreach and engagement strategy are summarized below. Outreach materials associated with these efforts are provided in Appendix A.

Outreach and Communications

To sustain visibility throughout the engagement period, the Planning Team coordinated a range of digital and physical outreach tools, including:

- Press release posted on the City Website
- Fire Department Website Promotion
- Social Media posts through City channels in English, Spanish, Korean, and Armenian
- E-blasts distributed through City lists
- Distribution of survey promotion postcards at the Earth Day and Cherry Blossom Festival

These efforts generated thousands of impressions and multiple points of public interaction across web, social media, and in-person events. Key outreach performance metrics, including impressions, posts, and engagement levels, are summarized in Appendix A.

Web-Based Community Survey

The City developed a web-based community survey to gather public input on hazard mitigation priorities, risk awareness, and preparedness. The survey asked respondents about natural hazards they have experienced, the hazards of greatest concern to their neighborhood or home, and actions the City could take to reduce those risks. The survey also included questions assessing respondents' awareness of available emergency preparedness resources and information.

The survey was available in English, Spanish, Armenian, and Korean, and was promoted through multiple channels, including the City of Glendale website, the City of Glendale and the Glendale Fire Department social media pages, and QR codes distributed at community events.

The survey was open from March 19, 2026 to May 3, 2026 and received 157 responses. Of these respondents, 128 resided within the City of Glendale, and 47 voluntarily provided contact information for future outreach. Survey results indicate that respondents were most concerned about earthquake, wildfire, and storm/high winds. A full summary of survey questions and responses can be found in Appendix A.

Mobile Workshops

The City conducted two mobile workshops to provide low-barrier, in-person opportunities for community members to learn about the LHMP and provide input. These pop-up events were designed to accommodate brief interactions and to engage participants who may not attend traditional public meetings. Community input collected through these workshops informed the hazard and risk assessment and development of the mitigation strategy.

Mobile Workshop 1

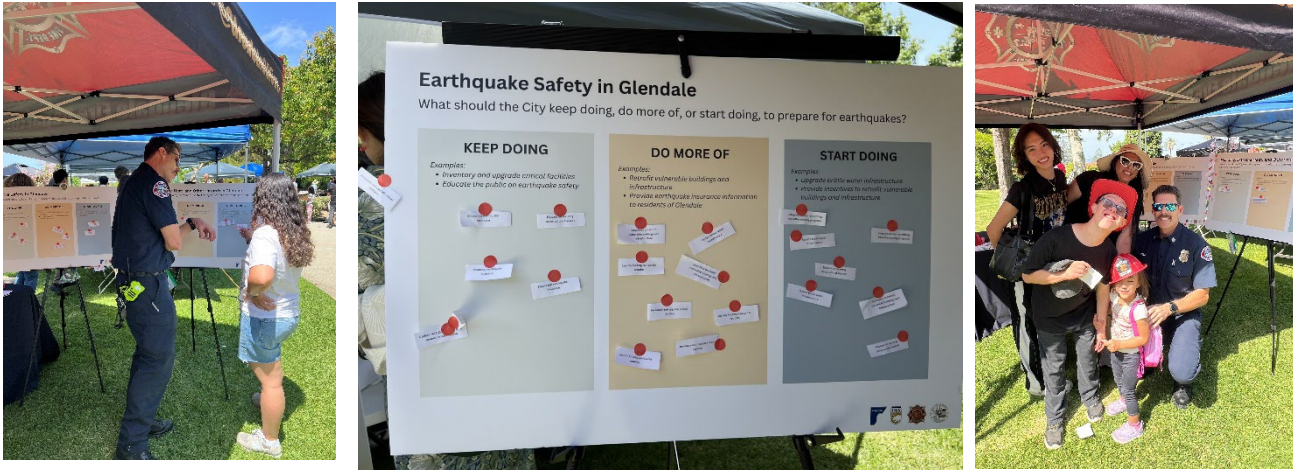
The first mobile workshop took place at the City's Earth Day Fair at Verdugo Park on April 4th 2026, from 10:00 AM – 1:00 PM, and engaged approximately 40 visitors. The booth featured informational materials about the LHMP and hazards affecting Glendale, a dot-voting exercise to identify community hazard priorities, and a community asset mapping



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exercise. Survey postcards with QR codes were distributed, and a ring-toss activity was provided to engage children and families.

Mobile Workshop 2

The second mobile workshop took place at the City's Cherry Blossom Event at Brand Park on April 19th, 2026, from 10:00 AM – 3:00 PM, and engaged approximately 80 visitors. The booth featured informational materials about the LHMP along with an interactive activity designed to gather community feedback on existing mitigation measures. Survey postcards with QR codes were also distributed.



2.5 Incorporation into Other Planning Mechanisms

The City of Glendale is committed to integrating the mitigation goals, strategies, and actions delineated in this Local Hazard Mitigation Plan (LHMP) into its existing and forthcoming planning processes, regulatory frameworks, capital improvement initiatives, and operational protocols to foster long-term community resilience. This LHMP integrates with current City planning efforts, providing a framework for continuous policy and investment decisions across municipal departments. Key planning instruments include the Glendale General Plan, the Capital Improvement Program (CIP), the annual budget process, emergency operations planning, infrastructure and utility planning, and the review processes for future developments.

The mitigation actions articulated in this LHMP are not only aligned with but also reinforce the goals and policies outlined in the Glendale General Plan, particularly within the Safety, Land Use, and Mobility Elements. The Safety Element provides critical policy direction concerning seismic safety, wildfire risk reduction, flood management, infrastructure resilience, and climate adaptation strategies. The Land Use Element aims to steer future growth away from environmentally sensitive and hazardous areas, including steep hillsides and areas near wildfire interfaces. Meanwhile, the Mobility Element supports comprehensive multimodal transportation planning and infrastructure enhancements aimed at preserving evacuation routes, improving emergency response mobility, and strengthening the resilience of the transportation infrastructure during hazard events. Together, these General Plan elements provide a robust policy framework that systematically integrates hazard mitigation into land-use decisions, infrastructure investments, and future development.

Additionally, the City will embed mitigation priorities within the Capital Improvement Program (CIP) and the annual infrastructure budgeting process. This strategy aims to prioritize investments that mitigate long-term hazard risks while ensuring the continuity of essential services. Hazard mitigation considerations will consistently inform the planning, design, and implementation of public infrastructure projects, which encompass stormwater management improvements, roadway rehabilitation, slope stabilization measures, utility system fortification, emergency power enhancements, and facility retrofitting. The Glendale Capital Improvement Program and the annually adopted budget were evaluated during this LHMP update, contributing to the prioritization and feasibility assessment of mitigation actions.

As Glendale updates its general and infrastructure plans, City departments will leverage this LHMP to align hazard mitigation strategies with land use, climate adaptation, and capital investments. The City will continue to facilitate interdepartmental coordination to incorporate hazard mitigation principles into project development, grant applications, development reviews, emergency preparedness planning, and public infrastructure improvements.

2.6 Review of Existing Plans, Reports, Technical Documents, and Data

The Planning Team reviewed and integrated a variety of existing plans, studies, reports, and technical information into the updated LHMP. Table 3 below contains the list of existing resources that were reviewed and how they were incorporated into the development of the plan.

Table 3 Existing Plan Review

Document or Resource	Reference and Its Use
City of Glendale Emergency Plan	Provides relevant hazards to incorporate in the hazard analysis and risk analysis.
2019 City of Glendale Local Hazard Mitigation Plan	Provides relevant hazards, mitigation actions, and risk assessment to build on for the updated plan.
2025 City of Glendale General Plan: Safety Element	Provides relevant hazards to consider in the hazard and risk analysis, as well as critical facilities and vulnerable populations identification.
2026 City of Glendale General Plan: Draft Land Use Element	Informed the risk assessment on Glendale's housing, economic infrastructure, and environmental protection. Also provided a framework of recent and anticipated growth.
2025 County of Los Angeles All Hazards Mitigation Plan	Describes hazards relevant to Los Angeles County. Used to inform the hazard analysis and risk assessment.
2023 California State Hazard Mitigation Plan	Describes hazards that informed the hazard analysis and risk assessment.
California's Fifth Climate Change Assessment (2026)	Describes the modeling and analysis of climate hazards and impacts that inform hazard identification and risk assessment.
Glendale Water and Power Integrated Resource Plan (2024)	Used to assess the capability assessment related to electricity demand and needs.
Glendale Adopted Budget Fiscal Year 2025-2026	Used to inform the mitigation actions.
Glendale Capital Improvement Program 2025-2026	Used to inform mitigation action priorities.
Glendale Climate Action and Adaptation Plan (2025)	Used to inform the hazard assessment, risk assessment, identification of vulnerable populations, and capability needs.
Glendale Code of Ordinances	Used to inform the mitigation strategy by supporting existing mitigation efforts.
Glendale Urban Water Management Plan (2020)	Used to inform mitigation actions to address climate change.
Glendale Wildfire Mitigation Plan (2025)	Used to inform wildfire mitigation actions.
CalAdapt (Accessed 2026)	Used for the hazard analysis to identify hazard severity and behavior.

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3 Planning Area Description

The following section provides an overview of the City's planning area. It includes a description of the natural environment and population characteristics.

3.1 Location and Description

The City of Glendale is located at the southeastern edge of the San Fernando Valley, within and along the Verdugo Mountains, and is part of the larger Los Angeles metropolitan region. Glendale is situated on the traditional lands of the Gabrielino-Tongva people, who established villages throughout the region and stewarded its natural resources for millennia prior to European contact. In the Spanish and Mexican periods, much of present-day Glendale was part of the Rancho San Rafael, a 36,403-acre land grant originally awarded in 1784 to José María Verdugo (City of Glendale, n.d.).

The City of Glendale was incorporated in 1906 and experienced substantial growth during the early 20th century, spurred by rail access such as the Pacific Electric Railway, and later by the expansion of the regional highway system. Today, Glendale is served by a well-developed regional transportation network. Major freeways include State Route 134 (Ventura Freeway), State Route 2 (Glendale Freeway), Interstate 5 (Golden State Freeway) and Interstate 210 (Foothill Freeway). Key arterial streets include Brand Boulevard, Central Avenue, Pacific Avenue, and Verdugo Road which run north to south, while Broadway, Colorado Street, Glenoaks Boulevard, and San Fernando Road run east to west, connecting residential areas with major commercial centers and the regional freeway network. Rail, bus, and shuttle transit services also link Glendale to Los Angeles and surrounding communities.

Glendale has a residential population of approximately 190,748 residents (U.S. Census ACS 5-Year Estimates: 2020-2024) and functions as a major employment and activity center within Los Angeles County, with significant regional retail, office, healthcare, and entertainment-related uses. According to the 2026 Draft Land Use Element, Glendale consists of 35 square miles and is approximately 42 percent residential, two percent commercial, one percent industrial, and 36 percent public land, and two percent "special use", which includes cemeteries, specific plan areas, and City-owned residential sites (Draft Land Use Element of Revised General Plan, 2026).

Glendale is also home to several major educational, cultural, and civic institutions, including Glendale Community College, Woodbury University, the Alex Theatre, Brand Library and Art Center, the Museum of Neon Art, and Forest Lawn Memorial Park, a nationally recognized cultural and memorial site. Glendale is known locally as the "Jewel City" and functions as a significant center for retail, offices, entertainment-related businesses, and regional visitor activity within Los Angeles County. The city has over six million square feet of office space and is home to firms such as Walt Disney Imagineering, ServiceTitan, IHOP/Applebee's, DreamWorks, LegalZoom, and Public Storage.

3.2 Geology

The City of Glendale is located at the boundary between two of Southern California's geomorphic provinces, in an area that is being compressed by geological forces associated with movement on the Pacific and North American tectonic plates. In the Glendale area, the main faults include the Sierra Madre, the Verdugo and the Raymond faults.

The Sierra Madre fault is a reverse fault that extends across the northern portion of the city, at the base of the San Gabriel Mountains. A portion of the Sierra Madre fault extending through Glendale is zoned under the Alquist-Priolo Earthquake Fault Zoning Act. Geologic evidence indicates that the Verdugo Fault extends across the central portion of the City and exhibits left-lateral strike-slip movement, similar to the Raymond fault, which is located immediately south of the city (City of Glendale General Plan Safety Element, 2025).

3.3 Climate

The City of Glendale has a Mediterranean climate. Average daytime temperatures range from approximately 67°F in winter months to 88°F in summer, while average nighttime low temperatures range from about 47°F in winter to 66°F in summer. Glendale's highest recorded temperature reached approximately 109°F on September 27, 2020, while the record low temperature of 35°F was recorded on December 31, 1913. Average annual precipitation is approximately 12 inches,

with the most rainfall occurring between November and March. Winter conditions are generally mild, with cool nights and periodic storm events; snowfall is extremely rare within the city, although trace snowfall has been observed historically during exceptional cold storms. Glendale experiences periodic extreme heat waves, particularly during late summer and early fall, which have increased in frequency and duration in recent decades. The combination of seasonal drought conditions, low humidity, periodic Santa Ana wind events, and the city's extensive open space and hillside areas creates elevated wildfire risk, particularly during late summer and fall months.

3.4 History

The City of Glendale is in Tovaangar, the home and traditional lands of the Gabrielino-Tongva people, who have lived in this area and been stewards of this land for thousands of years, and continue to grow and flourish (City of Glendale CAAP, 2024). During the Spanish colonial period beginning in the late 18th century, Indigenous lands were appropriated through the mission and rancho system. In 1798, Rancho San Rafael, a Spanish land grant, was established by José María Verdugo on Tongva ancestral territory. Following American acquisition of California and subsequent legal proceedings, the Rancho was dissolved through a series of subdivisions and the "Great Partition" of 1871, and smaller parcels were developed for agricultural and residential uses (City of Glendale, n.d.).

The Town of Glendale was formally platted in 1887, and the City was incorporated in 1906. Glendale expanded significantly during the first half of the 20th century through multiple annexations, growing from approximately 1,486 acres at incorporation to 31 square miles today, including foothill and mountainous areas such as the Verdugo Mountains and what is now the George Deukmejian Wilderness Park. Glendale's development occurred through the establishment of numerous residential neighborhoods, which together form the modern city. The area is currently divided into neighborhoods and census tracts used for planning and statistical purposes (City of Glendale, n.d.).

3.5 Government

Glendale has a Council-Manager form of government. Five council members are elected that represent the community city-wide to four-year terms and serve as the City's legislative body. The mayor, selected from among the councilmembers, presides over Council meetings, performs ceremonial duties, and retains the same authority as other members of the City Council. The City Council appoints a City Manager, who is responsible for day-to-day administration of City operations and coordination of municipal services, including emergency management and hazard mitigation activities.

3.6 Economy

Glendale has a diverse local economy with employment across a wide range of sectors, including professional and business services, retail and wholesale trade, manufacturing, construction, transportation, healthcare and social assistance, education, hospitality, entertainment, and public administration. Approximately 92,300 residents are employed across a broad mix of industries. According to 2019-2023 American Community Survey-based estimates, the employed population aged 16 years and older is distributed as follows: approximately 52 percent in management, professional, and related occupations; 15 percent in service occupations; 21 percent in sales and office occupations; 7 percent in production, transportation, and material-moving occupations; and 5 percent in construction, extraction, and maintenance occupations (U.S. Census Bureau, 2020-2024 ACS).

3.7 Demographics

Table 4 shows the ethnic composition of Glendale's population. While a majority of the city's population identify as White (65.1%), 34 percent is of Armenian descent, presenting unique cultural and equity considerations. The next largest racial group is Asian (12.9%), followed by "some other race" (10.5%), "two or more races" (9.3%), Black and African American (1.5%), American Indian and Alaskan Native (0.6%) and Native Hawaiian and Pacific Islander (0.1%). Just under a fifth of the population is of Hispanic origin.

Table 4 Race and Ethnicity

Race/Ethnicity	Glendale		Los Angeles County	
	Number	Percent	Number	Percent
White	124,135	65.1%	3,025,998	30.9%
Black and African American	2,792	1.5%	751,615	7.7%
American Indian and Alaskan Native	1,199	0.6%	141,639	1.4%
Asian	24,634	12.9%	1,486,983	15.2%
Native Hawaiian and Pacific Islander	200	0.1%	22,609	0.2%
Some Other Race	20,072	10.5%	2,428,851	24.8%
Two or More Races	17,716	9.3%	1,950,972	19.9%
Total	190,748	100%	9,808,667	100%
Hispanic Origin (of any race)	34,620	18.1%	4,752,274	48.4%

Source: U.S. Census Bureau, American Community Survey 5-Year Estimates 2019-2023. Hispanic or Latino persons are not counted as a separate racial or ethnic category; persons who identify as Hispanic or Latino are also included in other racial or ethnic categories.

3.8 Land Use

Glendale's General Plan Land Use Element (1986) is based on a series of goals that indicate the purpose served by planning in Glendale. The Land Use Element Goals are:

1. Effectuate a moderate growth policy for the City of Glendale consistent with community needs, available services and the environment.
2. Reinforce Glendale's image and community identity within the greater Los Angeles area metropolitan complex.
3. Form an urban environment which will provide for residential diversity and opportunity.
4. Improve livability of the total community for all Glendale residents as expressed in living, working and shopping areas, as well as community facilities.
5. Promote development and improvement within the community capitalizing on the location of, and access to, Glendale as adjacent to the regional core. Establish a basis for discussion and policy formulation concerning problems of physical development.
6. Provide measures to prevent the loss of life, injury, and economic dislocation resulting from fire, flood, and geologic hazards.

The General Plan is broken out into the following land uses:

1. Very Low Density/Open Space - Provides for rural residential development and open space uses in mountainous and hillside areas at densities of approximately 1 to 3 dwelling units per acre.
2. Low Density - Provides for low-intensity single-family residential development in established neighborhoods at densities of approximately 1 to 8 dwelling units per acre.
3. Moderate Density - Provides for townhouse and garden apartment development at densities of approximately 8 to 25 dwelling units per acre, often serving as a transition between higher- and lower-intensity land uses.
4. Medium Density - Provides for medium-scale multi-family residential development, primarily garden-style apartments, at densities of approximately 25 to 35 dwelling units per acre.
5. High Density - Provides for high-intensity multi-family residential development, including large apartment complexes, at densities of approximately 35 to 60 dwelling units per acre.
6. Commercial Centers and Development Districts - Provides for regional, community, and neighborhood-serving commercial retail and service uses distributed throughout the city.
7. Light Industrial - Provides for limited manufacturing, assembly, and warehousing activities, generally located along major transportation corridors to minimize conflicts with surrounding land uses.
8. Restricted Industrial - Provides for industrial uses with greater operational constraints, oriented toward freeway access and arterial roadways and planned to reduce potential impacts on adjacent residential and commercial areas.

9. Recreation/Open Space - Provides for publicly and privately owned recreation and open space uses, including parks, golf courses, and natural hillside areas, with larger concentrations located in the Verdugo Mountains, San Rafael Hills, and designated recreational corridors.
10. Specialized Use - Includes parks, schools, cemeteries, historic sites, and other institutional or specialized commercial uses identified separately from standard residential and commercial designations.

Table 5 Land Use Designations

Land Use Designation	General Plan Acres	Percent of Total Acres
Residential		
Very Low Density/Open Space	1,864	9.5%
Low Density	5,081	25.9%
Moderate Density	339	1.7%
Medium Density	1,079	5.5%
High Density	529	2.7%
Subtotal	8,892	45.3
Commercial	824	4.2%
Light Industrial	545	2.8%
Restricted Industrial	206	1.0%
Recreation/Open Space	5,163	26.3%
Cemetery	112	0.5%
Net Developable Area	15,742	80.3%
Streets & Rights-of-Way	3,839	19.6%
Total	19,581	100%

Source: City of Glendale General Plan Land Use Element Adopted March 25, 1986

The City is currently updating its Land Use Element as part of a comprehensive General Plan revision. The proposed update is expected to include revised goals, land use designations, and distribution patterns that reflect contemporary planning priorities. Until formally adopted, the 1986 Land Use Element remains in effect. This Hazard Mitigation Plan recognizes that land use policies are in transition and future mitigations and implementation will be coordinated with the updated Land Use Element upon adoption to maintain alignment between development matters and hazard mitigation objectives.

3.9 Change in Development

Development patterns in Glendale over the past five years reflect incremental infill and redevelopment within the existing urbanized area, rather than expansion into undeveloped land. New residential and mixed-use development has been directed toward established corridors, downtown, and areas with existing infrastructure capacity, while lower-density hillside neighborhoods and open-space areas have largely remained stable (City of Glendale Housing Element, 2022). This pattern represents a shift toward increased residential density in targeted locations, including the reuse of underutilized commercial sites, while limiting new development in environmentally constrained areas such as steep slopes and hillside fire-prone areas (City of Glendale Safety Element, 2025). As a result, recent development has the potential to increase exposure to hazards such as earthquakes, flooding, and extreme heat in higher-density infill areas, while avoiding new exposure in areas subject to wildfire and slope instability.

In accordance with adopted land use and housing policies, future development in the Glendale Planning Area is anticipated to continue within the existing city footprint, with growth focused on infill sites, transit-accessible corridors, and mixed-use districts that can accommodate higher densities (City of Glendale Housing Element, 2022). The City anticipates increased residential intensity and population growth in designated areas, supported by infrastructure and proximity to services, while maintaining development limitations in hillside areas and other locations subject to natural hazards (City of Glendale Safety Element, 2025).

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4 Hazard Identification

4.1 Introduction

This Risk Assessment identifies the hazards that can affect Glendale. It analyzes each of these hazards with respect to: where each hazard might affect the planning area (location); its potential magnitude (extent); how often events have happened in the past (previous occurrences); how likely they are to occur in the future (future probability); what parts of the community are most likely to be affected (vulnerability); and the potential consequences (impacts). Section 4 provides a description of the hazards. Section 5 describes Glendale's vulnerability and potential impacts from the hazards.

4.2 Hazard Identification and Analysis

Hazard Identification

A hazard analysis involves identifying potential hazards, evaluating their relevance, and describing their characteristics. This process considers both natural and humanmade hazards. Natural hazards arise from unpredictable or uncontrollable environmental events with significant scale and destructive potential. Humanmade hazards stem from human actions, which are typically accidental or occur due to unintended consequences, such as a chemical leak from an underground storage tank caused by corrosion or equipment failure.

Identifying hazards of concern is the first step in developing mitigation to reduce or eliminate impacts from these events. Mitigation efforts aim to lessen the future impacts of hazards, including fatalities, property damage, economic disruption, and the costs associated with recovery. For the 2026 LHMP, a preliminary list of hazards of concern was developed through a document review crosswalk (Table 6). The Planning Team, HMPC, and community then evaluated the likelihood of an event occurring and the impact if the event should occur, both on a scale of High, Medium, and Low as defined in Table 7. The results of this prioritization are shown in the Hazard Prioritization Matrix (Table 8). The results of the Hazard Prioritization Matrix were used to determine which hazards should be included in the LHMP and to assess their overall risk.

Hazard Screening Criteria

Per FEMA Guidance, the first step in developing the Risk Assessment is identifying the hazards. The HMPC reviewed the previous LHMP and other relevant documents to determine the hazards with the greatest probability and highest impact to the community. Table 6 provides a crosswalk of hazards identified in the 2019 Glendale Local Hazard Mitigation Plan, the 2008 Glendale Emergency Plan, the 2025 General Plan Safety Element, the 2025 County of Los Angeles All Hazards Mitigation Plan, and the 2023 California State Hazard Mitigation Plan. It also includes hazards of concern identified by the HMPC as relevant to Glendale. There were 22 different hazards identified. The crosswalk was used to develop a preliminary hazards list for HMPC members to evaluate and identify which hazards were truly relevant to the city and community, as described in section 4.3 Hazard Risk Rating. For example, volcanic activity was considered to be of little relevance to the city while earthquake and wildfire were discussed in almost all hazard documentation. Hazards found to be most relevant to Glendale are further described in section 4.4 Hazard Profiles.

Table 6 Document Review Crosswalk

Hazards	City of Glendale Emergency Plan	2019 City of Glendale Local Hazard Mitigation Plan	2025 City of Glendale General Plan Safety Element	2025 County of Los Angeles All Hazard Mitigation Plan	2023 CA State Hazard Mitigation Plan	HMPC Meeting #1
Earthquake/ Geologic Hazards	X	X	X	X	X	
Wildfire	X	X	X	X	X	
Hazardous Materials	X	X	X		X	
Flood		X	X	X	X	
Terrorism		X	X		X	
Dangerous Animals and Plants			X			
Landslide		X			X	
Aviation Disaster		X				
Pandemic		X			X	
Vehicular Disaster		X		X	X	
Extreme Heat				X	X	X
Drought				X	X	
Dam Failure				X	X	
Tsunami				X	X	
Severe Wind and Tornado				X	X	
Mass Violence				X		
Cybersecurity				X	X	X
Public Health Emergencies				X		
Extreme Cold					X	
Air Pollution					X	
Extreme Wind						X
Social Unrest						X

In addition to reviewing existing plans, previous hazard occurrences were evaluated. These historic events offer important insight into the types of hazards that have impacted Glendale previously and provide insights on the likelihood of those events to occur again. Federal and State disaster declaration records from FEMA and Cal OES were compiled and summarized in each hazard profile (see Section 4.4) to document formally recognized events. While these declarations do not capture every incident since many events do not rise to the level of formal state or federal action, they offer a baseline for understanding the range and severity of hazards experienced by the city.

In determining what hazards to include in the LHMP, the HMPC and consulted stakeholders considered which hazards had the potential to impact public safety, public health, buildings, transportation, infrastructure, and critical facilities. The initial assessment of each hazard is based upon the following sources:

1. Historic occurrence of the hazard – considering how often an event has happened, its scale, and the degree of impact.
2. Expert opinion – incorporating professional judgment, prior studies, and insights from the Planning Team and HMPC.
3. Published data and information – referencing credible information from organizations such as the U.S. Geological Survey, California Geological Survey, and the National Weather Service

4.3 Hazard Risk Rating

The Planning Team utilized a non-numerical ranking system for the update process. This process consisted of generating a non-numerical ranking (High, Medium, or Low) for the 1) probability and 2) impact of each hazard that was not included in the previous LHMP, as well as those that had been previously included in the LHMP but currently have an uncertain probability or impact for Glendale. Table 7 below indicates how the hazards were ranked and the definition of “High,” “Medium,” and “Low” probability and impacts. Table 8 Planning Team Prioritization Responses shows the results of this ranking exercise with the HMPC, where red boxes represent the higher priority hazards; orange represents the medium priority, and yellow boxes represent lowest level of priority. Based on this ranking exercise, the high priority hazards of concern are Drought and Water Shortage, Earthquake/Geologic Hazards, and Wildfire Activity.

The probability indicators are based on the likelihood of the event occurring based on history and trends. Events categorized as “highly likely” have either occurred in Glendale in the past and/or will inevitably happen again. Those events categorized as “Possible,” are events that are becoming a greater and a more common threat locally and nationally. These “Possible” events are unpredictable and may or may not ever occur in Glendale. These events can have a high impact on the city and warrant a proactive approach to preparation and mitigation. Events that are categorized as “Low” do not have a strong historical record of occurrence in Glendale and would result in having low impact to the city if they were to happen. Table 9 presents the summary of the hazards in Glendale, as well as their probabilities, impacts, and a brief description on how they could impact the city.

Table 7 Hazard Ranking Methodology

Probability	Impact
High – Highly Likely/Likely	High – Catastrophic/Significant
Medium – Possible	Medium – Limited
Low – Unlikely	Low – Negligible

Table 8 Planning Team Prioritization Responses

Glendale Hazard Assessment Matrix				
Probability		Impact		
		High	Medium	Low
	High	Extreme Heat Extreme Wind Wildfire Earthquake/Geologic Drought	Landslide Floods	
	Medium			
	Low	Humanmade Hazards (Hazardous materials, vehicular disaster, aviation disaster)	Dam Failure	

Community members were invited to participate in a hazard perception exercise during public outreach activities. Participants were asked to place colored dots on a board to indicate which hazards they believed would have the biggest impact on Glendale, categorizing each as low, medium, or high impact. A total of 33 responses were collected across seven hazard categories.

Community members identified wildfires, earthquakes, and hazardous materials as the primary hazards of concern, with wildfires receiving the most medium- to high-impact ratings, followed by earthquakes. Extreme wind and heat were more often rated as low to medium impact. While these perceptions generally align with past experience, the technical hazard assessment shows that extreme wind and heat are becoming more frequent and have documented impacts on infrastructure, utilities, public health, and emergency services. Accordingly, this plan includes mitigation actions to address extreme wind and heat in support of long-term risk reduction and resilience objectives.

Figure 1 Community Prioritization Responses



Hazard	History	Probability	Impact
Earthquake and Geologic Hazards	Yes	High	High
Wildfire	Yes	High	High
Drought	Yes	High	High
Flood and Dam Failure	Yes	High	Medium
Landslide	Yes	High	Medium
Extreme Weather, including extreme heat and extreme wind	Yes	High	High
Humanmade Hazards, including hazardous materials, vehicular disaster, and aviation disaster	Yes	Low	High

Hazards Evaluated and Not Included

Four potential hazards – terrorism, social unrest, cybersecurity threats, and pandemics – were evaluated during the planning process but ultimately not included in the 2026 LHMP. While the HMPC acknowledged that each presents a credible risk to Glendale, concerns were raised regarding the inclusion of potentially sensitive or confidential information in a publicly accessible document. Additionally, these hazards are already comprehensively addressed through other existing plans, policies, and programs, making their inclusion in this plan unnecessary.

4.4 Hazard Profiles

The hazards that were selected for inclusion by the Planning Team and HMPC are profiled below. Each hazard profile includes a description of the type, location, extent, previous occurrences, regulatory environment, and probability of future events within the description. Maps and graphs are used in this plan to display hazard identification data. The 2026 LHMP lists seven hazards that affect the planning area based on historical information, the potential impacts of the hazard, and the likelihood of future occurrences of the hazard. Hazard profiles serve as the basis for the hazard risk assessment in Section 5.

4.4.1 Earthquakes

Hazard Description

While Glendale is at risk for many natural and man-made hazards, an earthquake is the event with the greatest potential for far-reaching loss of life or property, and economic damage. This is true for most of southern California, since damaging earthquakes are frequent, affect widespread areas, trigger many secondary effects, and can overwhelm the ability of local jurisdictions to respond. Earthquake-triggered geologic effects include ground shaking, liquefaction, surface fault rupture, subsidence, expansive soils, and landslides. Earthquakes can also trigger human-made hazards such as urban fires, dam failures, and toxic chemical releases.

Ground Shaking

Ground shaking is the motion felt on the earth's surface caused by seismic waves generated by the earthquake. It is the primary cause of earthquake damage and is typically reported as the peak horizontal ground acceleration estimated as a percentage of **g**, the acceleration of gravity. Full characterization of shaking potential, though, requires estimates of peak (maximum) ground displacement and velocity, the duration of strong shaking, and the periods (lengths) of waves that will control each of these factors at a given location. The strength of ground shaking also depends on the source, path, and site effects.

Liquefaction

Liquefaction typically occurs within the upper 50 feet of the surface, when saturated, loose, fine- to medium-grained soils (sand and silt) are present. Earthquake shaking suddenly increases pressure in the water that fills the pores between soil grains, causing the soil to lose strength and behave as a liquid. This process can be observed at the beach by standing on

the wet sand near the surf zone. Standing still, the sand will support your weight. However, when you tap the sand with your feet, water comes to the surface, the sand liquefies, and your feet sink.

Liquefaction-related effects include loss of bearing strength, ground oscillations, lateral spreading, and flow failures or slumping. The excess water pressure is relieved by the ejection of material upward through fissures and cracks. When soils liquefy, the structures built on them can sink, tilt, and suffer significant structural damage. Buildings and their occupants are at risk when the ground can no longer support the buildings.

Surface Fault Rupture

The break or fracture between moving blocks of rock is called a fault, and such differential movement produces a fault rupture. The place where the fault first ruptures is called the focus (or hypocenter). The released energy waves radiate out in all directions from the ruptured surface, making the earth vibrate and shake as the waves travel through. Faults have formed over millions of years, usually in response to regional stresses. Active faults show proven displacement of the ground surface within about the last 11,000 years (within the Holocene Epoch) and are capable of producing earthquakes. Potentially active faults show evidence of movement within the last 1.6 million years, but have not been shown conclusively to have moved in the last 11,000 years. Not active faults have conclusively not moved in the last 11,000 years. Surface fault rupture typically results in a relatively small percentage of the total damage in an earthquake, yet being too close to a rupturing fault can result in extensive damage. It is difficult to safely reduce the effects of this hazard through building and foundation design.

Subsidence

Ground subsidence refers to the downward movement of the earth's surface, typically with minimal horizontal displacement. While natural processes can contribute to subsidence, it is most commonly the result of human activity, particularly the removal of subsurface fluids such as oil, gas, or groundwater. In Southern California, areas including Antelope Valley, Murrieta, and Wilmington have experienced measurable ground sinking linked to long-term fluid extraction. When groundwater is pumped from underground aquifers, the fine-grained sediments, especially clay layers, that once relied on water pressure for structural support begin to compact. In clay-rich soils, this compaction is frequently permanent, meaning lost storage capacity cannot be recovered even if water levels are later restored. The surface consequences of this process can include the formation of earth fissures, localized sinkholes, ground depressions, and changes to natural drainage patterns. Infrastructure most vulnerable to these effects includes canals, levees, pipelines, and drainage systems, though significant subsidence events can extend damage to buildings, roads, wells, and other improvements. Effective management of local water supplies through reduced groundwater pumping, importation of surface water, and artificial aquifer recharge has proven successful in slowing or stabilizing subsidence in many affected California communities (Johnson, 1998; Stewart et al., 1998).

Expansive Soils

Expansive soils are fine-grained soils with variable amounts of clay minerals that can undergo significant volumetric changes as a result of changes in moisture content. The upward pressures induced by the swelling can have significant harmful effects upon structures and other surface improvements.

Landslides

Earthquake-induced landslides and rockfalls are secondary earthquake hazards that occur from ground shaking. Gravity pulls hillsides down, and earthquake shaking enhances this ongoing process. Landslides and rockfalls can destroy the roads, buildings, utilities, and other critical facilities necessary to respond and recover from an earthquake. Many communities in southern California with steep slopes have a high likelihood of being impacted by landslides. Landslides are discussed in further detail in Section 4.4.4, Landslides.

History

Since seismologists started recording and measuring earthquakes, there have been tens of thousands of recorded earthquakes in southern California, most with a magnitude below 3.0. Figure 2 shows the historical seismicity in the immediate vicinity of Glendale. The map shows that small earthquakes, of magnitude between 1 and 3, have occurred historically in the area, but that no moderate to large earthquakes have occurred beneath Glendale in historical times. Nevertheless, these recordings show that only the easternmost portion of southern California may be beyond the reach of

a damaging earthquake. Table 10 lists the moderate to large historical earthquake events that have affected southern California. The most significant of these events based on their felt effects in Glendale are summarized in the next pages.

Figure 2 Historical Seismicity Map (1855-2002)

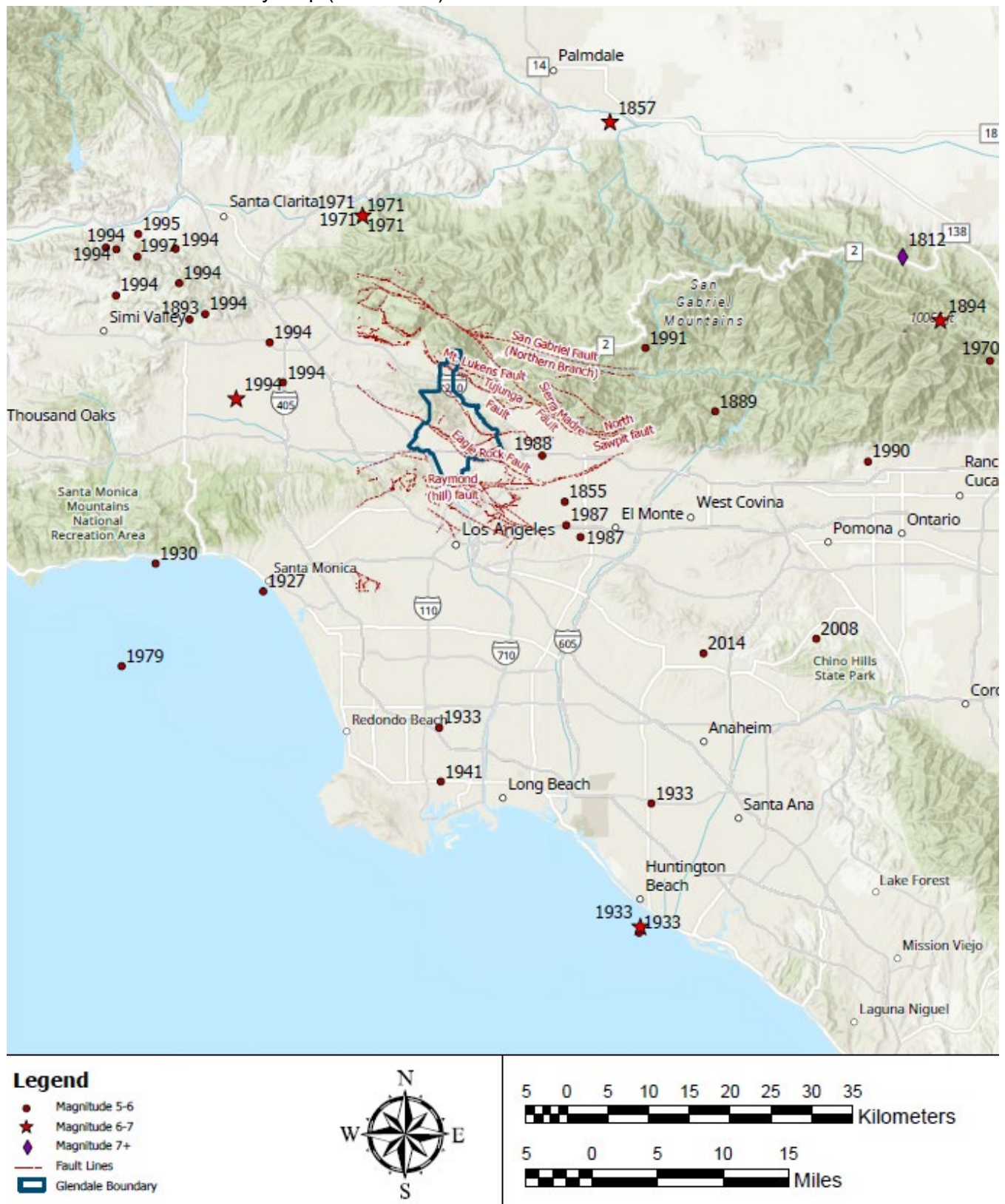


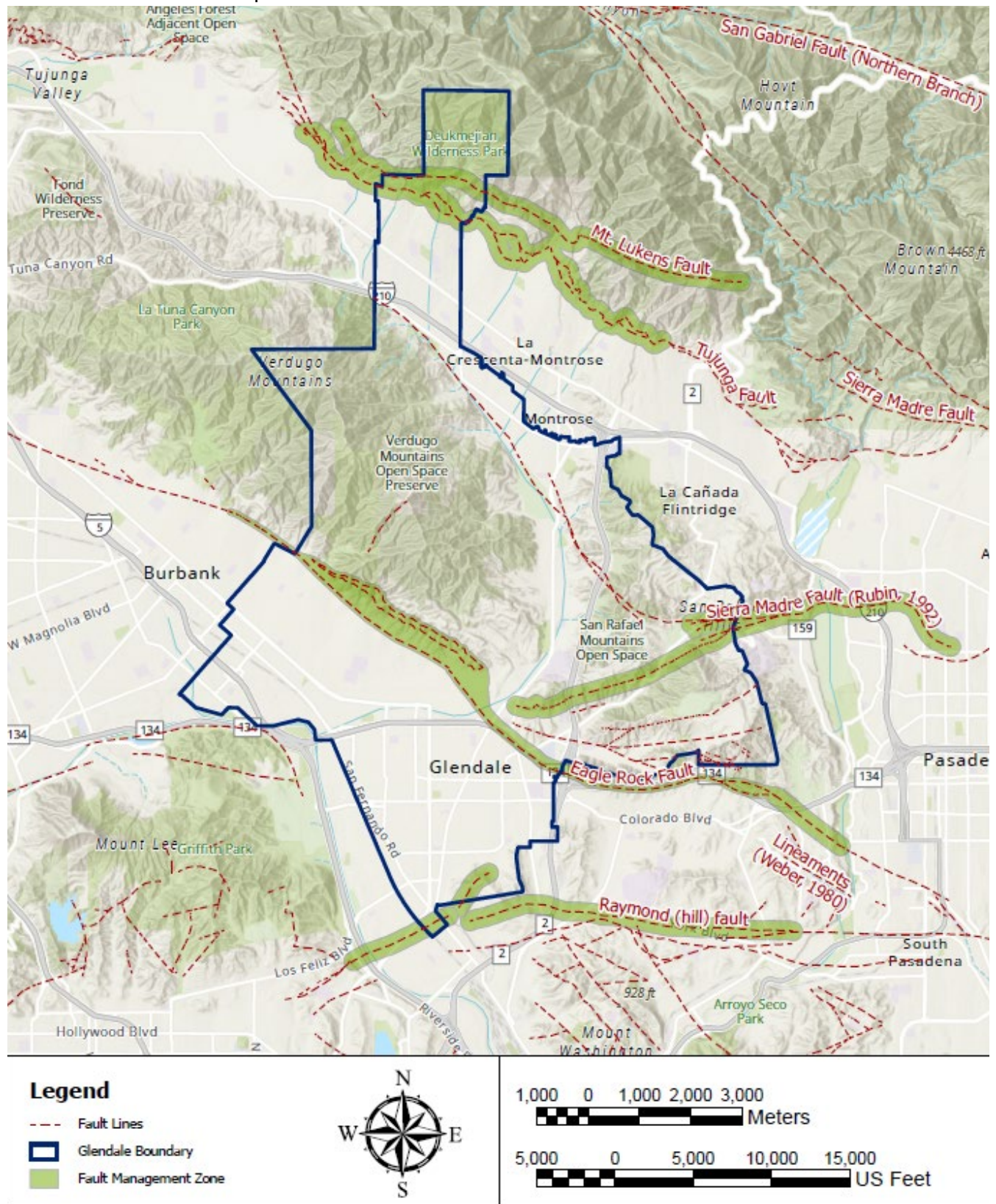
Table 10 Historical Earthquakes in the Southern California Region with Magnitude > 5

Year	Region	Year	Region
1769	Los Angeles Basin	1933	Long Beach
1800	San Diego Region	1941	Carpinteria
1812	Wrightwood	1952	Kern County
1812	Santa Barbara Channel	1954	West of Wheeler Ridge
1827	Los Angeles Region	1971	San Fernando (Sylmar)
1855	Los Angeles Region	1973	Point Mugu
1857	Great Fort Tejon Earthquake	1979	Malibu
1858	San Bernardino Region	1986	North Palm Springs
1862	San Diego Region	1987	Whittier Narrows
1892	San Jacinto or Elsinore Fault	1988	Pasadena
1893	Pico Canyon	1989	Malibu
1894	Lytle Creek Region	1991	Sierra Madre
1894	San Diego Region	1992	Landers and Big Bear
1899	Lytle Creek region	1992	Big Bear
1899	San Jacinto and Hemet	1994	Northridge
1907	San Bernardino region	1999	Hector Mine
1910	Glen Ivy Hot Springs	2001	West Hollywood
1916	Teion Pass Region	2010	Borrego Springs
1918	San Jacinto	2014	South Napa
1923	San Bernardino Region	2019	Garlock (Ridgecrest)
1925	Santa Barbara		

Location

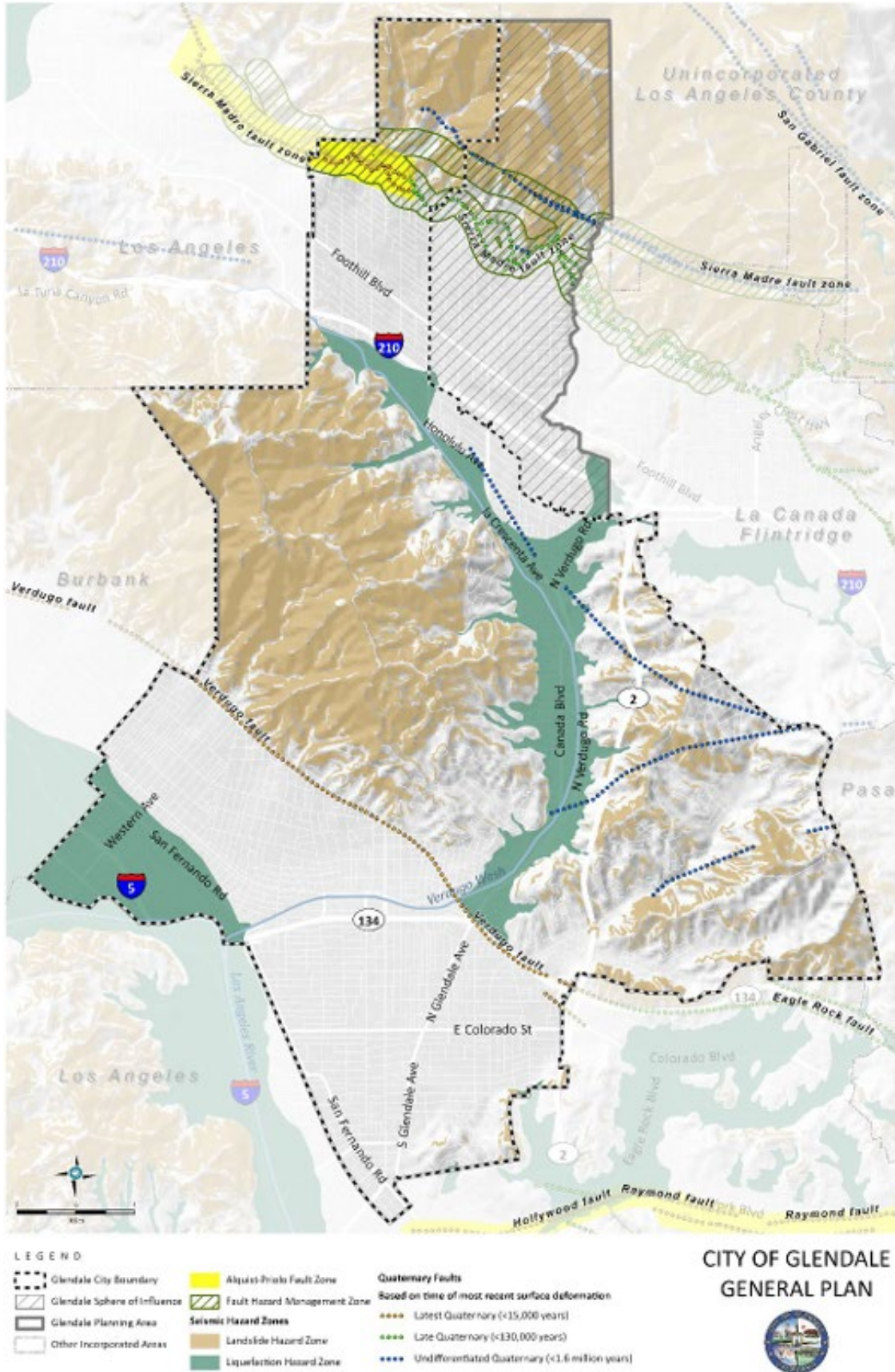
The three faults with the greatest potential to impact the City of Glendale are the Verdugo, Sierra Madre, and Raymond Faults (Figure 3 and Figure 4). The Verdugo Fault represents the worst-case scenario for the city due to it being a 13- to 19-mile long fault capable of generating magnitude 6.0 to 6.8 earthquakes located directly below extensively developed portions of Glendale. The Sierra Madre Fault zone runs along the northern portion of the city and is capable of generating earthquakes of magnitude 7.2 to 7.6, which could generate significantly stronger peak ground accelerations, especially in the northern portion of the city. The Raymond Fault, a left-lateral strike-slip fault, extends through the southern reaches of Glendale and a conservative magnitude 6.5 earthquake on this fault would generate peak ground accelerations of about 0.55g and seismic intensities in the VII to X range in the Glendale area. A rupture of any of these three faults has the potential to severely impact the city.

Figure 3 Plate 1-2 Fault Map Glendale



Fault Map Glendale, California

City of Glendale
City of Glendale Local Hazard Mitigation Plan
Figure 4 Plate P-1 Seismic Hazards



Extent

When comparing the sizes of earthquakes, the most meaningful feature is the amount of energy released. Thus, scientists most often consider **seismic moment**, a measure of the energy released when a fault ruptures. However, most people are more familiar with scales of **magnitude**, which measure amplitude of ground motion. Magnitude scales are logarithmic, meaning each one-point increase in magnitude represents a ten-fold increase in amplitude of the waves as measured at a specific location, and a 32-fold increase in energy. For example, a magnitude 7 earthquake produces 100 times (10×10) the ground motion amplitude of a magnitude 5 earthquake. Similarly, a magnitude 7 earthquake releases approximately 1,000 times more energy (32×32) than a magnitude 5 earthquake. Most people are most familiar with the Richter magnitude scale which is a subjective assessment of the intensity of shaking observed near the epicenter of an earthquake. Although this scale is no longer used by scientists, it is still commonly used in popular reporting. Recently, scientists have developed the **moment magnitude (M_w)** scale to relate energy release to magnitude. An example of the difference is the Loma Prieta earthquake of 1989, which had a moment magnitude of 6.9. This is an energy equivalent slightly less than 4 billion pounds of TNT.

An early measure of earthquake size still used today is the seismic **intensity scale**, which is a qualitative assessment of an earthquake's effects at a given location. Although it has limited scientific application, intensity is still widely used because it is intuitively clear and quick to determine. The most commonly used measure of seismic intensity is called the Modified Mercalli Intensity (MMI) scale, which has 12 damage levels (Table 11).

A given earthquake will have one moment and, in principle, one magnitude, although there are several methods of calculating magnitude, which give slightly different results. However, one earthquake will produce much intensity because intensity effects vary with the location and perceptions of the observer. As an example, the Loma Prieta earthquake had an MMI of VIII (Severe) across much of the area near the epicenter, but portions of San Francisco experienced an MMI of IX (Violent).

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Table 11 Abridged Modified Mercalli Intensity Scale

Intensity Value and Description	Average Peak Velocity (cm/sec)	Average Peak Acceleration (g ± 1σ)
I. Not felt except by a very few under especially favorable circumstances (I Rossi-Forel scale). Damage potential: None.	<0.1	<0.0017
II. Felt only by a few persons at rest, especially on the upper floors of high-rise buildings. Delicately suspended objects may swing. <i>II to II Rossi-Forel scale</i>). Damage potential: None.	0.1–1.1	0.0017–0.014
III. Felt quite noticeably indoors, especially on upper floors of buildings, but many people do not recognize it as an earthquake. Standing automobiles may rock slightly. Vibration like passing of truck. Duration estimated. <i>(III Rossi-Forel scale)</i> . Damage potential: None.	0.1–1.1	0.0017–0.014
IV. During the day felt indoors by many, outdoors by few. At night some awakened. Dishes, windows, doors disturbed; walls make creaking sound. Sensation like a heavy truck striking building. Standing automobiles rocked noticeably. <i>(IV to V Rossi-Forel scale)</i> . Damage potential: None. Perceived shaking: Light .	1.1–3.4	0.014–0.039
V. Felt by nearly everyone; many awakened. Some dishes, windows, and so on broken; cracked plaster in a few places; unstable objects overturned. Disturbances of trees, poles, and other tall objects sometimes noticed. Pendulum clocks may stop. <i>(V to VI Rossi-Forel scale)</i> . Damage potential: Very light. Perceived shaking: Moderate .	3.4–8.1	0.039–0.092
VI. Felt by all; many frightened and run outdoors. Some heavy furniture moved; few instances of fallen plaster and damaged chimneys. Damage slight. <i>(VII to VII Rossi-Forel scale)</i> . Damage potential: Light. Perceived shaking: Strong .	8.1–16	0.092–0.18
VII. Everybody runs outdoors. Damage negligible in buildings of good design and construction; slight to moderate in well-built ordinary structures; considerable in poorly built or badly designed structures; some chimneys broken. Noticed by persons driving cars. <i>(VIII Rossi-Forel scale)</i> . Damage potential: Moderate. Perceived shaking: Very strong .	16–31	0.18–0.34
VIII. Damage slight in specially designed structures; considerable in ordinary substantial buildings with partial collapse; great in poorly built structures. Panel walls thrown out of frame structures. Fall of chimneys, factory stacks, monuments, and walls. Heavy furniture overturned. Sand and mud ejected in small amounts. Changes in well water. Persons driving cars disturbed. <i>(VIII+ to IX Rossi-Forel scale)</i> . Damage potential: Moderate to Heavy . Perceived shaking: Severe .	31–60	0.34–0.65
IX. Damage considerable in specially designed structures; well-designed frame structures thrown out of plumb; great in substantial buildings with partial collapse. Buildings shifted off foundations. Ground cracked conspicuously. Underground pipes broken. <i>(IX Rossi-Forel scale)</i> . Damage potential: Heavy. Perceived shaking: Violent .	60–116	0.65–1.24
X. Some well-built wooden structures destroyed; most masonry and frame structures destroyed; ground badly cracked. Rails bent. Landslides considerable from river banks and steep slopes. Shifted sand and mud. Water splashed, slopped over banks. <i>(X Rossi-Forel scale)</i> . Damage potential: Very heavy. Perceived shaking: Extreme .	>116	>1.24
XI. Few, if any, (masonry) structures remain standing. Bridges destroyed. Broad fissures in ground. Underground pipelines completely out of service. Earth slumps and land slips in soft ground. Rails bent greatly.	>116	>1.24
XII. Damage total. Waves seen on ground surface. Lines of sight and level distorted. Objects thrown into air.	>116	>1.24

Modified from Bolt (1999); Wald et al. (1999).

Probability of Future Events

As Glendale is in a seismically active area, the probability of future seismic events is highly likely. Seismic shaking is the seismic hazard that has the greatest potential to severely impact Glendale given the city's proximity to several active seismic sources (faults). To give the planning team a better understanding of the hazard posed by these faults, Earth Consultants International performed a deterministic seismic hazard analysis as part of the 2011 LHMP to estimate the Peak Horizontal Ground Accelerations (PHGA) that can be expected at Glendale's City Center due to earthquakes occurring on any of the known active or potentially active faults within 100 km (62 miles) from the city. The consultant also conducted probabilistic seismic hazard analyses to estimate the median PHGA at twelve different sites throughout

the city. Those faults that, based on the ground shaking analyses described above, can cause peak horizontal ground accelerations of about 0.1g or greater (Modified Mercalli Intensities greater than VII) in the Glendale area are listed in Table 10. For a map showing most of these faults, refer to Figure 3.

Table 12 below shows:

- The closest approximate distance, in miles and kilometers, between Glendale's City Hall and each of the main faults considered in the deterministic and probabilistic analyses;
- the maximum magnitude earthquake (Mmax) each fault is estimated capable of generating;
- the intensity of ground motion, expressed as a fraction of the acceleration of gravity (g), that could be experienced in the Glendale area if the Mmax occurs on one of these faults; and
- the Modified Mercalli seismic Intensity (MMI) values estimated to be felt in the city because of the Mmax on each one of these faults.
- Abbreviations: mi - miles; km - kilometers; Mmax - maximum magnitude earthquake; PGA - peak ground acceleration as a percentage of g, the acceleration of gravity; MMI - Modified Mercalli Intensity.

Table 12 Estimated Horizontal Peak Ground Accelerations and Seismic Intensities in the Glendale Area

Fault Name	Distance to Glendale (mil)	Distance to Glendale (km)	Magnitude of Mmax *	PGA (g) from Mmax	MMI from Mmax
Verdugo	<1	<1	6.7	0.61	X
Hollywood	<2	~1	6.4	0.55	X
Raymond	<2	~1	6.5	0.55	X
Sierra Madre	5	9	7.0	0.46+	X
Elysian Park Thrust	6	10	6.7	0.38	IX
Sierra Madre (San Fernando)	9	15	6.7	0.28	IX
Santa Monica	10	16	6.6	0.25	IX
Newport-Inglewood	11	17	6.9	0.24	IX
Compton Thrust	12	19	6.8	0.25	IX
San Gabriel	12	19	7.0	0.23	IX
East Oak Ridge (Northridge)	12	20	6.9	0.26	IX
Clamshell-Sawpit	13	21	6.5	0.20	VIII
Malibu Coast	17	28	6.7	0.18	VIII
Whittier	17	28	6.8	0.16	VIII
Santa Susana	19	30	6.5	0.16	VIII
San Jose	21	33	6.5	0.14	VIII
Palos Verdes	21	34	7.1	0.16	VIII
Holser	24	39	6.5	0.13	VIII
Cucamonga	27	43	7.0	0.15	VIII
Chino-Central Avenue	27	44	6.7	0.13	VIII
Anacapa-Dume	28	45	7.3	0.17	VIII
San Andreas (1857 Rupture)	29	46	7.8	0.18	VIII
San Andreas - Mojave	29	46	7.1	0.12	VII
Oakridge (Onshore)	31	49	6.9	0.13	VIII
Simi-Santa Rosa	33	53	6.7	0.11	VII
San Cayetano	36	57	6.8	0.11	VII

* The maximum earthquake sizes listed here are based on older fault data from the California Geological Survey. However, newer studies suggest that some faults, such as the Sierra Madre fault, may be capable of producing larger earthquakes than previously estimated. The ground shaking values (peak ground accelerations) were calculated using Blake's (2000a) deterministic analysis modeling software. In general, areas closer to a fault experience stronger shaking than areas farther away. This means the northern part of the city, which is closer to the Sierra Madre fault, could experience stronger shaking than the values shown here. Shaking intensity typically decreases with distance from the fault. However, local conditions, such as being on a ridge or certain soil types, can amplify seismic waves and result in stronger shaking in specific areas. Because of this, the values presented here should be considered averages. Actual shaking may be higher in some locations depending on site-specific conditions.

Impact of Climate Change

Seismic activity is driven entirely by geological forces and is not expected to be influenced by climate change in terms of frequency, magnitude, or severity. However, the secondary hazards associated with earthquakes, particularly landslides and slope instability, may become more pronounced as climate change contributes to more intense and variable precipitation patterns. Prolonged periods of heavy rainfall, such as those experienced during recent atmospheric river events, can significantly increase soil saturation and destabilize slopes, raising the likelihood of landslide occurrence. Similarly, more powerful El Niño cycles may deliver greater volumes of precipitation in concentrated periods, increasing erosion and ground instability even as the region trends toward drier overall conditions.

4.4.2 Wildfires

Hazard Description

Wildfire

The California Department of Forestry and Fire Protection (CAL FIRE) 2018 Strategic Plan defines wildfire as “an unplanned ignition; unwanted wildland fire including unauthorized human-caused fires, escaped wildland fire use events, escaped prescribed fire projects, and all other wildland fires where the objective is to put the fire out” (CAL FIRE, 2018).

Certain conditions must be present for significant fires to occur. The most common conditions include hot, dry, and windy weather; the inability of fire protection forces to contain or suppress the fire; the occurrence of multiple fires that overwhelm committed resources; and the presence of a large fuel load (dense flammable vegetation). Once a fire has started, several conditions influence its behavior. These include fuel, topography, weather conditions, how densely homes are built, how easy the area is to access, the materials used in construction (especially roofs and fire-resistant materials), and the availability of local fire protection measures such as nearby fire stations, hydrants, roads, defensible space, and fire sprinklers.

The climate and setting in Glendale contributes to the likelihood of fires. The large amounts of open space and wildland within and around Glendale make the city susceptible to wildfires year-round. Dried out vegetation from the hot summer months is exposed to Santa Ana wind conditions in the fall that, when combined with low humidity conditions, can trigger wildfires. Santa Ana winds become extremely erratic when combined with winds generated from burning vegetation and can stress fire-fighting resources and reduce fire-fighting success.

Glendale is a highly urbanized community, yet several large areas within the city consist of undeveloped grass- and chaparral-covered hillsides and mountains. In the city, the Verdugo Mountains rise more than 2,300 feet above the valley floor, the San Rafael Hills rise more than 1,200 feet above the alluvial plain, and the rough topography in both areas not only facilitates the spread of fire but also impedes the response of fire-fighting personnel and equipment access. In addition, wildfires pose a substantial hazard to life and property in communities built within or adjacent to hillsides and mountainous areas in the Wildland Urban Interface (WUI). The CAL FIRE 2018 Strategic Plan defines the Wildland Urban Interface (WUI) as “the line, area, or zone where structures and other human development meet or intermingle with undeveloped wildland or vegetative fuels” (National Wildfire Coordinating Group, 2018).

History

Several historical fires have impacted the Glendale area over the years, with the entire northern two-thirds of the city having burned at some time in the last 125 years. Hillside areas have a history of fires, with some areas experiencing a wildland fire at least once a decade (Figure 5 Historical Wildfire Events in Glendale). Glendale has not been included in any federal disaster declarations related to fire but has been included in a State emergency proclamation. Below is a list of the most notable fires that have impacted Glendale and surrounding region.

Proximal to Glendale

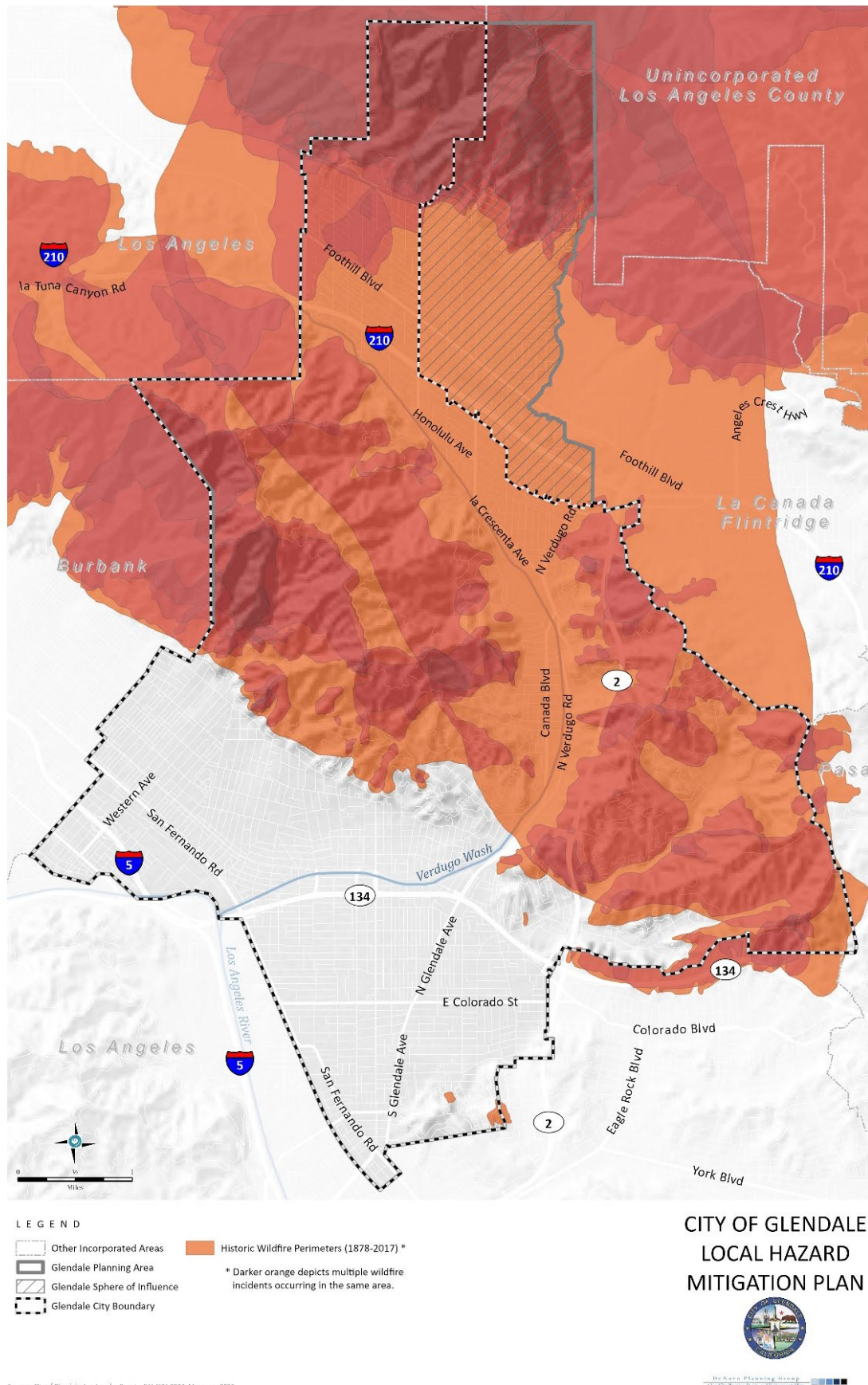
- **January 7, 2025 – The Eaton Fire** began in Eaton Canyon in the Altadena-Pasadena region amid hurricane-force Santa Ana winds. The fire burned over 14,000 acres, destroyed more than 9,400 structures, and resulted in 17 civilian fatalities, making it the deadliest wildfire in Los Angeles County history. The fire extent did not affect Glendale directly, but evacuation orders were issued for Glendale neighborhoods including Chevy Chase Canyon and Glenoaks Canyon. The Glendale Unified School District closed its schools for one week.

- **September 1, 2017 – The La Tuna Fire** burned 7,194 acres through the Verdugo Mountains, destroyed five homes, and caused the evacuation of 300 households. While not impacting Glendale directly, it was the largest fire ever recorded within the City of Los Angeles at the time and received a FEMA Fire Management Assistance declaration.

Within Glendale

- **August 26, 2009 – The Station Fire** burned 160,833 acres across the Angeles National Forest, burning into Glendale's wildland interface including Dunsmore Canyon, destroyed 89 residences regionwide, and threatened 12,000 structures. It remains the largest wildfire in Los Angeles County history
- **September 2002 – The Mountain Fire** burned approximately 749 acres on the southern slopes of the Verdugo Mountains above Glendale over two days in September 2002.
- **June 1990 – The College Hills Fire** burned 100 acres and destroyed 64 homes in the foothills of the San Rafael Hills and remains one of the most destructive fires within Glendale city limits.
- **1878–1980** – Historical records kept by the City and Los Angeles County indicate that significant acreage was impacted by fires in 1878, 1927, 1933, 1964, 1975, and 1980.

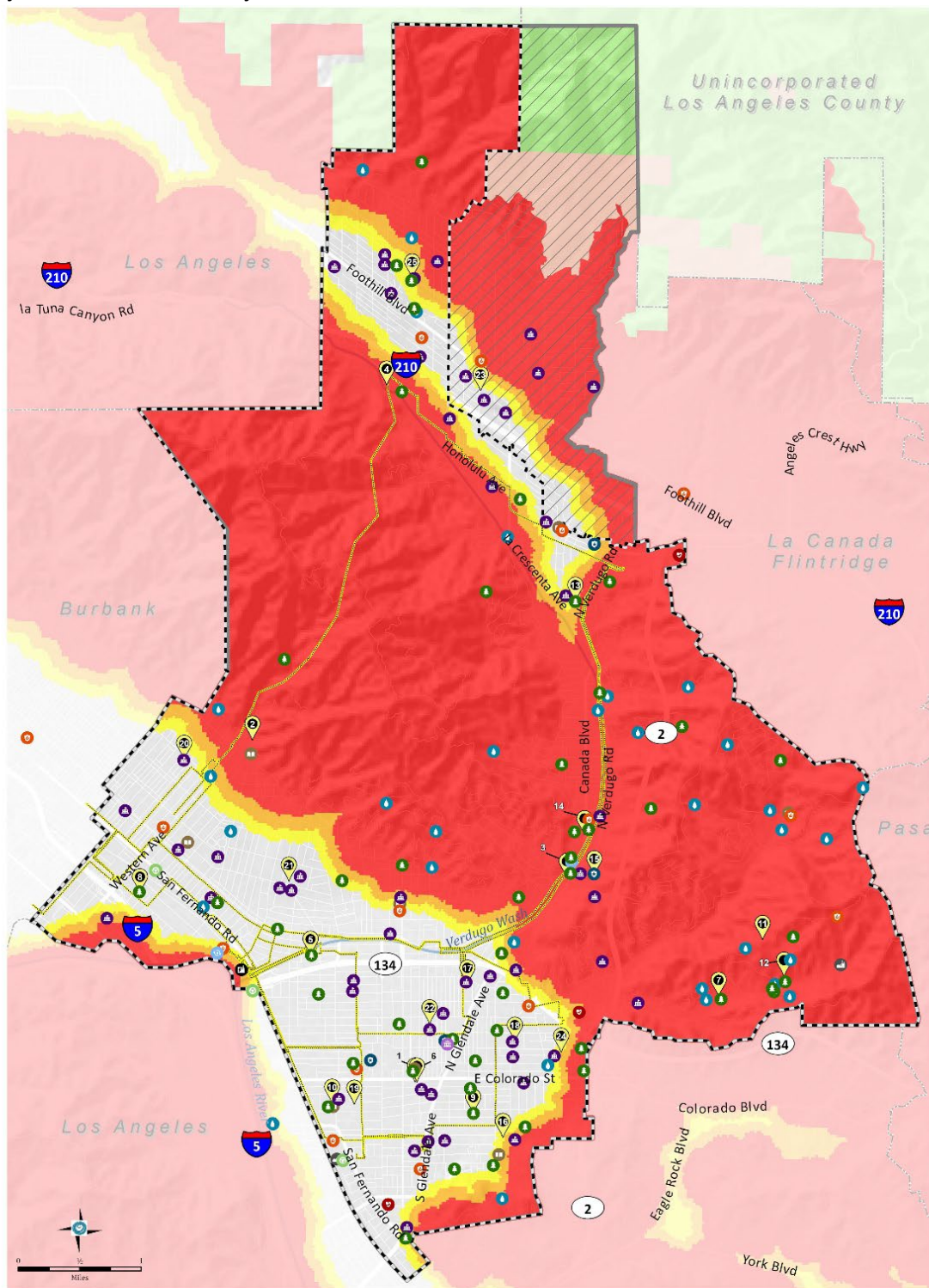
Figure 5 Historical Wildfire Events in Glendale



Location

The proximity of native vegetation and the climate of the region contribute to areas of the city having Very High Fire Hazard Severity Zones, as illustrated in Figure 6. Very High Fire Hazard Severity Zones are areas designated by CAL FIRE as having the highest potential for wildfire hazard based on fuels, terrain, and weather conditions. The portions of the San Rafael Hills and the Verdugo and San Gabriel Mountains within city limits are mapped as being within Very High Fire Hazard Severity Zones using a science-based and field-tested model that assigns a hazard score based on the factors that influence fire likelihood and fire behavior, including fire history, existing and potential fuel (natural vegetation), predicted flame length, potential for blowing embers, terrain, and typical fire weather for the area. As shown in the image, about two-thirds of the city is designated within a Fire Hazard Severity Zone. Very High Fire Severity Zones cover most of the northern, central, and eastern hillside areas of the city. The more urbanized southern portions and valley floor are designated High, Moderate, or undesignated.

Figure 6 City Fire Hazard Severity Zones



LEGEND

- Other Incorporated Areas
- Glendale Planning Area
- Glendale Sphere of Influence
- Glendale City Boundary

Fire Hazard Severity Zones by

Federal Responsibility Area (FRA)

State Responsibility Areas

Very High

Fire Hazard Severity Zones by
Local Responsibility Areas (LRA)

Very High

High

Moderate

State Responsibility Areas

Very High

Critical Facilities

City Hall

Park

Potable/Recycled Water Pump Station

Water Treatment Plant

School

Hospital

Library

Police Station

Fire Station

Recycling Facility

Landfill/Waste Management

Grayson Power Plant

Potential Shelter Locations

Transmission Line

CITY OF GLENDALE
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Sources: City of Glendale; Los Angeles County, CAL FIRE, 2007/2014/2025. Map year: 2025.

Updated Fire Hazard Severity Zone mapping indicates a substantial increase in the number of parcels located within the Very High Fire Hazard Severity Zone (VHFHSZ). Glendale currently contains approximately 44,726 total parcels citywide, with the number of parcels identified within the VHFHSZ increasing from approximately 8,973 parcels under previous mapping to approximately 16,383 parcels under the updated map. This represents an approximate 83 percent increase in parcels classified within the Very High hazard designation. The updated mapping reflects increased wildfire exposure throughout hillside and wildland-urban interface areas and further supports the need for continued investment in vegetation management, defensible space inspections, evacuation planning, staffing, fuel reduction, and wildfire mitigation projects.

Extent

CAL FIRE has mapped the most up to date Fire Hazard Severity Zones throughout California. The Fire Hazard Severity Zones maps are developed using a science-based and field-tested model that assigns a hazard score based on the factors that influence fire likelihood and fire behavior. There are three levels of hazard in ranking FHSZs: moderate, high, and very high. The fire hazard severity model for wildfire has two key components: probability of an area burning and expected fire behavior under extreme fuel and weather conditions. The expected intensity of a fire is highest in very high severity zones and gradually less intense as you look to moderate and low Fire Hazard Severity Zones.

As seen in Figure 6 above, much of the northern extent of the city is designated in the Very High Fire Hazard Severity Zone, meaning fires in these areas will be more intense and harder to control, posing threats to the residential neighborhoods that border the northern hillsides.

Probability of Future Events

The frequency, area, and severity of wildfires have increased significantly within Los Angeles County over the past two decades. Wildfire events are a product of temperature increases, precipitation declines, and high wind events, which compound to create wildfire prone conditions.

The probability of future wildfire occurrences in Glendale is high. As illustrated in Figure 5, wildfire has repeatedly burned across the northern and eastern portions of the city over a period spanning from 1828 to 2017. Similar areas are ranked in Figure 6 City Fire Hazard Severity Zones as Very High Fire Hazard Severity Zones. Because this designation is based on the physical conditions that create a likelihood and expected fire behavior over a 30- to 50-year period, without considering mitigation measures, there is a high likelihood of fire in these areas.

Impact of Climate Change

Climate change and the associated increase in temperatures and prolonged drought is expected to increase the frequency of conditions that lead to wildfire, as well as result in more severe wildfire events in Glendale. Rising temperatures accelerate the drying of chaparral and other native vegetation in the Verdugo Mountains, San Rafael Hills, and San Gabriel Mountains, increasing the flammability of the fuels that historically drive southern California wildfires. These conditions also heighten plant moisture stress and expand pest pressures, both of which degrade the health and resilience of the city's hillside vegetation and contribute to greater fuel loads over time. According to the City of Glendale's 2024 Climate Change Vulnerability Assessment, projected annual wildfire probability is expected to increase by 10 percent, from a current baseline of 20 percent to 30 percent, by mid-century, and remain at 30 percent through end of century (CalAdapt, 2025).

4.4.3 Floods

Storm-induced Flooding

Floods occur when water from a rainfall event exceeds the soil or stormwater system's ability to absorb or convey the water to a nearby water body.

For purposes of insurance provision, FEMA's National Flood Insurance Program defines flood as "A general and temporary condition of partial or complete inundation of two or more acres of normally dry land area or of two or more properties (at least one of which is the policyholder's property) from:

- Overflow of inland or tidal waters; or
- Unusual and rapid accumulation or runoff of surface waters from any source; or

- Mudslides (i.e., mudflows) which are proximately caused by flooding and are akin to a river of liquid and flowing mud on the surfaces of normally dry land areas, as when earth is carried by a current of water and deposited along the path of the current.; or
- Collapse or subsidence of land along the shore of a lake or similar body of water as a result of erosion or undermining caused by waves or currents of water exceeding anticipated cyclical levels that result in a flood as defined above.”

Like most of Southern California, Glendale and its surrounding areas are subject to unpredictable seasonal rainfall. Most years the area receives only light winter rainfall, but every few years the region experiences stronger storm systems that bring intense or prolonged rainfall, often caused by atmospheric rivers or slow-moving winter fronts. An atmospheric river is a long, narrow corridor of concentrated water vapor in the atmosphere that transports moisture over large distances, typically from tropical or subtropical regions to mid-latitude areas. When these systems make landfall, they can release significant amounts of precipitation over a relatively short period of time. These heavier storms can overwhelm natural drainage patterns and humanmade systems, causing the overflowing of river channels, flooded streets, mudflows and debris flows at the mouths of canyons, and other similar conditions. These events can cause extensive damage to people and property.

The 100-year and 500-year floodplains are commonly used benchmarks to describe areas with a 1 percent and 0.2 percent annual chance of flooding, respectively, based on historical data and modeled conditions (See *Extent* for additional information). These designations help guide land use planning, insurance requirements, and hazard mitigation efforts. When a major storm moves in, water collects rapidly and runs off quickly, making a steep, rapid descent from the mountains onto the alluvial fans and ultimately into Verdugo Wash.

In the City of Glendale, geography and climate may combine to create seasonal flooding conditions. Three primary types of flooding have historically affected the southern California area, including the city of Glendale: riverine flooding, urban flooding, and debris flows.

- **Riverine flooding** is the overbank flooding of rivers and streams. Large floods have the potential to cause significant damage to man-made structures and causing significant loss of life. Flooding in large river systems typically results from large-scale weather systems that generate prolonged rainfall over a wide geographic area, causing flooding in hundreds of smaller streams, which then drain into the major rivers.
- **Urban Flooding:** Urbanization of a watershed changes the hydrologic systems of the basin. Heavy rainfall collects and flows faster on impervious concrete and asphalt surfaces. Over 50 percent of the Glendale area has a high concentration of impervious surfaces. During periods of urban flooding, streets can become swift-moving rivers and basements can fill with water. Storm drains may also back up with vegetation and debris causing additional, localized flooding.
- **Debris flows** most often occur in mountain canyons and at the foothills of the large mountains, they can carry large items such as boulders, trees, and cars. When the flows reach flatter ground, the debris spreads over a broad area, sometimes accumulating in thick deposits that can wreak havoc in developed areas.

Dam Failure Flooding

Dam failure flooding occurs when water retention structures fail due to earthquakes, overtopping, foundation problems, or construction errors. California statutes governing dam safety empower the Division of Dam Safety to monitor structures greater than 25 feet in height or with more than 50 acre-feet of storage capacity.

Earthquake-related flooding may also result from damage to aboveground water storage tanks. Following lessons learned from past earthquakes, updated design standards were adopted in 1994, requiring features such as flexible inlet and outlet connections to accommodate ground movement. Most of Glendale’s larger steel tanks have been retrofitted with these improvements.

History

Historically, major flood events in the Glendale area are associated with atmospheric rivers. There have been several extreme precipitation events, with the most severe flood occurring in 1934. The Verdugo Wash is the main flood control channel in the city, separating Glendale into quadrants. The Verdugo Wash and several of its tributaries have been confined to man-made channels since the late 1930s. Despite this infrastructure, the city remains vulnerable to flooding during extreme precipitation events, particularly when the stormwater drainage system is overwhelmed by atmospheric river storms. Historical peak discharges have occurred most often between November and March, indicating that future

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flooding in the city is most likely to occur in the winter months. Significant floods affecting Glendale are listed below, detailing dates, descriptions, and associated declarations or impacts. This historical record underscores the persistent threat of flooding in the region and the importance of ongoing flood management and preparedness measures.

Historical Records of Notable Floods in Glendale

- **April 2024** - Severe winter storms, tornadoes, flooding, landslides, and mudslides affected Los Angeles County. Flash flood warnings were issued for Glendale. President Biden declared a major disaster for California (DR-4769-CA) on April 13, 2024.
- **February 2023** - Severe winter storms, straight-line winds, flooding, landslides, and mudslides affected Los Angeles County. President Biden declared a major disaster for California (DR-4699-CA) on April 3, 2023.
- **December 2022** - Severe winter storms, flooding, landslides, and mudslides affected Los Angeles County.
- **1969** - Verdugo Hills and the city were impacted by debris flows and flood flows when tributary streams reportedly overtopped their debris basins, causing damage.
- **1933-1934** - The most severe flood recorded in Glendale. Intense precipitation on New Year's Eve in 1933 caused the Verdugo Wash to overflow its natural channel. Extensive areas had burned two months earlier, producing large amounts of debris. More than 40 people died, several bridges were washed out, and 400 properties were damaged. Construction of the Verdugo Wash flood control channel followed directly from this event.

Dam Inundation

Dam failures are a rare occurrence in California. Four dam failures have occurred in Los Angeles County, all of which were prior to 1960 (California Department of Water Resources, 2026). The most significant dam failures in Los Angeles County are listed in Table 13.

Table 13 Dam Failures in Los Angeles County

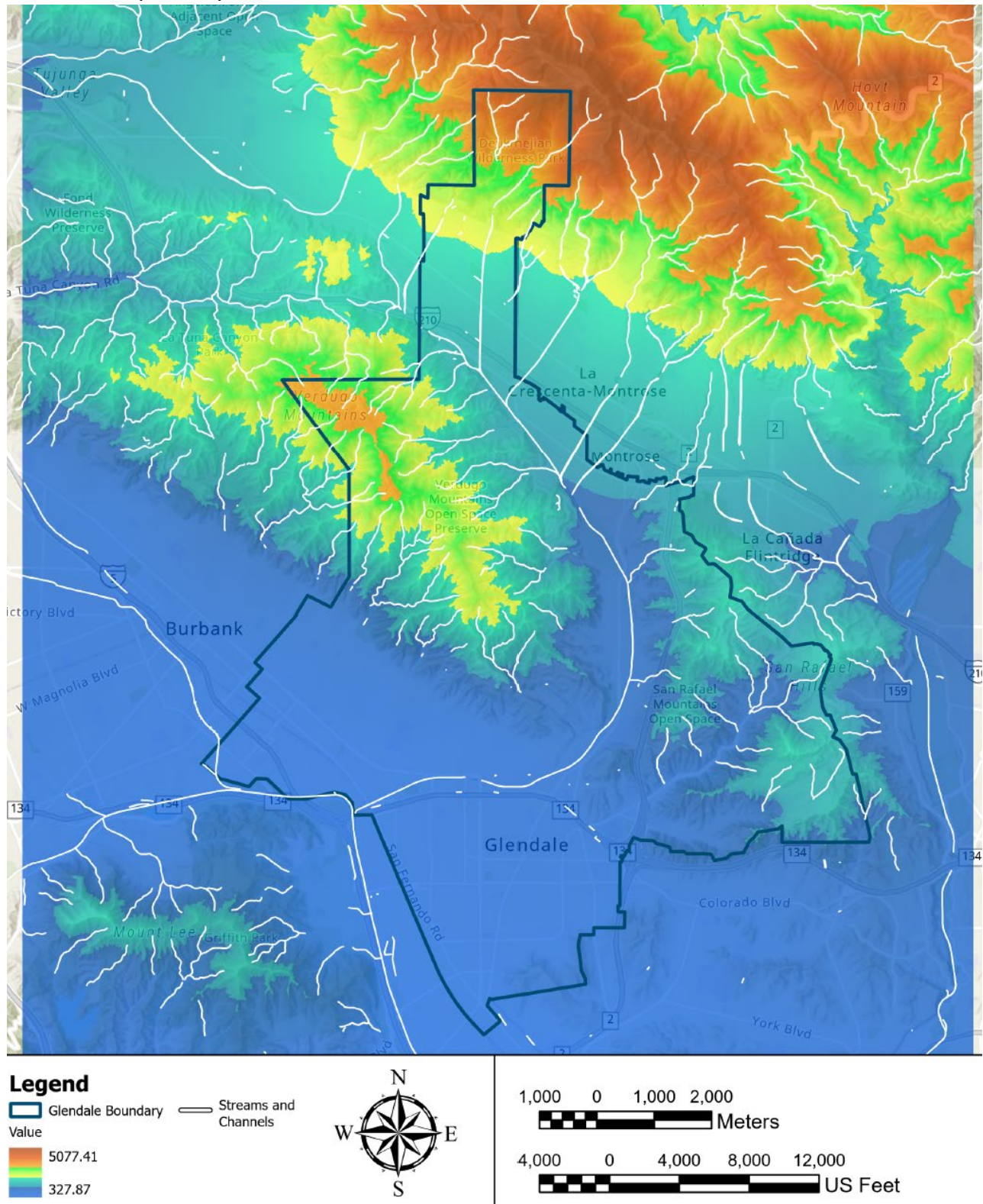
Dam Name	Location	Year	Failure Mechanism
Puddingstone	Pomona	1926	Overtopping during construction
Saint Francis	San Francisquito Canyon	1928	Sudden failure at full capacity through foundation, 426 deaths.
Cogswell	Monrovia	1934	Breaching of concrete cover
Baldwin Hills	Los Angeles	1963	Leak through embankment turned into washout, 3 deaths.

Location

The City of Glendale is drained primarily by the Verdugo Wash, which flows south, southwest, and west before emptying into the Los Angeles River at the city's western boundary. Numerous streams and canyon channels are tributaries to the Verdugo Wash throughout the city. From north to south, these include Cooks, Dunsmore, and Ward Canyons, as well as streams flowing out of the San Gabriel Mountains through the La Crescenta and La Cañada-Flintridge areas, including Shields, Eagle, Pickens, Hall Beckley, and Winery Canyons. Along the north and east sides of the Verdugo Mountains, additional tributaries include La Tuna, Las Barras, Sheep Corral, Cunningham, Henderson, Engleheard, Deer, and Dead Horse Canyons. Along the south flank of the Verdugo Mountains, Childs, Brand, Idlewood, Sherer, Hillcrest, Toll, Brookman, and Mand Canyons drain westward. In the western portion of the city, the Burbank Western Channel passes through a small section of Glendale before emptying into the Los Angeles River. The San Rafael Hills contribute additional drainage through Kirby, Sycamore, and Scholl Canyons, while several unnamed streams in the San Rafael Hills drain eastward toward the Arroyo Seco. To reduce flood risk, debris basins have been constructed in several canyons in the San Gabriel and Verdugo Mountains, most streams draining from the San Gabriel Mountains have been channelized through the La Cañada Valley, and the Verdugo Wash itself is channelized through Glendale.

Glendale does not have 100- or 500-year floodplains within its planning area; however, the geomorphology of Glendale is depicted in Figure 7 below, which illustrates potential locations of future flooding due to intense rainfall in the city. The geomorphic map provides important context for understanding flood risk by illustrating the underlying landforms and surface processes that influence how water moves across the landscape. Features such as alluvial fans, drainage channels, and valley bottoms indicate areas where water is naturally conveyed, concentrated, or deposited during storm

events. This information helps identify locations that may be more susceptible to flooding by highlighting the physical characteristics that govern runoff patterns and flow behavior.



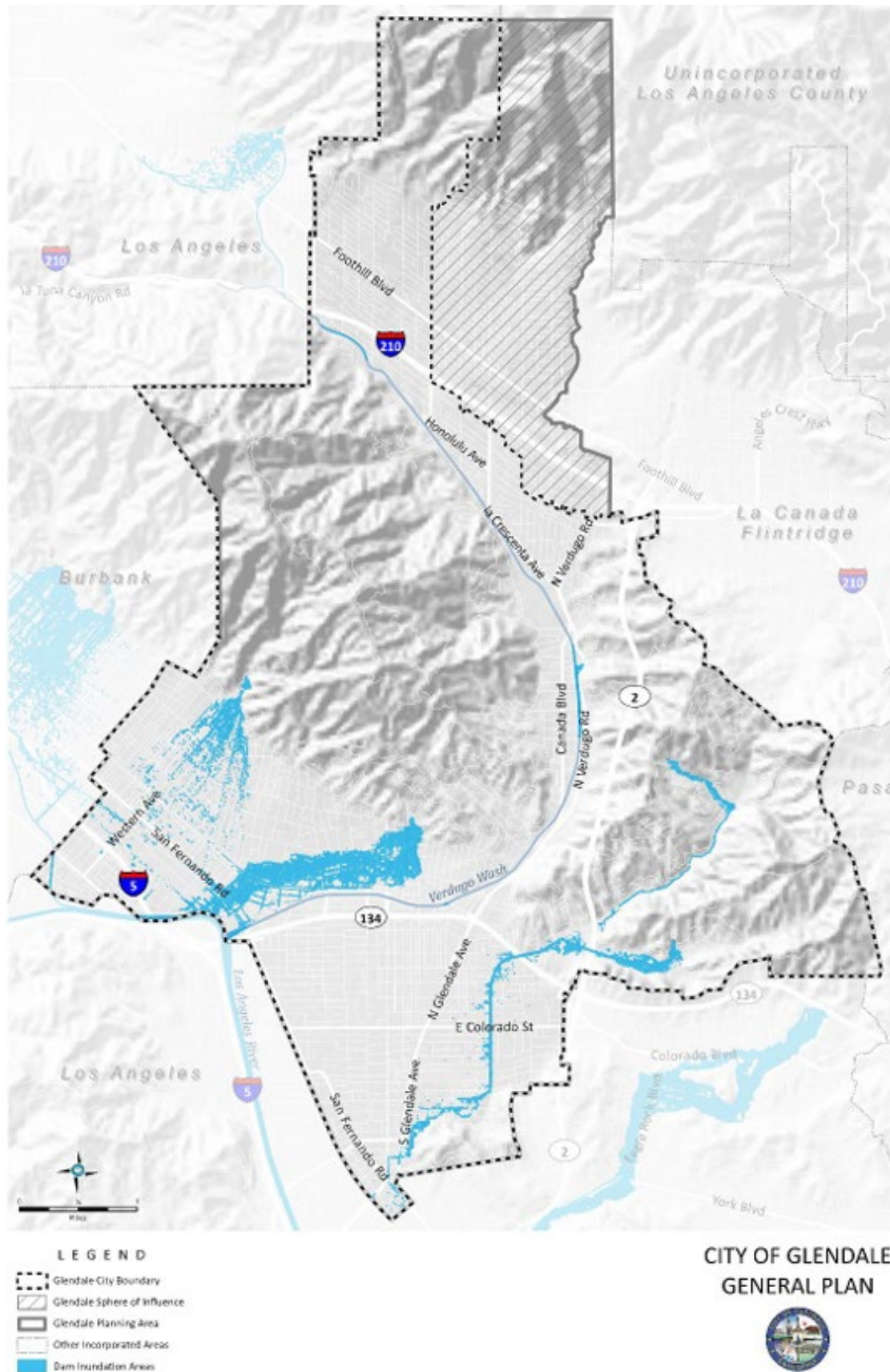
Geomorphic Map
Glendale, California

Dam Inundation

Seven dams located in the Glendale area fall under State jurisdiction. These dams are owned by the City of Glendale and retain small reservoirs in the Verdugo Mountains and San Rafael Hills. From west to east they include the 10th and Western, Brand Park, and Diederich dams in the Verdugo Mountains, and the East Glorietta, Chevy Chase 1290, Glenoaks and Chevy Chase 980 dams in the San Rafael Hills.

Several smaller debris basins in Glendale are not subject to State regulation due to their limited size. However, these basins, along with other flood control infrastructure such as canals, culverts, and levees, remain vulnerable to earthquake damage. Strong ground shaking or ground failure, including liquefaction and slope instability, can cause cracking or structural failure. If these facilities contain water during a seismic event, or are not repaired before subsequent storms, they could release water and create downstream inundation hazards.

Figure 8 shows potential flooding in Glendale in the event of a dam failure. Dam inundation risk in Glendale is concentrated along the major drainage corridors that traverse the city from the surrounding foothills and mountains toward the southwest. As shown on the map, potential inundation areas generally follow Verdugo Wash and associated tributary channels, extending through the central and southern portions of the city. These areas reflect the natural downstream flow paths where water released from upstream dam failures would be conveyed and concentrated. Inundation zones are primarily located within valley bottoms and developed urban corridors, where drainage systems align with existing waterways and topographic low points.



Extent

Flood events are measured by their likelihood of occurrence. FEMA defines the "base flood" or "100-year flood" as a flood that has a 1 percent or greater chance of occurring during any given year. A base flood has a 26 percent chance of occurring during a 30-year period, generally the length of most home mortgages. The recurrence interval represents the long-term average period between floods of a specific magnitude; rare floods could occur at short intervals or even within the same year. A 500-year flood is a flood that has a 1 in 500 (0.2 percent) chance of occurring in any given year. Floodplains are areas adjacent to bodies of water that are subject to flooding when it overflows its banks. While areas outside designated floodplains can still experience flooding, the most likely locations to experience future flooding are low-lying areas near bodies of water and drainage channels. Smaller-scale flooding associated with overburdened storm drain and canal systems may also damage property and hinder emergency activities such as fire department access or evacuation.

FEMA is the governmental body responsible for designating floodplain areas across the United States. While Glendale is not within the 100-year or 500-year FEMA floodplain zone, the city is at risk of flooding during extreme precipitation events. In 1979, FEMA determined that for all practical purposes no part of the community would be inundated by the base flood, and therefore classified the entire community as Zone C, an area of minimal flood hazards where the purchase of flood insurance is not mandatory. In 1984, FEMA again informed the City that no Special Flood Hazard Areas were present within the limits of Glendale, and thus placed the city in Zone D, which has no mandatory flood insurance purchase requirements. In 2008, FEMA prepared Flood Insurance Rate Maps for the city and Glendale was again placed in Zone D.

Although Glendale is designated as Zone D, the potential severity of localized flooding can be significant. Past storm events in Southern California have demonstrated that urban flooding can rapidly inundate streets, intersections, and structures, disrupting transportation networks and limiting emergency access. Floodwaters may enter homes and businesses, causing structural damage, property loss, and displacement of residents. Even short-duration flooding can render major roadways impassable and isolate portions of the community.

In more severe scenarios, flooding can overwhelm critical infrastructure, leading to power outages, disruptions to water and wastewater systems, and the spread of pollutants and hazardous materials. Debris-laden flows from surrounding foothill areas may further increase damage by clogging drainage systems and intensifying localized flooding. Collectively, these impacts can strain emergency response, pose risks to public health and safety, and result in substantial economic losses, even in the absence of mapped floodplains.

Dam Inundation

The Division of Safety of Dams (DSOD) categorizes dam failure hazard according to the potential impacts to downstream populations and property. These classifications are based on consequences rather than the structural integrity or condition of the dam itself; dam condition assessment definitions are presented below under "Probability of Future Events". DSOD utilizes four hazard levels, incorporating the three federal standard categories and an additional "extremely high" classification. Table 14 presents the downstream hazard potential categories applied by DSOD.

Table 14 Downstream Hazard Potential Classifications

Downstream Hazard Potential Classification	Potential Downstream Impacts on Life and Property
Low	No probable loss of human life and low economic and environmental losses. Losses are expected to be principally limited to the owner's property.
Significant	No probable loss of human life but can cause economic loss, environmental damage, impacts to critical facilities, or other significant impacts.
High	Expected to cause loss of at least one human life.
Extremely High	Expected to cause considerable loss of human life or would result in an inundation area with a population of 1,000 or more.

Probability of Future Events

Glendale currently experiences an average of approximately three atmospheric river events per year, each of which has the potential to overwhelm the stormwater system and result in localized flooding. Certain areas are particularly susceptible under existing conditions, and may worsen with future climate change; for example, the Henderson Canyon

segment of Verdugo Wash currently fills to within two feet of capacity, and the impacts of climate change will increase the risk of flooding due to an increase in peak flows along the Verdugo Wash. These patterns indicate that stormwater flooding is an ongoing and recurring hazard in the city, even in the absence of mapped floodplains, so there is a high probability of similar flood events occurring in the future.

Dam Inundation

The DSOD applies the U.S. Army Corps of Engineers' National Inventory of Dams condition assessment rating system (updated in 2021) when evaluating dam conditions. Within this framework, a dam safety deficiency is identified as a limitation in load capacity or another issue that could lead to failure of the dam or its appurtenant structures, indicating noncompliance with applicable regulatory standards. Normal operations refer to loading conditions associated with routine reservoir management to meet authorized purposes, consistent with minimum state or federal requirements. The condition assessment definitions, as recognized by the National Dam Safety Review Board, are summarized in Table 15.

All dams located within Los Angeles County are in "satisfactory" condition, with the exception of three: Castaic Dam, which is in poor condition but undergoing modernization as of 2026, and the Santa Anita Debris Basin and Sawpit Debris Basin, both in fair condition. Castaic Dam, Santa Anita Debris Basin, and Sawpit Debris Basin would not affect Glendale if they were to fail. Therefore, probability of a dam failure that may impact the City of Glendale is low (DSOD 2025).

Table 15 Condition Assessment Definitions

Ratings	Definitions from the National Inventory of Dams
Satisfactory	No existing or potential dam safety deficiencies are recognized. Acceptable performance is expected under all loading conditions (static, hydrologic, seismic) in accordance with the minimum applicable state or federal regulatory criteria or tolerable risk guidelines. Typical Circumstances: - No existing deficiencies or potentially unsafe conditions are recognized, with the exception of minor operational and maintenance items that require attention. - Safe performance is expected under all loading conditions including the design earthquake and design flood. - Permanent risk reduction measures (reservoir restrictions, spillway modifications, operating procedures, etc.) have been implemented to eliminate identified deficiencies.
Fair	No existing dam safety deficiencies are recognized for normal operating conditions. Rare or extreme hydrologic and/or seismic events may result in a dam safety deficiency. Risk may be in the range to take further action. Note: Rare or extreme event is defined by the regulatory agency based on their minimum applicable state or federal criteria. Other Circumstances: - Lack of maintenance requires attention to prevent developing safety concerns. - Maintenance conditions may exist that require remedial action greater than routine work and/or secondary studies or investigations. - Interim or permanent risk reduction measures may be under consideration.
Poor	A dam safety deficiency is recognized for normal operating conditions which may realistically occur. Remedial action is necessary. Poor may also be used when uncertainties exist as to critical analysis parameters which identify a potential dam safety deficiency. Investigations and studies are necessary. Other Circumstances: - Dam has multiple deficiencies or a significant deficiency that requires remedial work. - Lack of maintenance (erosion, sinkholes, settlement, cracking, unwanted vegetation, animal burrows, inoperable outlet gates) has affected the integrity or the operation of the dam under normal operational conditions and requires remedial action to resolve. - Critical design information is needed to evaluate the potential performance of the dam. For example, a field observation or a review of the dam's performance history has identified a question that can only be answered by review of the design and construction history for the dam. Uncertainty arises when there is no design and/or construction documentation available for review and additional analysis is needed to better understand the risk associated with operation under normal operational conditions. - Interim or permanent risk reduction measures may be under consideration.
Unsatisfactory	A dam safety deficiency is recognized that requires immediate or emergency remedial action for problem resolution. Typical Circumstances: - A critical component of the dam has deteriorated to unacceptable condition or failed. - A safety inspection indicates major structural distress (excessive uncontrolled seepage, cracks, slides, sinkholes, severe deterioration, etc.), advanced deterioration, or operational deficiencies which could lead to failure of the dam or its appurtenant structures under normal operating conditions. - Reservoir restrictions or other interim risk reduction measures are required. - A partial or complete reservoir drawdown may be mandated by the state or federal regulatory agency.
Not Rated	The dam has not been inspected, is not under state jurisdiction, or has been inspected but, for whatever reason, has not been rated

Impact of Climate Change

Climate change is expected to increase both the frequency and intensity of storm events, amplifying existing flood risks. Projections indicate that atmospheric river frequency in Glendale could increase by approximately 25 to 30 percent, along with an increase in extreme precipitation. Maximum one-day rainfall is projected to rise from a historical average of 2.6 inches to 2.8 inches by mid-century and up to 3.0 inches by the end of the century (CalAdapt, 2025).

These changes are expected to increase peak flows within local drainage systems, including Verdugo Wash. Modeling from the 2022 Verdugo Wash Visioning Report estimates future flow rates ranging from 9,665 cubic feet per second in the northernmost segment of the Wash to 51,480 cubic feet per second at confluence with the LA River, with potential hydrological challenges in the Henderson Canyon segment and the Confluence segment. As storm intensity increases, existing drainage infrastructure may be exceeded more frequently, resulting in greater flood extents, longer durations of inundation, and more widespread impacts to properties, roadways, and critical infrastructure.

4.4.4 Landslides

Hazard Description

Landslides are downslope movements of soil and rock under the direct influence of gravity, which includes events such as rock falls, topples, slides, spreads, and flows. Landslides vary greatly in their volume of rock and soil, the length, width, and depth of the area affected, frequency of occurrence, and speed of movement. They can generally be broken down into two categories: rapidly moving and slow moving. Rapidly moving landslides, commonly known as debris flows, travel down hillsides at speeds of 30 to 50 miles per hour and in some cases up to 200 miles per hour depending on slope angle, water content, and the type of earth and debris in the flow. Slow-moving landslides develop gradually over months to years and typically cause progressive ground deformation and long-term slope instability that can damage roads, utilities, and structures over time, often without the sudden destructive impacts associated with rapid debris flows.

Landslides can be initiated by rainfall, earthquakes, changes in groundwater, disturbance of a slope by humanmade construction activities, or any combination of these factors. The potential for slope failure is dependent on many factors, including slope height, slope steepness, shear strength and orientation of the underlying geologic unit, and moisture content. Failure occurs when the gravitational force pulling the slope downward exceeds the strength of the earth materials composing it. Debris flows are typically initiated by heavy or sustained periods of rainfall, though short bursts of concentrated rainfall in susceptible areas can also trigger them. Burned areas charred by wildfires are particularly susceptible to debris flows given certain soil characteristics and slope conditions. Slow-moving landslides are typically initiated or reactivated by prolonged increases in soil moisture, gradual changes in groundwater conditions, erosion at the base of a slope, seismic activity, weathering of underlying geologic materials, or human activities such as excavation, grading, vegetation removal, and altered drainage patterns that reduce slope stability over time.

History

Landslide occurrences have historically affected the City of Glendale during extreme precipitation events, particularly following intense wildfire. Four major landslide events resulting in property damage have been recorded in the city since 1962. Two landslides occurred in 1962, one in 1965, and one in 1972, affecting the San Gabriel Mountains, San Rafael Hills, and Verdugo Mountains.

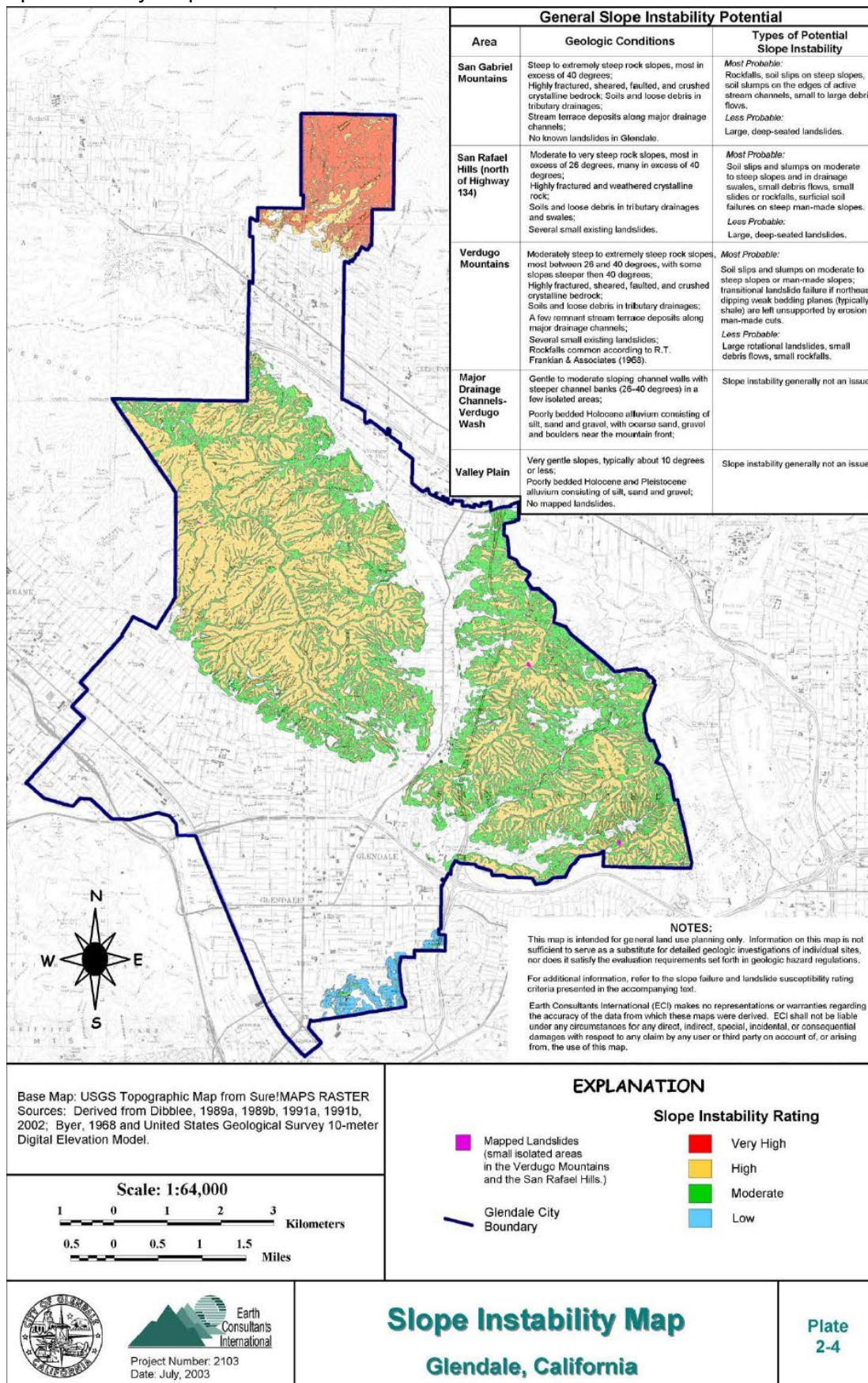
In 1933, a large fire in the Montrose-La Crescenta area burned more than 5,000 acres. On January 1, 1934, intense rainfall fell on the recently burned area, sending debris-laden flows through La Crescenta and Glendale, clogging streets, washing out bridges, and resulting in multiple fatalities. During winters of exceptional rainfall, debris flows have caused widespread property damage and loss of life in communities at the base of the San Gabriel Mountains. Notable events occurred in the winters of 1934, 1969, 1978, and 1980, when areas below burned watersheds received the greatest damage.

Location

Nearly half of the land in Glendale consists of steep hillslopes and rugged mountains. The city's hillsides are vulnerable to the steep terrain and slope instability primarily due to the fractured, crushed and weathered condition of the bedrock (Figure 47). Overly steepened slopes along the large drainage channels are also locally susceptible to slope instability. While most development in the city occurs on the flat to gently sloping alluvial surfaces at the base of the mountains, some residential development is present in and adjacent to steep hillsides, including the canyons within the Verdugo Mountains and the San Rafael Hills, as well as the alluvial fans at the front of the San Gabriel and Verdugo Mountains. These areas are locally vulnerable to slope instability, particularly during winters of heavy rainfall and in winters following wildfires.

The three principal mountain ranges within or bordering Glendale each present slope instability conditions (Figure 9). The San Gabriel Mountains to the north are characterized by steep to extremely steep rock slopes, highly fractured, sheared,

and crushed crystalline bedrock, and soils and loose debris in tributary drainages. The Verdugo Mountains exhibit moderately steep to extremely steep slopes with similarly fractured and weathered crystalline bedrock, and several small existing landslides have been documented there. The San Rafael Hills to the east contain moderate to very steep rock slopes with highly fractured and weathered crystalline rock, soils and loose debris in tributary drainages, and several small existing landslides.



The Southern California Area Mapping Project (SCAMP) is a cooperative effort between the U.S. Geological Survey and the California Geological Survey. SCAMP has identified that in upland areas underlain by sedimentary rock and fractured crystalline rock, such as that found in the mountains of Glendale, essentially all past debris flows have occurred on slopes with gradients of 26 degrees or steeper (USGS, 2013). The mapped debris flow susceptibility areas in the San Gabriel Mountains include most slopes exceeding this threshold (Figure 9). Flood control dams and debris basins constructed in the canyons are designed to contain flows from unburned areas; however, these structures can be overwhelmed during periods of extreme rainfall on recently burned hillsides, as occurred in 1934, 1969, 1978, and 1980.

Extent

Landslides and slope failures in Glendale range in intensity from slow-moving to rapidly moving debris flows. At the lower end of the intensity spectrum, soil creep involves imperceptibly slow downslope movement of soil on moderate to steep slopes and, while not catastrophic, can cause incremental damage to structures and improvements over time. Earth flows are slow-moving, lobe-shaped failures that occur on slopes with gradients of between 15 and 35 degrees and are mobilized by increased pore water pressure during and after winter rains. Soil slips are generated by strong winter storms and occur most commonly on slopes with gradients of between 27 and 56 degrees.

At the upper end of the intensity spectrum, debris flows represent the most dangerous and destructive form of slope failure. A debris flow is a rapidly moving slurry of water, mud, rock, vegetation, and debris capable of carrying trees, large boulders, and vehicles. Debris flows can move at speeds of up to 40 feet per second, can crush buildings, and can strike with very little warning. Debris flows are most likely to occur on slopes with gradients of 26 degrees or steeper, consistent with the SCAMP debris flow susceptibility threshold described above.

Figure 9 identifies four slope instability ratings across the city. The San Gabriel Mountains in the northern portion of the city carry a Very High slope instability rating, characterized by steep to extremely steep rock slopes, highly fractured crystalline bedrock, and soils and loose debris in tributary drainages. The San Rafael Hills, located north of Highway 134, are rated High, with moderate to very steep rock slopes, highly fractured and weathered crystalline bedrock, and several small existing landslides. The Verdugo Mountains carry a High rating as well, with moderately steep to extremely steep rock slopes, highly fractured crystalline bedrock, and several small existing landslides. The valley plain and major drainage channels along Verdugo Wash are rated Moderate to Low, where slope instability is generally not an issue.

Probability of Future Events

The highest risk of landslides is in areas with steep geography, as mapped by the California Department of Conservation. Wildfires can trigger heightened short-term landslide and mudflow risk in fire-scarred areas. The 2003 Safety Element Technical Background Report documents, which were re-adopted in 2025 as part of the most recent update to the Safety Element, note that debris flows caused widespread property damage in and near the base of the San Gabriel Mountains during the winters of 1934, 1969, 1978, and 1980, demonstrating a recurring pattern of damaging events during periods of exceptional rainfall or following wildfire.

The highly fractured crystalline rocks that underlie the San Gabriel and Verdugo Mountains and the San Rafael Hills rarely fail as large cohesive units, and no large deep-seated landslides have been mapped within city limits. The probability of large, deep-seated bedrock landslides is therefore relatively low across the San Gabriel Mountains, San Rafael Hills, and Verdugo Mountains. The more probable hazard arises from smaller slope failures, including soil slips, slumps, debris flows, and rockfalls. The initiation of such failures is generally tied to a preceding event such as wildfire, heavy winter storms, seismic activity, or grading activities.

The probability of debris flows of damaging intensity is significantly elevated following wildfire. The 2019 LHMP estimated post-fire erosion rates to be 15 to 35 times greater than normal, and debris flows in burned areas can occur in response to storms too small to trigger flows under normal conditions. Given the city's location adjacent to the San Gabriel Mountains and within an area of recurring wildfire, the probability of a damaging post-fire debris flow affecting developed areas of the city in any given decade must be considered high.

Impact of Climate Change

Climate change is expected to increase the probability and severity of landslide and debris flow events in Glendale. Triggered by extreme precipitation events or wildfires, the susceptibility of the City to landslides is projected to increase as precipitation variability increases and wildfires increase in frequency, size, and severity. The city is expected to experience an increased probability of landslides due to more frequent and severe wildfires and precipitation events, which may result in increased soil erosion and property damage. Physical vulnerabilities for infrastructure and critical assets in Glendale include exposure to wildfire and post-wildfire landslides.

4.4.5 Extreme Weather

Hazard Description

Extreme Wind

National Geographic defines wind as “the movement of air caused by the uneven heating of the Earth by the sun (National Geographic, 2026).” The primary extreme wind hazard affecting Glendale is Santa Ana winds. Santa Ana winds are hot, dry, and gusty winds that blow into southern California from inland deserts, descending down the leeward slopes of coastal mountain ranges toward the Pacific Ocean. They occur from early fall to early spring, peaking in December and January, and bring low humidity and warm weather. These winds can cause widespread damage and quickly spark wildfires by drying out vegetation (Britannica, 2025)

Extreme Heat

Extreme heat may be defined in a number of ways. The National Weather Service defines extreme heat as a “A period of abnormally hot and dangerous temperatures, with or without high humidities, that can result in negative impacts to people, animals, and infrastructure.” The California Department of Public Health classifies an extreme heat event as two or more days and nights of unusually high heat for a geographic area. Because some places are hotter than others, the declaration of an extreme heat event depends on the average for that particular location at that time of year. In Glendale, extreme heat events are presently defined for the purposes of opening cooling centers as days in which the temperature exceeds the 98th percentile (97.6°F). Extreme heat is responsible for the highest number of annual deaths among all weather-related hazards and is a frequent occurrence in Glendale and throughout California (California Department of Public Health, 2025).

History

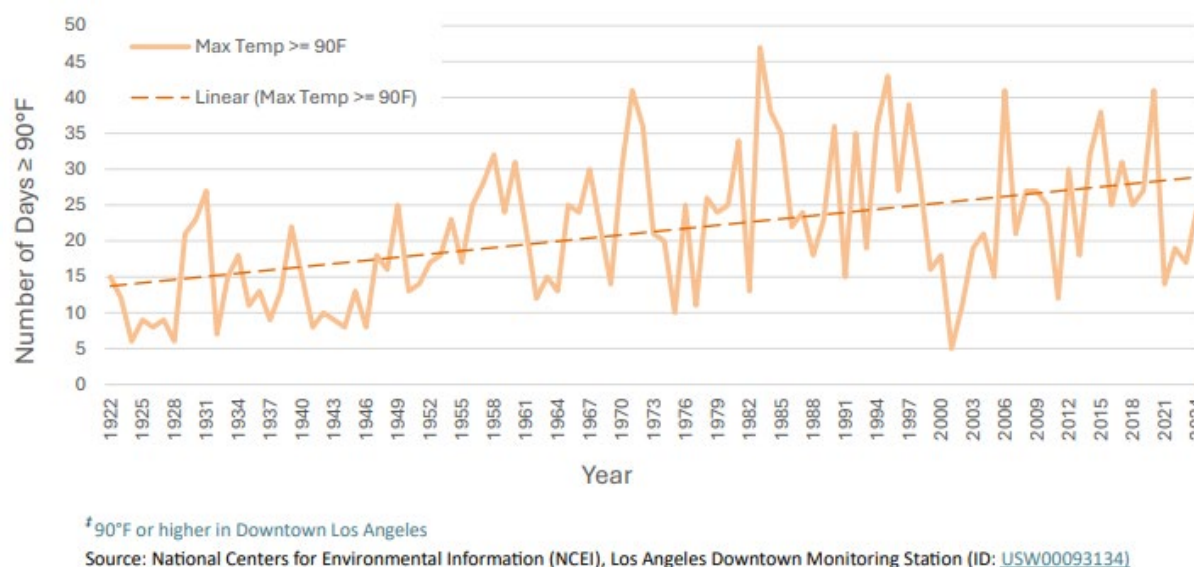
Extreme Wind

Extreme wind and heat events in Los Angeles County have been identified using data from the National Centers for Environmental Information Storm Events Database, with a focus on areas near Glendale (National Centers for Environmental Information National Oceanic and Atmospheric Administration, 2025). A total of 31 high wind events were recorded between 2023 and 2025 in the San Gabriel Mountains and San Fernando Valley, which border Glendale. Most of the high wind events were associated with offshore wind patterns, including Santa Ana winds. These conditions produce gusts in the foothill and valley areas. There has been one federal major declaration near Glendale for the federal disaster declaration for California Wildfires and Straight-line Winds (DR-4856-CA), issued on January 8, 2025, for an incident period of January 7 to January 31, 2025. This declaration highlights the role of strong winds in driving wildfire impacts across Los Angeles County.

Extreme Heat

Extreme heat events are generally not issued as official declarations. Based on recent trends however, extreme heat events in Glendale reflect broader patterns across Los Angeles County, where periodic heat waves often driven by high-pressure systems and Santa Ana wind conditions have produced temperatures exceeding 90°F even outside typical summer months. Historical records show recurring extreme heat episodes, including unusual fall heat events and increasingly frequent early-season heat waves, such as recent 2026 March events with temperatures in the 90s and elevated public health risks. Glendale's inland valley location and proximity to foothills contribute to higher temperatures compared to coastal areas, with the city reaching a recorded high of 115°F in 2020. As seen in Figure 10, historical records from 1922 through 2024 show substantial year-to-year variability in the number of extreme heat days, but the long-term trend indicates a gradual increase over time. Annual totals have ranged from fewer than 10 extreme heat days in some years to more than 40 days in others, with recent decades generally experiencing a higher frequency of extreme heat conditions compared to the early and mid-20th century.

Figure 10 Annual Number of Extreme Heat Days, 1922-2024



Location

Extreme Wind

High wind events affecting Glendale are concentrated in the surrounding San Gabriel Mountains and San Fernando Valley. The San Gabriel Mountains form the northern boundary of Glendale and consist of steep terrain and canyon systems that

can intensify wind speeds. The San Fernando Valley lies west and northwest of the city. These adjacent areas were used to represent wind conditions near the City due to their proximity and similar exposure.

Most of the high wind events have been recorded in the San Gabriel Mountains, including 16 in the western San Gabriel Mountains and 10 in the eastern San Gabriel Mountains. Fewer events have been recorded in the San Fernando Valley, with four in western San Fernando Valley and one in the eastern San Fernando Valley.

Extreme Heat

Urban Heat Island (UHI) refers to developed areas that are hotter than the surrounding landscape primarily due to the use of building materials and surfaces that absorb and re-radiate heat (like roofs and pavements), as well as a lack of vegetation, particularly trees. According to the Urban Heat Island Interactive Map from the California Environmental Protection Agency (CEPA UHI), the areas of Glendale that will experience the most intense UHI effect are the southwest neighborhoods along I-5 and the northeast neighborhoods along I-210 (CEPA UHI).

Extent

Extreme Wind

There are two common methods of measuring wind severity. The National Weather service has four classifications for wind warning: high wind watch, high wind warning, wind advisory, and extreme wind warning (City of Glendale CAAP, 2025).

- High wind watch is issued when there are possible sustained winds of 40 miles per hour (mph) for one hour or more or wind gusts of 58 mph or higher for any duration.
- High wind advisory is issued when there are expected sustained winds of 40 miles per hour (mph) for one hour or more or wind gusts of 58 mph or higher for any duration.
- Wind advisory is issued when there are expected sustained winds of 21 to 91 mph for an hour or more and/or wind gusts of 46 to 57 mph for any duration.
- Extreme wind warning is issued for surface winds of 100 knots (115 mph) or greater associated with non-convective, downslope, derecho (i.e., not associated with a tornado), or sustained hurricane winds are expected to occur within one hour.

The Beaufort Wind Scale was developed in 1805 by Sir Francis Beaufort and is still used today. The scale estimates wind speed and its effects, measuring wind speeds on a scale of zero to 12. Table 16 shows the Beaufort Wind Scale ratings.

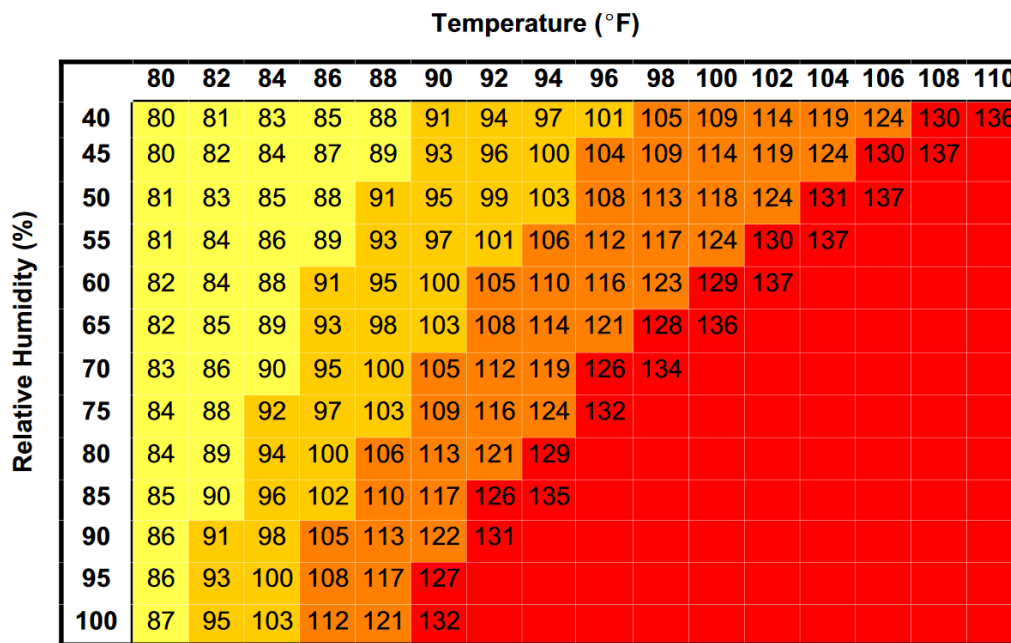
Table 16 Beaufort Wind Scale

Force	Speed (miles per hour)	Description	Specifications for Use on Land
0	0-1	Calm	Calm, smoke rises vertically
1	1-3	Light Air	Direction of wind shown by smoke drift, but not by wind vanes.
2	4-7	Light Breeze	Wind felt on face; leaves rustle; ordinary vanes moved by wind.
3	8-12	Gentle Breeze	Leaves and small twigs in constant motion; wind extends light flag.
4	13-18	Moderate Breeze	Raises dust and loose paper; small branches are moved.
5	19-24	Fresh Breeze	Small trees in leaf begin to sway; crested wavelets form on inland waters.
6	25-31	Strong Breeze	Large branches in motion; whistling heard in telegraph wires; umbrellas used with difficulty.
7	32-38	Near Gale	Whole trees in motion; inconvenience felt when walking against the wind.
8	39-46	Gale	Breaks twigs off trees; generally impedes progress.
9	47-54	Severe Gale	Slight structural damage occurs (chimney-pots and slates removed)
10	54-63	Storm	Seldom experienced inland; trees uprooted; considerable structural damage occurs.
11	64-72	Violent Storm	Very rarely experienced; accompanied by wide-spread damage.
12	72-82	Hurricane	N/A; utilizes Saffir-Simpson Hurricane Scale

High wind events affecting areas near Glendale include recorded wind gusts ranging from approximately 58 mph to over 110 mph, based on Storm Events Database records for adjacent mountain and valley zones. These values correspond to the upper levels of the Beaufort Wind Scale, including Force 10 (Storm) and Force 11 (Violent Storm), with some gusts exceeding the upper limit of the scale.

Extreme Heat

The heat index, developed by the National Oceanic and Atmospheric Administration (NOAA) (Figure 11), provides a comprehensive measure to indicate how hot it feels to humans by considering both air temperature and humidity. When it is humid, sweat does not evaporate well, making the body feel even hotter than the temperature suggests. For example, on a 90-degree day with 50 percent humidity, it feels like 95°F, but with 90 percent humidity, it feels like 122°F. High humidity impedes the body's ability to cool itself through sweat evaporation, intensifying the perceived temperature and creating risks of heat-related illnesses.



Likelihood of Heat Disorders with Prolonged Exposure and/or Strenuous Activity

■ Caution ■ Extreme Caution ■ Danger ■ Extreme Danger

Source NOAA: <https://www.noaa.gov/jetstream/synoptic/heat-index>

Currently, Glendale has an average maximum temperature of 74.9°F and an average minimum temperature of 51.2°F. Current extreme heat days occur between the months of March to October, while the 30-year baseline average of extreme heat days in Glendale is three days annually.

Probability of Future Events

Extreme Wind

The probability of extreme wind events in Glendale is influenced by regional climate patterns and local geography. The Glendale area experiences seasonal Santa Ana wind conditions, which occur most frequently in the fall and are characterized by strong, dry offshore winds. Winds in excess of 40 miles per hour are common during these events, with localized gusts exceeding 100 miles per hour. These conditions are driven by pressure gradients and are a recurring feature of the regional climate. The South Coast Air Basin (SCAB), where Glendale is located, is characterized by generally light average wind speeds due to a semi-permanent high-pressure system over the eastern Pacific Ocean. However, periodic breakdowns in these conditions can produce strong offshore wind events. Given the recurring nature of Santa Ana winds and their seasonal predictability, it is highly likely Glendale will continue to frequently experience extreme wind.

Extreme Heat

Extreme heat is a reoccurring hazard in Glendale, and the city has historically averaged three extreme heat days annually. Average maximum temperatures in Glendale are expected to increase between 4.2°F and 5.2°F by 2050 and between 5.4°F and 8.6°F by 2100. As temperatures increase, extreme heat days are projected to become more frequent and occur over a longer portion of the year. Projections indicate that extreme heat days may increase substantially by mid-century and end-century, along with a significant increase in warm nights and heat-related health events. Days over 97.6°F are projected to increase by 32 days by the end of the century and occur during a wide range of months from February to December (CalAdapt).

Impact of Climate Change

Climate change is expected to influence both extreme heat and wind-related hazards in Glendale through rising temperatures, changing seasonal patterns, and increased variability in weather conditions. Temperature increases affect various climate related hazards including extreme heat and warm nights, drought, wildfire, and poor air quality. In recent decades, climate change has intensified both the frequency and severity of extreme heat across the region, contributing to impacts such as increased energy demand, wildfire risk, and heat-related health concerns, and prompting expanded local responses such as cooling centers and public health advisories.

4.4.6 Drought

Hazard Description

Drought is a natural and recurring feature of nearly every climate, though its characteristics vary significantly by region. It typically results from a decline in precipitation over an extended period, usually one or more seasons, and its severity is shaped by duration, intensity, geographic extent, and water demands from both human activity and vegetation. Climatic factors such as prolonged high temperatures and low relative humidity can compound these effects, accelerating the onset and worsening the impact of drought conditions.

Because water supports nearly every human and ecological function, drought's effects ripple across multiple systems. This complexity is reflected in four distinct but interrelated definitions (National Integrated Drought Information System, 2026):

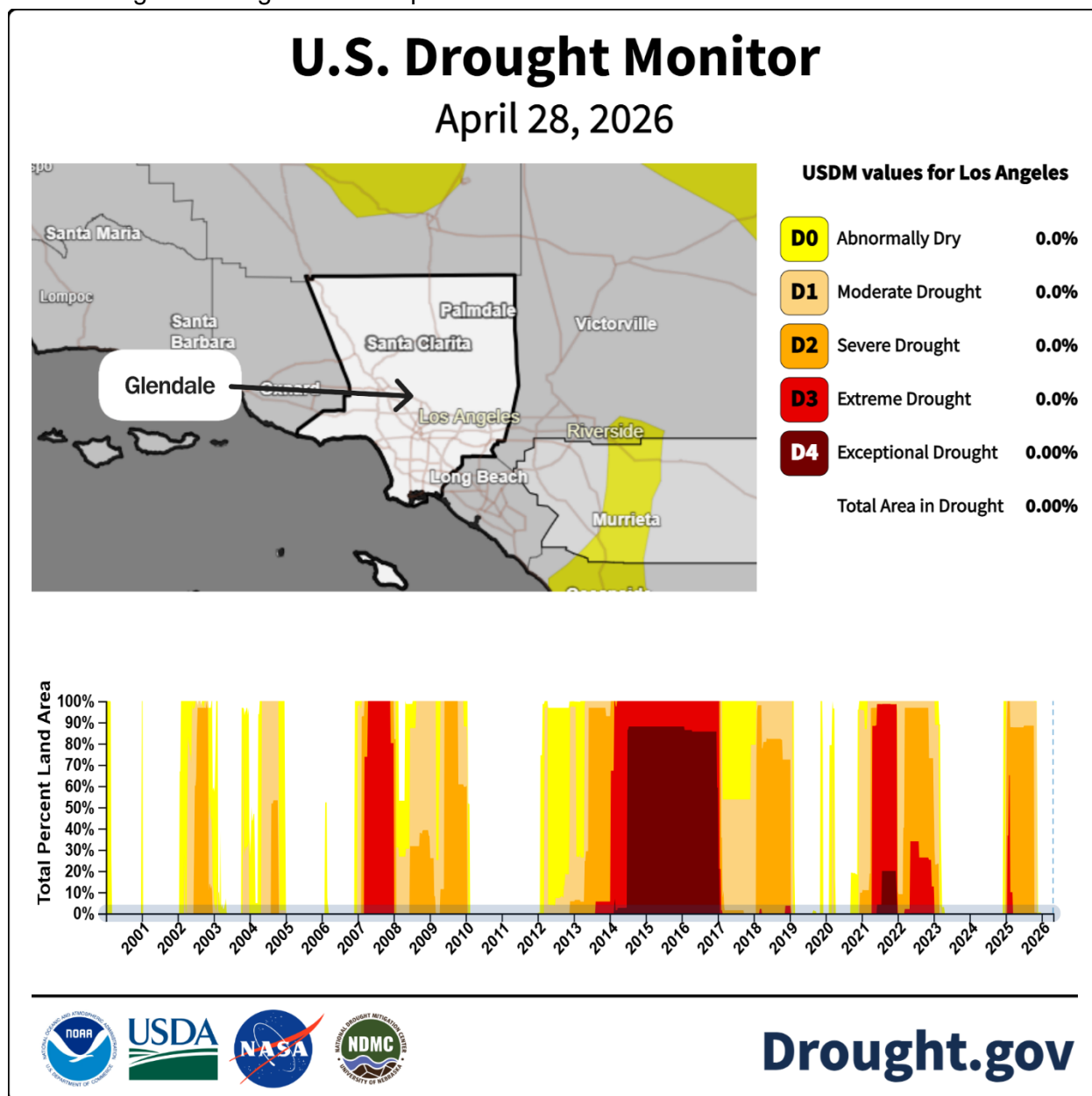
1. **Meteorological drought** is defined by the degree of dryness, specifically the departure of actual precipitation from expected averages over monthly, seasonal, or annual timeframes. It is the most direct expression of drought and often the precursor to other types.
2. **Agricultural drought** follows when soil moisture deficits reduce water availability below what plant life, particularly crops, requires to thrive.
3. **Hydrological drought** emerges as precipitation shortfalls reduce stream flows and lower reservoir, lake, and groundwater levels, affecting longer-term water storage and supply.
4. **Socioeconomic drought** occurs when demand for water exceeds weather-related supply, linking meteorological, agricultural, and hydrological conditions to economic goods and services.

These types are sequential as well as interrelated: a meteorological drought that persists long enough will typically trigger agricultural and hydrological drought, and if water demand outpaces supply, socioeconomic drought follows.

While climate is the primary driver of hydrological drought, human land use plays a significant compounding role. Changes in land cover, land degradation, and water infrastructure such as dam construction alter how water moves through a basin, affecting infiltration, runoff, and streamflow. Because watersheds are interconnected systems, the effects of a localized precipitation deficit can extend well beyond its origin. Altered land use upstream can reduce infiltration and increase runoff variability, raising the incidence of hydrological drought downstream even in areas that received normal rainfall. In this way, land use change functions as an independent driver of water shortage, capable of shifting drought frequency and severity independent of any change in meteorological conditions.

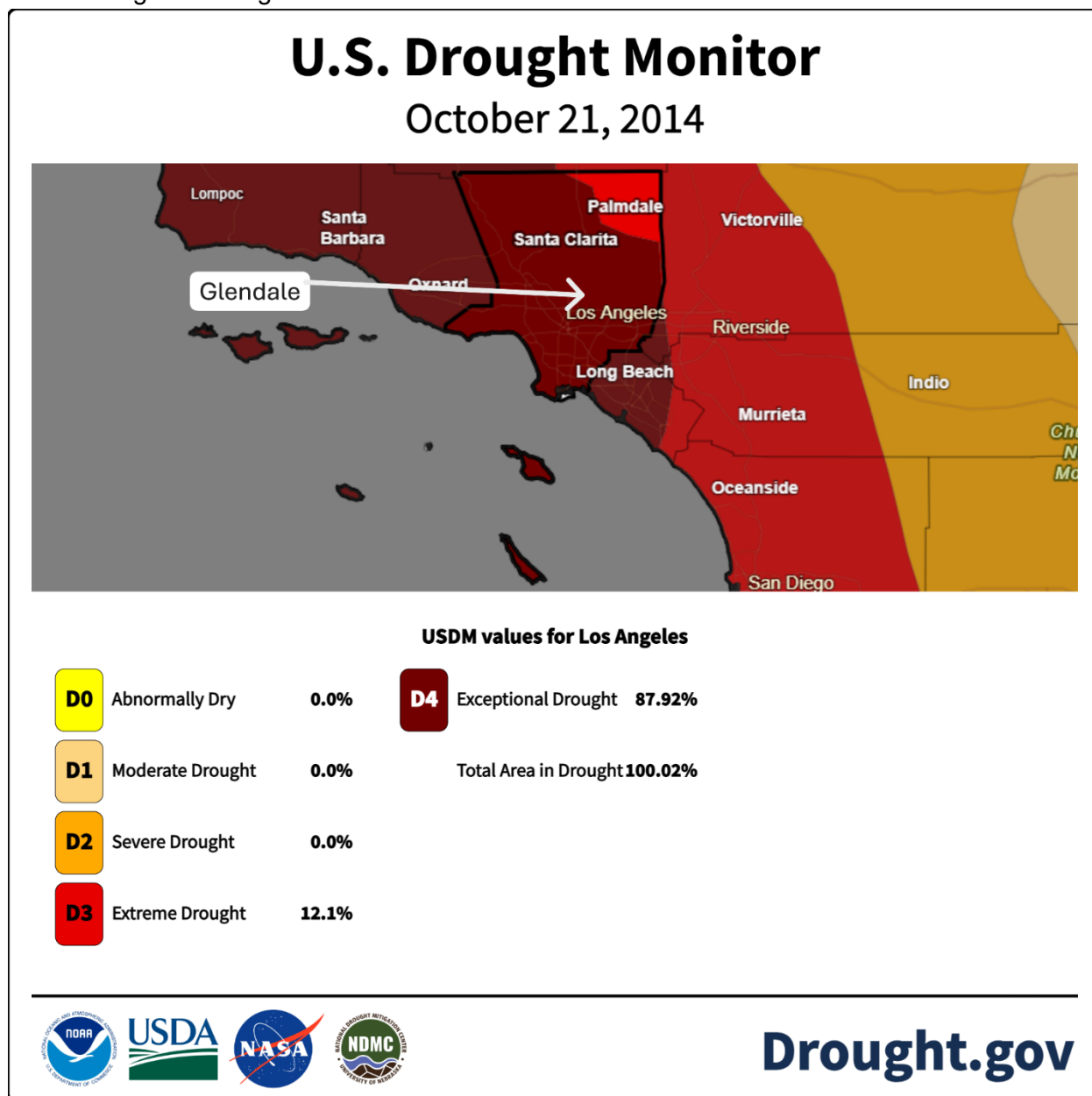
History

Glendale has experienced more frequent and longer continuous droughts over the past two decades. As seen in Figure 12 below, Los Angeles County experienced severe drought from June to December 2002, extreme drought from February to December 2007, moderate to extreme drought from May 2013 to May 2014, exceptional drought from June 2014 to December 2016, extreme to exceptional drought from April 2021 to December 2021, and extreme drought from April to December 2022 (National Integrated Drought Information System, 2026).



Since record keeping began, Glendale has only experienced one period of exceptional drought (June 2014 to December 2016). The following map (Figure 13) shows the extent of drought conditions in Glendale during the exceptional period.

Figure 13 Los Angeles Drought Monitor October 2014



Location

As seen in Figure 13, all of Glendale was affected by the exceptional drought period from June 2014 to December 2016. As drought is a regional hazard, the entirety of the city is affected by drought conditions affecting Southern California.

Extent

The National Integrated Drought Information System (NIDIS) Act of 2006 (Public Law 109-430) authorizes an interagency approach for drought monitoring, forecasting, and early warning (Public Law, 2006). As part of this effort, NIDIS operates the U.S. Drought Portal, an online platform that provides access to drought-related resources, including the U.S. Drought Monitor (National Integrated Drought Information System, 2026).

The primary indicators used by the U.S. Drought Portal in the western U.S. are the Palmer Hydraulic Drought Index and the 60-month Palmer Z-index. The Palmer Drought Severity Index (PDSI) is a commonly used indicator for assessing drought severity, particularly in relation to agricultural conditions and water resource management. The index is derived from observed temperature and precipitation data and is used to estimate relative soil moisture conditions. However, because the Palmer Index does not perform consistently across all climatic regions, it is not considered fully reliable for characterizing drought risk on a nationwide scale. Common drought severity classifications are shown in the Figure 14 below. Glendale has historically been affected by drought at each category, and is likely to in the future as well.

Figure 14 Drought Severity Classifications

Drought Severity Classification

Category	Description	Possible Impacts	Ranges				
			Palmer Drought Index	CPC Soil Moisture Model (Percentiles)	USGS Weekly Streamflow (Percentiles)	Standardized Precipitation Index (SPI)	Objective Short and Long-term Drought Indicator Blends (Percentiles)
D0	Abnormally Dry	Going into drought: short-term dryness slowing planting, growth of crops or pastures. Coming out of drought: some lingering water deficits; pastures or crops not fully recovered	-1.0 to -1.9	21-30	21-30	-0.5 to -0.7	21-30
D1	Moderate Drought	Some damage to crops, pastures; streams, reservoirs, or wells low, some water shortages developing or imminent; voluntary water-use restrictions requested	-2.0 to -2.9	11-20	11-20	-0.8 to -1.2	11-20
D2	Severe Drought	Crop or pasture losses likely; water shortages common; water restrictions imposed	-3.0 to -3.9	6-10	6-10	-1.3 to -1.5	6-10
D3	Extreme Drought	Major crop/pasture losses; widespread water shortages or restrictions	-4.0 to -4.9	3-5	3-5	-1.6 to -1.9	3-5
D4	Exceptional Drought	Exceptional and widespread crop/pasture losses; shortages of water in reservoirs, streams, and wells creating water emergencies	-5.0 or less	0-2	0-2	-2.0 or less	0-2

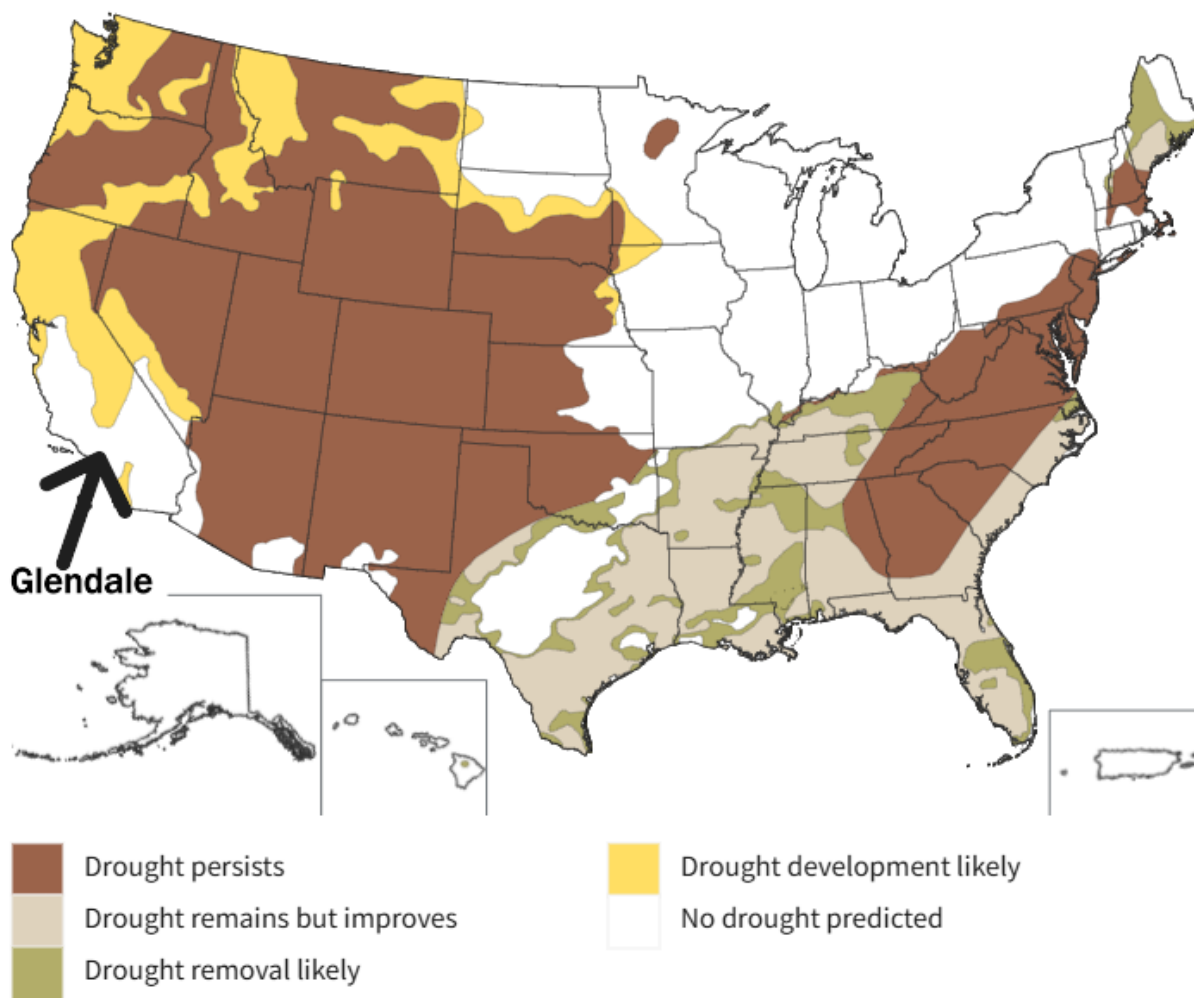
Probability of Future Events

Glendale is expected to experience increased drought conditions throughout the end of the century. There is increased likelihood that low precipitation years will coincide with above-average temperature years. The average maximum length of dry spell is projected to increase 15 days by the end of the century (CalAdapt, 2025). Therefore, drought conditions is considered to have a high probability of occurrence.

There is likely no drought conditions in the immediate future based on the NOAA National Weather Service (NWS) Climate Prediction Center (CPC). As seen in Figure 15 below, there are likely no expected dry spells between May 2026 and July 2026 in Glendale.

Figure 15 Seasonal Drought Outlook

U.S. Seasonal (3-Month) Drought Outlook



Source(s): Climate Prediction Center
Updates Monthly: 04/30/26

Drought.gov

Impact of Climate Change

Climate change is expected to worsen drought conditions in Glendale over time. Although annual rainfall totals may not change significantly, precipitation patterns are becoming more variable, with longer dry periods interrupted by years of intense rainfall. At the same time, higher temperatures increase evaporation and contribute to declining Sierra Nevada snowpack, an important source of water for Southern California. California is projected to face severe, long-term drought conditions more frequently, potentially occurring at least once per decade. This creates additional challenges for Glendale, which relies on the Metropolitan Water District of Southern California for approximately 60 to 70 percent of its potable water supply.

The impacts of prolonged drought extend beyond water shortages. Reduced water availability can stress parks, street trees, and local habitats, while dry conditions increase wildfire risk and contribute to poorer air quality. Extended drought and groundwater depletion may also lead to soil subsidence, which can affect building foundations and other infrastructure (Glendale CAAP, 2025).

4.4.7 Humanmade Hazards

Hazardous Materials

Hazardous material releases occur at facilities (fixed site) or along transportation routes (off-site). Releases occur because of human errors, technological failure, intentional acts (terrorism), or natural acts. Hazardous materials releases can cause injuries and sometimes death depending on the substance involved and type of release. These events can also contaminate air, water, and soils. While the probability of a hazardous materials release at either a fixed site or along local transportation corridors is relatively low, the consequences of the release of these materials have a high impact. Table 17 lists hazardous material sites in the city that are active, open, need evaluation, or have been referred to another agency for oversight (Department of Toxic Substance Control, n.d.). Figure 16 shows hazardous material sites in the city, with the southwestern portion of the city having the highest number of hazardous sites and a number of facilities concentrated along Foothill Boulevard.

To date, the city has not experienced a major hazardous materials release. However, there have been a number of minor incidents. Most hazardous materials incidents have occurred in off-site locations on freeways and other major arteries. The largest impacts have spurred from releases of petroleum products such as gasoline and diesel fuel.

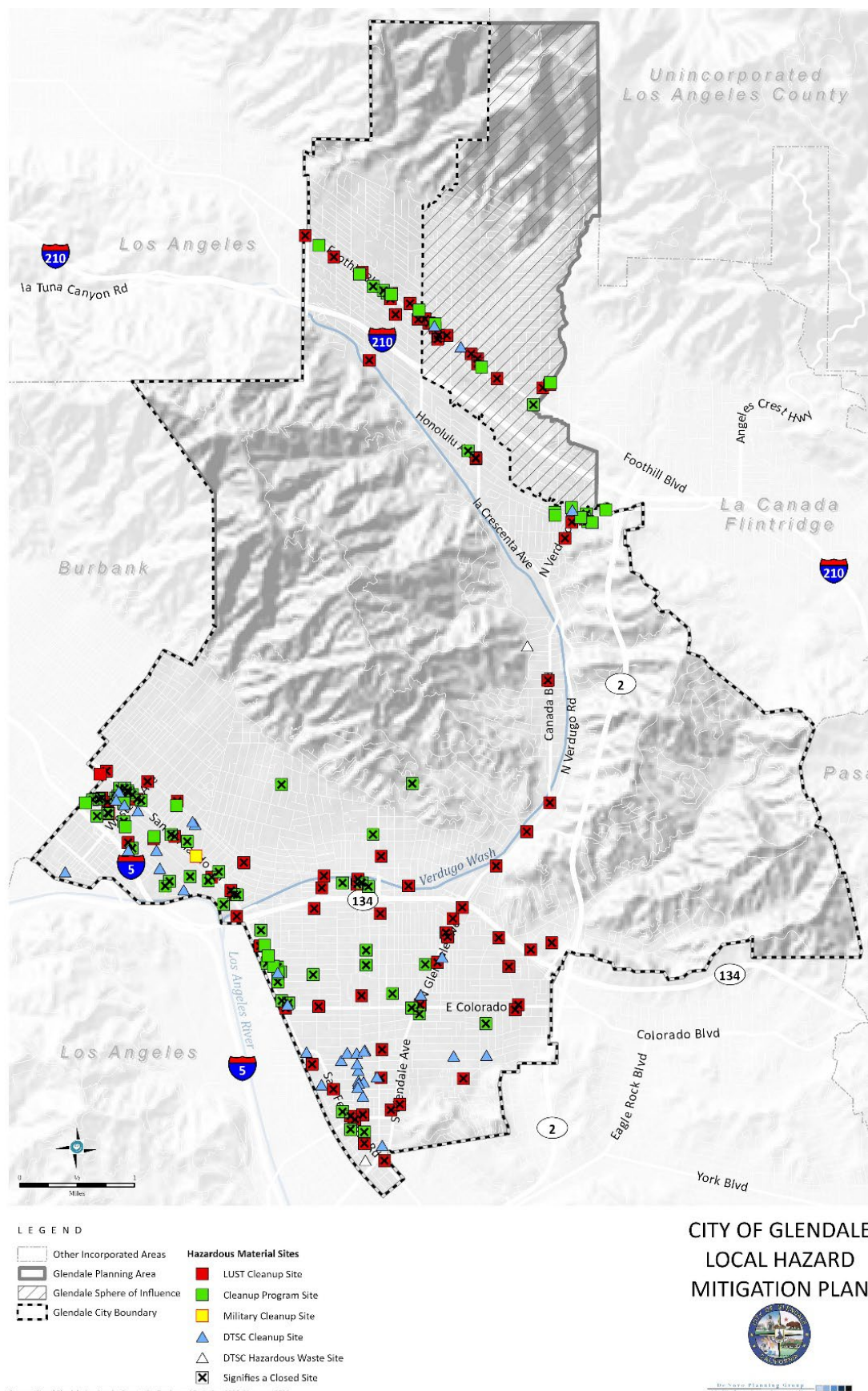
Table 17 Hazardous Material Sites in Glendale

Site Name	Facility ID	Site Type	Status
3731 PARK PLACE	T10000016866	Cleanup Program Site	COMPLETED - CASE CLOSED - LAND USE RESTRICTIONS
HI STAR AUTO SALES	SL603799586	Cleanup Program Site	OPEN - INACTIVE
HONOLULU CLEANERS	SL603799575	Cleanup Program Site	OPEN - SITE ASSESSMENT
MR. DRY CLEAN	SL603799574	Cleanup Program Site	OPEN - INACTIVE
3731 PARK PLACE	T10000016866	Cleanup Program Site	COMPLETED - CASE CLOSED - LAND USE RESTRICTIONS
AMERICAN METASEAL	T10000010277	Cleanup Program Site	OPEN - REMEDIATION
COURTAULDS AEROSPACE	SL603799127	Cleanup Program Site	OPEN - REMEDIATION
DRILUBE COMPANY - PLANT 1	SL603799102	Cleanup Program Site	OPEN - REMEDIATION
FORMER REGENCY CLEANERS	T10000024491	Cleanup Program Site	OPEN - SITE ASSESSMENT
FUELING STATION BROCK BUS LINE	T0603700195	Cleanup Program Site	OPEN - INACTIVE
HONOLULU CLEANERS	SL603799575	Cleanup Program Site	OPEN - SITE ASSESSMENT
IPPOLITO FAMILY PROPERTIES, LLC	SL0603790780	Cleanup Program Site	OPEN - SITE ASSESSMENT
KEN'S BROACHING	SL603799110	Cleanup Program Site	OPEN - INACTIVE
LOCKHEED LIBRASCOPE	T10000003338	Cleanup Program Site	OPEN - ASSESSMENT & INTERIM REMEDIAL ACTION
STANDARD ARMAMENT	SL603798975	Cleanup Program Site	OPEN - ASSESSMENT & INTERIM REMEDIAL ACTION
WALT DISNEY COMPANY	SL603798977	Cleanup Program Site	OPEN - SITE ASSESSMENT
INTERSTATE BRANDS CORPORATION	T0603702543	LUST Cleanup Site	OPEN - REMEDIATION
A-1 CLEANERS	60003649	DTSC Cleanup Site	INACTIVE - NEEDS EVALUATION
BELMONT CLEANERS	60003673	DTSC Cleanup Site	INACTIVE - NEEDS EVALUATION

Site Name	Facility ID	Site Type	Status
BELMONT CLEANERS	60003671	DTSC Cleanup Site	INACTIVE - NEEDS EVALUATION
CALIFORNIA DRY CLEANER	60003668	DTSC Cleanup Site	INACTIVE - NEEDS EVALUATION
CHIEF UPHOLSTERY	60003670	DTSC Cleanup Site	INACTIVE - NEEDS EVALUATION
GLENDALE DYE WORKS	60003672	DTSC Cleanup Site	INACTIVE - NEEDS EVALUATION
IRIS CLEANERS	60003640	DTSC Cleanup Site	INACTIVE - NEEDS EVALUATION
ORCHID CLEANERS	60003643	DTSC Cleanup Site	INACTIVE - NEEDS EVALUATION
PALACE CLEANERS GLENDALE	60003667	DTSC Cleanup Site	INACTIVE - NEEDS EVALUATION
TAKAHASHI ROY	60003669	DTSC Cleanup Site	INACTIVE - NEEDS EVALUATION
TREANORS CUSTOM DRAPERY SERVICE	60003641	DTSC Cleanup Site	INACTIVE - NEEDS EVALUATION
WADSWORTH J W	60003642	DTSC Cleanup Site	INACTIVE - NEEDS EVALUATION
ARARAT GARDENS	60003633	DTSC Cleanup Site	INACTIVE - NEEDS EVALUATION
GLENDALE PROPERTY	60003853	DTSC Cleanup Site	ACTIVE
IPPOLITO ESTATE	19200021	DTSC Cleanup Site	INACTIVE - NEEDS EVALUATION
KINNER MOTORS	80000163	DTSC Cleanup Site	INACTIVE - NEEDS EVALUATION
CENTRAL CLEANERS	60003360	DTSC Cleanup Site	ACTIVE
ELITE CLEANERS	60003362	DTSC Cleanup Site	ACTIVE
PALACE CLEANERS GLENDALE	60002013	DTSC Cleanup Site	ACTIVE
SAN FERNANDO VALLEY (AREA 2)	19990012	DTSC Cleanup Site	ACTIVE
THE DRILUBE CO.	71002199	DTSC Cleanup Site	ACTIVE
WINDSOR CLEANERS (721)	60003369	DTSC Cleanup Site	ACTIVE
WINDSOR CLEANERS (730)	60003368	DTSC Cleanup Site	ACTIVE
AUTOMATION PLATING CORP., 927 THOMPSON	71002201	DTSC Cleanup Site	REFER: OTHER AGENCY
ADAMS RITE PRODUCTS, INC.	71002786	DTSC Cleanup Site	REFER: OTHER AGENCY
AUTOMATION PLATING CORP., 902 THOMPSON	71003426	DTSC Cleanup Site	REFER: OTHER AGENCY
AUTOMATION PLATING CORP., 927 THOMPSON	71002201	DTSC Cleanup Site	REFER: OTHER AGENCY
GCG CORP.	71002489	DTSC Cleanup Site	REFER: OTHER AGENCY
EXTRA SPACE STORAGE FACILITY - GLENDALE	60002252	DTSC Cleanup Site	CERTIFIED O&M - LAND USE RESTRICTIONS ONLY

Site Name	Facility ID	Site Type	Status
Site Type			
<i>Cleanup Program Site: A location where hazardous substances have been released or disposed of improperly, and where DTSC is actively overseeing or conducting remediation efforts to address the contamination.</i>			
<i>LUST Cleanup Site: The remediation of sites where an unauthorized release (leak or spill) of hazardous substances, typically fuel hydrocarbons, has occurred from an Underground Storage Tank (UST).</i>			
<i>DTSC Cleanup Site: A location within California that the DTSC is tracking for various reasons related to hazardous waste.</i>			
Status			
<i>COMPLETED - CASE CLOSED - LAND USE RESTRICTIONS: a property where DTSC has placed limits or requirements on future use of the property due to varying levels of cleanup possible, practical, or necessary at the site.</i>			
<i>OPEN - SITE ASSESSMENT: Identifies a site where investigation is ongoing to determine if contamination exists.</i>			
<i>OPEN – INACTIVE: Identifies a site where the case is considered open but no active work is currently occurring.</i>			
<i>OPEN - ASSESSMENT & INTERIM REMEDIAL ACTION: Identifies a site where assessment is ongoing and partial cleanup has been implemented.</i>			
<i>OPEN – REMEDIATION: Identifies a site where the contamination has been characterized and primary cleanup is currently underway.</i>			
<i>INACTIVE - NEEDS EVALUATION: Identifies non-active sites where DTSC has determined a PEA or other evaluation is required.</i>			
<i>ACTIVE: Identifies that an investigation and/or remediation is currently in progress and that DTSC is actively involved, either in a lead or support capacity.</i>			
<i>REFER: OTHER AGENCY: Identifies sites that, based on limited information available to DTSC, appear to be more appropriately addressed by another agency.</i>			
<i>CERTIFIED O&M - LAND USE RESTRICTIONS ONLY: Identifies sites where a remedy is implemented and the selected remedy results in hazardous substances remaining at the site at concentrations above those acceptable for unrestricted use and a Land Use Restriction or Land Use Covenant has been recorded for the site.</i>			
<i>** EnviroStor site statuses reflect stages of investigation and cleanup defined by DTSC, including site assessment, interim remedial actions, and remedial action. Some status labels (e.g., 'inactive' or 'case closed') are administrative designations and are not explicitly defined in the EnviroStor glossary but are consistent with DTSC program practices.</i>			

Figure 16 Hazardous Material Sites in Glendale



Aviation Disasters

Aviation disasters that occur in densely populated residential areas can result in significant loss of life and property. When an aircraft impacts the ground, it may cause multiple explosions and intense fires. These conditions can lead to injuries, fatalities, and damage to structures at and surrounding the impact site.

Aviation disasters may result from mechanical failure, pilot error, or deliberate acts. The severity of an incident depends on several factors, including the size of the aircraft, the number of people on board, the location of the crash and whether it occurred in residential, commercial, or open areas, and the number of people on the ground. Response and recovery efforts typically require coordination among local governments, private organizations, and State and federal agencies.

On January 3, 1991, a small airplane (Piper 28) lost radar contact, turned toward terrain, struck a power line cable, and crashed, resulting in a fire. The pilot was killed, and no injuries or fatalities occurred on the ground. Another documented airplane crash in Glendale occurred on June 21, 1969, resulting in three fatalities.

More recently, on September 22, 2017, a single-engine plane carrying two people made an emergency landing on Allen Street after losing engine power. The pilot and passenger sustained minor injuries, and no buildings or individuals on the ground were impacted.

While only three airplane crashes have been documented in Glendale, nearby incidents demonstrate the potential severity of aviation disasters in residential areas. On August 31, 1986, an Aeromexico DC-9 collided with a Piper Archer PA-28 over Cerritos. The crash resulted in 82 fatalities, including 64 people on the jetliner, three in the Piper, and 15 on the ground. Property damage totaled nearly 4 million dollars, and 17 homes were severely damaged or destroyed.

Vehicular Disasters

Vehicular disasters can include the use of vehicles as ramming weapons to intentionally harm pedestrians. This type of attack has emerged as a global trend, making public spaces with vehicle access potential targets. These incidents do not require specialized or hard-to-obtain weapons and instead involve the misuse of common vehicles such as cars and trucks to drive into crowds and cause injuries or fatalities.

Public gatherings and open spaces in the City of Glendale, such as farmers markets and street protests, may be vulnerable to this type of hazard. Prevention measures include the installation of bollards, traffic calming features, and the temporary use of large City-owned vehicles to restrict access during events.

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5 Risk Assessment

A risk assessment is a structured process of identifying vulnerable assets, analyzing how different hazards could affect them, and estimating the resulting losses. Its purpose is to give the community a clear understanding of the most significant risks facing the city. This process identifies and quantifies at-risk elements such as people, buildings, critical facilities, and other key assets, using the best available data and considering the severity of each hazard. It also evaluates how these hazards could impact the city and its functions, pinpoints the areas most susceptible to each threat, and estimates potential damage or losses to critical facilities and community assets.

5.1 Community Lifelines and Critical Facilities

Community lifelines are the community services essential for maintaining public health, safety and economic viability, and are essential to the overall functionality of a community. Critical facilities are the buildings and infrastructure necessary to deliver and sustain these services. The ability of critical facilities to remain operational during and after a disaster significantly influences the severity of the resulting impacts and the speed at which the community can recover. Community lifeline systems include water, sewage, electricity, communication, transportation (highways, roads, bridges, railroads, airports, and public transit systems), natural gas, and liquid fuel systems. Critical facilities include schools, hospitals, fire and police stations, emergency operation centers, communication centers, cooling centers, and other facilities that could result in adverse impacts if damaged.

Identification of Critical Facilities

The placement of critical facilities is central to effective hazard mitigation because their ability to function during and after a disaster directly affects community safety, response capacity, and recovery speed. Facilities located in high-risk areas such as wildfire-prone zones and seismic hazard zones are more likely to be damaged or become inoperable during emergencies, reducing the community’s response capabilities when these services are needed most. Locating critical facilities outside of hazard areas helps ensure essential services can remain operational, reduces potential loss of life, minimizes costly disruptions, and protects critical infrastructure investments. Additionally, evaluating existing and planned facility locations supports long-term community resilience by guiding future land-use and infrastructure decisions.

The HMPC identified categories of critical facilities throughout the city based on the list of critical facilities previously documented in the City’s General Plan Safety Element, as well as additional facilities identified as part of the hazard and risk assessment of the LHMP. This list includes a total of 307 essential government, emergency response, health, education, utility, transportation, communication, recreation, and potential shelter facilities (Table 18). Critical facilities are categorized as essential facilities, high potential loss facilities, and transportation and lifeline facilities. Essential facilities refer to those that are necessary for health and welfare of the community, such as City Hall, which houses the emergency operations center. Several critical facilities provide multiple functions, such as some community centers which serve as both as park facilities and designated cooling centers. High potential loss facilities are critical structures in which damage or loss would result in significant loss of life, property damage, or severe economic impact, such as high-rise buildings housing large populations. Transportation lifeline facilities include highways, railways, bus systems, and airports. Critical facilities in Glendale are scattered throughout the city. Many critical facilities are concentrated in the southwestern and northern areas of the city, where the majority of development is located (Table 18). Interstate 210, State Route 2, and Verdugo Road serve as important connections between critical facilities and development in the northern part of the city and the rest of the city.

Table 18 Critical Facilities and Community Lifelines

Category	Type	Count
Essential Facility	City Hall	1
Essential Facility	Fire Station	9
Essential Facility	Hospitals/Medical Care	3
Essential Facility	Landfill/Waste Management	2

		Risk Assessment
Category	Type	Count
Essential Facility	Library	8
Essential Facility	Park	48
Essential Facility	Police Station	2
Essential Facility	Potable/Recycled Water Pump Station	26
Essential Facility	Potential Shelter Locations*	25
Essential Facility	Recycled Water Pump Station	7
Essential Facility	School	53
Essential Facility	Water Treatment Plant	2
Essential Facility	Glendale Water and Power	1
Essential Facility	Perkins Building	1
High Potential Loss	Communication Facility	3
High Potential Loss	Electric Power Facility	1
High Potential Loss	Recycling Facility	3
High Potential Loss	High Rise Building	27
Transportation Lifeline	Highway Bridge	80
Transportation Lifeline	Railway Bridge	4
Total		307

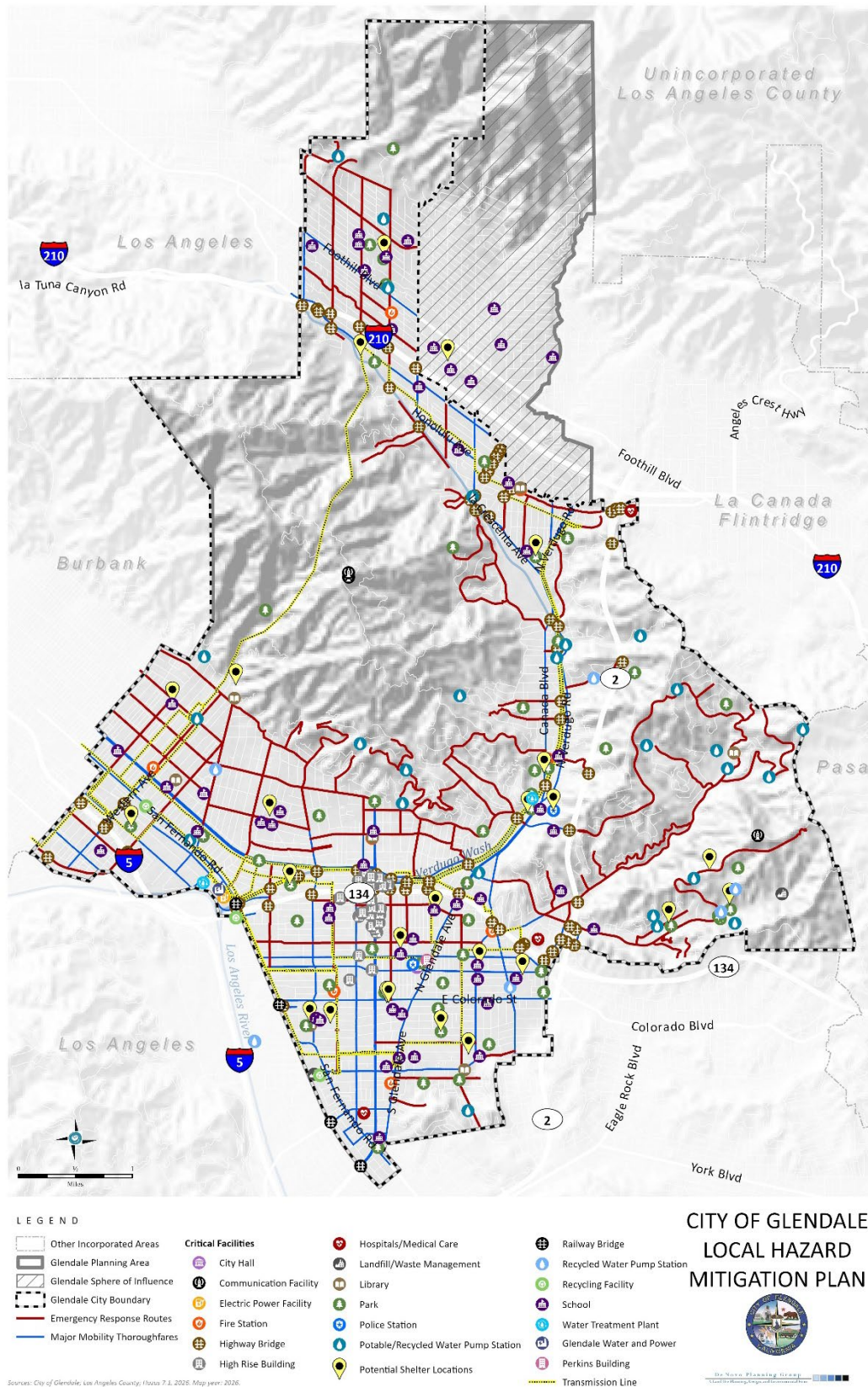
* Potential shelter locations were identified in the General Plan Safety Element as emergency shelters for displaced residents, as well as staging and communication areas for emergency response personnel during and after a disaster.

Additional transportation and lifeline facilities in Glendale include the network of roadways comprised of local streets and regional and state highways, as well as electrical transmission lines traversing the city (Table 19). Lifeline facilities such as natural gas and liquid fuel lines are vital assets to the city, providing energy resources to support essential functions, but are also potential vulnerabilities, as damage from hazards can result in service disruptions and public safety risks. Due to privacy and security considerations, these facilities are not mapped and therefore were excluded from the risk assessment. Transportation and lifeline facilities assessed in this risk assessment utilize Hazus roadway data (see Table 19). In contrast, the critical facilities mapped in Figure 17 includes key thoroughfares and emergency routes identified in the City's Safety Element. Although there is substantial overlap between these roadways, minor discrepancies may exist due to differences in data sources. While not included in the spatial risk assessment, transit systems, such as local and regional bus systems and the City's curb-to-curb shuttle service, Glendale Dial-A-Ride, could experience service interruptions, reduced operating capacity, and EV charging issues due to hazard events. Certain populations are likely to be disproportionately impacted by disruptions to public transit systems because they rely on transit as their primary means of transportation to access employment, healthcare, and other essential resources.

Table 19 Transportation and Lifeline Facilities

Type	Miles
Transmission Line	56.69
Railroad	6.70
Highway	66.57
Major Road	85.97
City Street	638.30
Access Ramp	55.40
Other	18.80
Trail	50.50
Alley	74.02
Total	1,052.95

City of Glendale
City of Glendale Local Hazard Mitigation Plan
Figure 17 Critical Facilities and Community Lifelines



5.2 Vulnerable Populations

Vulnerable populations are often at the highest risk for experiencing significant losses due to their limited capacity to prepare for, respond to, and recover from disasters. These groups are frequently overlooked during planning and engagement activities and may have limited access to disaster related information or have specific challenges that could impact their ability to prepare for and respond to disasters. Therefore, hazard mitigation planning should address groups with higher risk exposure to help avoid disproportionate impacts. Vulnerable populations in Glendale include (see Table 20):

- Individuals with high outdoor exposure
- Individuals facing societal barriers
- Individuals with chronic health conditions and health related sensitivities
- Under-resourced individuals

A social vulnerability index was developed as part of the Climate Change Vulnerability assessment prepared for the City's General Plan Safety Element and Climate Action and Adaptation Plan. The index used 31 population indicators (see highlighted rows in Table 20) to identify areas within the city with higher concentrations of characteristics associated with increased sensitivity to climate hazards. Census tracts were ranked on a scale of 0 to 100, with higher percentile scores assigned to areas with higher proportions of vulnerable populations. Census tracts above the 60th percentile are considered high social vulnerability areas. South and southwest Glendale have the greatest concentration of vulnerable populations. (Figure 18). Additional areas with high social vulnerability were identified by focus groups comprised of representatives from local community-based organizations as part of the City's Climate Action and Adaptation Plan.

Table 20 Vulnerable Populations in Glendale

Population Type	Population Description	Percentage of Total Population/ Household Type
Individuals with High Outdoor Exposure		
Outdoor Workers	Individuals who are employed, 16 and older, and work outdoors	8%
People experiencing houselessness ¹	Individuals who currently lack fixed, regular, and adequate housing	0.1%
Visitors ²	Individuals who are not residents and are visiting Glendale for a limited time	Not Available
People who use active transportation*	People who primarily get around by walking, biking, or other active mode of transportation	9%
People who use public transit*	People who primarily get around by buses, trains, subways, and other forms of public transportation	3%
Individuals Facing Societal Barriers		
Black, Indigenous, and People of Color (BIPOC)	Individuals who do not identify as white	23%
Native Americans	Individuals who identify as American Native and Alaskan Native	0.6%
Limited or non-English speakers	Households with individuals who are non or limited English-speaking	11%
Immigrants ³	Individuals residing in the United States with legal documentation	51%
People who are undocumented ⁴	Individuals residing in the United States without legal documentation	6%
Individuals with Chronic Health Conditions or Health Related Sensitivities		
Seniors	Individuals 65 years or older	18%
Young children and their parents/caregivers*	Individuals 5 years and younger and their parents/caregivers	5%
People who are differently abled	Individuals with access and functional needs (physical and mental)	26%
Individuals with asthma*	Individuals diagnosed with asthma	9%
Individuals with cardiovascular disease	Individuals diagnosed with coronary heart disease	6%
People with diabetes*	Individuals diagnosed with diabetes	9%
People with high blood pressure*	Individuals diagnosed with high blood pressure	28%

Population Type	Population Description	Percentage of Total Population/ Household Type
People with stroke risks*	People with disproportionately high risk for stroke	3%
Military Veterans	Individuals who have served but are not currently serving in the US Armed Forces	2%
Pregnant people*	Individual with a baby or babies developing inside the womb	Not Available
Under-Resourced Individuals		
People experiencing poverty	Household incomes less than 80% of the State median household income	14%
Unemployed	Percentage of population aged 18-64 who are unemployed	7%
Individuals with no health insurance	Individuals aged 18 to 64 years old currently uninsured	7%
Households without a computer	Households without access to a computer	6%
Households without broadband internet	Households without access to broadband internet	26%
Renters	Housing units that are renter occupied	64%
Individuals without vehicle access	Individuals without access to a vehicle	17%
Single female heads of household with kids	Households with kids supported by a single female	14%
Individuals with education attainment less than 4 years of high school	Percentage of people over age 18 without a high school education or higher	10%
People in overcrowded households	Household with more than one person per room	5%
Mobile home households	Housing units that are mobile homes	0.1%
Households experiencing housing burden	Percentage of households that spend more than 30% of their gross household income on housing costs	11%
Students	Individuals 3 years and older enrolled in school	23%
People who live in areas of high violent crime	Percentage of areas that have an above average risk of crime occurring relative to the US average.	63%
Households using fuels for heating*	Households using solid fuels, kerosene, and gas to heat home	78%

Population Type	Population Description	Percentage of Total Population/ Household Type
Residents without air conditioning ^{7*}	Households without air conditioning	Not Available
Households experiencing energy burden	Percentage of gross household income spent on energy costs	1%

Source: City of Glendale. 2023. City of Glendale Climate Change Vulnerability Assessment (CCVA).

Highlighted rows indicate population indicators for which census level data for Glendale was available, and therefore were included in the social vulnerability index mapping of the CCVA.

¹ People experiencing houselessness percentage is calculated using data for Glendale from the City's 2023 Glendale Homeless County (195 sheltered and unsheltered) and the 2020 City of Glendale Population from the Census (196,543). Data for this group was not available at the Census tract level for Glendale and therefore was not included in the CCVA Social Vulnerability Index.

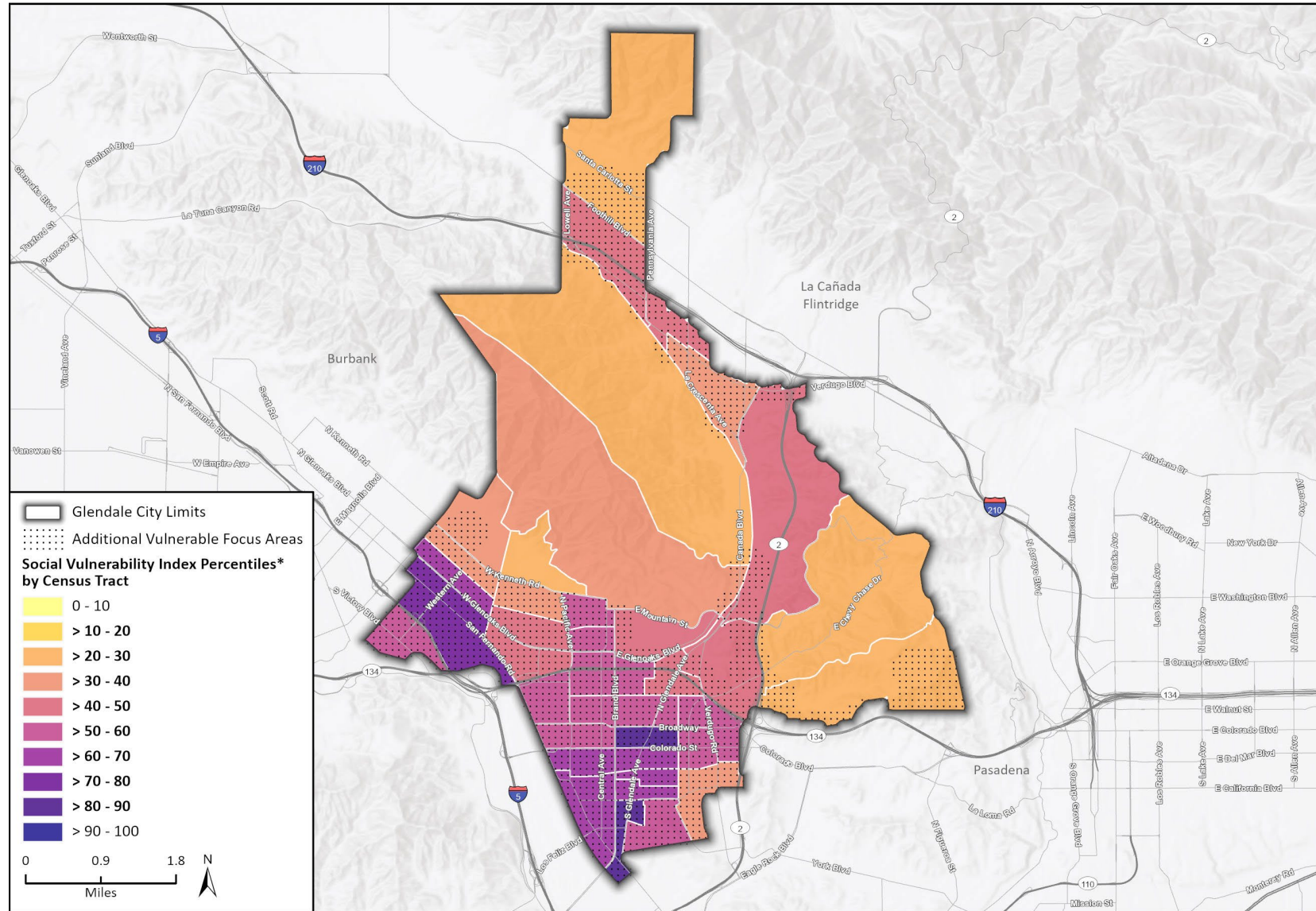
² Data for visitors was not available at the Census tract or city level for Glendale and therefore was not included in the CCVA Social Vulnerability Index.

³ Immigrants with legal documentation percentage is calculated using data for Glendale and is sourced from the California Immigrant Data Portal (99,796 immigrants with legal documentation in Glendale in 2019, most recent year available) and the 2020 City of Glendale Population from the Census (196,543). Data for this group was not available at the Census tract level for Glendale and therefore was not included in the CCVA Social Vulnerability Index.

⁴ People who are undocumented is calculated using data for Glendale and is sourced from the California Immigrant Data Portal (11,130 undocumented immigrants in Glendale in 2019, most recent year available) and the 2020 City of Glendale Population from the Census (196,543). Data for this group was not available at the Census tract level for Glendale and therefore was not included in the CCVA Social Vulnerability Index.

Source: The percentages used in this table were acquired from the U.S. Census, 2021 American Community Survey (ACS), CDC's PLACES Health Data, Esri's Crime Index, and U.S. Department of Energy LEAD Tool.

Figure 18 Social Vulnerability



Basemap provided by Esri and its licensors © 2023. Additional data provided by Esri Updated Demographics, 2022; U.S. Census Bureau, (ACS 2017-2021), 2020; CDC, 2010; LEAD tool, 2018. Social Vulnerability Analysis calculated by Rincon Consultants, Inc., 2023. * The City of Glendale's Social Vulnerability Index Percentiles range from 20 to 85.

5.3 Other Assets

Community assets beyond critical facilities include cultural and historic sites, museums, open space areas, and landmarks. These assets are often highly vulnerable to damage or loss from a disaster. Structural damage and failure of historic buildings and cultural sites can threaten artifacts and resources that cannot be replaced. Other assets, such as natural resources, public spaces and recreational amenities, and social infrastructure like schools, childcare centers, senior centers, and nonprofits, may face closures or service interruptions due to disasters. This can severely limit essential community support networks when residents need them most. Local businesses, especially small businesses, may also experience temporary or permanent closure and financial losses that can reduce employment opportunities and limit access to important goods and services. The disruption or destruction of these community assets not only affects physical structures but can also impact community identity, cultural continuity, and individual resilience following a disaster.

5.4 Risk Assessment and Potential Loss

The risk assessment identifies hazards most likely to affect the community and evaluates the level of risk to people, property, infrastructure, and essential services. The assessment examines local conditions, and potential future impacts to existing critical facilities and community assets. The findings from this analysis will highlight areas of vulnerability, which will guide the development of targeted mitigation strategies designed to reduce risk to people and property and build long-term community resilience.

5.5 Analysis of Potential Losses by Hazard

The risk assessment evaluates and quantifies potential losses of people, property, and critical infrastructure from the identified hazards most likely to affect Glendale. The analysis layers complementary methodologies to build a more comprehensive assessment of estimated risk. These methods include the use of FEMA's Hazus program for applicable hazards, as well as locally developed approaches to estimate potential losses for hazards not addressed by Hazus. Both the locally developed methodology and the Hazus analysis incorporate available local data to provide a more comprehensive assessment of risk.

FEMA's Hazus program is a nationally standardized, GIS-based risk modeling system designed to help communities estimate potential losses from natural hazard events. Hazus provides data-driven tools, models, and inventories for analyzing the impacts of earthquakes, floods, hurricanes, and tsunamis, allowing communities to quantify risk and inform mitigation planning. The risk assessment uses Hazus to estimate building damages, economic losses, displaced households, casualties, and debris generation for analyzing potential earthquake scenarios. Glendale has no designated flood hazard zones and is not expected to be impacted by hurricanes or tsunamis. The risk assessment of other applicable hazards used a GIS-based spatial analysis approach that overlays Los Angeles County Assessor's parcel data with hazard zone mapping to enable identification of structures, infrastructure, and critical facilities located within each hazard area and quantification of at-risk assets.

5.5.1 Earthquakes

Earthquakes have the potential to result in widespread structural damage, disruption of essential services, and injury and loss of life since they strike without warning and can affect large geographic areas simultaneously. In addition to physical destruction, earthquake impacts may include utility outages, transportation and communication disruptions, economic hardship for residents and businesses, and long-term recovery challenges.

Earthquakes can trigger compounding hazard events that significantly increases potential losses from secondary impacts such as fires, landslides, and dam or levee failure. Fire ignitions may occur when gas lines rupture or electrical systems fail. Seismic ground shaking can compromise roads, electrical and telecommunication lines, and underground utility pipelines. Damaged flood-control structures may result in downstream flooding, and weakened slopes may generate landslides that may block critical transportation routes. These cascading events can exacerbate damage and losses and strain the community's limited emergency response capabilities. This analysis examines the community's building stock, infrastructure systems, critical facilities, and vulnerable populations to understand the extent of damage that could occur during various earthquake scenarios.

While the risk assessment evaluates known hazards, it cannot fully account for cascading or compound events because these scenarios involve a high degree of uncertainty and complex interactions that are impossible to predict. Cascading events depend on numerous unpredictable variables, including the magnitude and location of the initial event, existing physical and environmental conditions, weather patterns, and human response. Therefore, cascading hazards are important considerations in hazard mitigation planning but cannot be accurately modeled. Instead, they are addressed through broader resilience strategies, such as redundancy, robust emergency planning, and interjurisdictional coordination, that help the community prepare for and respond to multi-hazard scenarios.

The risk assessment estimates damage and costs associated with earthquake risk and considers population and property distribution, earthquake frequency, landslide susceptibility, building and infrastructure placement, and disaster preparedness capabilities.

The Hazus analysis evaluated three potential earthquake scenarios on the Sierra Madre, Verdugo, and Raymond faults, as these three faults have the greatest potential to impact the city (see Table 21). The Sierra Madre, Verdugo, and Raymond faults lie directly beneath Glendale, and the Verdugo fault in particular underlies extensively developed areas of the city. Earthquakes along these faults are more likely to pose a significant threat to people and property than more distant faults, such as the San Andreas, which has higher probability of generating an earthquake but is farther from the city.

Table 21 Hazus Earthquake Scenarios

Fault	Magnitude*
Sierra Madre	7.2
Verdugo	6.9
Raymond	6.7

* Earthquake magnitudes were selected based on the most comparable scenarios used in the 2020 LHMP, which identified and analyzed potential worst-case earthquake events for the city.

Earthquake events along the Sierra Madre, Verdugo, and Raymond faults pose a risk to people, structures, and critical facilities. Hazus models and maps shaking intensity for earthquake scenarios, grouping areas into shaking intensity zones that experience a similar level of ground shaking. Shaking intensity zones are defined using the Modified Mercalli Intensity scale, which evaluates the effects of earthquakes based on observed effects (Table 11). Lower-intensity zones typically include areas farther from active faults or underlain by more stable soils, whereas higher-intensity zones generally occur closer to fault sources or in areas with soft soils that amplify shaking. Hazus overlays these shaking intensity zones with building inventories, critical facilities, transportation networks, utilities, and population data to estimate how many people and structures fall within each zone, allowing identification of potential risk, structural damage, and service disruptions that are likely to occur during an earthquake.

Under the three modeled earthquake scenarios on the Sierra Madre, Verdugo, and Raymond faults, the entire city and population are exposed to strong, very strong, and severe shaking, as shown in Table 22. The degree of shaking in each earthquake scenario primarily depends on the magnitude of the earthquake and distance to the fault. Accordingly, in the Verdugo fault scenario, almost the entire city's population would be exposed to severe shaking, as the Verdugo fault runs through the central part of the

city where people and development is concentrated. In this scenario, ordinary buildings may experience considerable damage with partial collapse, and poorly built structures with inadequate seismic design may experience greater damage. The Raymond fault is located immediately south of the city, close to areas of concentrated development. In the Raymond fault scenario, a majority of the population would be exposed to severe shaking, followed by very strong shaking, in which modern and well-designed structures may experience slight to moderate damage and poorly built structures may experience strong shaking, where the earthquake is felt by all but damage would be slight. While the Sierra Madre fault scenario includes the highest magnitude earthquake, fewer residents would experience severe shaking compared to the other scenarios since the Sierra Madre fault runs across the northern part of the city, farther from the majority of the city's residents and development.

Areas of the city with higher social vulnerability are primarily located in southern and southwestern portions of the city and may experience strong to severe earthquake shaking due to their proximity to the Verdugo and Raymond faults. Vulnerable populations that may be especially at risk from earthquakes include under-resourced individuals, individuals facing societal barriers, and individuals with chronic health conditions or health related sensitivities. Under-resourced individuals and individuals facing societal barriers are more likely to live in housing that has not been adequately hardened or maintained to withstand major earthquakes. In addition, these populations are more likely to be financially burdened by costs associated with injury and property damage from an earthquake. Limited and non-English speakers and individuals without a computer or broadband access may not have access to emergency information and governmental guidance. Individuals with health conditions and sensitivities, including seniors, young children, and people who are differently abled may be at higher risk of injury due to mobility challenges.

Table 22 Earthquake: Threatened Populations

Shaking Intensity Zone	Number of People
Sierra Madre 7.2	208,980
Very Strong (VII)	195,324
Severe (VIII)	13,656
Verdugo 6.9	208,980
Very Strong (VII)	660
Severe (VIII)	208,320
Raymond 6.7	208,980
Strong (VI)	186
Very Strong (VII)	30,815
Severe (VIII)	177,979

Property throughout the city is at risk from an earthquake, including all residential, commercial, governmental, industrial, and recreational parcels in the city, with a total property value of \$50,926,790,991 exposed to strong, very strong, and severe shaking in all three earthquake scenarios (Table 23, Table 24, and Table 25). The majority of exposed property assets consist of residential and commercial property. Property values used in this assessment reflect both improvement and land value of parcels and are based on assessed values. This may understate the true level of economic exposure due to Proposition 13, which limits annual increases in assessed property values below market value and potentially below the cost to repair or rebuild. Improved parcels are those that have been developed, usually with buildings, roads, utilities, paving, or landscaping. In the Sierra Madre fault scenario, most properties are exposed to very strong shaking, whereas the Verdugo fault and Raymond fault scenarios have the greatest number of properties exposed to severe shaking.

Table 23 Earthquake (Sierra Madre 7.2): Threatened Populations and Assets

Property Type/Shaking Intensity Zone	Improved Parcel Count	Improvement Value	Land Value	Total
Residential	45,610	\$14,744,002,160	\$21,781,160,206	\$36,525,162,366
Very Strong (VII)	37,296	\$12,709,073,367	\$17,843,723,226	\$30,552,796,593
Severe (VIII)	8,314	\$2,034,928,793	\$3,937,436,980	\$5,972,365,773
Commercial	2,683	\$6,936,070,457	\$3,918,119,762	\$10,854,190,219
Very Strong (VII)	2,167	\$6,650,352,977	\$3,501,204,120	\$10,151,557,097
Severe (VIII)	516	\$285,717,480	\$416,915,642	\$702,633,122
Government	744	\$1,690,532	\$5,943,863	\$7,634,395
Very Strong (VII)	579	\$1,690,532	\$5,447,726	\$7,138,258
Severe (VIII)	165	N/A	\$496,137	\$496,137
Industrial	854	\$1,250,537,643	\$1,232,821,865	\$2,483,359,508
Very Strong (VII)	815	\$1,224,353,996	\$1,196,024,920	\$2,420,378,916
Severe (VIII)	39	\$26,183,647	\$36,796,945	\$62,980,592
Institutional	255	\$500,929,795	\$351,176,957	\$852,106,752
Very Strong (VII)	196	\$389,290,571	\$282,584,143	\$671,874,714
Severe (VIII)	59	\$111,639,224	\$68,592,814	\$180,232,038
Recreational	116	\$81,389,702	\$122,948,049	\$204,337,751
Very Strong (VII)	80	\$59,712,098	\$89,636,506	\$149,348,604
Severe (VIII)	36	\$21,677,604	\$33,311,543	\$54,989,147
Total	50,262	\$23,514,620,289	\$27,412,170,702	\$50,926,790,991

Note: N/A indicates data from the Los Angeles County's Assessor's Office not available or does not exist

Table 24 Earthquake (Verdugo 6.9): Threatened Populations and Assets

Property Type/Shaking Intensity Zone	Parcel Count	Improvement Value	Land Value	Total
Residential	45,610	\$14,744,002,160	\$21,781,160,206	\$36,525,162,366
Very Strong (VII)	3,104	\$997,866,464	\$1,654,469,129	\$2,652,335,593
Severe (VIII)	42,506	\$13,746,135,696	\$20,126,691,077	\$33,872,826,773
Commercial	2,683	\$6,936,070,457	\$3,918,119,762	\$10,854,190,219
Very Strong (VII)	3	\$1,419,701	\$14,745,542	\$16,165,243
Severe (VIII)	2,680	\$6,934,650,756	\$3,903,374,220	\$10,838,024,976
Government	744	\$1,690,532	\$5,943,863	\$7,634,395
Very Strong (VII)	111	N/A	\$1,641	\$1,641
Severe (VIII)	633	\$1,690,532	\$5,942,222	\$7,632,754
Industrial	854	\$1,250,537,643	\$1,232,821,865	\$2,483,359,508
Very Strong (VII)	1	N/A	N/A	N/A
Severe (VIII)	853	\$1,250,537,643	\$1,232,821,865	\$2,483,359,508
Institutional	255	\$500,929,795	\$351,176,957	\$852,106,752
Very Strong (VII)	2	\$22,455,231	\$1,840,139	\$24,295,370
Severe (VIII)	253	\$478,474,564	\$349,336,818	\$827,811,382
Recreational	116	\$81,389,702	\$122,948,049	\$204,337,751
Very Strong (VII)	18	\$2,347,069	\$10,011,145	\$12,358,214
Severe (VIII)	98	\$79,042,633	\$112,936,904	\$191,979,537
Total	50,262	\$23,514,620,289	\$27,412,170,702	\$50,926,790,991
Note: N/A indicates data from the Los Angeles County's Assessor's Office not available or does not exist				

Table 25 Earthquake (Raymond 6.7): Threatened Populations and Assets

Property Type/Shaking Intensity Zone	Improved Parcel Count	Improvement Value	Land Value	Total
Residential	45,610	\$14,744,002,160	\$21,781,160,206	\$36,525,162,366
Strong (VI)	153	\$41,404,843	\$68,958,035	\$110,362,878
Very Strong (VII)	23,267	\$6,668,578,827	\$11,964,421,082	\$18,632,999,909
Severe (VIII)	22,190	\$8,034,018,490	\$9,747,781,089	\$17,781,799,579
Commercial	2,683	\$6,936,070,457	\$3,918,119,762	\$10,854,190,219
Strong (VI)	2	N/A	\$1,098,555	\$1,098,555
Very Strong (VII)	859	\$847,466,283	\$805,329,015	\$1,652,795,298
Severe (VIII)	1,822	\$6,088,604,174	\$3,111,692,192	\$9,200,296,366
Government	744	\$1,690,532	\$5,943,863	\$7,634,395
Strong (VI)	44	N/A	\$75,616	\$75,616
Very Strong (VII)	490	\$1,026,054	\$1,704,143	\$2,730,197
Severe (VIII)	210	\$664,478	\$4,164,104	\$4,828,582
Industrial	854	\$1,250,537,643	\$1,232,821,865	\$2,483,359,508
Strong (VI)	4	\$174,412	\$48,896	\$223,308
Very Strong (VII)	324	\$753,940,643	\$576,658,747	\$1,330,599,390
Severe (VIII)	526	\$496,422,588	\$656,114,222	\$1,152,536,810
Institutional	255	\$500,929,795	\$351,176,957	\$852,106,752
Strong (VI)	2	\$184,066	\$537,627	\$721,693
Very Strong (VII)	90	\$194,238,885	\$132,152,788	\$326,391,673
Severe (VIII)	163	\$306,506,844	\$218,486,542	\$524,993,386
Recreational	116	\$81,389,702	\$122,948,049	\$204,337,751
Strong (VI)	7	\$1,775,693	\$1,399,244	\$3,174,937
Very Strong (VII)	69	\$33,006,568	\$70,396,192	\$103,402,760
Severe (VIII)	40	\$46,607,441	\$51,152,613	\$97,760,054
Total	50,262	\$23,514,620,289	\$27,412,170,702	\$50,926,790,991

Note: N/A indicates data from the Los Angeles County's Assessor's Office not available or does not exist

Critical facilities, including City Hall, schools, fire stations, police stations, and essential public facilities, may experience varying degrees of damage and reduced functionality from earthquakes. In the Verdugo fault earthquake scenario, most critical facilities within the city, including all highway and railroad bridges, would be exposed to severe shaking. In the Sierra Madre and Raymond fault earthquake scenarios, most critical facilities within the city would be exposed to very strong or severe shaking. Damage to essential public facilities, such as water pumps and treatment facilities, communication facilities, and the electric power facility could result in loss of water supply or electricity to thousands of residents. Disruptions to power and water services can have cascading impacts on other community lifelines and critical facilities, including hospitals, cooling centers, emergency operations, wastewater facilities, and communications systems. Loss of electricity can also affect traffic signals and reduced water pressure or supply can impair firefighting capability.

Table 26 Earthquake (Sierra Madre 7.2): Critical Facilities at Risk

Infrastructure Type	Very Strong (VII) Shaking Intensity Zone	Severe (VIII) Shaking Intensity Zone	Total
Essential Facility			
City Hall	1	0	1
Library	7	1	8
Park	41	8	49
Potable/Recycled Water Pump Station	22	4	26
Recycled Water Pump Station	7	0	7
Water Treatment Plant	2	0	2
Landfill/Waste Management	2	0	2
Potential Shelter Locations	21	4	25
Fire Stations	7	2	9
Hospitals/Medical Care	2	1	3
Police Stations	2	0	2
Schools	36	17	53
Glendale Water and Power	1	0	1
Perkins Building	1	0	1
High Potential Loss			
Utility-Communication Facility	3	0	3
Utility-Electric Power Facility	1	0	1
Recycling Facility	3	0	3
High-Rise Buildings	27	0	27
Transportation and Lifeline			
Highway Bridge	52	28	80
Railway Bridge	4	0	4
Total	151		307

Table 27 Earthquake (Verdugo 6.9): Critical Facilities at Risk

Infrastructure Type	Very Strong (VII) Shaking Intensity Zone	Severe (VIII) Shaking Intensity Zone	Total
Essential Facility			
City Hall	0	1	1
Library	1	7	8
Park	7	42	49
Potable/Recycled Water Pump Station	10	16	26
Recycled Water Pump Station	2	5	7
Water Treatment Plant	0	2	2
Landfill/Waste Management	1	1	2
Potential Shelter Locations	2	23	25
Fire Stations	1	8	9
Hospitals/Medical Care	0	3	3
Police Stations	0	3	2
Schools	0	53	53
Glendale Water and Power	0	1	1
Perkins Building	0	1	1
High Potential Loss			
Utility-Communication Facility	1	2	3
Utility-Electric Power Facility	0	1	1
Recycling Facility	0	3	3
High-Rise Buildings	0	27	27
Transportation and Lifeline			
Highway Bridge	0	80	80
Railway Bridge	0	4	4
Total			307

Table 28 Earthquake (Raymond 6.7): Critical Facilities at Risk

Infrastructure Type	Strong (VI) Shaking Intensity Zone	Very Strong (VII) Shaking Intensity Zone	Severe (VIII) Shaking Intensity Zone	Total
Essential Facility				
City Hall	0	0	1	1
Library	0	4	4	8
Park	1	23	25	49
Potable/Recycled Water Pump Station	0	22	4	26
Recycled Water Pump Station	0	4	3	7
Water Treatment Plant	0	0	2	2
Landfill/Waste Management	0	1	1	2
Potential Shelter Locations	0	11	14	25
Fire Stations	0	5	4	9
Hospitals/Medical Care	0	1	2	3
Police Stations	0	1	1	2
Schools	0	26	27	53
Glendale Water and Power	0	0	1	1
Perkins Building	0	0	1	1
High Potential Loss				
Utility-Communication Facility	0	3	0	3
Utility-Electric Power Facility	0	0	1	1
Recycling Facility	0	1	2	3
High-Rise Buildings	0	0	27	27
Transportation and Lifeline				
Highway Bridge	1	45	34	80
Railway Bridge	0	0	4	4
Total				307

All three earthquake scenarios expose lifeline facilities to very strong and severe shaking (Table 29, Table 30, and Table 31). Under the Verdugo fault scenario, almost 57 miles of transmission lines, seven miles of railroad, and 881 miles of roadways would be exposed to severe shaking, which could result in damage that could disrupt power supply and critical transportation corridors, limiting emergency response and evacuation efforts. Damage to transmission lines could result in electrical system disruptions. Under the Sierra Madre fault and Raymond fault scenario most of the city's railroad and roadways would be exposed to very strong shaking, and under the Raymond fault scenario railroad and roadways are primarily exposed to very strong or severe shaking. While fewer roadway miles are exposed to severe shaking in these scenarios, critical transportation corridors may still be impacted and could impede emergency response and evacuation. Damage to roadways, bridges, and rail corridors could result in temporary closures, service disruptions, and reduced public transit reliability citywide. These disruptions would likely disproportionately affect under-resourced individuals who rely on buses and rail service for evacuation, emergency access, and essential daily travel.

Table 29 Earthquake (Sierra Madre 7.2): Lifelines at Risk

Facility Types	Very Strong (VII) Shaking Intensity Zone	Severe (VIII) Shaking Intensity Zone	Total
Transmission Line	49.23	7.4	56.63
Railroad	6.67	0	6.67
Roads			
Highway	52.68	13.89	66.57
Major Road	68.37	17.60	85.97
City Street	479.38	157.97	638.33
Access Ramp	44.18	11.25	55.43
Other	17.59	1.18	18.77
Trail	48.25	0.37	50.52
Alley	53.76	20.14	74.02
Roads Total	764.22	222.40	989.61
Total			1,052.91

Table 30 Earthquake (Verdugo 6.9): Lifelines at Risk

Facility Types	Very Strong (VII) Shaking Intensity Zone	Severe (VIII) Shaking Intensity Zone	Total
Transmission Line	0.69	55.94	56.63
Railroad	0.00	6.67	0.00
Roads			
Highway	4.60	61.97	66.57
Major Road	5.49	80.48	85.97
City Street	58.16	580.17	638.33
Access Ramp	3.45	51.98	55.43
Other	2.75	16.00	18.75
Trail	23.75	26.80	50.55
Alley	10.60	63.40	74.00
Roads Total	108.80	880.80	989.60
Total			1,052.90

Table 31 Earthquake (Raymond 6.7): Lifelines at Risk

Facility Types	Strong (VI) Shaking Intensity Zone	Very Strong (VII) Shaking Intensity Zone	Severe (VIII) Shaking Intensity Zone	Total
Transmission Line	1.1	21.35	34.18	56.63
Railroad	0.00	2.02	4.64	6.66
Roads				
Highway	3.95	30.79	31.83	66.57
Major Road	2.21	35.96	47.80	85.97
City Street	14.65	369.14	254.54	638.33
Access Ramp	2.18	18.96	34.29	55.43
Other	0.12	10.64	8.00	18.76
Trail	11.13	34.90	4.49	50.52
Alley	7.20	50.69	16.12	74.01
Roads Total	41.44	551.08	397.07	989.59
Total				1,052.88

5.5.2 Wildfires

Glendale faces elevated wildfire risk due to the extensive areas within fire hazard severity zones along the foothills of the San Rafael Hills and the Verdugo and San Gabriel Mountains. The region's climate is also a major contributor to the potential for wildfire events, with hot, dry summers, Santa Ana winds in the fall, and sloping topography that supports the spread of wildfire. In addition, increases in temperatures and prolonged droughts due to climate change will increase the frequency of conditions that lead to wildfire, resulting in more frequent and severe wildfire events.

The development of homes and other structures encroaches into vegetation areas that are primarily undeveloped. Overhead electrical lines also increase the risk of wildfire in these areas. Neighborhoods at this interface are characterized by a diverse mixture of housing structures, development patterns, ornamental and natural vegetation, and natural fuels. In the event of a wildfire, this diverse mixture of vegetation, structures and development patterns, compounded by the local topography and weather, could result in an unwieldy and unpredictable fire. Given the high wildfire risk in these areas, enhanced wildfire protection measures are necessary for protecting people and development, including maintaining sufficient emergency and evacuation access, implementing firebreaks, ensuring proximity to water sources for firefighting, and providing adequate firefighting personnel and equipment.

People and assets located within fire hazard severity zones are particularly vulnerable to wildfire due to their close proximity to potential fuels. These communities often face additional challenges with wildfire events, including limited access and egress, steep and narrow roadways, and greater distance from fire suppression resources. Residents in neighborhoods in very high fire hazard severity zones, especially those with only one point of access are especially at risk of experiencing evacuation challenges in the event of a wildfire. The Safety Element identifies these areas as concentrated in the Chevy Chase and Verdugo Mountain areas.

Potential losses due to future wildfire events were estimated by overlaying property value data from the Los Angeles County's Assessor's Office with CAL FIRE Fire Hazard Severity Zone maps. A large portion of residents are at risk from wildfire, including 10,738 residents within the moderate fire hazard severity zone, 8,339 residents within the high fire hazard severity zone, and 15,982 residents within the very high fire hazard severity zone, as shown in Table 32.

Areas of the city with higher social vulnerability in southern and southwestern parts of the city are adjacent to moderate, high, and very high fire hazard severity zones, indicating elevated risk of wildfire impacts. Wildfire poses an increased risk to individuals with high outdoor exposure, under-resourced individuals, individuals facing societal barriers, and individuals with chronic health conditions or health related sensitivities. Outdoors workers and other individuals with high outdoor exposure may face disproportionate exposure to wildfire smoke which can exacerbate existing respiratory conditions, mental illness, and chronic health conditions. Under-resourced individuals are likely to experience financial burden associated with medical treatment and property loss or damage from wildfire. In addition, they are less likely to live in housing that is adequately hardened and weatherized. Individuals facing societal barriers, such as limited and non-English speakers, may not have adequate access to advisory warnings and government guidance, limiting their access to resources and safe evacuation. Individuals with chronic health conditions and health related sensitivities may be more susceptible to injuries or death from burns. In addition, people who are differently abled, young children, seniors, and individuals without access to a vehicle may have difficulty evacuating from wildfires.

Table 32 Wildfire: Threatened Populations

Fire Hazard Severity Zone	Number of People
Moderate	10,738
High	8,339
Very High	15,982
Total	35,059

Portions of the city within the Moderate, High, and Very High Fire Hazard Severity Zones are at risk from wildfire, encompassing a total of \$23,392,408,695 in property assets, not accounting for reductions in assessed values due to Proposition 13. Assets within moderate, high, and very high fire hazard severity zones primarily include residential property. The majority of these properties lie within areas designated as very high fire hazard severity zones, as shown in Table 33.

Table 33 Wildfire: Threatened Residential Property

Property Type	Fire Hazard Severity Zone	Improved Parcel Count	Improvement Value	Land Value	Total
Residential	Moderate	3,600	\$997,455,001	\$1,651,536,152	\$2,648,991,153
	High	3,331	\$807,194,393	\$1,534,486,202	\$2,341,680,595
	Very High	19,981	\$5,704,094,904	\$10,154,702,613	\$15,858,797,517
Commercial	Moderate	179	\$342,227,025	\$196,782,657	\$539,009,682
	High	140	\$61,989,724	\$99,545,151	\$161,534,875
	Very High	332	\$300,592,633	\$304,727,538	\$605,320,171
Government	Moderate	33	N/A	N/A	N/A
	High	32	N/A	N/A	N/A
	Very High	510	N/A	\$95,502	\$95,502
Industrial	Moderate	49	\$40,957,822	\$28,835,787	\$69,793,609
	High	22	\$21,375,868	\$21,167,373	\$42,543,241
	Very High	56	\$480,115,033	\$185,284,105	\$665,399,138
Institutional	Moderate	18	\$39,065,782	\$15,324,478	\$54,390,260
	High	25	\$35,822,349	\$37,047,422	\$72,869,771
	Very High	50	\$139,507,299	\$90,882,150	\$230,389,449
Recreational	Moderate	6	\$551,097	\$818,202	\$1,369,299
	High	1	\$50,469	\$65,915	\$116,384
	Very High	67	\$33,332,948	\$66,775,101	\$100,108,049
Total		28,432	\$9,004,332,347	\$14,388,076,348	\$23,392,408,695

Note: N/A indicates data from the Los Angeles County's Assessor's Office not available or does not exist

Critical facilities at risk from wildfire include water supply facilities, a recycling facility, a landfill, potential shelter locations, fire stations, hospitals/medical centers, the police station, schools, parks, and libraries and highway and railway bridges (Table 34). Damage or loss to utility, police and fire, and medical facilities could result in delayed or impaired emergency response and public safety operations. Impacts to highway and railroad bridges can limit emergency access and evacuation for affected neighborhoods. Electric utilities may implement temporarily public safety power shutoffs, in which portions of the electrical system is shut off during periods of elevated wildfire risk, such as periods with strong winds, low humidity, and dry vegetation. Periods of interrupted electrical service, whether due to public safety power shutoffs or damage to power facilities, could impact emergency response, communication systems, and transportation systems. This could further impact disaster response and recovery efforts and constrain emergency access and evacuation activities. Damage to water infrastructure from wildfire or power outages could limit firefighting capabilities.

Table 34 Wildfire: Critical Facilities at Risk

Infrastructure Type	Moderate Fire Hazard Severity Zone	High Fire Hazard Severity Zone	Very High Fire Hazard Severity Zone	Total
Essential Facility				
City Hall	0	0	0	0
Library	2	0	2	4
Park	6	3	23	32
Potable/Recycled Water Pump Station	1	0	23	24
Recycled Water Pump Station	0	2	3	5
Water Treatment Plant	0	1	1	2
Landfill/Waste Management	0	0	1	1
Potential Shelter Locations	3	1	8	12
Fire Stations	1	0	2	3
Hospitals/Medical Care	0	1	1	2
Police Stations	0	0	1	1
Schools	3	6	11	20
Glendale Water and Power	0	1	0	1
Perkins Building	0	0	0	0
High Potential Loss				
Utility-Communication Facility	0	0	3	3
Utility-Electric Power Facility	0	1	0	1
Recycling Facility	1	0	0	1
High-Rise Buildings	0	0	0	0
Transportation and Lifeline				
Highway Bridge	12	6	35	53
Railway Bridge	1	0	0	1
Total				166

Lifeline facilities at risk from wildfire include almost 21 miles of transmission lines, less than one mile of railroad, and over 700 road miles, including approximately 55 highway miles and 45 miles of major roadways, as shown in Table 35. The majority of roadway miles within fire hazard zones are in the very high fire hazard severity zone. Wildfires could cause temporary or prolonged roadway closures due to active fires, smoke conditions, or damage. Disruptions to roadways, especially highways and major arterials, could limit emergency access and evacuation efficiency, while impacts to rail and roadway corridors may result in rerouting or temporary shutdown of public transit services. Transit disruptions would likely disproportionately affect under-resourced individuals who are transit-dependent by limiting access to shelters, medical services, employment centers, and other essential destinations during wildfire events and recovery operations.

Table 35 Wildfire: Transportation and Lifeline Facilities at Risk

Facility Types	Moderate Fire Hazard Severity Zone	High Fire Hazard Severity Zone	Very High Fire Hazard Severity Zone	Total
Transmission Line	4.23	1.92	14.6	20.75
Railroad (miles)	0.30	0.00	0.00	0.30
Roads				
Highway (miles)	3.10	2.96	48.73	54.79
Major Road (miles)	4.40	5.98	34.10	44.48
City Street (miles)	39.50	47.10	369.40	456.00
Access Ramp (miles)	2.90	2.25	38.30	43.45
Other (miles)	0.40	1.26	14.86	16.52
Trail (miles)	0.00	0.00	50.50	50.50
Alley (miles)	2.60	3.98	32.20	38.78
Roads Total (miles)	52.90	63.53	588.09	704.52
Total (miles)				725.57

5.5.3 Floods

Flooding in Glendale primarily consists of short-duration flash floods characterized by high peak and high velocity flows. While the city does not contain any 100-year or 500-year FEMA floodplains, localized flooding remains a concern, particularly during extreme precipitation events or in areas affected by recent wildfires, where burn scars can significantly increase runoff. There are no NFIP structures in Glendale that have experienced repetitive loss due to flood.

Climate change impacts will increase flood risk, including higher peak flows along the Verdugo Wash. In addition, dam failure or overtopping, which could occur as a result of aging or poorly maintained infrastructure, seismic activity, or extreme precipitation, could inundate downstream areas. There are five dams within the vicinity of the city: Brand Park, Diedrich Reservoir, Glenoaks 968 Reservoir, Chevy Chase 1290, and East Glorietta, all of which were constructed more than 50 years ago. Glendale does not lie within FEMA-designated 100- or 500-year flood zones; therefore, quantitative flood loss estimates were not developed as part of this LHMP.

Potential losses due to dam failure were estimated by overlaying property value data from the Los Angeles County's Assessor's Office with dam inundation zone mapping. While it is unlikely that all dams affecting Glendale would experience failure at the same time, this analysis models the combined impacts of all dams. Individual dam failures would likely impact smaller areas and fewer assets and critical facilities. Flood risk due to dam failure is dependent on multiple factors, including where the failure/breach occurs, the extent of the release, the path and velocity of flow, and the type and intensity of development within the path of flow. A large number of residents are at risk from dam failure, consisting of 38,699 residents who live within dam inundation zones, as shown in Table 36.

Areas of the city with higher social vulnerability in southern and southwestern parts of the city overlap with dam inundation zones. Vulnerable populations in these areas could be disproportionately impacted by dam failure due to limited access to resources and limited capacity to prepare for and recover from inundation impacts. Dam inundation hazards disproportionately impact individuals with high outdoor exposure, under-resourced individuals, individuals facing societal barriers, and individuals with chronic health conditions or health related sensitivities. Individuals with high outdoor exposure may have limited access to shelter and transportation to evacuate from hazardous areas. Under-resourced individuals may experience cost burden from damage or medical costs and are less likely to live in adequately hardened and weatherized housing. Individuals facing societal barriers are more likely to live in low-lying areas that are susceptible to flooding, and limited and non-English speakers may not have access to advisory

warnings or governmental guidance in the event of an emergency. Individuals with health conditions or health related sensitivities, including seniors and young children, may not be able to safely evacuate and may be more sensitive to mold infestations that can occur after flood events.

Table 36 Dam Inundation: Threatened Populations

Zone	Number of People
Dam Inundation	38,699
Total	38,699

Potential losses due to dam failure include approximately \$5,407,376,262 in property assets, comprised primarily of residential properties, as shown in Table 37. This estimate does not reflect lower assessed property values resulting from Proposition 13.

Table 37 Dam Inundation: Threatened Residential Property

Property Type	Improved Parcel Count	Improvement Value	Land Value	Total
Residential	4,423	\$1,665,467,006	\$2,159,753,254	\$3,825,220,260
Commercial	216	\$360,396,607	\$292,645,103	\$653,041,710
Government	71	N/A	\$738	\$738
Industrial	77	\$522,044,786	\$257,919,335	\$779,964,121
Institutional	30	\$74,050,039	\$64,817,302	\$138,867,341
Recreational	5	\$3,428,316	\$6,853,776	\$10,282,092
Total	4,822	\$2,625,386,754	\$2,781,989,508	\$5,407,376,262

Note: N/A indicates data from the Los Angeles County's Assessor's Office not available or does not exist

Critical facilities at risk from dam failure include water supply facilities, fire stations, schools, libraries, potential shelter locations, and highway and railway bridges. (Table 38). Damage or loss to these critical facilities could reduce emergency response capabilities, disrupt essential public services, and limit recovery assistance efforts. Impacts to highway and railroad bridges could lead to road closures that restrict emergency access and evacuation.

Table 38 Dam Inundation: Critical Facilities at Risk

Infrastructure Type	Total
Essential Facility	
City Hall	0
Library	4
Park	5
Potable/Recycled Water Pump Station	6
Recycled Water Pump Station	1
Water Treatment Plant	1
Landfill/Waste Management	0
Potential Shelter Locations	2
Fire Stations	2
Hospitals	0
Police Stations	0
Schools	6
Glendale Water and Power	1
Perkins Building	0
High Potential Loss	
Utility-Communication Facility	0
Utility-Electric Power Facility	0
Recycling Facility	0
High-Rise Buildings	0
Transportation and Lifeline	
Utility-Communication Facility	11
Utility-Electric Power Facility	2
Total	41

Lifeline facilities at risk from dam inundation include less than one mile of railroad and almost 71 road miles, as shown in Table 39. The majority of roadway miles within dam inundation zones consists of 52 miles of city streets. Dam failure could result in temporary or prolonged closures of roadways and rail corridors and cause the suspension or rerouting of public transit services in affected areas. Such disruptions may limit access for emergency response and disproportionately affect under-resourced individuals who rely on localized bus service for daily and emergency transportation.

Table 39 Dam Inundation: Transportation and Lifeline Facilities at Risk

Facility Types	Total
Transmission Line	3.07
Railroad (miles)	0.02
Roads	
Highway (miles)	1.40
Major Road (miles)	8.70
City Street (miles)	52.40
Access Ramp (miles)	1.70
Other (miles)	0.80
Trail (miles)	0.01
Alley (miles)	5.80
Roads Total (miles)	70.81
Total (miles)	73.90

5.5.4 Landslides

Although major landslide events are not expected to occur, significant events can happen and the likelihood of such incidents is increasing. Changing conditions, such as more frequent and intense flood events and heightened erosion and soil instability following wildfire events, make the incidence of landslides more probable in the future. In addition, climate change is expected to increase the probability and severity of landslide and debris flow events due to increased frequency and severity of extreme precipitation and wildfire events. The potential for slope failure is dependent on many factors, including slope, ground conditions, and moisture levels.

Potential losses due to landslide were estimated by overlaying property value data from the Los Angeles County's Assessor's Office with high landslide susceptibility zones. Approximately 8,706 residents live within high landslide susceptibility zones (Table 40).

Populations at increased risk from landslides include individuals with high outdoor exposure, under-resourced individuals, individuals facing societal barriers, and individuals with chronic health conditions or health related sensitivities. Individuals with high outdoor exposure may have limited access to shelter and transportation to evacuate from hazardous areas. Under-resourced individuals may experience cost burden from damage or medical costs. Both under-resourced individuals and individuals with chronic health conditions or health related sensitivities are more likely to live in housing without home hardening and weatherization improvements that may protect against landslides. Individuals with health conditions or health related sensitivities may be more susceptible to injuries or death from a landslide and may have difficulty evacuating in the event of an emergency.

Table 40 Landslide: Threatened Populations

High Landslide Susceptibility Zone	Number of People
8	3,258
9	4,549
10	899
Total	8,706

Approximately \$5,901,029,754 in property assets, comprised primarily of residential properties, are located within high landslide susceptibility zones (Table 41). This estimate does not account for reduced assessed property values due to Proposition 13.

Table 41 Landslide: Threatened Residential Property

Property Type	Landslide Susceptibility Class	Improved Parcel Count	Improvement Value	Land Value	Total
Residential	8	3,473	\$1,124,269,611	\$1,783,758,756	\$2,908,028,367
	9	2,130	\$517,673,110	\$1,001,279,530	\$1,518,952,640
	10	1,723	\$512,836,805	\$903,092,790	\$1,415,929,595
Commercial	8	0	\$0	\$0	\$0
	9	6	\$26,180,271	\$5,265,024	\$31,445,295
	10	0	\$0	\$0	\$0
Government	8	16	N/A	\$10,098	\$10,098
	9	30	N/A	N/A	N/A
	10	4	N/A	N/A	N/A
Industrial	8	1	\$2,658,222	\$3,511,350	\$6,169,572
	9	1	\$318,143	\$1,138,898	\$1,457,041
	10	1	N/A	N/A	N/A
Institutional	8	0	\$0	\$0	\$0
	9	0	\$0	\$0	\$0
	10	0	\$0	\$0	\$0
Recreational	8	1	\$3,337,363	\$12,315,522	\$15,652,885
	9	3	\$1,031,453	\$2,181,475	\$3,212,928
	10	1	N/A	\$171,333	\$171,333
Total		7,390	\$2,188,304,978	\$3,712,724,776	\$5,901,029,754

Note: N/A indicates data from the Los Angeles County's Assessor's Office not available or does not exist

Impacts to critical facilities from a landslide would be localized and would likely affect a small number of facilities (see Table 42). Damage to or loss of these facilities could interrupt power and water supply and result in temporary roadway closures and temporary or long-term closure of parks and recreational facilities. Localized water and power service outages could have broader impacts on other critical facilities and services, including wastewater treatment, emergency response services, medical facilities, traffic signal infrastructure, and communication systems. Roadway and rail corridor closures caused by landslides and debris flows could limit emergency access and evacuation routes and disrupt transit services, necessitating shutdown or rerouting of bus and shuttle routes. This would likely disproportionately impact under-resourced individuals that rely on public transit as their primary mode of transportation.

Table 42 Landslide: Critical Facilities at Risk

Infrastructure Type	Total
Essential Facility	
City Hall	0
Library	0
Park	4
Potable/Recycled Water Pump Station	3
Recycled Water Pump Station	0
Water Treatment Plant	0
Landfill/Waste Management	0
Potential Shelter Locations	1
Fire Stations	0
Hospitals/Medical Care	0
Police Stations	0
Schools	0
Glendale Water and Power	0
Perkins Building	0
High Potential Loss	
Utility-Communication Facility	0
Utility-Electric Power Facility	0
Recycling Facility	0
High-Rise Buildings	0
Transportation and Lifeline	
Highway Bridge	6
Railway Bridge	1
Total	15

Lifeline facilities at risk from landslides include two miles of transmission lines, less than one mile of railroad, and almost 79 road miles, consisting primarily of 46 miles of city streets, 12 miles of trails, and nine miles of highways (Table 43).

Table 43 Landslide: Transportation and Lifeline Facilities at Risk

Facility Types	Total
Transmission Line	2.25
Railroad (miles)	0.05
Roads	
Highway (miles)	9.10
Major Road (miles)	1.10
City Street (miles)	46.10
Access Ramp (miles)	3.94
Other (miles)	2.10
Trail (miles)	12.30
Alley (miles)	4.80
Roads Total (miles)	79.44
Total (miles)	81.74

5.5.5 Extreme Weather

Extreme Wind

Extreme wind events are a recurring hazard in Glendale. Due to climate change, extreme weather events, including extreme wind, are anticipated to increase in frequency and severity. While they are typically short in duration, extreme wind events can cause widespread damage, particularly due to their ability to exacerbate other hazards such as wildfire. Extreme wind can damage structures, including roofs, windows, fences, and signage, particularly for older and poorly maintained structures. Strong winds can also cause trees, branches to fall, and other debris can damage vehicles and buildings, block roadways, and injure people. Extreme winds pose a significant risk to overhead power and communication lines, increasing the likelihood of power outages, telecommunications disruptions, and loss of internet and cellular service throughout the city. These outages can impair emergency response operations, limit public access to emergency warnings and information, and disrupt essential services for residents and businesses. In addition, downed lines and falling trees may block roadways and damage vehicles or structures. These obstructions could significantly impair emergency response times, delay evacuation efforts, restrict access to hospitals, shelters, and other critical facilities, and require suspension or rerouting of public transit services. Impacts to transit operations would likely disproportionately impact under-resourced individuals who rely on transit for emergency and daily transportation activities.

Extreme wind events can also lead to wildfire ignition and spread, particularly during dry conditions. Wind-driven wildfires can spread rapidly, overwhelm suppression efforts, and lead to evacuations, structural losses, loss of life, and air quality impacts. High winds can prompt public safety power shutoffs to reduce wildfire risk, which can result in widespread temporary power outages. Power disruptions can affect water systems by interrupting electrically powered pumps and treatment facilities which could exacerbate concurrent extreme wind, wildfire, or heat events, during which reliable power and water service are critical for firefighting, cooling, and emergency response activities. Extreme wind can also worsen power outage impacts during heat waves, by disrupting power service when cooling demand is highest. Disruptions to water and power systems, whether caused by damage or preventative measures, can also impact medical facilities and wastewater, transportation, and communication services.

Populations at increased risk from extreme wind events include individuals with high outdoor exposure, individuals with chronic health conditions or health related sensitivities, and under-resourced individuals. Populations with high outdoor exposure would be directly exposed to hazardous conditions from extreme wind events and would be at increased risk of injury. Individuals with chronic health conditions who rely on uninterrupted power for medical or other necessary devices would be particularly vulnerable since power outages could disrupt life-sustaining equipment. Under-resourced individuals are more likely to live in older or substandard housing that may be more susceptible to damage. In addition, medical costs associated with injuries and property damage from extreme wind events could place significant financial hardship on under-resourced individuals.

Extreme Heat

Extreme heat events are expected to increase in frequency due to climate change. Extreme heat poses a significant and growing risk to the city due to its frequency, duration, and broad impacts on public health, infrastructure, and essential services. Periods of prolonged high temperatures increase the likelihood of heat exhaustion, heat stroke, dehydration, cardiovascular stress, and respiratory complications. Populations especially vulnerable to extreme heat include individuals with high outdoor exposure, individuals facing societal barriers, individuals with chronic health conditions or health related sensitivities, and under-resourced individuals. Individuals with high outdoor exposure are at risk of heat related illnesses, including outdoor workers and people experiencing homelessness. Under-resourced individuals may be at higher risk of experiencing heat related illnesses, as they may be unable to pay for adequate air conditioning or fans, may face challenges traveling to cooling centers or temporary shelters if they are without a vehicle, and may not receive heat advisory warnings or governmental guidance if they are without a computer or broadband internet. Similarly, individuals facing societal barriers are more

likely to live in housing with insufficient protection from extreme heat and with limited or no affordable air conditioning. Extreme heat can worsen respiratory and cardiovascular conditions such as asthma, heart disease, high blood pressure, and diabetes which could lead to life threatening heat-related illnesses for individuals with chronic health conditions or health related sensitivities. Extreme heat events can also trigger power outages which could be dangerous for those who have electricity-dependent medical devices.

During extreme heat events, emergency medical calls and hospital admissions typically increase, placing added stress on healthcare facilities and first responders. Between 2008 and 2018, extreme heat events have resulted in an additional 6,409 emergency room visits in Los Angeles County (UCLA, 2018). Emergency medical visits can also create significant financial burden for under-resourced individuals, who may have limited access to health insurance, and may exacerbate existing economic hardships. According to the Los Angeles County Heat Action Plan, research shows an approximately 15 percent increase in emergency medical calls in Los Angeles County during extreme heat events. Additionally, the economic impact of heightened emergency response and medical service needs is substantial. The heat wave in September 2022 generated \$1.76 million in additional emergency medical service expenses for the Los Angeles County Fire Department and \$2.28 million in additional emergency room costs (Los Angeles County Chief Sustainability Office, 2026).

Extreme heat events place increased demand on power systems as people rely on air conditioning and cooling equipment. Extreme heat events can strain power infrastructure, increasing the likelihood of brownouts, rolling blackouts, and localized outages. These disruptions can affect residents and businesses, as well as critical facilities, including hospitals, water and wastewater facilities, schools, daycares, cooling centers, and emergency response operations. Heat-related power outages are often associated with significant economic costs due to business and service interruptions and school closures. The California Department of Insurance reported power outage costs ranging from \$9.6 million to \$230 million per event, as documented in its report "Impacts of Extreme Heat to California's People, Infrastructure, and Economy (The California Department of Insurance, 2024)."

Power disruptions during extreme heat events can have cascading impacts on multiple essential services. Loss of electricity can interrupt water and wastewater operations by disabling treatment, pumping, and distribution systems; impair transportation services by disabling traffic signals; disrupt communications by affecting cellular networks and emergency communications infrastructure; and hinder emergency response capabilities by limiting access to critical facilities, cooling centers, and medical services.

High temperatures can also degrade infrastructure by accelerating the deterioration of mechanical, electrical, and transportation systems. Extreme heat can cause rail expansion, leading to track deformities and an increased risk of service interruptions or derailments. Asphalt roadways are susceptible to premature rutting and surface degradation due to extreme heat, requiring more frequent repair and maintenance and roadway service lifetime. According to the California Department of Insurance's report, road and rail infrastructure repair costs and delays associated with extreme heat range from \$3.8 million to \$35 million per event (Los Angeles County Chief Sustainability Office, 2026)

5.5.6 Drought

The severity, frequency, and length of drought conditions are expected to increase due to climate change. Prolonged periods of drought pose significant risks to the city due to its potential to impact water supply reliability, water quality, public health, and critical infrastructure. The City purchases between 60 percent and 70 percent of its potable water from the Metropolitan Water district of Southern California. The remaining 30 percent of its water is from local groundwater wells. Unlike hazards that occur suddenly, such as earthquakes, drought develops gradually and can cause long-lasting and compounding impacts.

Drought can impact water reliability and water infrastructure. Projected changes in snowpack, temperature, and precipitation rates from climate change across California will result in increased water scarcity through the end of the century (Ackerly et al. 2018). The recent multi-year drought significantly

strained the State's water supply systems, which resulted in water storage levels sinking to historic lows. This led to mandatory water use restriction impacting day to day activities and local economies. Low water supply also led to significant capital investments by water agencies in an effort to increase reliability during extended drought periods, which may lead to future water rate adjustments. Drought can result in an increased dependency on groundwater and lower groundwater levels, causing increased contaminant concentrations in aquifers and permanently impaired aquifers (LA County CVA 2021). Although Glendale has a diverse portfolio of multiple different water sources and providers, the impacts of drought on the water system are regional in scope.

Drought events have a broad range of financial impacts, including direct costs associated with water supply and quality, as well as sector-wide impacts to agriculture, industrial operations, and tourism and recreation. The Center for Climate Integrity's study, Los Angeles County's Climate Cost Challenge, reported drought-induced water quality impacts would cost Los Angeles County an additional \$179,000 per day for water treatment during drought events (The Center for Climate Integrity, 2024). Drought can also result in increased maintenance needs, causing cracked pavements compounded with extreme heat (Samuel et al. 2019).

During periods of prolonged drought, under-resourced individuals are more likely to experience the cost burden associated with increased water rates (Feinstein et al. 2017). These individuals may struggle to access clean and affordable drinking water which may cause financial strain (Gamble et al. 2016).

Prolonged droughts can also significantly impact natural resources. Drought will affect plants and animals, placing stress on animals and vegetation, disrupting habitats, and causing dehydration and food supply issues. Dry and dead vegetation can create hazardous conditions by providing fuel for wildfire and reduced water supply will constrain firefighting capability. Drought would likely increase irrigation requirements for maintaining landscaping, park facilities, and street trees, while water use restrictions would potentially prevent asset managers from meeting this increased watering demand, resulting in water stressed vegetation, increased vegetation mortality, and potentially reducing the quality of and benefits provided by recreational resources such as open spaces and parks and the urban forest (Lund et al., 2018; Okin et al., 2018).

The entire city is at risk from drought. However, populations most likely to be disproportionately affected by drought include under-resourced individuals who often experience cost burden associated with increased water and energy rates. Under-resourced individuals could struggle to access clean and affordable drinking water.

5.5.7 Humanmade Hazards

Hazardous Materials Release

Hazardous materials are managed by the City of Glendale Fire Department's Hazardous Materials Section, which is designated as the City's Certified Unified Program Agency (CUPA) with the responsibility for administering and enforcing the City's hazardous materials programs. The City has several programs that regulate hazardous materials, including requiring Hazardous Materials Business Plans and permitting for operations that handle hazardous materials. The conditions that lead to a release and the specific characteristics of the materials involved are highly variable and often occur without measurable warning signs. These incidents may arise from equipment failures, human error, transportation accidents, security breaches, or unforeseen triggers such as seismic shaking or severe weather. Therefore, the most effective way to reduce the likelihood and impacts of a potential hazardous materials release event is to establish effective prevention measures that minimize the conditions under which such an incident could occur coupled with well-developed emergency response procedures.

The greatest probability of a major hazardous material incident is from a transportation accident, such as vehicle collisions or rail-related incidents. Glendale is intersected by four major highways (Interstate 5; State Route 2; State Route 134, and 210 Foothill Freeway). These highways are major transportation corridors for the greater Los Angeles and Southern California area, and also serve as transportation

routes for a large number of trucks that transport goods, many of which may be considered hazardous materials. Rail lines run through the southeastern portion of the city, adjacent to heavily developed areas with residential, commercial, and industrial uses. Freight rail operations passing through the city may involve the transport of hazardous materials, which could pose a potential risk to residents in the event of a rail incident.

The high volume of traffic that flows along transportation routes creates the potential for hazardous materials release resulting from an accident. Accidents on freeways or on other local streets could close the affected roadways for several hours or more, requiring traffic to detour through other local routes. In the event of an accident involving a vehicle carrying hazardous materials, the populated business and residential areas adjacent to the highway may be under threat and need to be evacuated. Additionally, rail incidents involving the transport of hazardous materials could result in similar impacts and necessitate roadway closures and evacuations. Roadway closures caused by hazardous materials incidents could impact emergency access and evacuation and result in the rerouting or temporary shutdown of transit services, which would disproportionately affect under-resourced individuals who rely on transit for emergency and daily transportation activities.

While the probability of hazardous materials release at either a fixed site or along local transportation corridors is relatively low, the potential consequences of such a release can be severe. The release of toxic, flammable, or explosive substances may require large-scale evacuations, shelter-in-place orders, and extensive cleanup efforts, placing significant strain on emergency response services and major disruptions to people and transportation systems. Uses such as high-density residential developments, schools, hospitals, and group homes located near highways, rail lines, and industrial zones are particularly vulnerable. A hazardous materials release could result in injury or fatalities to those who are exposed, or damage to buildings, infrastructure, and critical facilities. Additionally, hazardous materials incidents could disrupt power and water services if they occur near electrical facilities, water treatment plants, pump stations, or major pipelines. Facilities may need to be shut down temporarily to prevent contamination, ensure worker safety, or isolate affected areas. Power and water service interruptions can hinder emergency response, disrupt critical facilities, impair firefighting capability, and limit medical services.

In addition to transportation-related incidents, hazardous materials releases may also originate from fixed, on-site sources, such as industrial and manufacturing facilities, automotive service and repair shops, dry cleaners, fueling stations, and other uses that store, use, or handle hazardous substances. Accidental releases can occur due to equipment failure, human error, improper storage, or damage caused by hazards such as earthquakes or extreme weather. An on-site release could impact nearby residences and businesses, potentially requiring evacuations, road closures, and coordinated emergency response. In Glendale, industrial uses are concentrated along the railroad in the southwestern portion of the city. These areas are adjacent to residential and commercial uses and major transportation corridors, including Interstate 5, increasing the potential for human exposure, transportation network impacts, and the need for evacuations in the event of a hazardous materials release.

Areas of the city with higher social vulnerability are located in southern and southwestern portions of the city and are adjacent to major roadways, including San Fernando Road, Glendale Avenue, and Interstate 5. Vulnerable populations in these areas would potentially be at risk from hazardous materials incidents that could occur along major roadways. Vulnerable populations at increased risk from hazardous materials include individuals facing societal barriers, individuals with chronic health conditions or health related sensitivities, and under-resourced individuals. Individuals with chronic health conditions, including seniors and young children, may be more sensitive to hazardous materials exposure. Limited and non-English speakers and households without a computer or broadband internet may have difficulty accessing emergency information related to hazardous materials incidents. Facilities such as hospitals may be particularly affected since they typically serve as the primary medical treatment facilities for individuals who may have been exposed to hazardous materials. During a hazardous materials incident, hospitals can experience a sudden influx of patients, which could put a strain on medical resources and staff. Economic impacts could include business interruption and cleanup and remediation costs. Small

businesses may be susceptible to prolonged closures. Property values in affected areas may decline, and redevelopment or reuse of contaminated sites may require significant time and investment.

Transportation Incidents

Aviation Disasters

The skies above Glendale are filled with commercial and private airplanes. Glendale is also on the landing path of commercial airplanes inbound to the Bob Hope Airport (BUR). The likelihood of an aircraft incident is low due to stringent federal safety regulations and modern aviation technology. However, potential impacts of an aircraft incident can be severe and could result in loss of life, structural fires, hazardous fuel spills, debris damage, and disruption to transportation networks or nearby critical facilities. Areas beneath or adjacent to established flight corridors face elevated risk. Critical facilities and essential services may be disrupted by an aviation disaster due to physical damage, safety closures, or the diversion of emergency response resources. Damage to electrical and water facilities and distribution lines could result in localized or citywide service interruptions, potentially resulting in impacts to medical, emergency response, transportation, and communication systems. Roads and transportation corridors may be closed for extended periods to support emergency response and ensure community safety, limiting access for residents. In addition, road closures could result in rerouting or temporary shutdown of transit services which would disproportionately impact under-resourced individuals who rely on public transit as their primary mode of travel. Economic impacts could include property damage, business interruption, cleanup costs, and redevelopment challenges in affected areas.

Vulnerable populations at increased risk from aviation disasters include individuals with chronic health conditions and health related sensitivities, including individuals with mobility challenges, such as seniors and people who are differently abled. Individuals with health conditions that require constant power for medical devices or timely access to medical care could be disproportionately impacted from power outages caused by aviation incidents. In addition, individuals facing societal barriers and under-resourced individuals may have greater difficulty recovering from an aviation disaster and have limited ability to replace or repair damaged property or secure temporary housing if displaced. Limited and non-English speakers are also at elevated risk since they may not have access to language appropriate emergency information and guidance in the event of a disaster.

Vehicular Disasters

Vehicular disasters pose a localized, but potentially high-impact, risk to the city. Serious vehicle incidents can result in injuries or fatalities, property damage, and temporary disruptions to transportation systems and emergency response access. Areas of higher risk include major transportation corridors, freeway interchanges, commercial corridors, and public gathering spaces. Vehicular disasters can impair transportation lifelines through road closures, traffic congestion, and damaged infrastructure, leading to increased demand on police, fire, and emergency medical services. Road closures and traffic congestion could cause rerouting or temporary shutdown of transit services, which could disproportionately impact under-resourced individuals who rely on public transit for transportation. Vehicular disasters could also disrupt water and power service in the event of damage to power poles, transformers, water pumping stations, water treatment facilities, and water and power distribution lines. These disruptions can limit emergency response by affecting communications, traffic signals, fire suppression water supply, and the operation of other nearby critical facilities.

Vulnerable populations at increased risk from vehicular disasters include individuals with chronic health conditions and health related sensitivities and under-resourced individuals. Individuals with health conditions and sensitivities may be at increased risk of injury or death from a vehicular incident. Under-resourced individuals, such as individuals with no health insurance and people experiencing poverty could face significant financial burden from medical costs or property damage associated with a vehicular disaster.

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6 Capability Assessment

The Capability Assessment summarizes the evaluation of the City's policies, programs, and resources that are available to support the mitigation strategy (see Section 7, Mitigation Strategy). It also outlines the resources available to the Planning Team to prioritize, implement, and manage mitigation strategies to reduce risk to existing and future infrastructure and development.

6.1 Existing Authorities, Policies, Programs, and Resources

An evaluation of the City's authorities, policies, programs, and resources was conducted to identify existing capabilities that help reduce vulnerability to hazards. These capabilities include regulatory and legal tools, financial resources, and staff expertise. Staff resources include technical professionals such as planners, engineers, and emergency management staff with knowledge of land use and development practices, construction standards, hazard risks, floodplain management, surveying, GIS, and other relevant areas.

The Planning Team also explored opportunities to strengthen and build upon existing policies and programs to better incorporate mitigation actions into the City's day-to-day operations. Table 44 through Table 47 provide a summary of the current authorities, policies, programs, and resources available to support mitigation.

6.1.1 Planning and Regulatory Capabilities

Planning and regulatory capabilities refer to citywide ordinances, policies, and regulations. Capabilities come from City plans and municipal code sections such as the General Plan, building codes, zoning codes, and emergency preparedness and response plans. These capabilities are used to inform mitigation planning and may be used to facilitate implementation of mitigation actions. Table 44 lists Glendale's planning and regulatory capabilities.

Table 44 Local Planning and Regulatory Capabilities

Name	Hazards Addressed	Description
California's Fifth Climate Change Assessment	Extreme weather, wildfire, flooding, drought	California's Fifth Climate Change Assessment is currently underway, led by the Governor's Office of Land Use and Climate Innovation in partnership with the CEC, California Natural Resources Agency, and Strategic Growth Council. Community engagement conducted in 2023 for the Los Angeles region identified extreme heat and the urban heat island effect, wildfire, flooding, drought, and sea level rise as priority climate hazards for the region, with extreme heat most strongly emphasized. The full Fifth Assessment Regional Synthesis Report for the Los Angeles region is expected to be publicly available by mid-2026 and should be incorporated into future LHMP updates when available. <u>Expansion and Improvement:</u> Align the LHMP with the Los Angeles Region Summary Report to understand local changes that may affect Glendale both directly and indirectly.
Glendale Safety Element (2025)	Earthquake, landslide, flooding, wildfire, climate change, extreme heat, hazardous materials	Addresses safety issues associated with natural and human-made hazards in Glendale. Provides goals, policies, and actions aimed at reducing the City's risk from these hazards. <u>Expansion and improvement:</u> Align the LHMP with future updates of the Safety Element.
Glendale Draft Land Use Element (2026)	Flooding, fire, earthquake, landslide	Planning framework that guides how land in Glendale will be used and developed to support housing, economic growth infrastructure and environmental protection while preserving the community. <u>Expansion and improvement:</u> Align the LHMP with future updates of the Land Use Element.
Glendale Water and Power Integrated Resource Plan (2024)	Climate change, extreme weather, energy infrastructure variability, drought	The plan lays out how Glendale will meet its electricity needs from 2024-2045 while reducing greenhouse gas emissions and transitioning to clean energy.
Glendale Adopted Budget Fiscal Year 2025-2026	All	The City of Glendale Adopted Budget for Fiscal Year 2025-2026 is the City's official annual financial plan, adopted by the City Council prior to the July 1 fiscal year. The budget establishes appropriations for all City departments and identifies funding sources across the General Fund, Special Revenue Funds, Debt Service Funds, Capital Improvement Program, Enterprise Funds, and Internal Service Funds. <u>Expansion and Improvement:</u> Future budget should include hazard mitigation projects.
Glendale Capital Improvement Program 2025-2026	All	A program of infrastructure investments and major maintenance projects intended to expand, modernize, and preserve the City's physical systems while supporting reliable services and long-term community needs. <u>Expansion and Improvement:</u> Future iterations of the Capital Improvement Program should include hazard mitigation projects.

Name	Hazards Addressed	Description
Glendale Climate Action and Adaptation Plan (2025)	Extreme weather, wildfire, landslides, flooding, drought	This plan is a greenhouse gas reduction and climate resiliency document to help the City achieve carbon neutrality and reduce its risk to climate related hazards. <u>Expansion and Improvement:</u> As this plan is updated, mitigation measures from the new LHMP can be incorporated.
Glendale Code of Ordinances	Multiple	Codes adopted and enforced by the City of Glendale, including the California Building Standards Codes (Title 24) and locally adopted amendments, to regulate building design, construction, fire safety, and energy efficiency. These codes address local conditions and support hazard mitigation and public safety. The City has adopted the following codes, collectively known as the 2026 Glendale Building and Safety Code, effective January 1, 2026: • 2025 California Building Code • 2025 California Residential Code • 2025 California Electrical Code • 2025 California Mechanical Code • 2025 California Plumbing Code • 2025 California Energy Code • 2025 California Green Building Standards Code • 2025 California Fire Code • 2026 Glendale Reach Code (local amendments, Ordinance 5999 as amended) <u>Expansion and Improvement:</u> Ensure ordinances align with industry standards and look at the implications of adding additional restrictions that improve mitigation citywide.
Glendale Urban Water Management Plan (2020)	Climate change, earthquake, drought	The Urban Water Management Plan provides the City of Glendale with a long-term planning document to ensure adequate and reliable water supplies to meet existing and future needs. The plan incorporates water supply reliability assessments and evaluates risks associated with prolonged drought, climate change, and potential supply disruptions, while identifying strategies to maintain system resilience. <u>Expansion and Improvement:</u> The UWMP and HMP will be aligned in describing and developing mitigation actions to address climate change and drought. Water demand reduction strategies contained in the UWMP should be considered for inclusion as mitigation activities in the HMP.

Name	Hazards Addressed	Description
Glendale Wildfire Mitigation Plan (2025)	Wildfire, extreme heat	The Wildfire Mitigation Plan provides the City of Glendale with a framework to reduce the risk of wildfires associated with electrical infrastructure. The plan identifies wildfire hazards such as ignition sources, high wind conditions, vegetation fuel loads, and climate-related impacts, and outlines strategies to minimize both the likelihood of ignition and the spread of fires through infrastructure improvements, vegetation management, operational practices, and emergency response measures. <u>Expansion and Improvement:</u> Align the HMP with the Wildfire Mitigation Plan as it is updated to ensure mitigation actions related to wildfire hazards remain consistent.
Los Angeles County Climate Vulnerability Assessment (2021)	Extreme weather, wildfire, flooding, drought	Los Angeles County Climate Change Vulnerability Assessment is a comprehensive assessment of the social and physical vulnerabilities facing Los Angeles County as a result of climate change. The assessment defines high climate vulnerability as a combination of increased exposure to climate hazards; high susceptibility to negative impacts of exposure; and low adaptive capacity, or ability to manage and recover from exposure. The assessment includes a Climate Hazard Assessment (CHA) which evaluates potential changes in the frequency and severity of specific climate hazards (extreme heat, wildfire, extreme precipitation and inland flooding, coastal flooding, and drought) resulting from climate change in the coming decades. It also includes a Social Vulnerability Assessment (SVA) which looks at the level of risk across communities and populations and identifies groups and places that are highly vulnerable to climate hazards. The third major section is the Physical Vulnerability Assessment (PVA) which examines how physical infrastructure and facilities across the County face risk of damage from climate hazards and outlines how damage to highly vulnerable facilities could affect people and society. Finally, the Cascading Impacts Assessment explains how infrastructural systems rely on one another and how harm to one type of infrastructure can affect other facilities, related services, and the people who rely on those services. <u>Expansion and Improvement:</u> Utilize the findings of the Los Angeles County Climate Vulnerability Assessment, including the Climate Hazard Assessment, Social Vulnerability Assessment, Physical Vulnerability Assessment, and Cascading Impacts Assessment, to inform and refine Glendale's mitigation actions and to prioritize resources toward the City's most vulnerable communities and critical infrastructure.

6.1.2 Administrative and Technical Capabilities

Administrative and technical capabilities include the City of Glendale staff and their skills that can be utilized for mitigation implementation. These skills include engineering, planning, GIS, inspections, and grant writing.

Table 45 Administrative and Technical Capabilities

Resource Name	Lead Department	Description
Communications	Management Services	Glendale’s communications team manages the City’s public communications across multiple platforms to provide timely, accurate information, promote transparency, and keep residents informed and engaged with services, projects, and initiatives. <u>Expansion and Improvement:</u> Partner with the County of Los Angeles Office of Emergency Management, local hospitals, nonprofits, and Federally Qualified Health Centers to coordinate notification and response services using advanced communication tools.
City Clerk	City Clerk’s Office	The City Clerk serves as the City of Glendale’s Custodian of Records and Election Official, responsible for maintaining official records, administering elections and regulatory programs, coordinating City Council and Housing Authority meetings and agendas, and providing administrative support and public access to city information. <u>Expansion and Improvement:</u> Prioritize new initiatives to support mitigation actions in the city.
Code Compliance	Community Development	The City of Glendale’s Code Compliance Program enforces the Glendale Municipal Code by investigating violations and educating the community to maintain health, safety, and quality of life, with inspectors conducting regular site visits and using a range of enforcement actions including warnings, citations, and legal measures. <u>Expansion and Improvement:</u> Use code compliance to integrate hazard mitigation into construction and improvements undertaken by residents and businesses.
Engineering	Public Works	The Engineering Division of the City of Glendale is responsible for the planning, design, and construction management of public infrastructure projects, including streets, sidewalks, traffic systems, sewer and storm drain systems, and related facilities. The Division oversees the implementation of Capital Improvement Program (CIP) projects and provides engineering, inspection, and land development services citywide. <u>Expansion and Improvement:</u> Work with City departments to identify infrastructure deficiencies and develop strategies to improve system performance, enhance safety, and support long-term resilience of Glendale’s built environment.

Resource Name	Lead Department	Description
Public Works	Public Works	The City of Glendale Public Works Department is responsible for maintaining and improving the city's essential infrastructure and public facilities. The Department is comprised of six divisions: Administration, Fleet Services, Integrated Waste Management, Maintenance Services, Facilities Management, and Engineering. These divisions collectively support the operation, maintenance, and repair of streets, sewers, storm drains, debris basins, traffic signals, signage, public buildings, parks, and other City-owned assets. Services include waste collection, fleet operations, facility and custodial maintenance, street and sidewalk upkeep, stormwater system maintenance, and management of public spaces and infrastructure systems. <u>Expansion and Improvements:</u> Enhance infrastructure resilience and maintenance practices to support hazard mitigation by improving stormwater management systems, maintaining critical facilities, and incorporating risk reduction strategies into daily operations and capital projects.
Information Technology	Information Technology	Information technology connects people, processes, and information through the secure use of technology while providing customer service (such as GIS services). <u>Expansion and Improvements:</u> Enhance system redundancy and resilience by improving technology and connectivity.
Public Safety	Police Department	The Glendale Police Department is responsible for protecting life and property, preserving public trust, and maintaining public safety through law enforcement services, crime prevention, investigations, and traffic control activities. <u>Expansion and Improvements:</u> Enhance officer training and interagency coordination to improve identification of potential hazards, strengthen emergency response capabilities, and support hazard mitigation efforts. Increase redundancy in emergency evacuation communication systems in the event of an electric outage through a variety of measures, and regularly test alert systems for potential evacuation scenarios.

Resource Name	Lead Department	Description
Emergency Management	Fire Department	The City of Glendale Emergency Operations Center (EOC) serves as the central coordination hub for managing emergency response and disaster operations, providing situation analysis, information sharing, and support for City departments, agencies, and partners during major incidents. <u>Expansion and Improvement:</u> Enhance coordination and communication among City departments, partner agencies, and stakeholders to strengthen emergency preparedness, response efficiency, and overall disaster resilience. Provide training and educational opportunities for EOC staff and partner agencies on how climate change is projected to alter the frequency and severity of hazard events in the Glendale area, to support more effective and anticipatory emergency planning.
Fire	Fire Department	The Glendale Fire Department is responsible for protecting life and property by providing emergency response services, fire suppression, rescue operations, and public safety services to the community, guided by values of professionalism, leadership, compassion, and accountability. <u>Expansion and Improvement:</u> Strengthen coordination and collaboration with neighboring jurisdictions and partner agencies to enhance emergency response capabilities, improve resource sharing, and increase regional resilience.
Housing Division	Community Development	The City of Glendale Housing Division, within the Community Development Department, administers housing programs and services that support affordable housing development, housing assistance, and fair housing opportunities, with a focus on serving low- and moderate-income households and addressing the city's housing needs. <u>Expansion and Improvement:</u> Integrate hazard mitigation and resilience strategies into affordable housing and community development programs to improve housing conditions, reduce vulnerabilities, and support long-term neighborhood stability.
Planning Division	Community Development	The Planning Division within the City of Glendale's Community Development Department is responsible for administering zoning regulations, reviewing development applications, and ensuring proposed projects comply with City standards and land use requirements. <u>Expansion and Improvement:</u> Provide ongoing training and professional development opportunities for staff to stay current with evolving planning practices, zoning regulations, and state requirements to support effective and resilient community development. Include training on how climate change is projected to affect the severity and frequency of hazard events to ensure planning decisions reflect current and anticipated future risk.

Resource Name	Lead Department	Description
Building Division	Development Services	The Development Services Division within the City of Glendale's Community Development Department administers permit review, plan check, and inspection services to ensure that buildings and development projects comply with applicable municipal and state codes and regulations. <u>Expansion and Improvement:</u> Provide ongoing training and professional development opportunities for Community Development staff to maintain current knowledge of evolving building codes, regulations, and best practices.
Financial Services	Finance	The City of Glendale Finance Department is responsible for maintaining the City's financial systems and records, including accounting, revenue monitoring, payment processing, financial reporting, and budget development, as well as supporting fiscal planning, debt management, and procurement activities to ensure sound financial operations. <u>Expansion and Improvement:</u> Support hazard mitigation efforts by enhancing financial tracking of disaster-related costs, identifying and managing grant funding opportunities, improving financial reporting for emergency events, and strengthening long-term fiscal planning for operations, maintenance, and capital improvements. Start considering what local revenue streams (e.g., sewage, trash, and taxes) could be used as leverage to secure external funding or financing streams if they are connected to climate mitigation and action efforts.
Human Resources	Human Resources	The City of Glendale Human Resources Department administers a comprehensive human resources program that includes recruitment and hiring, employee benefits and compensation, labor relations, organizational development, and employee services, while also managing risk and safety programs such as workers' compensation and employee wellness to support a safe and effective workforce. <u>Expansion and Improvement:</u> Support and coordinate training opportunities for City staff to build expertise in how climate change is increasing the severity and frequency of natural hazard events, to strengthen the City's overall capacity to plan for and respond to climate-driven risks. Include a description of Glendale's climate goals and values in job postings, improving talent acquisition and potentially boosting retention and worker morale.

Resource Name	Lead Department	Description
City Council	City Clerk's Office	The Glendale City Council is the governing body of the city and operates under a Council-Manager form of government. Five Councilmembers are elected at large to serve four-year terms, with a three-term limit. The Mayor presides at Council meetings and carries ceremonial responsibilities in addition to other Council duties. The City Council is responsible for setting policy, adopting the annual budget, and making final decisions on matters affecting the City, including land use, hazard mitigation, and public safety. <u>Expansion and Improvement:</u> Ensure the City Council is kept informed of hazard mitigation priorities, LHMP update progress, and funding opportunities so that mitigation actions can be considered and supported during the annual budget and policy process.
Planning Commission	City Clerk's Office	The Glendale Planning Commission is responsible for guiding the city's long-range growth and development by reviewing land use proposals, subdivision plans, and development applications, and making recommendations to the City Council on general and master plans, zoning, and other development-related matters, while also approving certain land divisions and development requests. <u>Expansion and Improvement:</u> Provide ongoing training and educational opportunities for Planning Commission members to maintain current knowledge of planning practices, land use regulations, and emerging policy requirements.
City Attorney	City Attorney's Office	The City Attorney serves as the City's chief legal advisor and provides legal services to the City Council, Housing Authority, City departments, and boards and commissions, including prosecuting violations of the Charter and municipal code, advising on municipal law, drafting and reviewing legislation, negotiating agreements, managing outside counsel, and litigating civil matters. <u>Expansion and Improvement:</u> Provide opportunities for the City Attorney's Office to review updates to laws, regulations, and policy requirements to support expert review of City resolutions, ordinances, and legal actions related to hazard mitigation.

Resource Name	Lead Department	Description
Water and Power	Glendale Water and Power	Glendale Water and Power is a municipal utility that serves the citizens and community of Glendale. GWP's vision is to deliver reliable, high quality, environmentally sensitive, and sustainable water and power services in a caring and cost-competitive manner. GWP is owned by the City of Glendale, administered by the GWP Commission, and governed by the Glendale City Council. GWP is actively modernizing its electric grid and water system through upgrades and improvements to strengthen its ability to meet demand, maintain reliability and efficiency, save water, and increase the amount of renewable energy. <u>Expansion and Improvement:</u> Incorporate hazard mitigation considerations into GWP's utility modernization and Capital Improvement Program planning to strengthen the resilience of water and electric infrastructure against natural hazards and ensure continuity of critical utility services for Glendale residents and businesses during and after disaster events.
Parks and Recreation	Community Services & Parks	The Community Services & Parks Department's mission is to enhance the quality of life by providing safe and well-maintained parks and public spaces, preserving open space and historic resources, providing services that address the physical, recreational, social, and economic needs of the community, and creating opportunities for renewal, growth, and enrichment. <u>Expansion and Improvement:</u> Incorporate hazard mitigation considerations into the planning, design, and maintenance of parks, open space, and public facilities, including wildfire defensible space in areas adjacent to open space and the use of parks as designated community cooling centers and emergency shelter locations during natural hazard events.

6.1.3 Financial Capabilities

Financial capabilities include grants, general funds, property sales, income taxes, impact fees, or stormwater utility fees. Based on the process for each resource, these financial resources can be used for mitigation strategies.

Table 46 Financial Capabilities

Resource Name	Administrator	Description
General Fund	Finance	The General Fund provides the majority of ongoing governmental services not funded through restricted special revenue funds. Services funded include Fire, Police, Library, Arts & Culture, Community Services and Parks, Community Development, and Public Works. The General Fund is supported by property tax, sales tax, utility users tax, transient occupancy tax, and other taxes and revenues. The Budget Division coordinates preparation of the annual budget, adopted by City Council prior to the July 1 fiscal year. <u>Expansion and Improvement:</u> Hazard mitigation projects may be considered during the annual budgeting process for funding from the General Fund.
Capital Improvement Program Fund	Public Works	The City's Capital Improvement Program (CIP) is a rolling multi-year plan specifying which capital projects will be built and where funding will come from. The City enters each fiscal year with an active CIP that is reviewed and updated through annual City Council budget workshops. The Engineering Division is responsible for planning, design, and construction management of CIP projects related to the City's streets, sidewalks, traffic signals, curbs and gutters, sewers, storm drains, corrugated metal pipes, and slopes. <u>Expansion and Improvement:</u> Include mitigation infrastructure projects into the CIP during the annual budget workshops.
Special Revenue/Enterprise Funds	Finance	Special Revenue Funds are governmental funds restricted by law or administrative action to be expended for specified purposes. Enterprise Funds are proprietary funds used to account for business-type activities funded primarily through user charges rather than taxes. The City's major Enterprise Funds are the Electric Fund and Water Fund, operated by Glendale Water and Power (GWP), and the Sewer Fund, operated by the Public Works Department. GWP maintains its own Capital Improvement Program budget. <u>Expansion and Improvement:</u> Where permissible, Special Revenue and Enterprise Funds may be considered during the annual budgeting process to fund hazard mitigation projects, such as utility system hardening, water infrastructure resiliency, and related capital improvements.

Resource Name	Administrator	Description
Permitting Fees and Development Impact Fees	Community Development	The Community Development Department's Development Services Division collects building permit fees and plan check fees assessed on new construction and development. The Finance Department's Revenue section administers the citywide Fee Schedule, reviewed annually, and manages development impact fee programs in accordance with the California Mitigation Fee Act. Impact fees collected by the City include the Parks Quimby Fee, assessed on residential subdivisions to fund park improvements; the Parks Mitigation Fee and Library Mitigation Fee, assessed on new development; and the Housing Development Impact Fee, imposed on commercial development projects. Permit fees are based on project valuation per nationally recognized standards. <u>Expansion and Improvement:</u> Where authorized, permit and impact fee revenues may support mitigation-related infrastructure improvements, hazard-reduction code enforcement, and plan review for development in hazard-prone areas.
Safe, Clean Water Program (Measure W)	Public Works	Measure W established the Safe Clean Water (SCW) Program, providing a special parcel tax of 2.5 cents per square foot of impermeable surface within the LA County Flood Control District. The Program is divided into a District Program, Regional Program, and Municipal Program. The City of Glendale pays for stormwater projects through a combination of fees, the General Fund, and Measure W funding. <u>Expansion and Improvement:</u> Measure W Municipal Program funds can support stormwater quality and flood mitigation projects, such as storm drain improvements, green infrastructure, and bioretention facilities, directly reducing flood hazard risk to the community.
Community Development Block Grants (CDBG)	Community Services & Parks	The CDBG program is an annual federal formula grant program. The City of Glendale is a CDBG entitlement community that receives funds annually. <u>Expansion and Improvement:</u> Where applicable, CDBG funds should be used to fund mitigation projects enhancing the resiliency of low-income and underserved communities, including public facility improvements and infrastructure upgrades.

Resource Name	Administrator	Description
HOME Investment Partnership Program	Community Development Department	The HOME Investment Partnerships Program is an annual federal grant administered by the U.S. Department of Housing and Urban Development (HUD) and managed locally by the Community Development Department as part of the City's integrated Annual Action Plan for CDBG, ESG, and HOME programs. Funds support affordable housing activities including development, rehabilitation, and preservation of housing for low- and moderate-income households. <u>Expansion and Improvement:</u> HOME funds may support housing rehabilitation projects incorporating hazard mitigation measures such as seismic retrofitting, fire hardening, or flood resilience improvements for low- and moderate-income households.
Emergency Solutions Grant	Community Development Department	The Emergency Solutions Grant (ESG) is an annual federal HUD formula grant administered by the Community Development Department as part of the City's Annual Action Plan (alongside CDBG and HOME). <u>Expansion and Improvement:</u> ESG may support pre-event planning for emergency shelter for vulnerable populations and post-disaster emergency housing stabilization for unsheltered individuals affected by natural hazard events.
Hazard Mitigation Grant Program (HMGP)	Fire Department	The HMGP provides funding to implement long-term hazard mitigation measures following a presidentially declared disaster. HMGP funding is allocated to states based on a percentage of total disaster recovery expenditures and may be used for projects such as property acquisition, structure elevation, wildfire risk reduction, and infrastructure protection. A FEMA-approved LHMP is required for project eligibility. <u>Expansion and Improvement:</u> Train staff on procedures and track funding opportunities via Cal OES to initiate HMGP sub applications following disaster declarations.
Flood Mitigation Assistance Grant Program (FMA)	Fire Department	The FMA program provides funding for projects that reduce or eliminate long-term risk of flood damage to structures insured under the National Flood Insurance Program (NFIP). Common project types include property acquisition and demolition, structure elevation, and floodproofing. The program prioritizes repetitive loss and severe repetitive loss properties. <u>Expansion and Improvement:</u> Maintain NFIP participation in good standing to preserve eligibility for FMA subapplications. Monitor annual FMA funding opportunities via Cal OES should flood risk properties be identified in the future.

Resource Name	Administrator	Description
Building Resilient Infrastructure and Communities (BRIC)	Fire Department	The BRIC program is FEMA’s primary pre-disaster mitigation funding source. BRIC supports proactive investments in infrastructure and community resilience to reduce risks from natural hazards. Eligible activities include large-scale infrastructure projects, nature-based solutions, and capability- and capacity-building efforts. Jurisdictions must have a FEMA-approved LHMP to apply for project funding. <u>Expansion and Improvement:</u> Monitor annual BRIC funding opportunities via Cal OES.
Repetitive Flood Claims (RFC) Program	Fire Department	The Repetitive Flood Claims program provides funding to reduce flood risk to NFIP-insured properties that have experienced repeated flood damage. While smaller in scale and more limited in funding than other programs, RFC supports mitigation activities similar to FMA, including acquisition, elevation, and floodproofing of high-risk structures. <u>Expansion and Improvement:</u> Glendale currently has no repetitive loss properties and is designated No Special Flood Hazard Area under the NFIP. As such, the RFC program is not currently applicable to Glendale. Should repetitive loss properties be identified in the future, staff will monitor RFC funding opportunities via Cal OES.
Severe Repetitive Loss (SRL) Program	Fire Department	The Severe Repetitive Loss program focuses specifically on properties that have experienced multiple flood insurance claims with high cumulative losses. The program provides funding for mitigation measures to reduce future claims and overall flood risk. Although SRL has largely been integrated into the FMA program in recent years, it remains a relevant category for understanding FEMA’s prioritization of high-risk properties. <u>Expansion and Improvement:</u> Glendale currently has no repetitive loss properties and is designated No Special Flood Hazard Area under the NFIP. As such, the SRL program is not currently applicable to Glendale. Should severe repetitive loss properties be identified in the future, staff will monitor SRL funding opportunities via Cal OES.
Glendale Water and Power Enterprise Funds and Capital Improvement Program	Glendale Water and Power	Glendale Water and Power maintains separate Electric Utility and Water Utility funds, each with independently audited annual financial statements. Glendale Water and Power maintains its own Capital Improvement Program budget to plan and fund infrastructure investments across its water and electric systems. <u>Expansion and Improvement:</u> Where applicable, Glendale Water and Power’s Capital Improvement Program budget and utility funds may be used to support hazard mitigation projects related to electric grid hardening, water system resilience, and wildfire risk reduction.

6.1.4 Education and Outreach Capabilities

Education and Outreach capabilities include fire prevention programs, hazard awareness initiatives, and the City of Glendale's communications and community relations efforts, which are used to inform and engage the public on current and potential hazard mitigation activities.

Table 47 Education and Outreach Capabilities

Resource Name	City Leads	Description
Communications Officer	Management Services	Develops and delivers outreach and engagement programs that promote hazard awareness and keep the public informed about City news, services, and initiatives. <u>Expansion and Improvement:</u> Provide additional information to the community about hazard mitigation activities.
City Website Glendale Emergency Preparedness	Management Services	Provides easily accessed information about the City, including emergency preparedness resources and hazard-specific guidance from the Fire Department. Used for LHMP public outreach and engagement. <u>Expansion and Improvement:</u> Use the City website to provide additional information to the community about hazard mitigation activities.
City Social Media Accounts: Facebook Instagram X/Twitter TikTok Glendale Fire Instagram	Management Services	Provides easily accessed information about the City across Facebook, Instagram, X (Twitter), TikTok, and YouTube. <u>Expansion and Improvement:</u> Use City social media platforms to provide additional information to the community about hazard mitigation activities.
Glendale TV (GTV)	Management Services	City government access channel available on Spectrum (Ch. 6), AT&T U-Verse (Ch. 99), live web stream, and YouTube. <u>Expansion and Improvement:</u> Use Glendale TV to broadcast hazard awareness programming and communicate information about hazard mitigation activities to the community.
Everbridge Emergency Alert System	Fire Department	Mass notification system used to send emergency alerts to registered residents regarding extreme weather, unexpected road closures, and evacuations. <u>Expansion and Improvement:</u> Promote Everbridge registration to increase community enrollment and use the system to communicate hazard mitigation information and preparedness resources.
Glendale City Connection Newsletter	Management Services	Monthly e-newsletter distributed to subscribed residents covering City news, upcoming events, and service updates across all departments. <u>Expansion and Improvement:</u> Include hazard mitigation updates, LHMP milestones, and preparedness tips to inform residents about the City's mitigation activities.

6.1.5 National Flood Insurance Program Participation

The City of Glendale participates in the National Flood Insurance Program (NFIP) and has adopted a Floodplain Management Ordinance, codified as Chapter 8.20 of the Glendale Municipal Code, to maintain eligibility in the program. Through this participation, property owners within the city remain eligible to obtain federally backed flood insurance.

The National Flood Insurance Program (NFIP), established in 1968, provides flood insurance to communities that adopt and enforce floodplain management regulations designed to reduce future flood risk. The City of Glendale has been a regular participant in the NFIP since August 31, 1984 (Community ID No. 065030). The City's Floodplain Management Ordinance meets the minimum requirements set forth in Title 44, Section 60.3 of the Code of Federal Regulations and establishes standards for construction and development to minimize potential flood damage.

7 Mitigation Strategy

The Mitigation Strategy establishes the framework for reducing long-term risk from natural and humanmade hazards in the City of Glendale. Building on the Risk Assessment and Capability Assessment, the Mitigation Strategy identifies goals and mitigation actions intended to minimize future losses of life, property, infrastructure, and critical facilities. The Mitigation Strategy also provides the basis for the Mitigation Action Plan, which further defines how mitigation actions will be prioritized, implemented, and administered over time. Together, these components guide coordinated mitigation efforts across City departments and support continuous progress toward reducing vulnerabilities to hazards.

7.1 Goals and Mitigations

Mitigation goals represent the City of Glendale's long-term priorities for reducing risk from natural and humanmade hazards. The goals provide broad direction for mitigation efforts and establish a framework for identifying the mitigation actions that address community vulnerabilities, strengthen existing capabilities, and support long-term risk reduction. These goals are informed by the Risk Assessment and Capability Assessment, as well as community input received through the public outreach process.

Mitigation actions were developed through a review of actions from the previous LHMP (see Appendix C), supplemented by additional mitigation ideas generated by the HMPC. During HMPC Meeting #3, the full action list was evaluated through a "keep, revise, or discard" exercise, with results incorporated into this Mitigation Action Plan. Additional actions were included to address gaps in mitigation coverage and to align with City operations and existing planning mechanisms, as well as incorporate broader community input. The complete mitigation strategy was then reviewed by the Planning Team, HMPC, and stakeholders during public review, with comments and edits incorporated as appropriate.

Glendale Local Hazard Mitigation Plan Goals

Goal 1: Reduce losses and damage from natural and humanmade hazards, including climate change impacts, by strengthening the resilience of the built environment.

Goal 2: Expand community understanding and participation in hazard mitigation through ongoing education and outreach programs that communicate hazard risks, share mitigation tools, and promote partnership and funding opportunities.

Goal 3: Incorporate natural systems in hazard mitigation solutions through integrated watershed, natural resource, and land use planning and management.

Goal 4: Promote coordinated hazard mitigation by establishing collaborative partnerships among public agencies, non-profit and community organizations, and businesses.

Goal 5: Improve the community's capacity to prepare for, respond to, and recover from natural and humanmade hazards through enhanced emergency operations and readiness.

Mitigation measures are listed in Table 48 and describe the specific projects, programs, policies, and activities the City of Glendale will undertake to achieve the mitigation goals and reduce identified hazard risks. These mitigation actions reflect a range of approaches, addressing the built environment and policy and planning based approaches, including planning, regulatory, operational, and educational initiatives. The mitigation actions address vulnerabilities associated with existing buildings and infrastructure, as

well as actions intended to reduce risk in new development and redevelopment. While some actions may apply across multiple hazards, others are hazard-specific and tailored to address particular risk conditions. Mitigation actions are included for each hazard evaluated in the Risk Assessment.

7.2 Mitigation Action Plan

The Mitigation Action Plan identifies the specific actions the City of Glendale will implement to minimize the impacts of natural and humanmade hazards, as well as details for how these actions will be administered and prioritized. These actions were developed by the Planning Team with input from the HMPC, community, and stakeholder group. The actions aim to reduce losses and damage for people, property, and critical facilities and infrastructure, while supporting the City's ongoing planning, regulatory, and capital improvement efforts. The Mitigation Action Plan includes information on potential funding sources, responsible departments or agencies, relative cost estimates, anticipated timeframes, and priority levels for each action (Table 48).

Prioritization

The Planning Team reviewed each action, incorporating HMPC, community, and stakeholder feedback, to determine its suitability and feasibility for addressing the risks identified in the Risk Assessment. Actions were ranked as high, medium, or low priority based on their relation to mitigation goals, the severity and likelihood of identified hazards, and the City's existing capabilities, resources, and programs.

- **High-priority** actions are those that address significant risks, support City goals and priorities, and are considered feasible given available resources.
 - Significantly reduces risk to life and/or critical infrastructure
 - Feasible with expected funding and staff capacity
 - Can be implemented in the near term (or is already underway)
 - Requires manageable coordination
 - Strongly aligned with City priorities and existing plans
- **Medium-priority** actions address identified risks but may require additional resources, coordination, or longer-term planning to implement.
 - Provides moderate risk reduction or supports other mitigation actions
 - Feasible but with some constraints (funding, staffing, or timing)
 - Longer-term or phased implementation
 - Requires coordination across departments/agencies
 - Generally aligned with City priorities
- **Low-priority** actions are those that provide more limited risk reduction benefits or are less feasible under current conditions but may become appropriate in the future.
 - Limited or indirect risk reduction
 - High cost or uncertain funding
 - Long-term or unclear implementation pathway
 - Requires significant coordination or faces major barriers
 - Weak or unclear alignment with current priorities

Potential Funding Sources, Responsible Department, Cost Estimates, and Timeframes

Potential funding sources for mitigation actions may include a combination of local, state, and federal resources. These can include the City's General Fund, capital improvement program (CIP) funds, and operating budgets, as well as external funding such as state and federal hazard mitigation grants, climate

resilience, infrastructure, and disaster recovery programs. The City will pursue and leverage available funding sources to support implementation of prioritized mitigation actions over time. State and federal grant and loan funding opportunities for mitigation actions include the following:

- **Hazard Mitigation Grant Program (HMGP)** provides support for implementing mitigation activities that reduce risk to life and property from natural hazards, including wildfire, earthquake, extreme weather, flooding, and other natural hazards defined in the State Hazard Mitigation Plan. The California Governor's Office of Emergency Services (Cal OES) administers funds for FEMA's HMGP in California.
- **Building Resilient Infrastructure and Communities (BRIC)** provides funding for implementation of projects that reduce risks from natural hazards, such as floods, earthquakes, and wildfires.
- **California Integrated Climate Adaptation and Resiliency Program (ICARP)** provides funding to support climate resilient infrastructure projects and capacity building to address hazards such as extreme heat, flooding, wildfires, and extreme weather.
- **Next Generation Warning System (NGWS) Grant Program** provides support for the identification of capability gaps and implementation of emergency alert and warning systems to inform the public and protect critical infrastructure.
- **CAL FIRE's Wildfire Prevention Grants Program** provides support to implement activities that reduce wildfire risk to communities, such as hazardous fuel reduction, wildfire prevention planning, and wildfire prevention education.
- **Proposition 4 Safe Drinking Water, Wildfire Prevention, Drought Preparedness, and Clean Air Bond Act of 2024 (Proposition 4)** provides funding to support locally driven water infrastructure and climate adaptation projects.
- **Emergency Management Performance Grant Program (EMPG)** provides support for building and sustaining core capabilities across the prevention, protection, mitigation, and response and recovery for all hazards.
- **Staffing for Adequate Fire and Emergency Response Grants (SAFER)** provides funding to increase and maintain the number of trained, "front line" firefighters available in their communities.
- **California Department of Water Resources (DWR) Integrated Regional Water Management (IRWM) Grant Program** provides funding for multi-benefit water management and climate resilience projects that improve water supply reliability, flood management, drought preparedness, groundwater management, ecosystem restoration, and climate adaptation planning.
- **California Department of Water Resources (DWR) Floodplain Management, Protection, and Risk Awareness Grant Program** provides support for local and regional projects that reduce flood risk, improve floodplain management, enhance emergency response capabilities, and increase public awareness of flood hazards and climate resilience.
- **California Energy Commission (CEC) The Community Energy Reliability and Resilience Investment (CERRI) Program** provides funding and technical assistance for projects that improve energy resilience, backup power systems, microgrids, energy assurance planning, and climate adaptation strategies for critical facilities and vulnerable communities.
- **California Energy Commission (CEC) Electric Program Investment Charge (EPIC) Program** provides funding for innovative clean energy, community energy resilience, and grid reliability projects that support climate adaptation, emergency preparedness, and resilience to extreme weather and power disruptions.

For each mitigation action, the Planning Team identified the department or agency responsible for implementation, estimated the relative cost, and anticipated timeframe for completion. The responsible department or agency will lead implementation efforts, coordinate with supporting entities as needed, and track progress over time. Relative cost estimates reflect anticipated staff time, materials, coordination needs, and capital investments. Cost estimates were categorized as follows:

- **Low cost (\$)** actions can be implemented primarily using existing staff time, routine operations, or minimal materials, with little or no additional funding required.
- **Medium cost (\$\$)** actions require moderate funding, additional staff effort, interdepartmental coordination, consultant support, or limited capital investment.
- **High cost (\$\$\$)** actions involve substantial capital investment, major construction or infrastructure improvements, land acquisition, or long-term funding commitments.

Timeframes for mitigation were categorized as short-term, medium-term, or long-term, and are aligned with the City's planning and budgeting mechanisms.

- **Short-term** actions include those that can be implemented within the current hazard mitigation planning period or capital improvement and budget cycles.
- **Medium-term** actions typically require additional planning, coordination, or funding and may include structural projects, regulatory updates, education and outreach, or natural systems protection efforts.
- **Long-term** actions are those that may be implemented over an extended period and are often tied to comprehensive planning efforts, major infrastructure investments, economic development initiatives, transportation planning, or the expected life cycle of infrastructure assets.

Table 48 Mitigation Action Plan

Mitigation Action	Hazards Addressed	Goal Targeted	Potential Funding Sources	Responsible Department/Agency	Relative Cost	Time Frame	Priority
1. Multi-Hazard							
1.1 Integrate Local Hazard Mitigation Plan goals and actions into existing City regulations, plans, programs, and capital improvements.	Earthquakes, Wildfires, Floods, Landslides, Extreme Weather, Drought, Hazardous Materials, Transportation Incidents	Goal 4	General Fund, CIP funds	Community Development Department	\$	Ongoing	High
1.2 Create and update an inventory of critical facilities and infrastructure as new critical facilities may come online to track facility upgrades, changes in use, and prioritization for retrofits and improvements.	Earthquakes, Wildfires, Floods, Landslides, Extreme Weather, Drought	Goal 1	General Fund, CIP funds	Public Works Department	\$	Ongoing	High
1.3 Evaluate critical facilities at risk from natural and humanmade hazards and improve their resilience by implementing retrofits, system redundancies, and alternative operating locations to maintain essential services during and after emergencies.	Earthquakes, Wildfires, Floods, Landslides, Extreme Weather, Drought, Hazardous Materials, Transportation Incidents	Goal 1	General Fund, CIP funds, federal and state grants (BRIC, Proposition 4)	Public Works Department	\$\$\$	5 years	Medium
1.4 Assess aging critical facilities and infrastructure at high risk of failure from hazards and identify funding to implement retrofits or replacements to reduce service disruptions and improve hazard resilience through the City's CIP as well as hazard mitigation funding sources.	Earthquakes, Wildfires, Floods, Landslides, Extreme Weather, Drought	Goal 1	General Fund, CIP funds, federal and state grants (BRIC)	Public Works Department	\$\$\$	5 years	Medium
1.5 Ensure reliable back-up power and fuel supply for critical facilities during emergencies by designing and implementing battery energy storage systems, on-site renewable energy systems, and resilient microgrid solutions, to prioritize power restoration during hazard events.	Earthquakes, Wildfires, Floods, Landslides, Extreme Weather, Drought, Hazardous Materials, Transportation Incidents	Goal 5	General Fund, CIP funds, federal and state grants (BRIC, Wildfire Prevention Grants, APGP)	GWP	\$\$\$	2-5 years	Medium
1.6 Maintain ongoing HMPC coordination and training to support mitigation implementation by establishing clear ongoing roles for HMPC participants, regular meetings to pursue and evaluate implementation of mitigation strategies, and routine training to ensure members stay current on emerging issues in natural and manmade hazard loss reduction. (Implements Safety Element Program 1-3.1)	Earthquakes, Wildfires, Floods, Landslides, Extreme Weather, Drought, Hazardous Materials, Transportation Incidents	Goal 4	General Fund	Fire Department	\$	Ongoing	Medium
1.7 Distribute biennial earthquake and wildfire insurance information to property owners in mapped hazard zones using a variety of targeted media approaches (mailed notices, website and social media postings, utility bill inserts and messaging). Insurance information should also be distributed in response to significant updates to hazard maps and after hazard events.	Earthquakes, Wildfires, Floods	Goal 2	General Fund	Fire Department	\$	Ongoing Yearly	High

Mitigation Action	Hazards Addressed	Goal Targeted	Potential Funding Sources	Responsible Department/Agency	Relative Cost	Time Frame	Priority
1.8 Support facility and community-level evacuation readiness through targeted public education and outreach by developing standardized evacuation guidance and route maps. Conduct annual workshops for residents, businesses, and facility managers to share evacuation information and distribute evacuation information to using digital platforms and community events.	Earthquakes, Wildfires, Floods, Landslides, Extreme Weather, Hazardous Materials	Goal 2	General Funds, federal and state grants (BRIC, EMPG)	Fire Department	\$	Ongoing Yearly	High
1.9 Conduct annual evacuation drills that test resident self-evacuation procedures, internal and public communications, and signage to inform improvements to evacuation guidance and outreach.	Earthquakes, Wildfires, Floods, Landslides, Extreme Weather, Hazardous Materials	Goal 2	General Funds, federal and state grants (BRIC, EMPG)	Fire Department	\$	Ongoing Yearly	Medium
1.10 Coordinate with neighboring jurisdictions and regional agencies on mitigation planning and emergency preparedness and response activities.	Earthquakes, Wildfires, Floods, Landslides, Extreme Weather, Drought, Hazardous Materials, Transportation Incidents	Goal 4	General Fund	Fire Department	\$	Ongoing	High
1.11 Identify gaps in existing participation in regional emergency transportation and evacuation planning efforts by evaluating the City's roles, contributions, and communication during collaborative evacuation planning and improvement efforts.	Earthquakes, Wildfires, Floods, Landslides, Extreme Weather, Hazardous Materials, Transportation Incidents	Goal 4	General Fund	Public Works Department	\$	Ongoing	High
1.12 Establish communication protocol with transportation providers to enable rapid restoration of public transit and transportation services, including traffic signaling, electric bus and shuttle charging infrastructure, City electric vehicle fleet charging systems, rail service, and communication systems.	Earthquakes, Wildfires, Floods, Landslides, Extreme Weather, Hazardous Materials, Transportation Incidents	Goal 5	General Fund	Glendale Water and Power/Public Works Department	\$	2 years	Medium
1.13 Improve emergency alert and notification systems by increasing public awareness of available emergency communication platforms, including how to sign up for alerts, where to access real-time emergency information, and how notifications are issued during emergencies.	Earthquakes, Wildfires, Floods, Landslides, Extreme Weather, Drought, Hazardous Materials, Transportation Incidents	Goal 5	General Fund, CIP funds, federal and state grants (HMGP, Wildfire Prevention Grants, NGWS Grant Program, EMPG)	Fire Department/Public Works Department	\$\$\$	2-5 years	Medium
1.14 Strengthen community preparedness and resilience through information sharing, establishing community response teams, and community partnerships.	Earthquakes, Wildfires, Floods, Landslides, Extreme Weather, Drought, Hazardous Materials, Transportation Incidents	Goal 2	General Fund	Fire Department	\$	Ongoing	High
1.15 Create and maintain a public website with interactive hazard maps to improve public understanding of local hazards and mitigation actions.	Earthquakes, Wildfires, Floods, Landslides, Extreme Weather, Drought, Hazardous Materials, Transportation Incidents	Goal 2	General Fund	Fire Department/ Community Development Department	\$\$	2 years	Medium

Mitigation Strategy							
Mitigation Action	Hazards Addressed	Goal Targeted	Potential Funding Sources	Responsible Department/Agency	Relative Cost	Time Frame	Priority
1.16 Continue to promote outreach programs aimed at businesses, residents and organizations that are most likely to be impacted by hazard events.	Earthquakes, Wildfires, Floods, Landslides, Extreme Weather, Drought, Hazardous Materials, Transportation Incidents	Goal 2	General Fund	Fire Department	\$	Ongoing	High
1.17 Conduct emergency preparedness and response education and neighborhood engagement in the five most commonly spoken languages.	Earthquakes, Wildfires, Floods, Landslides, Extreme Weather, Drought, Hazardous Materials, Transportation Incidents	Goal 2	General Fund	Fire Department	\$	Ongoing	High
1.18 Promote neighborhood-based Community Emergency Response Team (CERT) programs to increase emergency response capacity.	Earthquakes, Wildfires, Floods, Landslides, Extreme Weather, Drought, Hazardous Materials, Transportation Incidents	Goal 5	General Fund, federal and state grants (BRIC, EMPG)	Fire Department	\$\$	Ongoing	Medium
1.19 Apply technical knowledge of natural ecosystems to integrate natural resource management into land use planning and hazard mitigation by using ecological data, watershed mapping, and climate impact analyses to inform land use decisions and mitigation strategies and implementing green infrastructure strategies such as floodplain restoration, urban canopy expansion, fire resilient vegetation buffers, and stormwater capture and infiltration systems.	Earthquakes, Wildfires, Floods, Landslides, Extreme Weather, Drought	Goal 3	General Fund, federal and state grants (HMPC, BRIC, Wildfire Prevention Grants, Proposition 4, APGP)	Community Services & Parks Department	\$\$	Ongoing	Medium
1.20 Protect and enhance natural areas that reduce hazard risks by using ecological and hazard mapping to identify priority open space areas to support hazard mitigation such as groundwater recharge, flood attenuation, erosion control, urban heat island reduction, and wildfire barriers.	Earthquakes, Wildfires, Floods, Landslides, Extreme Weather, Drought	Goal 3	General Fund, CIP funds, federal and state grants (HMPC, BRIC, Wildfire Prevention Grants, Proposition 4, APGP)	Community Services & Parks Department	\$\$	Ongoing	Medium
1.21 Develop a centralized, internal hazard event management system to support real-time tracking, monitoring, and coordination of maintenance and hazard-related issues during emergency events that is capable of receiving and managing high volume reports from multiple sources.	Earthquakes, Wildfires, Floods, Landslides, Extreme Weather, Hazardous Materials, Transportation Incidents	Goal 5	General Fund, CIP funds, federal and state grants (BRIC, Proposition 4, APGP)	Fire Department/ Public Works Department	\$\$	2-5 years	Medium
2. Earthquake							
2.1 Identify opportunities, such as capital planning integration, sequencing with planned replacements, design standard enhancements, interdepartmental coordination, and available funding, to support seismic upgrades to Glendale Water and Power's brittle water infrastructure.	Earthquakes	Goal 1	General Fund, CIP funds, federal and state grants (HMPC, BRIC)	Glendale Water & Power	\$	5 years	High
2.2 Conduct targeted community outreach and educational programs to reduce nonstructural earthquake hazards such as bookcases and wall fixtures and promote household preparedness measures in various languages.	Earthquakes	Goal 2	General Fund	Fire Department	\$	Ongoing	Medium

Mitigation Action		Hazards Addressed	Goal Targeted	Potential Funding Sources	Responsible Department/Agency	Relative Cost	Time Frame	Priority
2.3	Establish incentives, informed by GIS-based seismic risk assessment results, to support retrofits for vulnerable buildings, critical facilities, and infrastructure located in areas with high expected ground shaking, liquefaction, or fault-related hazards, support essential services or community lifelines, particularly facilities with limited redundancy, and/or serve populations with higher social vulnerability.	Earthquakes	Goal 1	General Fund, CIP funds, federal and state grants (HMPC, BRIC)	Fire Department/ Public Works Department	\$\$	2-5 years	Medium
2.4	Review and update local building, zoning, and development regulations, where allowable, to strengthen seismic resilience beyond baseline state requirements by incorporating risk-informed design considerations, site planning standards, and protections for critical facilities and lifeline infrastructure.	Earthquakes	Goal 1	General Fund	Community Development Department/ Public Works Department	\$	2-5 years	Low
3. Wildfire								
3.1	Use updated CAL FIRE Very High Fire Hazard Severity Zones maps and WUI designations to prioritize fuel management, guide development review, improve evacuation and emergency access, and ensure adequate fire protection staffing, equipment, and infrastructure in high-risk areas.	Wildfire	Goal 1	General Fund, federal and state grants (BRIC, Wildfire Prevention Grants)	Fire Department	\$	2 years	High
3.2	Expand and improve fire resistant water infrastructure, including storage tanks, pump stations, backup power systems, and hydrants, to maintain reliable water supply and firefighting capacity.	Wildfire	Goal 1	General Fund, CIP funds, federal and state grants (HMGP, Wildfire Prevention Grants, Proposition 4)	Fire Department/ Glendale Water & Power	\$\$\$	2-5 years	High
3.3	Strengthen and maintain defensible space and vegetation management requirements for public and private properties through risk-based inspections, code enforcement, and coordinated maintenance of high-risk wildfire areas.	Wildfire	Goal 1	General Fund, federal and state grants (BRIC, Wildfire Prevention Grants)	Fire Department	\$\$	Ongoing	High
3.4	Provide assistance to vulnerable populations for vegetation clearance and fire readiness through targeted outreach and support programs that help eligible residents reduce hazardous vegetation, create defensible space, remove combustible debris, and implement wildfire preparedness measures.	Wildfire	Goal 2	General Fund, federal and state grants (HMGP, Wildfire Prevention Grants, APGP)	Fire Department	\$\$	Ongoing	High
3.5	Strengthen interdepartmental collaboration to reduce wildfire risk by formalizing coordination among fire, planning, public works, utilities, and emergency management to support fuel management, fire-resilient infrastructure, development review in the WUI, and evacuation planning.	Wildfire	Goal 4	General Fund, federal and state grants (EMPG)	Fire Department/ Community Development Department/Public Works Department	\$	Ongoing	Medium

Mitigation Strategy							
Mitigation Action	Hazards Addressed	Goal Targeted	Potential Funding Sources	Responsible Department/Agency	Relative Cost	Time Frame	Priority
3.6 Continue and expand the City's Vegetation Management Program to reduce wildfire risk within wildfire-prone areas and the Very High Fire Hazard Severity Zone. Activities may include annual defensible space inspections, PRC 4291 enforcement, AB-38 inspections, fuel reduction projects, open space inspections, weed abatement coordination, goat grazing operations, utility corridor vegetation management, chipper days, community brush clearance events, wildfire preparedness outreach, GIS wildfire hazard mapping updates, and evaluation of emergency evacuation access routes and fire roads.	Wildfire	Goal 1	General Fund, capital improvement funds, federal and state grants (BRIC, HMPG, Wildfire Prevention Grants)	Fire Department	\$\$	Ongoing	High
3.7 Coordinate with public and private partners on a quarterly basis to strengthen emergency fire preparedness by improving communication and aligning planning efforts related to fuel management, evacuation planning, resilient operations, and protection of critical facilities. Partners may include schools, healthcare providers, major employers, and community organizations.	Wildfire	Goal 4	General Fund	Fire Department	\$	Ongoing Quarterly	Medium
3.8 Use cross-departmental and partner exercises to identify coordination gaps and implement procedural or policy changes that reduce future fire and cascading hazard impacts.	Wildfire	Goal 4	General Fund	Fire Department	\$	Ongoing	Medium
3.9 Assess fire station locations, facility capacity, and long-term staffing needs to inform capital planning and service area adjustments that reduce wildfire risk over time.	Wildfire	Goal 1	General Fund, CIP funds, federal and state grants (BRIC, EMPG, SAFER)	Fire Department	\$\$	2-5 years	Medium
3.10 Install additional early wildfire detection devices, such as smoke-detection and thermal imaging cameras, in high-risk areas and coordinate with regional fire agencies, utilities, and other partners on implementation, monitoring, maintenance, and response procedures to improve early detection and emergency response.	Wildfire	Goal 5	General Fund, CIP funds, federal and state grants (BRIC, NGWS Grant Program, Wildfire Prevention Grants)	GWP/Fire Department	\$\$	2-5 years	Medium
3.11 Establish and communicate clear trigger points for public safety power shutoffs and emergency response and evacuation to all relevant departments and agencies.	Wildfire	Goal 5	General Fund	GWP/Fire Department	\$	Ongoing	High
3.12 Explore an electrical undergrounding strategy to identify feasible locations, implementation priorities, and potential funding opportunities that reduce wildfire and extreme wind risk.	Wildfire, Extreme Weather	Goal 1	General Fund, capital improvement funds, federal and state grants (BRIC)	GWP/Fire Department	\$\$	3 years	Medium
3.13 Require fire protection plans and demonstration of adequate water supply as part of new development review to reduce wildfire risk and long-term service demands.	Wildfire	Goal 1	General Fund	Fire Department	\$	Ongoing	High

Mitigation Action	Hazards Addressed	Goal Targeted	Potential Funding Sources	Responsible Department/Agency	Relative Cost	Time Frame	Priority
4. Floods and Dam Inundation							
4.1 Improve stormwater and rainfall-driven flood inundation data and mapping for urban flood areas, including updating GIS-based flood mapping to reflect current land use conditions, increased rainfall intensity projections under climate change scenarios, and downstream urban runoff patterns.	Flooding	Goal 1	General Fund, federal and state grants (BRIC, EMPG)	Community Development Department/Public Works Department	\$	Ongoing	Medium
4.2 Provide targeted technical assistance, guidance, or referrals to residents and property owners experiencing localized or repetitive stormwater flooding to support property-level risk reduction.	Flooding	Goal 2	General Fund, federal and state grants (CDBG, BRIC, APGP)	Public Works Department	\$	2-5 years	Low
4.3 Integrate dam inundation mapping into City GIS and planning tools to inform emergency planning, development review, and long-term land use and infrastructure decision-making.	Flooding	Goal 4	General Fund, federal and state grants (BRIC, EMPG)	Community Development Department/Public Works Department	\$	2 years	Medium
4.4 Enhance flood warning and communication systems to reduce risk to life and property by improving advance notification, situational awareness, and public response to localized and extreme rainfall flooding.	Flooding	Goal 5	General Fund, federal and state grants (EMPG, NGWS Grant Program)	Public Works Department	\$	2 years	Medium
4.5 Identify opportunities for upgrades to stormwater systems that account for more extreme rainfall events and reduce localized flooding risk.	Flooding	Goal 1	General Fund, federal and state grants (BRIC, Proposition 4)	Public Works Department	\$	2-5 years	High
5. Landslides							
5.1 Conduct updated landslide and post-wildfire debris-flow hazard mapping to capture changes associated with increased precipitation, wildfire impacts, slope conditions, soils, and rainfall intensity, and use the results to prioritize mitigation planning and protective measures.	Landslide, Wildfire, Flooding	Goal 1	General Fund, federal and state grants (HMGP, BRIC)	Public Works Department	\$\$	2 years	High
5.2 Promote slope-sensitive construction and subdivision design practices to reduce landslide risk in steep-slope areas, including grading, drainage, and site layout considerations.	Landslide	Goal 1	General Fund	Public Works Department	\$	Ongoing	Medium
5.3 Assess vulnerable properties and on-site infrastructure in landslide-prone areas following storm events or wildfire events to identify and implement targeted risk-reduction measures, such as drainage improvements, debris removal, or infrastructure hardening.	Landslide, Wildfire, Flooding	Goal 1	General Fund, federal and state grants (BRIC, EMPG)	Public Works Department	\$\$	Ongoing	Medium
5.4 Evaluate existing development regulations for landslide risk areas to ensure standards reflect current hazard conditions, climate-driven risk changes, and mitigation opportunities.	Landslide	Goal 1	General Fund	Public Works Department	\$	2 years	Medium

Mitigation Strategy							
Mitigation Action	Hazards Addressed	Goal Targeted	Potential Funding Sources	Responsible Department/Agency	Relative Cost	Time Frame	Priority
5.5 Identify safe evacuation routes and potential debris removal sources in high-risk debris flow and landslide areas, including their capacity, location, and suitability under future climate conditions.	Landslide	Goal 5	General Fund, federal and state grants (HMGP, BRIC, EMPG)	Fire Department	\$	2 years	High
6. Extreme Weather							
6.1 Reduce extreme wind and power-outage risks by trimming or removing wind-vulnerable trees on publicly owned and maintained properties, and by promoting and enforcing existing vegetation management requirements for private properties where trees pose a safety or infrastructure risk.	Extreme Weather	Goal 1	General Fund, federal and state funds (BRIC, EMPG)	Public Works Department	\$\$\$	Ongoing 2-5 years	Medium
6.2 Expand the functionality of cooling centers in the city to address identified gaps in access, capacity, operating hours, backup power, and supportive services improving the City's ability to protect vulnerable populations during extreme heat events.	Extreme Weather	Goal 5	General Fund, federal and state funds (BRIC)	Community Services & Parks Department	\$\$	Ongoing 2-5 years	High
6.3 Evaluate and, where appropriate, update local design standards, development review practices, and utility infrastructure standards to improve resilience of existing and new development to extreme weather, incorporating documented damage to buildings and infrastructure such as traffic signal poles, communication and power lines, transportation facilities, critical facilities, and other public and private structures.	Extreme Weather	Goal 1	General Fund	Public Works Department	\$	2-5 years	High
6.4 Conduct outreach on proper tree maintenance and identification of trees susceptible to severe winds and weather.	Extreme Weather	Goal 2	General Fund	Public Works Department	\$	Ongoing	Medium
6.5 Increase the use and construction of shade structures within new developments and City facilities.	Extreme Weather	Goal 3	General Fund, CIP funds, federal and state funds	Public Works Department	\$\$	5 years	High
6.6 Identify and prioritize opportunities to reduce wind- and wildfire- related risks by conducting electrical infrastructure hardening and undergrounding strategies.	Extreme Weather, Wildfire	Goal 1	General Fund, CIP funds, federal and state funds (BRIC, Proposition 4)	Glendale Water & Power	\$	2-5 years	High
7. Drought							
7.1 Develop and maintain a Drought Contingency Plan that establishes trigger points, response protocols, and inter-agency coordination procedures for each phase of the Glendale Water & Power's Mandatory Water Conservation Ordinance.	Drought	Goal 5	General Fund, federal and state funds	Glendale Water & Power	\$	2 years	High

Mitigation Action	Hazards Addressed	Goal Targeted	Potential Funding Sources	Responsible Department/Agency	Relative Cost	Time Frame	Priority
7.2 Conduct an assessment of Glendale's local groundwater wells to evaluate long-term yield reliability under extended drought scenarios, identify aquifer vulnerability to subsidence and contamination, and determine investment needs to protect the city's 30 to 40 percent local water supply buffer.	Drought	Goal 1	General Fund, federal and state funds	Glendale Water & Power	\$\$	2-5 years	Medium
7.3 Expand financial assistance outreach to under-resourced households, including renters, limited-English-proficient residents, and seniors, to ensure awareness of and access to existing programs such as the Low-Income Household Water Assistance Program (LIWAP) and Utility Users Tax exemptions during drought-driven rate increases.	Drought	Goal 2	General Fund, federal and state funds	Glendale Water & Power	\$	Ongoing	High
7.4 Identify and pursue opportunities to expand stormwater capture infrastructure and recycled water use for non-potable purposes, reducing dependence on imported MWD supplies and building local drought resilience.	Drought	Goal 1	General Fund, federal and state funds	Glendale Water & Power, Public Works	\$\$	5 years	Medium
7.5 Establish a coordinated planning protocol between GWP, the Fire Department, and Public Works to manage the compounding risks of simultaneous drought and wildfire, including pre-positioning water reserves and maintaining firefighting capacity during periods of mandatory conservation.	Drought Wildfire	Goal 4	General Fund, federal and state funds	Glendale Water & Power, Fire Department, Public Works	\$	2 years	High
8. Humanmade Hazards							
8.1 Maintain, integrate, and routinely update existing hazardous materials facility and transportation route mapping within City GIS and planning tools to support land-use planning, infrastructure projects, and hazard mitigation decision-making.	Humanmade	Goal 4	General Fund	Fire Department	\$	Ongoing 2 years	Medium
8.2 Strengthen coordination with regulated facilities, transportation agencies, and emergency response partners to reduce the potential impacts of hazardous materials incidents.	Humanmade	Goal 4	General Fund	Fire Department	\$	Ongoing	Medium
8.3 Integrate transportation safety and resilience improvements for vulnerable roadways and bridges into the City's Capital Improvement Plan	Humanmade	Goal 1	General Fund, CIP funds	Public Works Department	\$\$	Ongoing	Medium
8.4 Improve communication between the California Department of Transportation and the City's Public Works Department to prioritize and identify strategies that address roadway issues.	Humanmade	Goal 4	General Fund	Public Works Department	\$	Ongoing	High
8.5 Integrate hazard mitigation and climate change impact considerations into roadway and transportation infrastructure design standards.	Humanmade	Goal 1	General Fund, federal and state funds (HMGP, BRIC)	Public Works Department	\$	Ongoing 2 years	High

Mitigation Strategy							
Mitigation Action	Hazards Addressed	Goal Targeted	Potential Funding Sources	Responsible Department/Agency	Relative Cost	Time Frame	Priority
8.6 Coordinate with local and regional transportation agencies to identify and reduce risks associated with high-volume corridors.	Humanmade	Goal 4	General Fund, federal and state funds (HMGP, BRIC)	Public Works Department	\$\$	Ongoing 2-5 years	Medium
8.7 Coordinate with regional rail operators and emergency response agencies to improve preparedness and response capabilities for potential rail accidents, derailments, and hazardous materials incidents along rail corridors.	Humanmade	Goal 4	General Fund, federal and state funds (HMPG, BRIC, EMPG)	Fire Department	\$	2 years	High
8.8 Coordinate with regional aviation agencies, airport operators, and emergency response partners to support preparedness, emergency response, and public communication planning for potential aviation incidents affecting the city.	Humanmade	Goal 5	General Fund, EMPG	Fire Department	\$	2 years	Low

8 Plan Maintenance Procedures

Implementation and maintenance of the LHMP helps ensure that the City continues to identify opportunities to reduce risk, improve resilience, and support informed decision-making related to natural and human-caused hazards. This section describes the procedures the City will use to monitor, evaluate, update, and integrate the Plan throughout the five-year planning cycle.

The Plan is intended to serve as a living document that guides hazard mitigation activities across City departments and partner agencies. To maintain the relevance of the plan, the City will implement an ongoing maintenance process that includes regular monitoring of mitigation actions, periodic evaluation of progress toward mitigation goals, continued public participation, and formal plan updates at least once every five years.

The City's HMPC will oversee implementation and maintenance of the LHMP. The Planning Team will meet regularly to review mitigation project status, assess changes in hazard conditions and community capabilities, and identify opportunities to incorporate mitigation strategies into other local planning mechanisms, policies, programs, and capital improvement efforts. To support continuity in the maintenance process, the City will maintain representation from relevant departments and agencies on the Planning Team. If staffing or organizational changes occur, replacement representatives will be designated to support continued coordination and implementation of the LHMP. Through this ongoing process, the City will keep the LHMP current, actionable, and integrated into broader community planning and resilience initiatives.

Public participation opportunities will continue throughout implementation and future plan updates through community outreach efforts such as public meetings, online engagement opportunities, surveys, presentations to community organizations and City commissions, and updates posted on the City's website and social media platforms. These efforts will help ensure that residents, businesses, and stakeholders remain informed and engaged in hazard mitigation activities and future revisions to the Plan.

8.1 Monitoring and Evaluation

The Plan identifies a series of mitigation actions intended to reduce hazard vulnerability and support long-term resilience within the city. The effectiveness of the LHMP depends on continued coordination among City departments, incorporation of mitigation actions into ongoing programs and projects, and regular review of implementation progress throughout the five-year planning cycle.

The HMPC will be responsible for overseeing implementation, monitoring, and evaluation of the LHMP. The HMPC includes representatives from City departments and partner agencies involved in hazard mitigation planning and implementation. While individual departments will be responsible for carrying out mitigation actions relevant to their operational areas, the HMPC will coordinate overall plan maintenance activities and track progress toward mitigation goals.

City departments identified as leads or supporting agencies for mitigation actions will monitor the status of assigned projects and programs throughout the year. Departments will provide updates regarding completed actions, ongoing efforts, schedule adjustments, funding opportunities, and implementation challenges. The HMPC will compile this information and use it to evaluate overall plan progress and identify any necessary revisions or additions to the mitigation strategy.

The HMPC will convene annually to review implementation of the LHMP and prepare a progress assessment. The annual review process will include consideration of:

- A summary of any hazard events that occurred during the prior year and their impact on the planning area

- A review of successful mitigation initiatives identified in the 2026 plan
- A brief discussion about the targeted strategies that were not completed
- A re-evaluation of the action plan to determine if the timeline for identified projects needs to be amended, and the reason for the amendment, e.g., funding issues
- Any recommendations for new projects
- Any opportunities to integrate information and mitigation actions into other planning mechanisms
- Any changes in or potential for new funding options (grant opportunities)
- Any impacts of other planning programs or initiatives in the city that involve hazard mitigation

The HMPC will write a progress report that will be provided to the City's financial department for review and incorporation into the budget process as mitigation actions are implemented. The progress report will be posted on the City's LHMP project website and presented to City Council. The Planning Team will aim to complete the progress report process by July of each year.

8.2 Plan Update

The City intends to review and update the Plan on a five-year cycle to ensure that the plan continues to reflect current hazard conditions, community priorities, mitigation capabilities, and planning initiatives. The update process will build upon information gathered during annual monitoring and evaluation activities conducted by the HMPC.

The HMPC will coordinate the plan update process and provide oversight throughout development of the revised Plan. City departments, partner agencies, stakeholders, and community representatives will participate in the review and update of hazard information, mitigation strategies, and implementation progress. The update process will include outreach and opportunities for public participation to gather input from residents, businesses, community organizations, and other interested parties.

As part of the update process, the City will review and revise the following components of the LHMP, as appropriate:

- The hazard risk assessment will be reviewed and updated using the most recent information and technologies
- The action plan will be reviewed and revised to account for any initiatives completed, dropped, or changed and to account for changes in the risk assessment
- Any new City policies identified under other planning mechanisms, as appropriate
- The draft LHMP update will be sent to appropriate agencies and organizations for comment
- The public will be given an opportunity to comment on the updated version prior to adoption
- The City Council will adopt the updated plan

The City will begin the formal update process 8 to 12 months in advance of the plan expiration date to allow adequate time for coordination, public outreach, revisions, and adoption. Upon completion of the update process, the revised LHMP will be presented to the City Council for consideration and adoption.

Through continued monitoring, evaluation, public participation, and periodic updates, the City will maintain the Plan as a current planning tool that supports long-range resilience, informed decision-making, and coordination among City departments and community partners.

8.3 Continued Public Involvement

The City recognizes the importance of continued public participation throughout implementation and maintenance of the Plan. Public input provides local knowledge, helps identify community priorities, and

supports ongoing coordination between the City, residents, businesses, and community organizations regarding hazard mitigation activities and resilience planning.

The City will continue to provide opportunities for public involvement during implementation, monitoring, evaluation, and future updates of the Plan. Information related to hazard mitigation activities, mitigation projects, and plan updates may be shared in multiple languages through a variety of outreach methods, including:

- Public meetings and workshops
- City Council meetings and presentations
- Updates posted on the City website
- Social media announcements and outreach campaigns
- Community events and hazard preparedness events
- Surveys and questionnaires distributed online or in person
- Coordination with community organizations, neighborhood groups, and stakeholders
- Public notices and press releases, when appropriate

The City will make reasonable efforts to ensure outreach and engagement activities are accessible to populations that may be disproportionately vulnerable to natural hazards and emergencies. Targeted strategies may include culturally and linguistically appropriate materials, accessible meeting formats, and collaboration with trusted community-based organizations, service providers, and advocacy groups to reduce participation barriers.

The HMPC will support ongoing outreach efforts by identifying opportunities to engage the public throughout the five-year planning cycle. Public feedback gathered during annual reviews, community events, surveys, or other outreach activities may be considered during future evaluations and updates of the LHMP.

The City may also incorporate hazard mitigation information into broader public education and preparedness initiatives to increase awareness of local hazards, emergency preparedness practices, and mitigation opportunities. Departments involved in implementation of mitigation actions may coordinate outreach activities related to specific projects, infrastructure improvements, preparedness programs, or community resilience initiatives.

As part of future plan updates, the City will provide additional opportunities for public participation and review of draft Plan materials. Outreach efforts during the update process may include public meetings, online engagement opportunities, presentations to community groups and commissions, and public comment periods. Input received from residents, businesses, partner agencies, and stakeholders will help inform revisions to the Plan and support continued alignment with community priorities and needs.

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Appendix A

Community Engagement Documentation

Appendix B

Plan Review Tool

Appendix C

Previous Mitigation Action Status

Appendix D

Adoption Resolution