CITY OF PALOS VERDES ESTATES

SAFETY ELEMENT

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INTRODUCTION

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The Safety Element of the General Plan addresses natural and human-caused hazards in the Palos Verdes Estates and the potential short- and long-term danger to human life, property, and economic and social dislocation resulting from hazard events, including air pollution, drought, extreme heat, flooding, geologic hazards (including bluff erosion from sea-level rise), hazardous materials, and wildfires. This is one of seven elements required by State law (Government Code 65302). Climate change affects and potentially exacerbates the impact of hazards, therefore, in accordance with Senate Bill 379, this Safety Element also addresses climate change within each applicable hazard section.

This Safety Element includes an Existing Conditions section, which outlines each hazard facing Palos Verdes Estates, who these hazards affect, and how the City of Palos Verdes Estates (City) is currently addressing these hazards. **Vulnerable populations** are considered throughout this Safety Element because many hazards disproportionately affect certain individuals. Following the existing conditions is a Goals, Policies, and Actions section, which provides the City's safety roadmap, including a comprehensive hazard mitigation and emergency response strategy. Goals, policies, and actions are organized by four planning phases designed to enhance the resilience of a community: mitigate, prepare, respond, and recover.

Relation to General Plan Elements

This Safety Element directly relates to topics in the Land Use, Circulation, Conservation, Recreation, and Open Space Elements of the General Plan. The Safety Element identifies hazards and hazard abatement provisions to guide land use decisions related to zoning, subdivisions, and entitlement permits. The Safety Element also addresses emergency response and evacuation routes, which informs the Circulation Element to ensure that streets are sized adequately for fire truck access and other needs of first responders. Related to the Conservation and Open Space Element, the Safety Element addresses the urban forest and street trees to increase shade and mitigate hot days in Palos Verdes Estates.

VULNERABLE POPULATIONS

Vulnerable populations include people who have heightened exposure or increased sensitivity to hazards. Vulnerabilities vary by hazard, and can be caused by physical, social, political, or economic reasons. Climate change can exacerbate these vulnerabilities if not addressed.

Relation to the Local Hazard Mitigation Plan

Safety Elements and Local Hazard Mitigation Plans (LHMPs) are both hazard planning documents with overlapping purposes, but due to differing requirements they result in nuanced planning documents. Safety Elements respond to state legislation, while LHMP's respond to federal legislation. To ensure that these documents work in tandem, this Safety Element incorporates and augments the hazard profiles, risk analyses, and mitigation actions contained in the most recently adopted Local Hazard Mitigation Plan (LHMP). For more information on the City's LHMP and where to find it, continue reading.

The LHMP for the City of Palos Verdes Estates is developed in accordance with the Disaster Mitigation Act of 2000 (DMA 2000) and follows FEMA's Local Hazard Mitigation Plan guidance. The LHMP involves a process where hazards are identified and profiled, the people and facilities at risk are analyzed, and mitigation actions are developed to reduce or eliminate hazard risk. The implementation of these mitigation actions, which include both short and long-term strategies, involve planning, policy changes, programs, projects, and other activities. The City's LHMP can be found here (https://www.pvestates.org/services/police-department/disaster-preparedness/local-hazard-mitigation-plan) or by visiting the City's website (https://www.pvestates.org/home) and searching "LHMP" or "Local Hazard Mitigation Plan" in the search bar found at the top of the website.

Relation to Other Cities

The City's actions are important, but many hazards come from outside city limits, making regional or neighboring efforts noteworthy for the safety of Palos Verdes Estates' residents. For example, under extreme wind and drought conditions, fire can quickly travel through jurisdictions, across open spaces, riparian corridors, structures, and large lot residential tracts of land. The Palos Verdes Peninsula Public Safety Committee is one major avenue for regional efforts related to all aspects of public safety, including wildfire. This committee includes two councilmembers, city staff, and city managers from all four peninsula cities (Palos Verdes Estates, Rancho Palos Verdes, Rolling Hills, and Rolling Hills Estates), a representative from the Palos Verdes Peninsula Unified School District, and representatives from LA County Sheriff's Department and Palos Verdes Estates Police Department. In recent years this committee has created improvements to regional emergency communication, early wildfire detection, evacuation, and utility interdependencies. These efforts are detailed more throughout the Safety Element.

EXISTING CONDITIONS

This section outlines each hazard with five familiar questions: what, when, where, who, and how. For each hazard, this assessment explains **what** the hazard is and what causes it to occur in Palos Verdes Estates; **when** the hazard occurs, including if the hazard is seasonal or is forecasted to get worse as a result of climate change; **where** in Palos Verdes Estates this hazard is most likely to occur; **who** is most vulnerable to each hazard; and lastly, how the City is already addressing this hazard and how initiatives can be built upon and improved in the future.

This section addresses the following six hazards, as well as emergency preparedness and response:

- Drought and water resources
- Extreme heat
- Flooding and sea-level rise
- Geologic and seismic hazards
- Hazardous materials
- Wildfires

Drought and Water Resources

WHAT

Droughts are periods of time with limited precipitation, which impact the overall supply and storage of water. They can negatively impact surface water and groundwater water supply, various environmental conditions, agricultural yields, and recreation.

WHEN

Droughts can occur for months or years. Climate change has increased the probability that low-precipitation years occur simultaneously with warm years, which increases the current and future likelihood and severity of droughts in California.

When drought is occurring, it is measured on a D0 to D4 scale with D0 standing for abnormally dry conditions and D4 signifying exceptional drought. From 2011 to 2015, the Southern California region experienced a major drought that, at its worst, classified as a D4 (Exceptional Drought) across much of California including Palos Verdes Estates. [1] As of May 2023, Palos Verdes Estates and Los Angeles County are not experiencing drought conditions due to a heavy season of rain in the winter and spring of 2023.[2] Looking to the future, there is more than an 80% chance of a multidecadal drought during 2050-2099 (this prediction assumes a high-emissions scenario, which is a conservative estimate for future GHG emissions).[3] Check the U.S. Drought Monitor (https://www.drought.gov/states/california) for weekly updates on current drought conditions.

1 National Drought Mitigation Center. (2022, July). "U.S. Drought Monitor." **https://droughtmonitor.unl.edu/CurrentMap.aspx**

2 National Drought Mitigation Center. (2023, June). "U.S. Drought Monitor." **https://droughtmonitor.unl.edu/CurrentMap.aspx**

3 Cook, Benjamin I., Toby R. Ault, and Jason E. Smerdon. 2015. "Unprecedented 21st Century Drought Risk in the American Southwest and Central Plains." *Science Advances* 1 (1): e1400082

WHERE

The City's water utility is Cal Water, which serve the entire Palos Verdes Peninsula and many other surrounding cities. Cal Water purchases surface water from Metropolitan Water District of Southern California, which imports their water from the Colorado River and the State Water Project. This means that more localized droughts may not directly impact the daily operations of residents and businesses in Palos Verdes Estates. Similarly, broader statewide drought conditions could impact Palos Verdes Estates even when local drought conditions are not as severe.

WHO

The impacts of drought depend on the specific area's water users and water source. In relation to safety, drought is a unique hazard that mainly impacts water supply for fire suppression. Very high fire hazard potential is present across the entire city, meaning that drought's impact on fire suppression would impact individual safety across the city in a similar way.

Depending on the severity of the drought, non-safety drought-related issues can include reduced water supply for certain types of water uses such as agriculture, or recreation. These issues can especially impact certain businesses. Palos Verdes Estates does not have any agriculture, but the Palos Verdes Golf Club may be impacted by reduced water supply during times of drought. Other water conservation measures may be required during times of drought.

HOW

Water planning in California can be complex and many decisions occur at regional levels. For example, Integrated Regional Water Management (IRWM) is a program intended to manage water on a regional scale. IRWM regions develop regional water management plans collaboratively, prioritize key projects, and act as a major pathway for funding opportunities. Palos Verdes Estates is within the Greater Los Angeles County IRWM Region, more specifically the South Bay subregion.[4]

Urban Water Management Plans (UWMPs) are more localized plans for water management within a water district or system. These plans supply information on water demand, water supply, supply reliability, potential vulnerabilities, contingency planning, and demand management policies and programs. Cal Water's UWMP for the area covers the entirety of the Palos Verdes Peninsula including Palos Verdes Estates, Rancho Palos Verdes, Rolling Hills Estates, and Rolling Hills.

The Palos Verdes Peninsula's 2020 water demand/water use was 18,067 acre-feet (AF) per year. This is equal to an average day demand of approximately 16.1 million gallons per day. The water distribution system can handle up to 40 million gallons of water per day. Future water demands are expected to slowly increase over time, reaching 18,264 AF per year (~16.3 million gallons per day) by 2040. Demand was modeled to see how the change in mean temperature caused by climate change is expected to impact water demand. This model found that water demand would increase by between 2% and 3% over the next 25 years depending on the severity of climate change, which is mostly attributable to more water being needed for irrigation. This model does not account for landscaping choices that may be influenced by future drought and/or water costs. Cal Water assumes that purchased water will be sufficient to serve all demand through at least 2045 (the furthest year that the 2020 Urban Water Management Plan plans for).

As is stated earlier, Palos Verdes Estates' water supply comes from a combination of the Colorado River and the State Water Project. Groundwater, surface water, and diverted stormwater are not planned sources of water

4 Greater Los Angeles County IRWM Region. (n.d.). "Integrated Regional Water Management." **https://dpw.lacounty.gov/wmd/irwmp/**

for Cal Water in the Palos Verdes District at this time. As of 2023, no recycled water is distributed to the Palos Verdes service area; however, an agreement was reached in 2015 to bring approximately 194 AF per year of recycled water to the peninsula starting in 2030. This project would primarily irrigate the Palos Verdes Golf Course. It is important to identify water sources when discussing seismic hazards because large seismic events have the potential to destroy or incapacitate the normal water supply.

Another recent prominent water project is the Palos Verdes Peninsula Water Reliability Project. This project involved a new pump station and pipeline that increased redundancies and resiliency for the district, easing the community's reliance on two older pipelines that are potentially vulnerable to hazards.[5] As of 2023, CalWater is in the process of investigating feasibility for additional water storage, and will continue to work with the City when developing water-related projects.

Emergency interties are an important tool to create redundancies and allow for water sharing across water districts during times of emergency. The District's main ties are with the West Basin Municipal Water District, and it has emergency ties with the Hermosa Redondo District. Further emergency measures are stated within the Urban Water Management Plan's Water Shortage Contingency Plan. These measures respond to different levels of emergency water shortages.

While much of the planning occurs by Cal Water and through regional agencies, the City has worked to minimize drought impacts on certain fronts. Section 18.50 of the Municipal Code (Water Conservation Landscaping) promotes water conservation and water-efficient landscaping citywide. The City also posts drought notices and state mandates related to water use on the "Water Quality and Conservation" page on their website, which also hosts water conservation best practices.

Extreme Heat

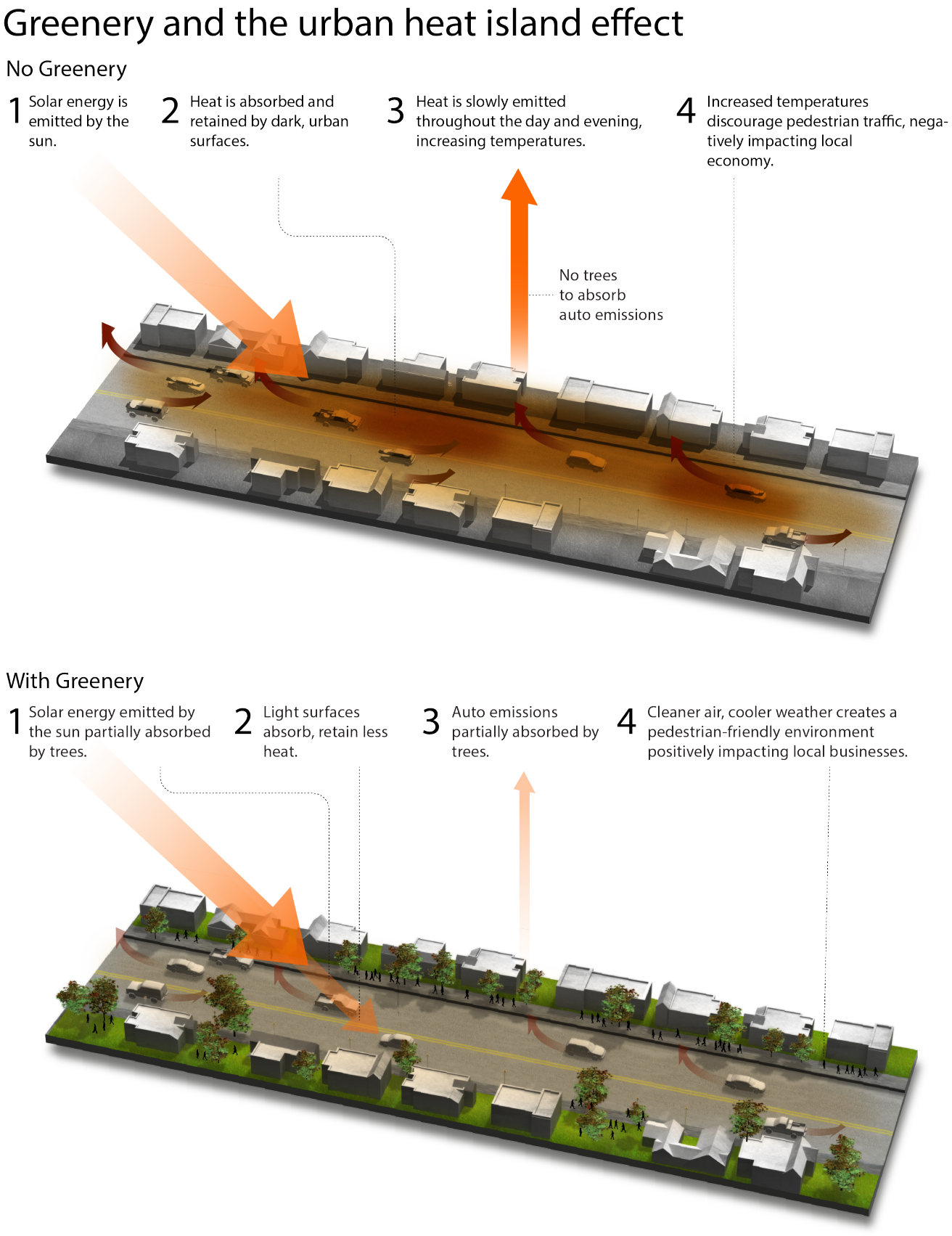
WHAT

Extreme heat is a hazard that occurs on hot days, warm nights, or during heat waves, and can result in heat-related illness and hospitalization. Extreme heat is measured locally, as communities are acclimatized to their historic environment. An extreme heat day is one that is in the hottest 2% of days observed between 1960 and 1990. In Palos Verdes Estates, an extreme heat event is a day hotter than 90.7°F.

Heat waves and extreme heat days are made worse by the urban heat island effect. The urban heat island effect inflates average annual urban air temperatures 1.8°F to 5.4°F warmer than other areas. Heat islands also increase energy demand for air conditioning. **Figure 1, Greenery and the Urban Heat Island Effect**, illustrates the urban heat island effect.

5 California Water Service. 2020, October. "Improvement Project Completed in Palos Verdes Peninsula." https://www.calwater.com/latest-news/2020-1013-improvement-project-completed-in-palos-verdes-peninsula/

Figure 1. Greenery and the Urban Heat Island Effect



WHEN

Extreme heat occurs in the summer and early fall in Palos Verdes Estates. Climate change is expected to increase the average temperature year-round, including the frequency of extreme heat days. Using the climate model RCP 8.5, from 2035 to 2064 extreme heat days are projected to occur an average of 7 days a year, compared to 2 days a year historically (1961 to 1990).[6]

WHERE

Areas with more asphalt surfaces, more buildings, less vegetation, and less shade experience the urban heat island effect the most. When assessed in 2011, impervious surfaces covered approximately 20% of land citywide.[7] The southwestern portion of Palos Verdes Estates has slightly higher rates of impervious surfaces, but these rates are still favorable compared to neighboring cities and are much better than Los Angeles as a region. Additionally, Palos Verdes Estates' proximity to the ocean further reduces localized extreme heat.

WHO

People can be adversely affected by extreme heat if they have existing health conditions or spend increased time outdoors living, working, commuting, or playing. This can include people who depend on walking, biking, or transit to get around; older adults; and young children. Palos Verdes Estates has more than double the rate of adults over 65 than the State of California as a whole.[8] All other populations vulnerable to extreme heat are found at relatively low rates in Palos Verdes Estates (see **Table 1**).

Table 1. Populations Vulnerable to Extreme Heat

	LOCATION		
HEALTH INDICATOR	**PALOS VERDES ESTATES**	**LOS ANGELES COUNTY**	**CALIFORNIA**
Active Commuters[1]	**2.08%**	**9.01%**	8.99%
Children[2]	**4.1%**	**6.39%**	6.54%
Older Adults[3]	**26.20%**	**12.90%**	13.60%
Outdoor Workers[4]	**0.39%**	**5.15%**	6.36%

Source: Public Health Alliance 2022. "The California Healthy Places Index." **https://map.healthyplacesindex.org**

Legend: Quartile 1 = Good Quartile 2 = Moderate Quartile 3 = Poor Quartile 4 = Challenged

Note: The table is colored to provide an understanding of the rate of populations vulnerable to extreme heat, and does not indicate that certain traits are overall "good" or "bad."

1 Percent of workers who commute to work by transit, walking, or cycling
2 Percent of residents under 18 years old
3 Percent of residents 65 years old and older
4 Percent of residents who work outdoors. This does not include people who live outside of Palos Verdes Estates and work outdoors in Palos Verdes Estates.

6 California Energy Commission. 2021. "CalAdapt – Extreme Heat". Accessed July 2022.

7 California Department of Public Health. 2011. "Climate Change and Health Vulnerability Indicators for California." **https://www.cdph.ca.gov/Programs/OHE/Pages/CC-Health-Vulnerability-Indicators.aspx**

8 U.S. Census Bureau. 2020. "Age and Sex." ACS 5-Year Estimates. Table S0101.

HOW

The City's Energy Efficiency Climate Action Plan includes a goal to decrease energy demand through reducing the urban heat island effect.[9] One implementing action is listed within this goal: to promote tree planting for shading and energy efficiency.

Oftentimes air-conditioned public buildings are designated as cooling centers where people can go during heat waves to cool off if they do not have access to air conditioning or cannot afford to run their air conditioning. There are no designated cooling centers in Palos Verdes Estates, but the City Hall Council Chambers could be considered a de-facto cooling center if needed. The closest designated cooling center is the Palos Verdes Library in Rolling Hills Estates.

Flooding and Sea-Level Rise

WHAT

Flooding is caused by intense rain resulting in rivers and urban drainage basins filling and overflowing. Increased flooding occurs when rain falls over a shorter period of time, even if there is less overall rain, because the soil does not have enough time to absorb the rainfall. Flooding occurs in low-lying areas near creeks and other waterways and is generally discussed in the context of what percent chance an area could be flooded in any given year. A 1% chance of flooding is equivalent to a flood that is likely to occur once every 100 years.

Sea-level rise (SLR) is a phenomenon occurring throughout the world's oceans due to climate change increasing global temperature averages. These temperature increases cause polar ice caps and glaciers to melt at higher rates, and **thermal expansion** of ocean water to occur. SLR can cause coastal flooding, which is when flooding occurs due to any combination of, high tides, rain, and insufficient drainage into the ocean, as well as bluff erosion, when increased wave action from rising seas destabilizes the bluff face made worse because of climate change.

THERMAL EXPANSION

Thermal expansion is when something changes shape, area, volume, or density in response to temperature change. In the case of sea level rise, as ocean water warms it takes up more space on a molecular level.

WHEN

Flooding is more likely to occur in the winter months (December, January, February) when Palos Verdes Estates receives the most rain. Climate change is predicted to increase the number of extreme rain events, when large amounts of rain falls over a short period of time, does not have time to soak into the ground, and overwhelms stormwater infrastructure. Historically, average rains are accommodated by stormwater infrastructure. As recently as 2023, the City withstood a series of heavy storms without any documented flooding, indicating a well-working stormwater system. Still, Palos Verdes Estates has experienced road closures and property damage in the past due to localized flooding.[10]

9 City of Palos Verdes Estates. (2015, December). "Energy Efficiency Climate Action Plan." **https://www.pvestates.org/Home/ShowDocument?id=9520**

10 City of Palos Verdes Estates. 2018. "Local Hazard Mitigation Plan."

Coastal flooding is not a concern for Palos Verdes estates in 2023 due to cliffs lining the coastaline; however, it's still valuable to track SLR projections for potential future impacts. Relative to SLR, it is important to set assumptions for the scale of time being assessed, because while sea levels are projected to increase over time, SLR models become more uncertain the further out they project, and can have ranges of multiple feet. Projections also differentiate between "low emission" and "high emission" scenarios, meaning that climate action on a global scale can have an impact on projected SLR. These large ranges can be the difference between a home being flooded or not, so it's important for regulations to be cautious with their assumptions. General plan elements, such as this safety element, are long-range planning documents that generally look at time scales between 25 and 50 years, depending on how frequently the element is updated. For reference, this comprehensive Safety Element update is the first major revision to the last Safety Element which was adopted nearly 50 years ago. See **Table 2**, below, to understand the ranges of SLR projected off the coast of Palos Verdes Estates at different time scales, emission scenarios, and likelihoods.

Table 2. Los Angeles Sea-Level Rise Projections

		MEDIAN PROJECTION (FT.)	LIKELY RANGE (FT.)	1-IN-200 CHANCE (FT.)	WORST-CASE SCENARIO (FT.)
	YEAR	50% CHANCE SLR MEETS OR EXCEEDS	66% CHANCE SLR REACHES THIS LEVEL	0.5% CHANCE SLR REACHES THIS LEVEL	H++ SCENARIO
High Emissions	2030	0.3	0.5	0.7	1.0
	2040	0.5	0.7	1.2	1.7
	2050	0.7	1.0	1.8	2.6
Low Emissions	2080	1.0	1.6	3.6	6.4
High Emissions	2080	1.5	2.2	4.3	
Low Emissions	2100	1.3	2.1	5.4	9.9
High Emissions	2100	2.2	3.2	6.7	

Source: California Natural Resource Agency and California Ocean Protection Council. 2018. "State of California Sea-Level Rise Guidance." **https://opc.ca.gov/webmaster/ftp/pdf/agenda_items/20180314/Item3_Exhibit-A_OPC_SLR_Guidance-rd3.pdf**

WHERE

As shown in **Figure 2, Flood Zones**, some areas of Palos Verdes Estates are within the 100-year flood zone, including land surrounding Agua Amarga Canyon Creek, Zurita Canyon Creek, Olmsted Creek and Malaga Creek. Floodplain maps are based on historic observations; however, flood events are projected to happen slightly more frequently due to climate change.[11] Compared to the rest of Palos Verdes Estates, there is limited development in the flood zone; however, Palos Verdes High School, Palos Verdes Intermediate School, Lunada Bay Elementary, the Palos Verdes Golf Club, the Town and Country Nursery School, and approximately 72 single-family residential parcels overlap with the 100-year flood zone (1% chance of flooding annually).

11 Cal-Adapt. (2022). "Extreme Precipitation Events." Accessed August, 2022. Data: LOCA Downscaled CMIP5 Climate Projections (Scripps Institution of Oceanography), Gridded Observed Meteorological Data (University of Colorado Boulder), LOCA Derived Products (Geospatial Innovation Facility). **https://cal-adapt.org/tools/extreme-precipitation**

Figure 2. Flood Zones

All of the coastal bluffs are at risk of wave hazard during storms; however, no developed areas are within this hazard area outside of potentially the Beach and Athletic Club. The Beach and Athletic Club has limited coastal flood risk as of 2023, but there are factors that make for potential flood risk in the future, primarily the extent of sea-level rise, which could range from 2 to nearly 10 feet by 2100. This increased sea-level, combined with king tides or storm surges, could cause flooding in the latter half of the century. A future detailed study will be necessary to determine the Beach and Athletic Club's risk for coastal flooding and feasible adaptation measures that can mitigate that risk. The City should coordinate with the California Coastal Commission when considering the timing and scope of this effort.

WHO

People can be vulnerable to flooding due to social isolation and/or physical disabilities leading to difficulty evacuating during a flood event. Additionally, low-income renters can face increased challenges in recovering from flood events because they are less likely to have renter's insurance and can face higher levels of displacement and homelessness if their residence is damaged during a flood event. There is a low number of low-income renters in Palos Verdes Estates, but a high rate of those residents are housing burdened (see **Table 3**). No multi-family residences are located in a flood zone, though renters may oocupy one of the single-family homes that is located on a parcel that overlaps with the 100-year flood zone.

Table 3. Populations Vulnerable to Flooding

	LOCATION		
HEALTH INDICATOR	PALOS VERDES ESTATES	LOS ANGELES COUNTY	CALIFORNIA
Disability[1]	8.45%	9.91%	10.6%
Low Income Housing Burdened Renters[2]	27.7%	28.9%	26.2%

Source: Public Health Alliance 2022. "The California Healthy Places Index." **https://map.healthyplacesindex.org**

Legend: Quartile 1 = Good Quartile 2 = Moderate Quartile 3 = Poor Quartile 4 = Challenged

Note: The table is colored to provide an understanding of the rate of populations vulnerable to flooding, and does not indicate that certain traits are overall "good" or "bad."

1 Percent of people who have a disability
2 Percent of low-income renters who pay more than 50% of their income on housing costs.

HOW

The City participates in the National Flood Insurance Program, which makes flood insurance available in communities that enact minimum floodplain management rules consistent with the Code of Federal Regulations Section 60.3. The LHMP includes flooding-related policies and actions that call for a building audit to identify residential, commercial, and critical infrastructures vulnerable to flooding.

Geologic and Seismic Hazards

WHAT

Geologic and seismic hazards are interrelated natural processes with the ability to impact life, health, and property. Palos Verdes Estates is vulnerable to several geologic and seismic hazards such as earthquakes, landslides, liquefaction, and subsidence.

◘ Seismic Hazards/Earthquakes

Seismic hazards are related to the movements of tectonic plates below the earth's surface. One common seismic hazard is an earthquake. Earthquakes are sudden ground-shaking events caused by the release of pressure in the earth. This quick release of pressure poses a safety hazard to people and structures due to the unpredictability of magnitude and timing. Earthquakes can cause surface rupture along fault lines, ground shaking, ground failure, geologic hazards (discussed below) and tsunamis.

◘ Geologic Hazards

Geologic hazards are related to the movement of earth, including soil, rock, debris, or other material. Some common geologic hazards that can impact safety include landslides, mudslides, and rapid subsidence.

Landslide and mudslide events happen when debris and earthen materials fall down a slope. Mudslides occur specifically when the soil is saturated with water from rain or some other source. The landslide or mudslide can pose threats to human life, buildings, and infrastructure. Additionally, if soils and debris are contaminated, they can pose a hazardous waste concern.

Subsidence is when a land surface lowers (either slowly over time, or rapidly). Liquefaction and sink holes are two forms of subsidence that can occur rapidly. Rapid subsidence can pose threats to human life, buildings, and infrastructure.

A third major geologic hazard is bluff erosion, which can occur along the bluffs that border the Palos Verdes Estates coastline. Bluff erosion is a natural process that can occur due to wave motion, tidal currents, coastal flooding, and stormwater runoff.

WHEN

◘ Seismic Hazards/Earthquakes

Earthquakes can occur at any time and with limited warning.

One especially devastating earthquake was the January 1994 magnitude 6.7 Northridge Earthquake. This thrust fault produced severe ground motion, caused 57 deaths and 9,253 injuries, and left more than 20,000 people displaced. Scientists have stated that such devastating shaking should be considered the norm near any large thrust earthquake. Recent reports from scientists of the U.S. Geological Survey and the Southern California Earthquake Center say that the Los Angeles area could expect one earthquake every year of magnitude 5.0 or more for the foreseeable future.

Several smaller earthquakes have occurred near Palos Verdes Estates in the years since the Northridge Earthquake, including aftershocks in the weeks after the Northridge Earthquake. Nearby historic earthquakes and their magnitudes can be seen on **Table 4**, below.

Table 4. Historical Earthquakes near Palos Verdes Estates

DATE	MAGNITUDE	GENERAL LOCATION
1/17/1994	6.7	Northridge
1/18/1994	4.8	Santa Clarita
1/19/1994	4.5	Reseda
1/19/1994	5.1	Valencia
1/21/1994	4.5	Pacoima
1/22/1994	4.6	Santa Clarita
1/24/1994	4.6	Santa Clarita
1/27/1994	4.6	Chatsworth
1/29/1994	5.1	Chatsworth
3/20/1994	5.2	Panorama City
12/6/1994	4.5	Lake View Terrace
9/20/1995	5.0	Southern California
4/27/1997	4.9	Valencia
6/14/2002	4.8	Yorba Linda
6/16/2005	4.9	Greater Los Angeles Area
8/9/2007	4.7	Chatsworth
7/29/2008	5.4	Chino Hills
5/19/2009	4.7	Lennox
3/29/2014	5.1	Brea
9/19/2020	4.5	South El Monte

Source: USGS. (2022, July). "Earthquake Catalog." **https://earthquake.usgs.gov/earthquakes/search/**

While predicting earthquakes is an inexact science, there are factors that can help to predict the likelihood of various magnitudes of earthquakes occurring over a long period of time. Geologic evidence suggests that over the next 30 years there is more than a 50% chance of at least one 7+ magnitude earthquake occurring in the

Los Angeles region.[12] This magnitude of quake could cause casualties and structural damage in Palos Verdes Estates and across the region.

Geologic Hazards

Geologic hazards can have several causes which make them difficult to predict.

Landslides and mudslides can be caused by earthquakes, heavy storms, human activity, or other events able to disturb at-risk slopes.[13] Climate change does not directly impact landslides, but it does impact the hazards that can cause landslides. is not projected to change the overall amount of rain in Southern California, but rain is projected to decrease in frequency and increase in intensity. Instead of multiple smaller storms delivering precipitation to the region, a few heavier storms are projected. The increase in heavy storms can increase the likelihood of landslides. Wildfires are also projected to increase in Southern California, which could increase landslide likelihood and severity in recent burn scars. Refer to the wildfire section for more details.

Subsidence is a process of land surface lowering. It can occur slowly over time, or quickly during events like liquefaction or sinkholes. Liquefaction is a term for when certain saturated soils turn from a solid state to a liquid state, commonly due to an earthquake. During a liquification event, people, buildings, and infrastructure are at risk of casualties or major damage. Sinkholes are similar sudden subsidence events that can result in human, building, or infrastructure damage and large holes in the ground. Sinkholes are dependent on the rock formations below the surface of the ground. Sinkhole hazard potential is highest in areas where the dominant subsurface rock can be naturally dissolved, such as with limestone. Over hundreds or thousands of years, groundwater dissolves the rock and create caverns underground which eventually fail, resulting in sinkholes.[14] These cavern failures can occur naturally or can be caused suddenly by heavy loads placed on the land surface, or through disturbance of the ground during construction or seismic events.

Bluff erosion is expected to accelerate over the next 100 years. These higher rates of erosion are projected due to increased impacts on bluffs caused by rising sea levels.[15] That being said, bluff erosion is site specific and requires further studies to identify vulnerabilities.

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12 Field, E.H., and 2014 Working Group on California Earthquake Probabilities, 2015, UCERF3: A new earthquake forecast for California's complex fault system: U.S. Geological Survey 2015–3009, 6 p., **https://dx.doi.org/10.3133/fs20153009**

13 Highland, L.M., and Bobrowsky, Peter, 2008, The landslide handbook—A guide to understanding landslides: Reston, Virginia, U.S. Geological Survey Circular 1325, 129 p. **https://pubs.usgs.gov/circ/1325/pdf/C1325_508.pdf**

14 USGS. 2018, June. "Sinkholes." **https://www.usgs.gov/special-topics/water-science-school/science/sinkholes**

15 Limber, P. W., Barnard, P. L., Vitousek, S., & Erikson, L. H. (2018). A model ensemble for projecting multidecadal coastal cliff retreat during the 21st century. Journal of Geophysical Research: Earth Surface, 123, 1566– 1589. **https://doi.org/10.1029/2017JF004401**

WHERE

Seismic Hazards/Earthquakes

Active faults are identified by the U.S. Department of Conservation, and new developments are prohibited in a zone around these faults to prevent repetitive loss of structures and threats to the safety of occupants. The unsafe areas around active faults are regulatory zones referred to as Alquist-Priolo earthquake fault zones. Land within Alquist-Priolo earthquake fault zones is at elevated likelihood of surface rupture. There are no Alquist-Priolo earthquake fault zones within Palos Verdes Estates city limits.

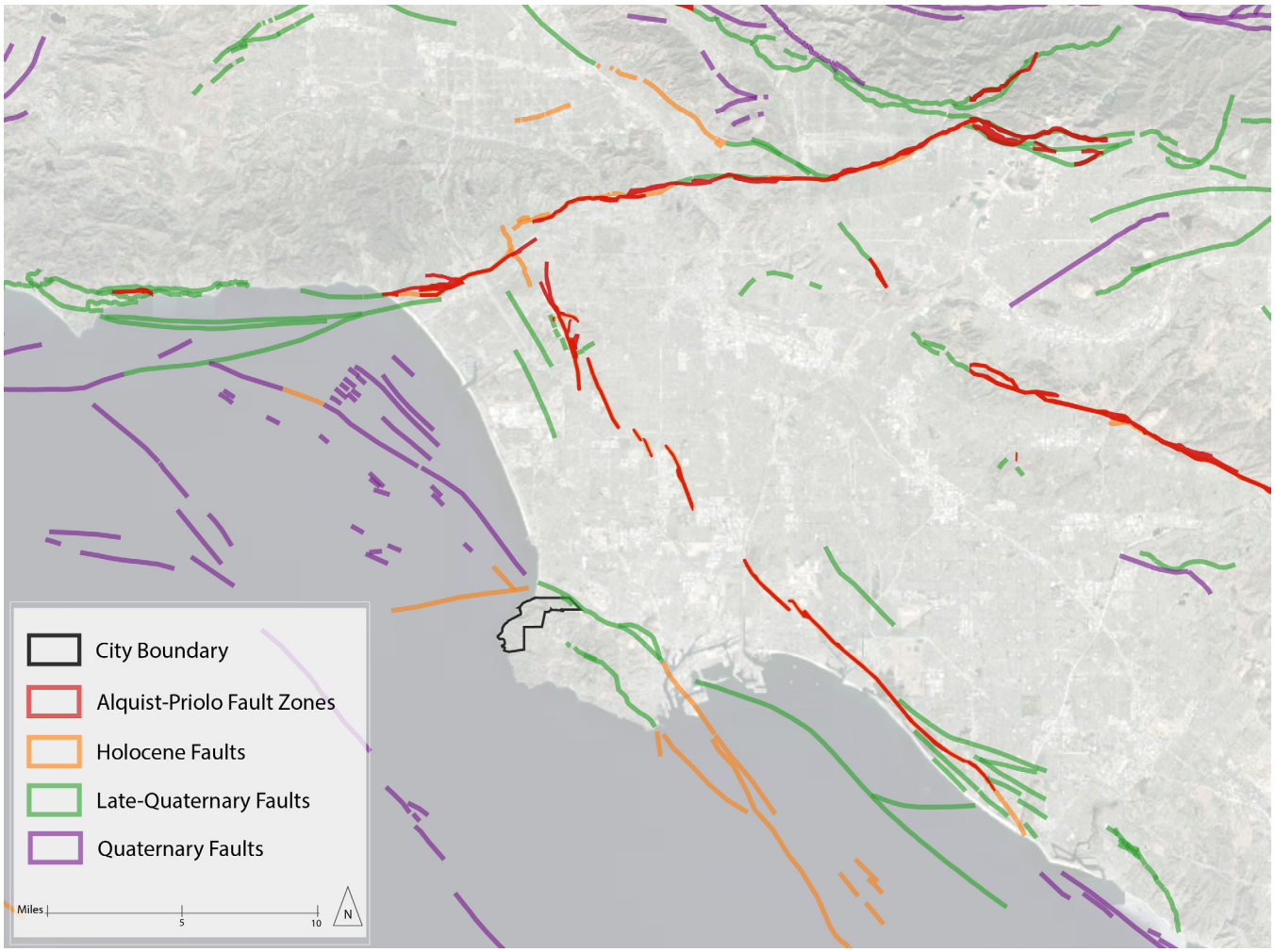
The Palos Verdes Fault runs both onshore and offshore from the Palos Verdes peninsula. This fault cannot be mapped with certainty on land because the past surface ruptures have been built over; however, the fault's inferred location can be seen on **Figure 3, Faults and Fault Zones**. There is uncertainty over whether this fault is considered active or not. For a fault to be active it must have ruptured in the last 11,000 years. Past studies have resulted in an ambiguous understanding of how recent the fault's movements are.[16] However, a 2015 study on this fault suggested three or more ruptures have occurred in the last 11,000 years, with a potential magnitude of 7 or greater.[17] This fault requires further studies to improve our understanding of it, to more accurately locate it, and to improve policies related to it.

Regardless of the chance of surface rupture, Palos Verdes Estates could still be impacted by ground shaking from major earthquake events on other nearby active faults. The San Andreas Fault is approximately 55 miles northeast of Palos Verdes Estates and is considered the most seismically active fault in the Southern California region. Other active faults within 20 miles of Palos Verdes Estates include the Newport-Inglewood-Rose Canyon Fault, Raymond Fault, and Whittier-Elsinore Fault. A significant earthquake originating along any of these or other regional faults could cause damage to buildings and infrastructure, as well as casualties, in Palos Verdes Estates.

16 Fisher, Michael & Normark, W.R. & Langenheim, Victoria & Calvert, Andrew & Sliter, R.. (2004). The Offshore Palos Verdes Fault Zone near San Pedro, Southern California. Bulletin of the Seismological Society of America. 94. 506-530. 10.1785/0120030042.

17 Brothers, D. S., Conrad, J. E., Maier, K. L., Paull, C. K., McGann, M., and Caress, D. W. (2015), The Palos Verdes Fault offshore Southern California: Late Pleistocene to present tectonic geomorphology, seascape evolution, and slip rate estimate based on AUV and ROV surveys, J. Geophys. Res. Solid Earth, 120, 4734– 4758, doi:10.1002/2015JB011938.

Figure 3. Faults and Fault Zones



Ground shaking can cause major damage to vulnerable structures, and it is important to identify these structures to mitigate this risk. Older buildings are more likely to sustain serious damage from earthquakes, because newer buildings were built to meet higher earthquake standards. The most significant seismic building requirements were developed in 1978. The City Hall Complex, which houses City departments, the City's police station, and the City's lone fire station, was built in 1959 according to County assessor data. There may be unreinforced buildings within Palos Verdes Estates which would be most vulnerable to earthquakes and in need of retrofits; however, a list of unreinforced masonry buildings has not been developed.

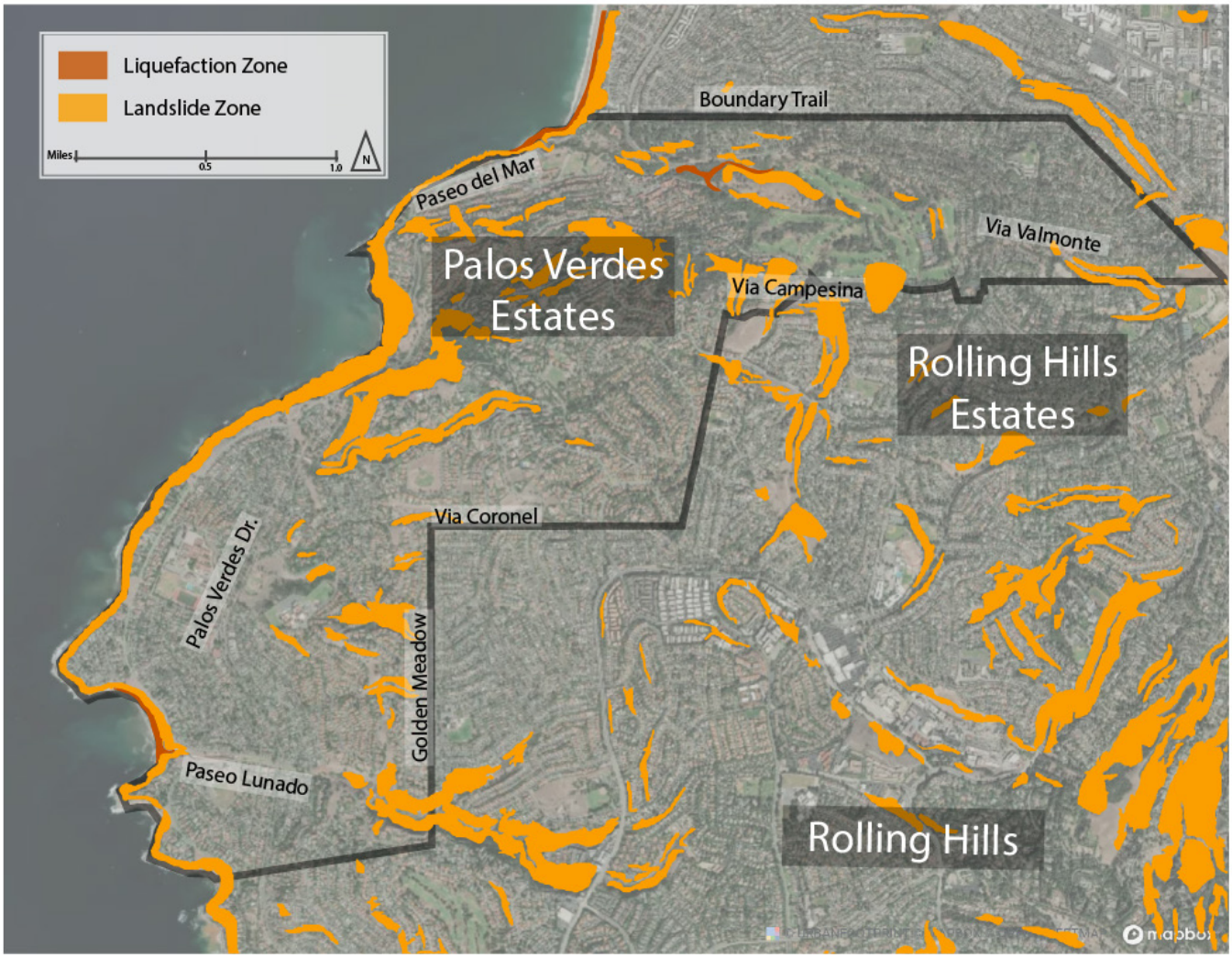
Geologic Hazards

Landslides and subsidence are dependent on the soil types and topography of the land. This means that there are well-documented areas of elevated likelihood for these hazards, which makes the mitigation of this hazard more straightforward.

Landslide likelihood is relatively high in Palos Verdes Estates due to the presence of coastal bluffs and hills across Palos Verdes Estates (see **Figure 4, Landslide and Liquefaction Zones**). Several homes exist in and below these landslide zones. No notable facilities are within a landslide zone, but there are two nearby and downhill from these zones including the Palos Verdes Intermediate School and Malaga Library. One City facility, the Palos Verdes Golf and Country Club, is located in a landslide zone. Another City facility, the Palos Verdes Beach and Athletic Club, is nearby and downhill from a landslide zone.

Rapid subsidence hazards are related to soil types. Areas with elevated likelihood of liquefaction during seismic events can be seen on **Figure 4**, below. These areas are located along two Palos Verdes Estates beaches, and in an area along Malaga Creek, on the northwestern edge of the Palos Verdes Golf Course. No structures are present in the Palos Verdes Estates liquefaction zones.

Figure 4. Landslide and Liquefaction Zones



Bluff Erosion

In addition to landslides and liquefaction, bluff erosion can occur along the coastal bluffs that line Palos Verdes Estates. In Palos Verdes Estates, homes and other structures are intentionally set back from these cliffs to reduce the potential for damages caused by coastal erosion. Additional studies would be needed to understand more specific vulnerabilities along the coastline.

WHO

Assets like homes or infrastructure can be more susceptible to geologic and seismic hazards based on location, but no population groups are specifically more sensitive to an earthquake, landslide, mudslide, liquefaction, or subsidence based on their inherent traits. However, certain groups may have more difficulty during the

recovery stage that follows a major geologic or seismic hazard event. People in low-income households or renters may be displaced and, if they lack insurance, without compensation for belongings lost during the hazard. Others may struggle with the accessibility of existing emergency response communication methods. For example, some older adults may have difficulty with online or digital forms of communication. Language can be another barrier to communication (see **Table 5**).

Table 5. Populations Vulnerable to Geologic and Seismic Hazards

HEALTH INDICATOR	LOCATION		
	PALOS VERDES ESTATES	LOS ANGELES COUNTY	CALIFORNIA
Low Income Housing Burdened Renters[1]	**27.7%**	**28.9%**	26.2%
Older Adults[2]	**26.20%**	**12.90%**	13.60%
Speaks English Less than Very Well[3]	**9.79%**	**23.6%**	17.8%

Source: Public Health Alliance 2022. "The California Healthy Places Index." https://map.healthyplacesindex.org

Legend: Quartile 1 = Good Quartile 2 = Moderate Quartile 3 = Poor Quartile 4 = Challenged

Note: The table is colored to provide an understanding of the rate of populations vulnerable to geologic and seismic hazards, and does not indicate that certain traits are overall "good" or "bad."

1 Percent of low-income renters who pay more than 50% of their income on housing costs.
2 Percent of people aged 65 and older
3 Percent of people aged 5 and older who speak English less than very well

More information on emergency response communication and recovery programs are discussed in the Emergency Response section.

HOW

The City's LHMP includes actions related to seismic hazards including annual site reviews of all concessions and unreinforced buildings. Retrofits of soft story buildings are under evaluation, and a seismic study of City Hall was recently completed. Furthermore, landslide vulnerability identification and related mitigation activities are the most prioritized of the LHMP actions. Mitigation measures for new development are addressed in Title 15 of the City's municipal code. The City has adopted the California Building Code in full, with minor amendments, however regular updates are required as this code is updated every three years.

Related to coastal erosion, the City has several considerations within the Municipal Code which protect the coastal bluffs and assure that coastal bluffs can support any proposed private developments. The best example of this is the 50-foot setback from bluff edges for any structures, additions, grading, stairways, pools, tennis courts, spas, or solid fences. Effective stormwater infrastructure that diverts stormwater from running down the bluffs can also help to reduce the rate of erosion. The City's website promotes best practices for residents related to stormwater, and stormwater infrastructure is further regulated within Chapter 13.08 of the Municipal Code.[18]

It should also be noted that earthquakes can have major impacts on utilities and their infrastructure, which can cause major disruptions during the recovery from a seismic or geologic hazard. Refer to the Drought and Water Resources section, above, to better understand the City's water infrastructure.

18 City of Palos Verdes Estates. 2021, October. "Municipal Code." **https://www.codepublishing.com/CA/PalosVerdesEstates/**

Human Caused Hazards

Hazardous Materials

WHAT

Hazardous materials are substances that can cause death, serious illness, or hazard to human health or the environment when not properly treated, stored, transported, or disposed of. Many household substances are considered hazardous, including gasoline, refrigerants, paint, and some gardening supplies, and nearly all households and businesses have small amounts of hazardous waste. Hazardous waste is hazardous material that no longer has practical use but has not yet been properly disposed of. Certain businesses, such as gas stations, auto repair shops, and dry cleaners, generate larger amounts of hazardous waste. Hospitals, clinics, and laboratories also generate medical waste, which can be hazardous. The pollution of water from various sources can also create water which is hazardous to consume. If hazardous waste is not properly disposed of it can create the need for cleanup sites, which require specialized cleanup procedures determined by the Department of Toxic Substances Control.

WHERE

Hazardous materials can potentially be found anywhere as a result of improper disposal or storage; however, sites with large concentrations of hazardous materials are catalogued by EnviroStor. EnviroStor is a data management program operated by the California Department of Toxic Substances Control that is used to monitor, investigate, permit, and cleanup sites with known contaminants. Palos Verdes Estates is home to just one site listed by EnviroStor in need of evaluation.[19] Additionally, GeoTracker is the system used by the California State Water Resources Control Board to organize information on underground storage tanks, and publicly list sites that require cleanup or have potential to impact groundwater. Cleanups in Palos Verdes Estates have occurred in the past, but there are no GeoTracker sites in need of cleanup within city limits as of 2022.[20] With Cal Water's management and supply of water to Palos Verdes Estates, there is no anticipated contamination threat to potable water quality.

The one ongoing hazardous waste evaluation site in Palos Verdes Estates is shown in **Figure 5, Hazardous Waste Sites.**

19 California Department of Toxic Substances Control. 2022. “EnviroStor.” **https://www.envirostor.dtsc.ca.gov/public/data_download**

20 California State Water Resources Control Board. 2022. “GeoTracker.” **https://geotracker.waterboards.ca.gov/**

Figure 5. Hazardous Waste Sites

WHO

Children, older adults, and people with preexisting health conditions are more at-risk of adverse health impacts from hazardous waste. Palos Verdes Estates has a high number of older adults (see **Table 6**). Due to the low number of cleanup sites in Palos Verdes Estates and site management required to follow state and federal regulations, the health hazard posed is relatively low.

Table 6. Populations Vulnerable to Hazardous Waste

HEALTH INDICATOR	LOCATION		
	PALOS VERDES ESTATES	LOS ANGELES COUNTY	CALIFORNIA
Children[1]	**4.1%**	**6.39%**	6.54%
Older Adults[2]	**26.20%**	**12.90%**	13.60%

Source: Public Health Alliance 2022. "The California Healthy Places Index." **https://map.healthyplacesindex.org/**

Legend: Quartile 1 = Good Quartile 2 = Moderate Quartile 3 = Poor Quartile 4 = Challenged

Note: The table is colored to provide an understanding of the rate of populations vulnerable to hazardous waste, and does not indicate that certain traits are overall "good" or "bad."

[1] Percent of people under 18 years old
[2] Percent of people aged 65 and older

HOW

The LHMP includes discussions about the potential for cascading impacts if hazards such as earthquakes and flooding cause a hazardous materials spill. The State and Federal governments provide specific regulations for hazardous waste storage and transportation.

The City also addresses household hazardous waste through an education campaign which includes instructions and resources posted on the City Public Works webpage. The local waste provider schedules regular household hazardous waste pickup dates in which residents may put out hazardous material for collection services to safely dispose of. The webpage also hosts a number of brochures with best practices as well as local opportunities to dispose of hazardous waste hosted in neighboring cities. The nearest permanent hazardous waste disposal is operated by Los Angeles County and is found approximately 7 miles southeast of Palos Verdes Estates at the Gaffey Street SAFE Collection Center. These are also promoted through the Palos Verdes Estates e-newsletter and bulletin.

Air Pollution Hazards

WHAT

Air pollution can include many types of pollutants or toxins. State and Federal air quality standards regulate several of these and are known as California Ambient Air Quality Standards (CAAQS) and National Ambient Air Quality Standards (NAAQS). From 2018-2020 two pollutants, ground-level ozone (known as smog) and particulate matter 2.5 (combustion emissions or fine dust) exceeded NAAQS pollutant concentration levels. These same pollutants were in nonattainment for CAAQS in addition to particulate matter 10 (dust, pollen, and smoke).[21] The amount and type of air pollution depends on levels of pollutant sources like cars or factories, but air quality is also impacted by other factors including temperature and wind patterns. Future air quality will also depend on local policies and State laws mandating and incentivizing pollution reduction at the source. Regardless, the air quality in Los Angeles County receives an "F" from the American Lung Association for high ozone days and particle pollution for the year 2022.[22]

WHEN

Air pollution in the form of ozone and particulate matter have, on average, decreased over the past 20 years[23]. Efforts by several agencies and jurisdictions have contributed to this trend, including but not limited to regulations on refineries and fueling operations, automobile exhaust standards, diesel standards, improvements to solid waste management, and other market-based incentives. Future transportation emission reductions are expected as a result of the Advanced Clean Cars II regulations which will phase out the sale of gas-powered vehicles by 2035 in favor of zero-emissions vehicles, and Advanced Clean Fleets rule which will transition medium-and-heavy duty vehicles to zero-emissions technology by 2045.[24][25] However, climate change may hinder efforts to reduce ozone by contributing to higher-than-average temperatures,

21 South Coast AQMD. 2022. 2022 Air Quality Management Plan: Appendix II: Current Air Quality. http://www.aqmd.gov/docs/default-source/clean-air-plans/air-quality-management-plans/2022-air-quality-management-plan/final-2022-aqmp/appendix-ii.pdf?sfvrsn=6

22 American Lung Association. 2022. State of the Air. https://www.lung.org/research/sota/city-rankings/states/california

23 South Coast AQMD. 2022. 2022 Air Quality Management Plan: Appendix II: Current Air Quality. http://www.aqmd.gov/docs/default-source/clean-air-plans/air-quality-management-plans/2022-air-quality-management-plan/final-2022-aqmp/appendix-ii.pdf?sfvrsn=6

24 California Air Resources Board. 2023. "Advanced Clean Cars II Regulations: All New Passenger Vehicles Sold in California to be Zero Emissions by 2035." https://ww2.arb.ca.gov/our-work/programs/advanced-clean-cars-program/advanced-clean-cars-ii

25 California Air Resources Board. 2023. "California approves groundbreaking regulation that accelerates the deployment of heavy-duty ZEVs to protect public health." https://ww2.arb.ca.gov/news/california-approves-groundbreaking-regulation-accelerates-deployment-heavy-duty-zevs-protect

which can lead to elevated ozone levels. This will likely have the greatest impact in the summer months when temperatures are highest. Future air quality will also depend on local policies and State laws mandating and incentivizing pollution reduction at the source.

While pollution sources in Palos Verdes Estates are limited, outside sources like nearby industrial land uses have potential to impact local air quality as a result of ongoing operations or accidents. For example, in February 2015, the Torrance Refinery experienced a large explosion in an air pollution control device ejected heavy metal parts, narrowly missing a unit that contains highly toxic modified hydrofluoric acid. This event and the facility's subsequent restart led to air pollution violations. Then owner, ExxonMobil, was fined $5.5 million to South Coast Air Quality Management District; $2.77 million went towards community benefit projects. In July 2016, PBF Energy took over ownership and operation of the refinery. In that same year, several power cuts led to unplanned flaring (a safety measure used at refineries to prevent explosions or accidents that could result from gases building up excess pressure, which typically causes large flames, and can result in black smoke when power losses impact steam generation).

WHERE

While the regional air basin generally experiences poor air quality in comparison to other state regions, local air quality can be impacted by regular wind patterns and proximity to pollution sources. Palos Verdes Estates' proximity to the ocean and topography help to increase circulation and reduce pollution exposure.

Palos Verdes Estates also has potential to experience negative local air quality hazards. These include potential impacts from the Torrance Refinery and the twin ports of Los Angeles and Long Beach. The Torrance Refinery refines gasoline, diesel fuel, aviation fuels, liquefied petroleum gases, and coke and sulfur. Incidents in violation of State and federal requirements present potential hazards to local air quality. The twin ports are the single largest fixed source of air pollution in Southern California, responsible for smog greater than the daily emissions from all 6 million cars in the region. Unhealthy levels of ozone in the basin are due in large part to port operations. The California Air Resources Board estimates that port air pollution creates cancer risks exceeding 500 in 1 million for tens of thousands of residents.[26]

The Torrance Refinery, located at 3700 W. 190th Street in nearby Torrance, is about 4.66 miles northeast from Palos Verdes. The proximity of the refinery to the City poses a greater likelihood of detrimental health impacts if events such as the 2015 explosion or the 2016 flaring occur again in the future.

The Port of Los Angeles and the Port of Long Beach are approximately 8.34 miles and 10.15 miles southeast from Palos Verdes, respectively. The air quality hazard associated with the ports is primarily basin-wide. Thus, while the impact is not localized in the City, port air pollution impacts Palos Verdes Estates due to its location within the South Coast Air Basin.

WHO

People with existing health conditions, such as asthma and heart disease, are more sensitive to air pollution. These health conditions are also caused by exposure to air pollution. This means that living in areas with poor air quality can cause generational cycles of health concerns. Approximately 12 people per 10,000 visit the hospital for asthma every year in Palos Verdes Estates, which is much better than state or regional averages.[27] Similarly, about seven people per 10,000 visit the hospital for heart disease every year in Palos Verdes Estates.

26 South Coast AQMD. N.d. "Clean Port". Accessed December 2, 2022. http://www.aqmd.gov/nav/about/initiatives/clean-port

27 Public Health Alliance 2022. "The California Healthy Places Index." https://map.healthyplacesindex.org/

This is also much better than state averages, which shows that preexisting conditions are a minor issue for Palos Verdes Estates.

People who spend more time outdoors are often exposed to polluted air at higher rates. This may include young children, people who work outdoors, and people who get to work without a car. Palos Verdes Estates has fewer young children, outdoor workers, and active commuters than state averages, so its residents are less susceptible to poor air quality.

See **Table 7**, below, for data on populations vulnerable to air pollution.

Table 7. Populations Vulnerable to Air Pollution

	LOCATION		
HEALTH INDICATOR	**PALOS VERDES ESTATES**	**LOS ANGELES COUNTY**	**CALIFORNIA**
Asthma[1]	**1.94**	**5.23**	5.18
Cardiovascular Disease[2]	**0.57**	**0.84**	0.84
Children[3]	**4.1%**	**6.39%**	6.54%
Outdoor Workers[4]	**0.39%**	**5.15%**	6.36%
Active Commuters[5]	**2.08%**	**9.01%**	8.99%

Source: Public Health Alliance 2022. "The California Healthy Places Index." **https://map.healthyplacesindex.org/**

Legend: Quartile 1 = Good Quartile 2 = Moderate Quartile 3 = Poor Quartile 4 = Challenged

Note: The table is colored to provide an understanding of the rate of populations vulnerable to air pollution, and does not indicate that certain traits are overall "good" or "bad."

1 Asthma emergency department visits per 100,000 people
2 Heart attack emergency department visits per 100,000 people
3 Percent of residents under 18 years old
4 Percent of workers who work outdoors
5 Percent of workers who commute to work by transit, walking, or cycling

HOW

The California Air Resources Board (CARB) has primary authority to develop and adopt emissions standards for motor vehicles, but South Coast AQMD is the authority for regulation of emissions other than from motor vehicles, including marine vessels. Furthermore, South Coast AQMD assures that California Environmental Quality Act (CEQA) documents are accurate regarding air quality impacts and may suggest feasible mitigation measures and alternatives to reduce air quality impacts. South Coast AQMD can influence port development through this role and, potentially, through litigation. South Coast AQMD also has authority to adopt transportation control measures to reduce vehicle trips, use, miles traveled, etc. for motor vehicle emissions. Southern California Association of Governments (SCAG) initially develops transportation control measures, but South Coast AQMD adopts standards.

The South Coast AQMD also monitors air quality, and up-to-date information on air quality for Palos Verdes Estates can be found on South Coast AQMD's website for the Southwest Coastal L.A. County Monitoring Station.[28]

28 SCAQMD. 2022. "AQ Details – Current Air Quality." Accessed on July 15, 2022. **https://xappprod.aqmd.gov/aqdetail/AirQuality?AreaNumber=3**

In addition to regulation via standards, specific actions have been taken regarding the refinery and ports. The Torrance Refinery owner, PBF Energy, was put under administrative order to mitigate risks related to flaring by the independent South Coast AQMD Hearing Board. The order required the refinery to improve power reliability and reduce air pollution from flaring incidents. A years-long process, the Hearing Board maintains jurisdiction over the administrative order until all requirements are fulfilled.

South Coast AQMD has also adopted a Clean Port initiative, which calls for development and adoption of South Coast AQMD "backstop" rules that would take effect when the ports do not take sufficient action to reduce emissions. The Clean Port initiative work plan also includes air monitoring, enhanced CEQA review processes for air quality, identification of recommendations for alternatives or emission mitigation measures, coordination between local harbor commissions, legislative efforts to fund port cleanup, among other items. These actions are intended to compliment State, federal, and international port air pollution regulations.[29]

The Clean Port Air Monitoring Partnership, part of the Clean Port Workplan, includes labor organizations, community groups, CARB, United States Environmental Protection Agency, Office of Environmental Health Hazard Assessment, port tenants, railroads, trucking industry, Ports of Los Angeles and Long Beach, and academia.

Airport Compatibility

WHAT

The Torrance Municipal Airport is a general aviation airport near Palos Verdes Estates serving the South Bay area with 543 aircraft. It primarily serves private aircraft, but also houses several Fixed Base Operators (FBOs) that are available for flight instruction, aircraft repair, and charter flights. The Airport is also home to the largest manufacturer of private helicopters in the US, Robinson Helicopters.

WHERE

Torrance Municipal Airport is located just east of Palos Verdes Estates. The City does not overlap with runway protection zones, airport property, or the airport influence area for Torrance Municipal Airport. The City of Torrance's Noise Abatement Office implements measures to reduce airplane noise for surrounding communities; however, Palos Verdes Estates community members, council members, and planning commissioners have noted an increase in air traffic on Runway 29, which runs towards the City. It is not clear whether the noise abatement program at the Airport considers this increase in its noise reduction measures. Since the Airport is under the City of Torrance jurisdiction, coordination with the Torrance Airport Commission is necessary to address this issue.

29 SCAQMD (2006). Clean Port Initiative Workplan. Accessed December 2, 2022. **http://www.aqmd.gov/docs/default-source/default-document-library/news-docs/clean_port_workplan.pdf?sfvrsn=0**

Wildfires

WHAT

Wildfires are most commonly caused by humans via electrical equipment and vehicles or by lightning, and often start unnoticed. They are known to spread more quickly on dry, windy days and move more easily in an uphill direction and in areas with higher-density vegetation. Wildfires are a natural and important part of the ecosystem, but can become more intense and dangerous as a result of climate change and poor land management.

WHEN

Climate change projections indicate that wildfire may increase in Southern California. Approximately 80% of wildfires occur in the summer and fall, with one-quarter of annual wildfires occurring during Santa Ana wind events. Climate change is likely to intensify the fall fire season by extending the dry season further into Santa Ana wind season.[30] The Fire and Resource Assessment Program (FRAP) compiled a statewide spatial database of fire perimeters from Bureau of Land Management (BLM), National Parks Service (NPS), United States Forest Service (USFS) and CAL FIRE fires, which represents fire perimeters throughout the State from 1950 to present.[31] According to this database, approximately 11 fires have occurred within the city boundaries since the first of which was recorded in 1946. The most recent fire to burn inside of the city limits occurred in 1990. Within the Los Angeles region, major fires in 2003 and 2007 caused dangerous air pollution, mass evacuations, loss of property, and loss of life.

WHERE

All of Palos Verdes Estates is located within a very high wildfire severity zone (see **Figure 6, Wildfire Hazard Severity Zones**). That means the physical conditions that make fire likely and damaging are seen across the City, without considering short-term modifications like fuel reductions. Land uses are important to note as they relate to fire hazards. The City is mainly made up of single-family homes, but there are also several schools, parks, public facilities, a golf course, and two commercial clusters (the Malaga Cove Plaza in the north and Lunada Bay Plaza in the south). Critical facilities and non-critical city facilities are discussed more in the Emergency Response Facilities section, below.

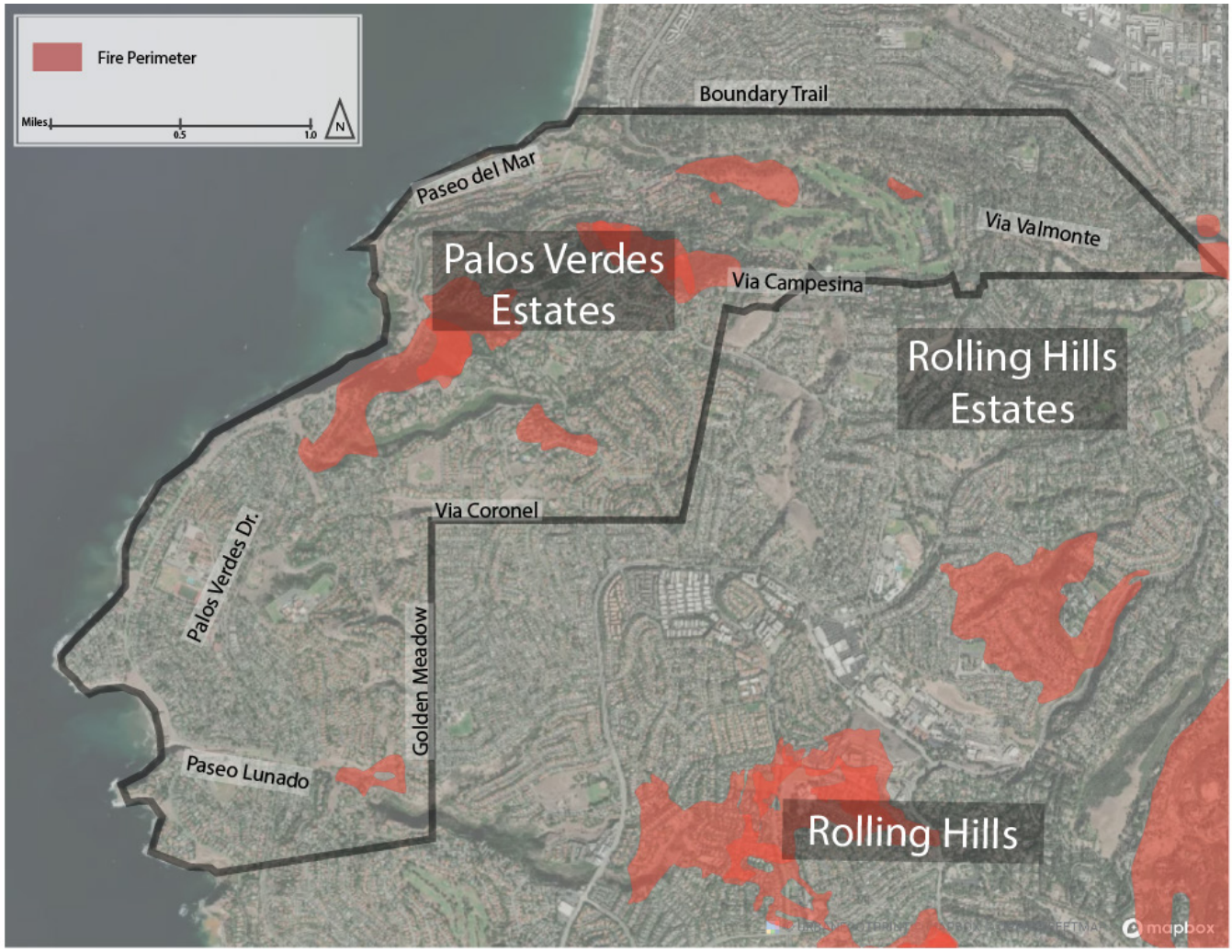
Historically, 11 fires have overlapped with the city limits (see **Figure 7, Fire History**). In total, approximately 275 acres have burned within the city limits. The two largest fires occurred in 1956 and 1958 expanding up to 82 acres and 56 acres respectively. All but 1 of the 11 fire perimeters in the history of Palos Verdes Estates burnt the central and northern regions beyond of Palos Verdes Intermediate and High Schools; however, the wildfire hazard severity zone is very high across the entirety of the city. The most recent fire, an isolated incident south of the schools, burned approximately 14 acres in 1990 near the riparian corridor in the southernmost portion of the city.

30 OPR (Governor's Office of Planning and Research). 2019. California's Fourth Climate Change Assessment. Los Angeles Region Report. Accessed December 30, 2020. **https://www.energy.ca.gov/sites/default/files/2019-11/Reg%20Report-%20SUM-CCCA4-2018-007%20LosAngeles_ADA.pdf**

31 CAL FIRE (California Department of Forestry and Fire Protection). 2019. "State of California Fire Perimeters: Wildfire 1950-2018." May 2019. **https://frap.fire.ca.gov/media/10302/firep_18_map_ada.pdf.**

Figure 6. Wildfire Hazard Severity Zones

Figure 7. Fire History



WHO

Similar to flooding, people can be vulnerable to wildfire due to social or linguistic isolation and/or physical disabilities that lead to difficulty evacuating. Additionally, households without access to a car can face difficulty evacuating. Secondary impacts, such as poor air quality due to smoke, can cause respiratory irritation and more heavily impacts people with pre-existing respiratory conditions like asthma (see **Table 8**).

Table 8. Populations Vulnerable to Wildfire

HEALTH INDICATOR	LOCATION		
	PALOS VERDES ESTATES	LOS ANGELES COUNTY	CALIFORNIA
Speaks English Less than Wel l[1]	**9.79%**	**23.6%**	17.8%
Disability[2]	**8.45%**	**9.91%**	10.6%
Car Access[3]	**98.2%**	**91.2%**	92.9%
Asthma[4]	**1.94**	**5.23**	5.18

Source: Public Health Alliance 2022. "The California Healthy Places Index." **https://map.healthyplacesindex.org/**

Legend: Quartile 1 = Good Quartile 2 = Moderate Quartile 3 = Poor Quartile 4 = Challenged

Note: The table is colored to provide an understanding of the rate of populations vulnerable to hazardous waste, and does not indicate that certain traits are overall "good" or "bad."

1 Percent of people over 5 years old who speak English less than very well
2 Percent of people with a disability
3 Percent of households with access to a car
4 Asthma emergency department visits per 100,000 people

HOW

Planning for evacuation and creating defensible spaces in new and existing developments are key to mitigating the hazard of wildfire. The City takes part in the HMGP, which helps states and local governments implement long-term hazard mitigation measures for natural hazards by providing federal funding following a federal disaster declaration. The HMGP applies to projects that would retrofit structures to minimize damage from wildfires, among other natural hazards, and that would plant fire-resistant vegetation in potential wildland fire areas. The LHMP hosts several mitigation measures targeted at increasing preparedness and minimizing risk and potential impact. These goals and implementation actions address vulnerability concerns related to landslides, earthquakes, wildland fire, flood, drought, SLR, and tsunami. Additionally, the plan includes two implementation actions that focus on ensuring the information and mitigation measures contained within the LHMP are cross-walked across all other planning initiatives and hazard related processes and programs.

The City has adopted the California Fire Safe regulations as amended in the Los Angeles County Code, which regulates several fire-related activities including fuel modification and defensible space regulations. Vegetation clearance maintenance along roadways is another aspect regulated by the Fire Code that impacts fire mitigation, evacuation, and emergency response. Roadway clearance is under the jurisdiction of the road owner, which in most cases is the City. The City does not maintain any fuel breaks within city limits.

Early fire detection is another way to reduce the likelihood of devastating fires by identifying and containing fires in their early stages. The City is in the process of implementing wildfire detection cameras as a result of efforts undertaken by Rancho Palos Verdes and regional collaboration via the Palos Verdes Peninsula Public Safety Committee. These cameras are located at vantage points throughout the peninsula and will cover Palos Verdes Estates. As of 2023, funding for these cameras is secured for the next five to ten years.

One way that communities address wildfire is through the formation of fire safe councils; however, there are no fire safe councils within 20 miles of Palos Verdes Estates. The closest council is the Westhills Fire Safe Council approximately 22 miles northeast. Communities also develop Community Wildfire Protection Plans to mitigate fire risk and become competitive for grant funding. The closest city to complete a Community Wildfire Protection Plan was the City of Rolling Hills in 2020. This plan prioritizes fire mitigation, community preparedness, and evacuation strategies for Rolling Hills, and these efforts can benefit Palos Verdes Estates by reducing nearby fire hazard which could, if not contained, spread fire into Palos Verdes Estates' city limits.[32]

32 City of Rolling Hills. 2020, July. "Rolling Hills Community Wildfire Protection Plan." **https://cms5.revize.com/revize/rollinghillsca/CWPP_final_2020-09-10_v2020.1.pdf**

Emergency Preparation and Response

Emergency preparation and response are important components in ensuring residents are ready for hazards and first responders can adequately serve residents in the event of a hazard. As hazards, populations, and the City's built environment change over time, city preparedness programs and first responders must be reassessed and at times adjust to continue to fit the needs of the community. The City developed an Emergency Operations Plan in 2019 which informed this element and acts as an extension to the State of California Emergency Plan and the Los Angeles County Operation Area Emergency Operations Plan.[33]

PREPAREDNESS

The Los Angeles County Fire Department provides fire response services in Palos Verdes Estates. The Los Angeles County Fire Department regularly visits schools and provides community-level response education through its Community Emergency Response Team (CERT) training program.[34] CERT programs educate volunteers about disaster preparedness and basic response skills, such as fire safety and medical response. The Palos Verdes Peninsula CERT organization also provides regular training at Hesse Park. Furthermore, the Police Department developed and facilitates the Disaster District Program (DDP) which is designed to increase disaster readiness and survivability at the neighborhood level during a disaster. The Police Department organized the city into 6 emergency preparedness and response "Disaster Districts," each equipped with a stock of equipment and supplies to support trained volunteer community responders who have successfully gone through the DDP. The program integrates the resources of all local disaster services including CERT members, Neighborhood Amateur Radio Team (NART), Disaster Service Workers (DSW), and the Palos Verdes Estates Police Department's Reserve Corps.[35] Membership within each of these groups fluctuates, meaning that recruitment over time is important to ensure continued effectiveness.

The City's Police Department and Los Angeles County Fire Department also conduct community education and make available learning materials and checklists to help residents best prepare for any disaster.[36] The Police Department published a thorough Disaster Preparedness Guidelines document to educate and advise Palos Verdes Estates community members on the hazards they may experience, how to prepare and respond for the hazards, and what programs are in place locally to support these safety efforts. Furthermore, the Police Department run a program for seniors called PVE Cares. This is a volunteer-based program that is intended to reduce crimes against seniors through education and resource spreading. The program also has an emergency response component. Seniors who sign up can voluntarily be added to a database where medical and emergency information is able to be shared with first responders during an emergency to streamline assistance and wellness checks for vulnerable residents.[37]

RESPONSE

The Los Angeles County Fire Department and Palos Verdes Estates Police Department respond to small- and large-scale hazard events in Palos Verdes Estates. Currently, the City's response capacity meets the needs of

33 City of Palos Verdes and Emergency Planning Consultants. 2019, July. "Emergency Operations Plan – Basic Plan."

34 City of Palos Verdes Estates. 2018. "Local Hazard Mitigation Plan."

35 City of Palos Verdes Estates and Emergency Planning Consultants. 2019, July. "Emergency Operations Plan – Basic Plan."

36 City of Palos Verdes Estates. n.d. "Disaster Preparedness." Access August 2022. **https://www.pvestates.org/services/police-department/divisions/administration/disaster-preparedness**

37 City of Palos Verdes Estates. 2022. "PVE Cares." **https://www.pvestates.org/services/police-department/pve-cares**

the community; however, hard-to-reach populations with functional and medical needs still face challenges. Regarding mutual aid and coordination, the City is located within OES Mutual Aid Region I and the OES Southern Administrative Region. During local emergencies, cities first rely on their own resources. If needed, mutual aid is then requested by the Incident Commander first to other cities, then to the county. If the county requires support they will first reach out to other counties, then to the regional office of OES, which coordinates with the state. The City's Emergency Operation Plan includes recommended National Incident Management System (NIMS) and Standardized Emergency Management System (SEMS) trainings, which the City bases its training decisions on for the various levels of designated emergency personnel. Another important aspect of emergency response includes having visible and legible addresses present on residences, which allows emergency personnel to respond quickly to calls. The City has updated chapter 8.12 of their municipal code to be consistent with the most recent California Fire Code and requires legible and visible address signage.[38]

The City uses multiple platforms to communicate on hazard and emergency notifications. The Police Department uses Nixle to internally coordinate on emergencies, while Alert South Bay, Zonehaven, Facebook, and Instagram are utilized to communicate with the public. Alert South Bay is a notification service that uses voluntary sign-ups. Zonehaven is an evacuation management platform that helps emergency responders by organizing the City into evacuation zones based on geography, threat direction, jurisdiction, and population density. Zonehaven is being implemented across the Palos Verdes Peninsula in 2023 and will coincide with a public outreach campaign and website that is shared by peninsula cities. The Palos Verdes Peninsula Public Safety Committee approved deployment of Zonehaven and helped to establish standard communication protocols between peninsula cities for executive staff.

EMERGENCY RESPONSE FACILITIES

Emergency response facilities are those activated during an emergency and used to respond to the hazard. The City has their own police department and contracts with the Los Angeles County Fire Department for fire protection and other fire-related services. The City Hall Complex, located at 340 Palos Verdes Drive West is the City's designated Emergency Operations Center (EOC), and includes the City's only police station and fire station (see Figure 9, Emergency Response, Critical, and Non-Critical City Facilities). All of Palos Verdes Estates is within a very high fire hazard severity zone, meaning that the City's emergency response facilities are also within a very high fire hazard severity zone. If the primary EOC at City Hall becomes unavailable, PVE/NART have developed infrastructure for the City that can be used by the PVE Police Department's Mobile Command Unit to act as a backup EOC and lead communication efforts.

Critical Facilities

Within the Safety Element, critical facilities are considered places essential to the function of the City or public buildings that can be used to gather people and equipment during hazard response and recovery. For Palos Verdes Estates, these facilities include six schools, the school district building, and the Malaga Library. All critical facilities are within a very high fire hazard severity zone.

Critical facilities also include infrastructure supplying utilities like water, wastewater, power, and communications. As stated earlier, the City's water utility is Cal Water, which serve the entire Palos Verdes Peninsula and many other surrounding cities. Palos Verdes District operates the public water system (PWS number CA1910104), which provides drinking water for human consumption across approximately 26 square

38 City of Palos Verdes Estates. 2020, January. "Fire Code." **https://www.codepublishing.com/CA/PalosVerdesEstates/#!/PalosVerdes08/PalosVerdes0812.html#8.12**

miles. In 2020, the PWS supplied 18,067 AF and supplied 24,097 municipal connections. The Palos Verdes water system distributes water through two systems throughout the peninsula, including the "D-500 System" and the "Ridge System." The D-500 System serves 13% of the total peninsula-wide demand, while the Ridge System serves 87% of demand. The average daily demand of both systems combined is 12,500 gallons per minute and the maximum daily demand is 20,600 gallons per minute. The Palos Verdes Peninsula Water Reliability Project was recently completed by Cal Water that replaced aging water pipelines and added pipeline, pump station, and electrical redundancies. Water resiliency is important, and when water services are lost for even a few hours, other sectors can be significantly impacted.

The Los Angeles County Sanitation District owns and operates the wastewater collection system in Palos Verdes Estates. The City is located in District #5, which is serviced by the South Bay Cities Sanitation District. The Los Angeles County Sanitation District operates the Joint Water Pollution Control Plant in the City of Carson, which provides primary and secondary treatment of wastewater for approximately 3.5 million people across Los Angeles County, including Palos Verdes Estates. Electric power is one of the most important services for maintaining pumping and treatment operations.

Southern California Edison supplies the City's electricity through substations and overhead transmission lines with a max voltage of 66 kilovolts (kV)[39,40]. Three substations exist within Palos Verdes Estates, and the bordering cities of Rolling Hills Estates, Torrance, and Rancho Palos Verdes each have transmission lines and substations that convey electric power to Palos Verdes Estates. These facilities are susceptible to damage from seismic and geologic hazards, and present potential for fire ignitions. Natural gas is provided by Southern California Gas Company (SoCalGas) via transmission lines and high-pressure distribution lines which feed into the city's natural gas network which oftentimes runs parallel with residential water and electrical networks. For communications infrastructure, the nearest communications tower is in Redondo Beach near its border with Palos Verdes Estates[41].

Communications infrastructure varies depending on the type of communication and includes both physical and cyber infrastructure. Some infrastructures are locally-based, while others may be remote or far away. Five different types of communications systems include broadcasting systems, cable, satellite, wireless, and wireline. Communications towers, like cellular and microwave towers, are a local physical infrastructure that can serve multiple communications systems by transmitting radio frequency, microwave frequency, and other federally licensed communications energy. The closest cellular towers are located in Rolling Hills Estates at 500 Silver Spur Road and 734 Silver Spur Road[42]. Palos Verdes Estates has one microwave tower within its borders[43]. The closest FM (93.5 MHz) and AM (1070 kHz) antennas are located in Redondo Beach[44,45].

39 California State Geoportal. 2022. "California Electric Transmission Lines." **https://gis.data.ca.gov/datasets/CAEnergy::california-electric-transmission-lines/about**

40 California State Geoportal. 2022. "California Electric Substations." **https://gis.data.ca.gov/datasets/CAEnergy::california-electric-substations/about**

41 County of Los Angeles Enterprise GIS. 2022. "Communication Towers." **https://egis-lacounty.hub.arcgis.com/datasets/lacounty::communication-towers/about**

42 County of Los Angeles Enterprise GIS. 2022. "Cellular Towers." **https://egis-lacounty.hub.arcgis.com/datasets/lacounty::cellular-towers-1/explore?location=33.744753%2C-118.388478%2C11.66**

43 Count of Los Angeles Enterprise GIS. 2022. "Microwave Towers." **https://egis-lacounty.hub.arcgis.com/datasets/lacounty::microwave-towers/explore?location=33.794781%2C-118.369726%2C12.58**

44 County of Los Angeles Enterprise GIS. 2022. "AM Antennas." **https://egis-lacounty.hub.arcgis.com/datasets/lacounty::am-antennas-1/explore?location=33.754144%2C-118.227627%2C10.73**

45 County of Los Angeles Enterprise GIS. 2022. "FM Antennas." **https://egis-lacounty.hub.arcgis.com/datasets/lacounty::fm-antennas/explore?location=33.796668%2C-118.295000%2C7.92**

Non-Critical City Facilities

Non-critical City facilities are potentially useful during recovery and may have other value to the City such as economic or recreational value. These are generally flexible facilities that can be activated and would likely not all be used at once during a hazard event. Non-critical City facilities include the Palos Verdes Golf and Country Club, Tennis Club, Palos Verdes Beach & Athletic Club, and the Palos Verdes Stables (see **Figure 8**, below). All facilities fall within the very high fire hazard severity zone, and the Palos Verdes Beach & Athletic Club is potentially at-risk of flooding. The Palos Verdes Stables are a unique non-critical City facility because if a fire or other hazard were to threaten this facility, the horses that reside there may need special attention and/or evacuation. There is a fire safety and evacuation plan for the Palos Verdes Stables which outlines general safety rules for the stables, evacuation preparation guidelines for horse owners, and the evacuation steps to take during an emergency which requires evacuation.[46]

Figure 8. Emergency Response, Critical, and Non-Critical City Facilities

46 Palos Verdes Stables. 2022. Fire Safety/Evacuation Plan.

Evacuation Routes

In the event of an extreme fire, flood, or other circumstances, evacuation may be necessary. To preserve the lives of Palos Verdes Estates residents, it is important to ensure that the routes used for evacuation are unobstructed and in good condition. Evacuation routes can change depending on the location of the hazard, but major roads are generally used.

The Palos Verdes Peninsula Public Safety Committee, including members of all peninsula cities, have collaborated to develop peninsula-wide ingress and egress routes, which are useful in the event of a peninsula-wide evacuation. Palos Verdes Drive (both West and North) and Palos Verdes Estates Boulevard are the roads within Palos Verdes Estates included. The Public Safety Committee has also identified coordination measures among Public Works Departments which establish key personnel and contacts to ensure communication and traffic safety across jurisdictional lines during evacuations. Peninsula-wide mass evacuation planning is a next step for this regional collaboration.

When considering the City of Palos Verdes Estates and its evacuation capacity specifically, additional local routes have been included to more fully capture potential routes that could be utilized depending on the hazard (see **Figure 9, Regional Evacuation Routes** and **Table 9, Evacuation Route Capacity**). Palos Verdes Drive West allows for the main exit southward. Palos Verdes Estates Boulevard is the main exit northward. To the east there are three exits: one main exit along Palos Verdes Drive North and two along Granvia Altamira. See **Table 9**, below, to understand the capacity of these exits from Palos Verdes Estates. Within Palos Verdes Estates there are several roads that allow navigation between these exits, including Via Coronel, Via Fernandez, Via Del Monte, Via Campesina, Paseo La Cresta and Paseo Del Mar. All possible evacuation routes are within very high fire hazard severity zones. Palos Verdes Drive, Palos Verdes Estates Boulevard, and Via Campesina overlap with sections of the 100-year flood zone. Each of these drainage areas has stormwater infrastructure in place. Landslide hazard is elevated in certain portions of Palos Verdes Drive as well, including the Douglass Cut between the 1100 and 1300 block. Liquefaction zones do not overlap with any potential evacuation routes.

Table 9. Evacuation Route Capacity

ROAD	LANES	EVACUATION CAPACITY (CARS PER HOUR)[1]
Palos Verdes Drive W2	2	2,858
Palos Verdes Estates Boulevard2	2	2,858
Palos Verdes Drive N2	1	1,429
Granavia Avenue (exiting eastward toward Montemalaga Drive)	1	1,429
Granavia Avenue (exiting southward toward Hawthorne Boulevard)	1	1,429

1 This estimate assumes the average vehicle is approximately 16 feet long, allows approximately 10 feet between vehicles (26 feet per vehicle), and assumes an average vehicle speed of 7 miles per hour.

2 Signifies Designated Regional Evacuation Route

Figure 9. Regional Evacuation Routes

The length of time it takes for an area to evacuate can be determined by dividing the number of vehicles evacuating by the total roadway capacity (see formula, below). Palos Verdes Estates is home to 13,052 residents totaling 4,866 households.[47] Based on recent post-fire statistics, 1.75 vehicles evacuate per household.[48] If the entire city required evacuation, a total of 8,516 vehicles are projected to evacuate. Again, it should be noted that any combination of the above evacuation routes can be activated as necessary to avoid hazards, and that additional evacuation strategies can be taken by emergency responders to increase roadway capacity and improve evacuation speed, such as contra-flow operations, phased evacuation, traffic signal coordination, and more.

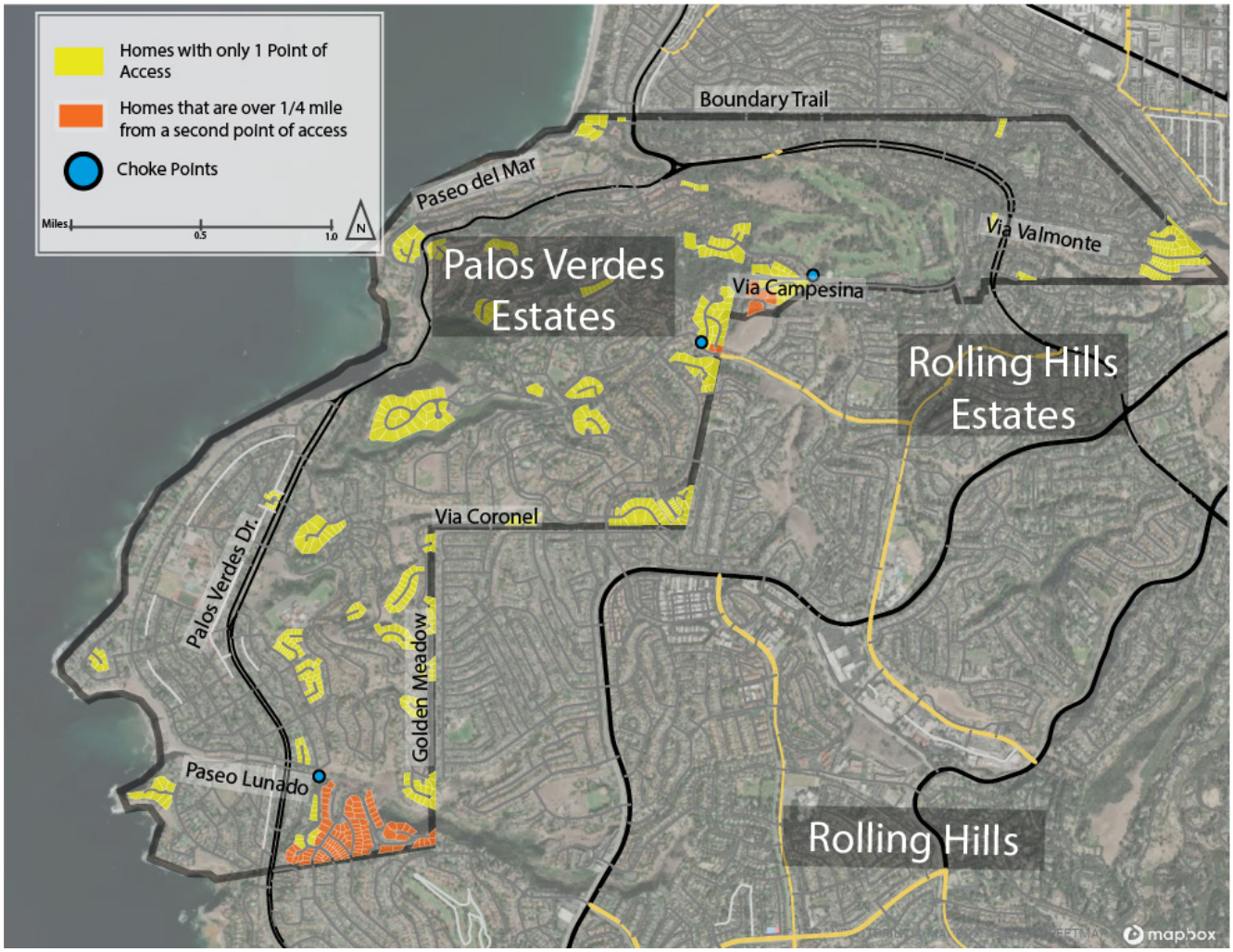
$$\text{Evacuation Time} = \frac{\left(\frac{\text{Evacuation Population}}{\text{Average Vehicle Occupancy}}\right)}{\text{Roadway Capacity}}$$

47 U.S. Census Bureau. 2021. "QuickFacts, Palos Verdes Estates, California." **https://www.census.gov/quickfacts/fact/table/palosverdesestatescitycalifornia**

48 Santa Rosa CA Post-Fire Survey. 2018.

Homes in Very High Fire Hazard Severity Zones with one point of access are also important to consider in relation to evacuations and emergency access. As of 2023, LA County Fire and PVE Police have not indicated issues with roads limited emergency vehicle access, but the entire city is in a Very High Fire Hazard Severity Zone, so all cul-de-sacs and dead ends result in single point of access residences. See **Figure 10, Residential Access to Evacuation Routes,** to see homes that have only 1 point of access. Approximately 565 homes within Palos Verdes Estates have only one point of access. However, many of these homes are located on short cul-de-sacs which wouldn't generally impact evacuation or emergency access. Of the 565 homes, 103 homes are more than a quarter mile (or approximately a 2-minute drive under evacuation conditions[49]) from a second point of access, meaning that if a hazard blocked the road prior to that second point of access, regular car ingress or egress would be impossible. The home farthest from a second point of access is approximately 0.9 miles away (approximately a 3-minute drive under normal conditions or up to an 8-minute drive under evacuation conditions) from a second point of access. If additional access points are possible in the future, they may improve evacuation safety and first response effectiveness.

Figure 10. Residential Access to Evacuation Routes

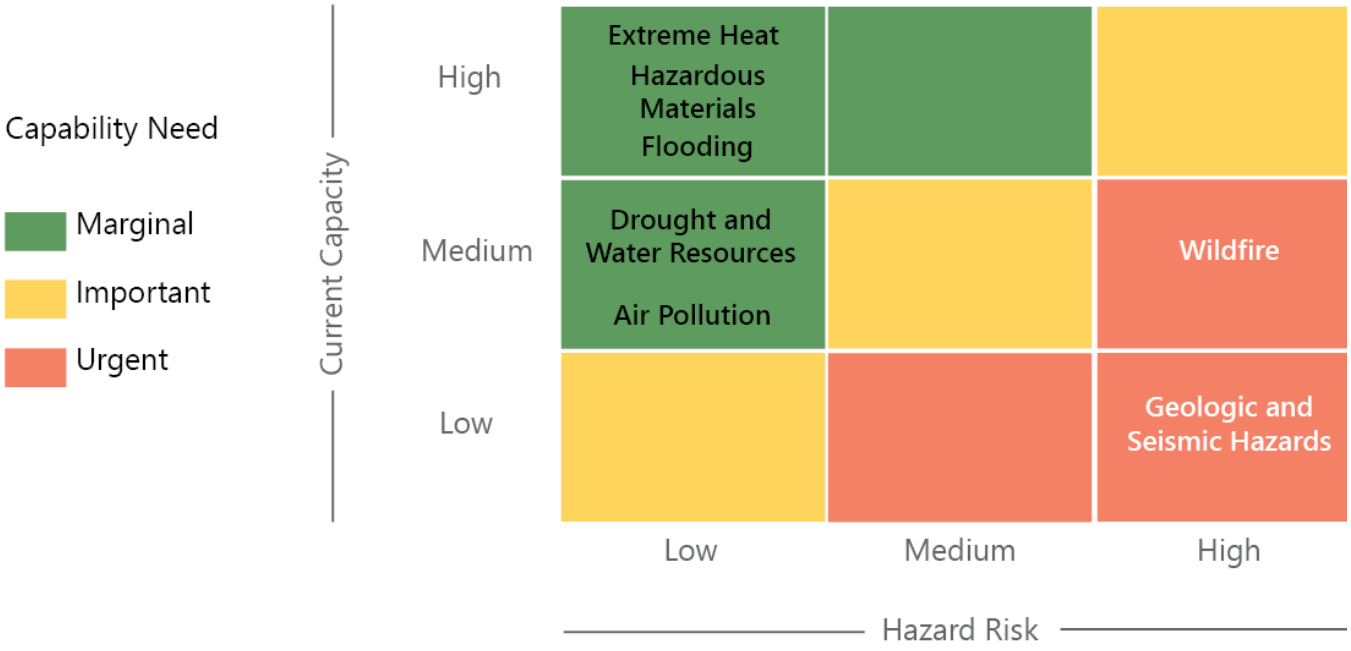


49 This assumes traffic is maintained at 7 mph, an estimate that is reduced from regular speeds due to a high volume of traffic, the potential impact of smoke, and other limiting factors.

Findings

Based on the above analysis of each hazard, Palos Verdes Estates is most at risk from wildfire and seismic and geologic hazards (see **Figure 11, Palos Verdes Estates Hazard Risk**). The risk level for each hazard was determined by looking at the potential impact for each hazard (high, medium, low) and the City's current adaptive capacity (high, medium, low). The potential impact is determined by how likely a hazard is to occur and how deadly and/or damaging it could be. This is generally assessed by whether there are hazard zones in or near a community (such as a fire hazard or flood zone), if there are large populations or important facilities in those zones, the historic impact of that hazard, and/or the potential role of climate change. The adaptative capacity is assessed by how well the public is educated and prepared for a hazard, if there are a high number of vulnerable people, the emergency alert and evacuation capacity, and if important facilities (including homes) meet hazard reduction standards through building materials and structural requirements.

Figure 11. Palos Verdes Estates Hazard Risk



DROUGHT AND WATER RESOURCES

Drought is expected to be experienced throughout California, including within Palos Verdes Estates. For Palos Verdes Estates and its residents, drought's impact is categorized as low, as it is projected to mainly be a monetary impact. The City's adaptive capacity is considered medium, as it has executed various drought-related programs in recent history. However, most actions responding to the drought are led by outside agencies, and the sources of the City's water are from other regions, making the adaptive capacity difficult to predict. Overall, the risk presented to the City and its residents by drought is considered low.

EXTREME HEAT

Extreme heat has historically occurred 2 days a year in Palos Verdes Estates, but it will become more prevalent due to climate change. The proximity of Palos Verdes Estates to the ocean and green spaces help to offset this hazard. For these reasons, the impact of extreme heat on residents is considered low. The City has policies to maintain its urban forest, and already has a relatively good tree canopy citywide. These factors make the City's adaptive capacity high, and overall risk from extreme heat low.

FLOODING

Some areas of Palos Verdes Estates are located within flood zones, including portions of parcels occupied by Palos Verdes High School, Palos Verdes Intermediate School, Lunada Bay Elementary, the Palos Verdes Golf Club, the Town and Country Nursery School, and single-family residential lots. Coastal flooding from tsunamis or as a result of sea-level rise is unlikely outside of the potential risk associated with the Beach Club in the future. Overall, flooding is not a common hazard, and recurring damages from flooding have not been reported. This makes the potential impact of flooding low. The City has robust floodplain management regulations within the Municipal Code and coordinates with FEMA relative to properties eligible for flood insurance. This makes the City's adaptive capacity for flooding high. Overall, low risk is associated with flooding for Palos Verdes Estates.

GEOLOGIC AND SEISMIC HAZARDS

Palos Verdes Estates is within proximity of faults and has several areas that are in landslide hazard zones. While the frequency of these events is low, the impact of them could be high. For these reasons, the impact of geologic and seismic hazards on Palos Verdes Estates is medium. The City's updated building code ensures that future developments are built to withstand ground shaking; however, Palos Verdes Estates is built out and this measure will only benefit the City over many years. There are more studies needed to understand the extent of hazard risks and the needs of City infrastructure relative to geologic and seismic hazards. This makes the City's current adaptive capacity for geologic and seismic hazards low. Overall, the City's risk relative to geologic and seismic hazards is high.

HUMAN-CAUSED HAZARDS

Hazardous materials are likely to have a low impact on Palos Verdes Estates, as there is only one existing cleanup site. The federal and state requirements related to hazardous materials makes the adaptive capacity in the City high. This means that hazardous materials present a low risk to the City.

Air pollution in the form of ground-level ozone and particulate matter (dust and fine dust) negatively impacts health in Palos Verdes Estates, though offshore wind and relatively high levels of tree canopy help to reduce the degree of air pollution experienced by residents. Populations vulnerable to air pollution are mainly older adults. The City has few air pollution sources within city limits, but has limited ability to regulate air pollution emissions outside of jurisdictional boundaries. For these outside sources of pollution, other agencies like CARB, the twin ports, or neighboring cities regulate the pollution. Therefore, adaptive capacity is medium. Overall, air pollution presents a low risk to the City.

Aircraft activity and nuisance from the Torrance Municipal Airport present minimal hazard to Palos Verdes Estates, and there are limited actions outside of advocacy and communication that can be done by the City.

WILDFIRES

The entire city is within a Very High Fire Hazard Severity Zone, including residences, emergency services, and other critical infrastructure such as schools. This means the potential impact of wildfires is high. The City has a medium level of adaptative capacity, as it has adopted the most recent California Fire Code and uses Los Angeles County's Fire Department for fire protection services. However, more fire mitigation measures could be taken. This results in wildfires presenting a high risk to the City.

Goals, Policies, and Actions

GOAL 1: *A City that reduces the risk from hazards.*

POLICY 1.1: Retrofit at-risk existing public facilities, support homeowner retrofits, and design new facilities to minimize risks during seismic and geologic events.

ACTION 1.1A: Public Facility Seismic Studies. Perform a building audit and subsequent seismic studies to guide seismic improvements to the City Hall Complex and other facilities.

ACTION 1.1B: Safe Facility Siting. Require new critical facilities to be located outside of hazard zones (FEMA Flood Zones, Fire Hazard Severity Zones, Alquist-Priolo Fault Zones, Liquefaction Zones, and Landslide Zones) whenever possible.

ACTION 1.1C: Support Private Retrofits. Provide informational materials and technical assistance to property owners interested in updating their homes and/or businesses to meet current seismic standards.

ACTION 1.1D: Building Database. Develop a database that documents building conditions such as age, building type, and retrofits. Update the database as building improvements and planning efforts occur or as deficiencies are reported. Prioritize inventorying public facilities.

POLICY 1.2: Study and monitor areas susceptible to landslides, erosion, tsunamis, sea-level rise, and other mappable hazards.

ACTION 1.2A: Hazard Overlays. Review hazard maps during development review including fault zones, flood zones, fire perimeters, and areas prone to landslides and erosion. Enforce required development standards for all new development, and site structures in a way that mitigates applicable hazards.

ACTION 1.2B: Landslide Mitigation. Assess and mitigate landslide vulnerabilities where necessary. Prioritize studies and slope stabilization efforts in areas recently impacted by wildfires or along evacuation routes, such as the Douglass Cut, located off Palos Verdes Drive between addresses 1100 and 1300.

ACTION 1.2C: Coastal Bluff Erosion Studies. During Local Coastal Program development, work with the California Coastal Commission and coastal engineers to assess coastal bluff erosion and determine any necessary adjustments to the Coastal Zone Overlay Zone or mitigation measures for allowed development in these areas.

ACTION 1.2D: Coastal Flooding Studies and Retrofits. Perform a site study and feasibility assessment to determine necessary sea-level rise upgrades for the Palos Verdes Beach Club during Local Coastal Program development or prior to major facility upgrades. Work with the California Coastal Commission to consider a trigger-based approach for potential options.

POLICY 1.3: Ensure that water, power, and communications infrastructure is able to withstand natural hazards and that these services are quickly and safely restored if they are interrupted.

ACTION 1.3A: Adequate Peakload Water Supply for Fire Protection. Involve LA County Fire during regular 5-year updates of the Urban Water Management Plan to ensure infrastructure maintenance, long-term integrity of the water system, location of anticipated water supply, and future peakload water supply is sufficient for fire protection.

ACTION 1.3B: Backup Power at Critical Facilities. Supply critical facilities with battery backup generators. Test these annually to ensure effectiveness.

ACTION 1.3C: Critical Communication Redundancies. Include consideration of redundancies and fail safes during emergency communications equipment purchasing to accommodate unexpected power outages.

GOAL 2: *A City where wildfire management is prioritized.*

POLICY 2.1: Explore the potential to expand fire protection efforts in the City.

ACTION 2.1A: Fire Protection Planning. Consider additional fire planning, such as a Community Wildfire Protection Plan (CWPP). Discuss with other peninsula jurisdictions the potential to collaborate and share costs. Meet with Rolling Hills staff to understand the lessons learned from their CWPP process. Share findings with the public and elected officials.

ACTION 2.1B: Fire Hazard Reduction Projects. Work with LA County Fire and neighboring jurisdictions to plan and prioritize fire hazard reduction projects. During the planning stage of these projects, consider and ensure long-term maintenance.

ACTION 2.1C: Assessment of Adequate Fire Protection and Emergency Services. Continue to dialogue with LA County Fire, Palos Verdes Police Department, and CalWater regarding fire protection, water supply, and emergency service capacity during new development review.

POLICY 2.2: Implement development standards to mitigate wildfire hazards.

ACTION 2.2A: New Development Requirements. Development in the City's Fire Hazard Severity Zones shall continue to be required to meet the most recent version of the California Fire Code and California Building Code. A Fire Protection Plan that describes project specific fuel modification methods and maintenance to achieve compliance with state requirements for defensible space shall be required.

ACTION 2.2B: Water for New Developments. Require new developments in Very High Fire Hazard Severity Zones to have adequate fire flow as defined by the most recent California Fire Code.

POLICY 2.3: Conduct a variety of educational outreach to promote fire safety and prevention.

ACTION 2.3A: Fire Education in Schools. Continue to work with LA County Fire and Palos Verdes Peninsula Unified School District (PVPUSD) to offer fire safety lessons in local schools.

ACTION 2.3B: Hazard Education at Health Fairs. Periodically host public Health Fairs to educate community members about public health, hazard prevention, and safety. Work with LA County Fire to include a booth focused on fire safety.

ACTION 2.3C: Defensible Space and Home Hardening Promotion. Provide informational materials to property owners to promote defensible space and home hardening best practices.

ACTION 2.3D: Homeowner Education. Meet annually with real estate groups, insurance providers, home owners, and the Palos Verdes Homes Association to educate residents of mitigation steps and preparedness information.

POLICY 2.4: Maintain the City's urban forest while promoting fire-safe landscaping.

ACTION 2.4A: Designated Street Tree List. During updates to the designated street tree list, continue to balance the impact on fire hazards, with special considerations given to evacuation routes and streets with homes that are over 1/4 mile from a second point of access.

ACTION 2.4B: Landscape Plan. During future landscape plan updates continue to require compliance with the California Fire Code and encourage the planting of species that are well-suited to the climate of PVE, that provide adequate shade, and that limit wildfire hazard.

ACTION 2.4C: Hazardous Tree Management. Regularly assess and improve tree management practices to avoid fallen limbs and promote fuel reduction concurrently.

ACTION 2.4D: Roadway Vegetation Management. Ensure that city-maintained roads comply with the requirements of the California Fire Safe regulations. Prioritize vegetation management along evacuation routes.

GOAL 3: *A City that has open lines of communication about hazards with its neighbors.*

POLICY 3.1: Increase communication with neighboring jurisdictions to reduce risks associated with hazards that occur outside of city limits.

ACTION 3.1A: Open Regional Communication. Maintain City staff involvement and provide elected officials with updates on the regulatory efforts of the South Coast Air Quality Management District, Port of Los Angeles, Port of Long Beach, and others related to nearby sources of hazardous waste.

ACTION 3.1B: Promote Public Input Opportunities. Utilize the City website, newsletter, and social media to promote public engagement opportunities for developments involving hazardous waste, high levels of air pollution, or safety concerns in neighboring jurisdictions.

ACTION 3.1C: Airport Safety. Communicate airport-related concerns with Torrance City staff and the Torrance Airport Commission.

ACTION 3.1D: Household Hazardous Waste Disposal. Pursue partnership opportunities with neighboring jurisdictions and waste providers that have opportunities for household hazardous waste disposal. Promote these opportunities and continue to provide information on the City website regarding proper handling and disposal of household hazardous waste.

POLICY 3.2: Participate in local and regional mutual aid efforts.

ACTION 3.2A: Mutual Aid Participation. Continue to participate in Statewide Master Mutual Aid Agreements and local automatic aid agreements related to emergency response.

ACTION 3.2B: Regional Safety Planning. Continue active participation on the Palos Verdes Peninsula Public Safety Committee and their quarterly meetings.

GOAL 4: *A City with community members prepared for hazards.*

POLICY 4.1: Improve emergency evacuation routes throughout the city.

ACTION 4.1A: Emergency Evacuation Route. Work with the City of Torrance to assess the feasibility of establishing another emergency evacuation route to Torrance (known as the "Torrance Gate").

ACTION 4.1B: Evacuation Capacity. Continue to study and monitor the conditions of existing evacuation routes to incorporate a range of emergency scenarios including differences in hazard types, locations, and timing. Consider a peninsula-wide approach.

ACTION 4.1C: Existing Road Upgrades. When possible and deemed necessary, or during regular road maintenance, upgrade existing roads to meet minimum road widths, surface, grade, radius, and turnarounds as defined by the most recent State Fire Code to ensure emergency vehicle access is possible.

ACTION 4.1D: Evacuation Standards for New Developments. When reviewing new discretionary residential developments, enforce the most recent State Fire Code as it relates to roadway design, street addressing, and signage. If the development has only one point of access consider the potential for additional access points.

POLICY 4.2: Ensure that vulnerable populations receive specialized communication and resources before, during, and after disasters.

ACTION 4.2A: Promote the Vulnerable Population Registry. Continue to work with local organizations, places of worship, and community leaders to increase registration of older adults and other vulnerable populations in the PVE Cares Voluntary Vulnerable Population Registry.

ACTION 4.2B: Vulnerable Population Registry Trainings. Develop a program to train first responders and cooperating agencies on how to use the Vulnerable Population Registry during hazard events. Consider needs related to early communication, transportation and specialized care.

POLICY 4.3: Develop resilience centers where residents can seek refuge, obtain resources, and recover from disasters.

ACTION 4.3A: Resilience Center Designations. Designate public facilities as resilience centers for community members to gather during an emergency or hazard event. Work with other Peninsula jurisdictions to consider a peninsula-wide resilience center network.

ACTION 4.3B: Resilience Center Upgrades. Update facilities serving as Resilience Centers to ensure that they are ADA compliant, air conditioned, have accessible restrooms, refrigerators, and back up power. As possible, plan to have an entertainment space for children and a separate space for pets.

ACTION 4.3C: Emergency Supplies. Allocate funds to the District Disaster Program to ensure that shelters are stocked with emergency supplies such as face masks, bottled water, or food for use during emergency events.

POLICY 4.4: Coordinate an effective hazard notification system for residents.

ACTION 4.4A: Emergency Communication and Testing. Continue to use multiple methods for emergency communication, including Nixle, Alert South Bay, Zone Haven and social media. Consider emerging methods as applicable. Test methods annually.

GOAL 5: *A City with capable and adaptable first responders.*

POLICY 5.1: Ensure that the Emergency Operations Center (EOC) and first responders have the capacity and resources to respond to hazard events.

ACTION 5.1A: EOC Siting. Conduct feasibility analyses to develop an alternative or backup Emergency Operations Center (EOC) location with the capacity to host all necessary staff during any type of emergency. In the interim, consider partnerships with other agencies or organizations for mutual aid opportunities regarding an EOC, such as the Palos Verdes Peninsula Unified School District.

ACTION 5.1B: EOC Technology. Conduct a periodic review of technology used to support the EOC to ensure systems are updated and effective.

ACTION 5.1C: Staff Training. Continue regular EOC training for City staff with EOC responsibilities, and cross train city staff at various EOC positions.

ACTION 5.1D: First Responder Training. Continue to train designated emergency personnel based on recommendations from the National Incident Management System and Standardized Emergency Management System.

POLICY 5.2: Continue to support the efforts of the Palos Verdes Peninsula CERT.

ACTION 5.2A: Palos Verdes Peninsula CERT. Provide Palos Verdes Peninsula CERT leaders with necessary resources and assistance to host regular community events and recruit volunteers.

ACTION 5.2B: Reduce Barriers for CERT Trainings. Consider modifications to CERT trainings offered to reduce barriers and expand the audience. This could include developing a shortened course that could be offered to classrooms, businesses, or local organizations.

GOAL 6: *A City able to serve a range of community needs when*

recovering from a major hazard.

POLICY 6.1: Plan for continued critical City and community member operations following a hazard event or emergency, including processing redevelopments, providing technical assistance, and receiving aid.

ACTION 6.1A: City Operations Contingency Planning. Make department-level contingency plans that note necessary operations and allow continued essential city operations during and immediately after a hazard event or emergency. Communicate with other peninsula jurisdictions to consider the possibility of mutual aid facility sharing for certain necessary operations.

ACTION 6.1B: Public Aid Resource Database. Create a list of public aid organizations that may be of assistance to residents recovering from hazard events. Ensure that these organizations want to be included as a resource and publish this resource so that it is accessible to the public.

ACTION 6.1C: Important Document Backups. Continue to convert important physical documents to digital copies to reduce the risk of loss due to a fire or other hazard.

POLICY 6.2: Adopt clear redevelopment standards and practices that balance efficiently getting people back in their homes while building back safely.

ACTION 6.2A: Maintain Redevelopment Fire Requirements. Plan to facilitate efficient post-fire redevelopment that complies with the most current version of the California Building Codes and California Fire Code.

ACTION 6.2B: Pre-Application Screenings. Develop a free pre-application screening service for property owners rebuilding after a major hazard. This would include an in-person meeting with staff that provides information on parcel data, setback and zoning requirements, assessor resources and utility connections to help with the building application submittal process.

ACTION 6.2C: Post-Fire Erosion and Flood Control. Work with applicable federal and state agencies to develop and provide oversight, guidance, and resources for post-fire erosion control measures.

Implementation

The following table is to outline important information for City staff and partner agencies in charge of implementing the safety element.

Table 10. Implementation Table

ACTION	DESCRIPTION	RESPONSIBLE DEPARTMENT	PARTNERS	HAZARD	PRIORITIES	COST	TYPE OF ACTION
1.1a	Public Facility Seismic Studies. Perform a building audit and subsequent seismic studies to guide seismic improvements to the City Hall Complex and other facilities. Pursue funding sources for critical facility safety improvements.	Public Works		Earthquake	High	$$	Planning, Capital Improvement or Purchasing
1.1b	Safe Facility Siting. Require new critical facilities to be located outside of hazard zones (FEMA Flood Zones, Fire Hazard Severity Zones, Alquist-Priolo Fault Zones, Liquefaction Zones, and Landslide Zones) whenever possible.	Community Development		Earthquake, Geologic Hazards, Flooding, Fire	Ongoing	$	Planning
1.1c	Support Private Retrofits. Provide informational materials and technical assistance to property owners interested in updating their homes and/or businesses to meet current seismic standards.	Community Development		Earthquake	Ongoing	$	Engagement
1.1d	Building Database. Develop a database that documents building conditions such as age, building type, and retrofits. Update the database as building improvements and planning efforts occur or as deficiencies are reported. Prioritize inventorying public facilities.	Community Development	Public Works	Earthquake	Medium	$	Planning
1.2a	Hazard Overlays. Review hazard maps during development review including fault zones, flood zones, fire perimeters, and areas prone to landslides and erosion. Enforce required development standards for all new development, and site structures in a way that mitigates applicable hazards.	Community Development		Fire, Flooding, Earthquake, Geologic Hazards	Ongoing	$	Ordinance

ACTION	DESCRIPTION	RESPONSIBLE DEPARTMENT	PARTNERS	HAZARD	PRIORITIES	COST	TYPE OF ACTION
1.2b	Landslide Mitigation. Assess and mitigate landslide vulnerabilities where necessary. Prioritize studies and slope stabilization efforts in areas recently impacted by wildfires or along evacuation routes, such as the Douglass Cut, located off Palos Verdes Drive between addresses 1100 and 1300.	Public Works	LA County Fire, Police, Community Development	Geologic Hazards	High	$$	Planning, Capital Improvement or Purchasing
1.2c	Coastal Bluff Erosion Studies. During Local Coastal Program development, work with the California Coastal Commission and subject matter experts to assess vulnerabilities to coastal bluff erosion and determine any necessary mitigation measures for development in these areas.	Community Development		Geologic Hazards	Medium	$$	Planning, Capital Improvement or Purchasing
1.2d	Coastal Flooding Studies and Retrofits. Perform a site study and feasibility assessment to determine necessary sea-level rise upgrades for the Palos Verdes Beach Club during Local Coastal Program development or prior to major facility upgrades. Work with the California Coastal Commission to consider a trigger-based approach for potential options.	Public Works	Community Development	Tsunamis, Sea-level Rise	Medium	$$	Planning, Capital Improvement or Purchasing
1.3a	Adequate Peakload Water Supply for Fire Protection. Involve LA County Fire during regular 5-year updates of the Urban Water Management Plan to ensure infrastructure maintenance, long-term integrity of the water system, water sources, and future peakload water supply is sufficient for fire protection.	Cal Water	LA County Fire, Public Works	Fire	Ongoing	$	Planning, Engagement
1.3b	Backup Power at Critical Facilities. Supply critical facilities with battery backup generators. Test these annually to ensure effectiveness.	Public Works		Emergency Preparedness & Evacuation	High	$$	Capital Improvement or Purchasing
1.3c	Critical Communication Redundancies. Include consideration of redundancies and fail safes during emergency communications equipment purchasing to accommodate unexpected power outages.	Police	Public Works, LA County Fire, IT	Emergency Preparedness & Evacuation, Emergency Services	Ongoing	$$	Capital Improvement or Purchasing

ACTION	DESCRIPTION	RESPONSIBLE DEPARTMENT	PARTNERS	HAZARD	PRIORITIES	COST	TYPE OF ACTION
2.1a	Fire Protection Planning. Consider additional fire planning, such as a Community Wildfire Protection Plan (CWPP). Discuss with other peninsula jurisdictions the potential to collaborate and share costs. Meet with Rolling Hills staff to understand the lessons learned from their CWPP process. Share findings with the public and elected officials.	Community Development	LA County Fire, Neighboring Jurisdictions	Fire	Medium	$	Engagement, Planning
2.1b	Fire Hazard Reduction Projects. Work with LA County Fire and neighboring jurisdictions to plan and prioritize fire hazard reduction projects. During the planning stage of these projects, consider and ensure long-term maintenance.	Community Development	LA County Fire, Police, Public Works	Fire	High	$$	Planning, Capital Improvement or Purchasing
2.1c	Assessment of Adequate Fire Protection and Emergency Services. Continue to dialogue with LA County Fire, Palos Verdes Police Department, and CalWater regarding fire protction, adequate water supply, and emergency service capacity during new development review.	Community Development	LA County Fire, Police, CalWater	Fire, Emergency Services, Water Resources	Ongoing	$	Planning, City Operations
2.2a	New Development Requirements. Development in the City's Fire Hazard Severity Zones shall continue to be required to meet the most recent version of the California Fire Code and California Building Code. A Fire Protection Plan that describes project specific fuel modification methods and maintenance to achieve compliance with state requirements for defensible space shall be required.	Community Development	LA County Fire	Fire	Ongoing	$	Ordinance
2.2b	Water for New Developments. Require new developments in Very High Fire Hazard Severity Zones to have adequate fire flow as defined by the most recent California Fire Code.	Community Development	LA County Fire	Fire	Ongoing	$	Ordinance
2.3a	Fire Education in Schools. Continue to work with LA County Fire and Palos Verdes Peninsula Unified School District (PVPUSD) to offer fire safety lessons in local schools.	LA County Fire	PVPUSD	Fire	Ongoing	$	Engagement

ACTION	DESCRIPTION	RESPONSIBLE DEPARTMENT	PARTNERS	HAZARD	PRIORITIES	COST	TYPE OF ACTION
2.3b	Hazard Education at Health Fairs. Periodically host public Health Fairs to educate community members about public health, hazard prevention, and safety. Work with LA County Fire to include a booth focused on fire safety.	Community Development	LA County Fire, Neighboring Jurisdictions, PVPUSD, Police	Fire	Ongoing	$	Engagement
2.3c	Defensible Space and Home Hardening Promotion. Provide informational materials to property owners to promote defensible space and home hardening best practices.	Community Development	LA County Fire	Fire	Ongoing	$	Engagement
2.3d	Homeowner Education. Meet annually with real estate groups, insurance providers, home owners, and the Palos Verdes Homes Association to educate residents of mitigation steps and preparedness information.	Community Development	Palos Verdes Homes Association	Fire	Ongoing	$	Engagement
2.4a	Designated Street Tree List. During updates to the designated street tree list, continue to balance the impact on fire hazards, with special considerations given to evacuation routes and streets with homes that are over ¼ mile from a second point of access.	Public Works	LA County Fire, Palos Verdes Homes Association	Fire	Low	$	Planning
2.4b	Landscape Plan. During future landscape plan updates continue to require compliance with the California Fire Code and encourage the planting of species that are well-suited to the climate of PVE, that provide adequate shade, and that limit wildfire hazard.	Public Works	Palos Verdes Homes Association	Fire, Extreme Heat, Drought	Low	$	Planning
2.4c	Hazardous Tree Management. Regularly assess and improve tree management practices to avoid fallen limbs and promote fuel reduction concurrently.	Public Works		Fire	Low	$	City Operations

ACTION	DESCRIPTION	RESPONSIBLE DEPARTMENT	PARTNERS	HAZARD	PRIORITIES	COST	TYPE OF ACTION
2.4d	Roadway Vegetation Management. Ensure that city-maintained roads comply with the requirements of the California Fire Safe Regulations. Prioritize vegetation management along evacuation routes.	Community Development	LA County Fire, Police	Fire	Ongoing	$	Capital Improvement or Purchasing
3.1a	Open Regional Communication. Maintain City staff involvement and provide elected officials with updates on the regulatory efforts of the South Coast Air Quality Management District, Port of Los Angeles, Port of Long Beach, and others related to nearby sources of hazardous waste.	Community Development	Neighboring Jurisdictions, Port of Los Angeles, Port of Long Beach, South Coast Air Quality Management District	Fire, Drought, Earthquake, Hazardous Materials, Air Pollution	Ongoing	$	Engagement
3.1b	Promote Public Input Opportunities. Utilize the City website, newsletter, and social media to promote public engagement opportunities for developments involving hazardous waste, high levels of air pollution, or safety concerns in neighboring jurisdictions.	Community Development	Neighboring Jurisdictions, Port of Los Angeles, Port of Long Beach, South Coast Air Quality Management District	Air Pollution, Airport Compatibility, Hazardous Materials	Ongoing	$	Engagement
3.1c	Airport Safety. Communicate airport-related concerns with Torrance City staff and the Torrance Airport Commission.	Community Development	Neighboring Jurisdictions	Airport Compatibility	Ongoing	$	Engagement
3.1d	Household Hazardous Waste Disposal. Pursue partnership opportunities with neighboring jurisdictions and waste providers that have opportunities for household hazardous waste disposal. Promote these opportunities and continue to provide information on the City website regarding proper handling and disposal of household hazardous waste.	Public Works	Neighboring Jurisdictions, Waste Providers	Hazardous Materials	Ongoing	$	Engagement
3.2a	Mutual Aid Participation. Continue to participate in Statewide Master Mutual Aid Agreements and local automatic aid agreements.	Police	LA County Fire, Neighboring Jurisdictions	Emergency Services	Ongoing	$	City Operations

ACTION	DESCRIPTION	RESPONSIBLE DEPARTMENT	PARTNERS	HAZARD	PRIORITIES	COST	TYPE OF ACTION
3.2b	Regional Safety Planning. Continue active participation on the Palos Verdes Peninsula Public Safety Committee and their quarterly meetings.	City Manager	Police, LA County Fire, Community Development, Public Works	Emergency Preparedness & Evacuation	Ongoing	$	City Operations, Engagement
4.1a	Emergency Evacuation Route. Work with the City of Torrance to assess the feasibility of establishing another emergency evacuation route to Torrance (known as the "Torrance Gate").	Police	LA County Fire, Public Works, Community Development, Neighboring Jurisdictions	Emergency Preparedness & Evacuation	Medium (2-5 Years)	$	Planning, Engagement
4.1b	Evacuation Capacity. Continue to study and monitor the conditions of existing evacuation routes to incorporate a range of emergency scenarios including differences in hazard types, locations, and timing. Consider a peninsula-wide approach.	Police	Community Development, Public Works	Emergency Preparedness & Evacuation	Long (5+ Years)	$	Planning
4.1c	Existing Road Upgrades. When possible and deemed necessary, or during regular road maintenance, upgrade existing roads to meet minimum road widths, surface, grade, radius, and turnarounds as defined by the most recent State Fire Code to ensure emergency vehicle access is possible.	Public Works	Police, LA County Fire	Emergency Preparedness & Evacuation	Ongoing	$	Capital Improvement or Purchasing
4.1d	Evacuation Standards for New Developments. When reviewing new discretionary residential developments, enforce the most recent State Fire Code as it relates to roadway design, street addressing, and signage. If the development has only one point of access consider the potential for additional access points.	Community Development	Public Works, LA County Fire	Emergency Preparedness & Evacuation	Ongoing	$	Ordinance
4.2a	Promote the Vulnerable Population Registry. Continue to work with local organizations, places of worship, and community leaders to increase registration of older adults and other vulnerable populations in PVE Cares' Voluntary Vulnerable Population Registry.	Police		Emergency Services	Ongoing	$	Engagement

ACTION	DESCRIPTION	RESPONSIBLE DEPARTMENT	PARTNERS	HAZARD	PRIORITIES	COST	TYPE OF ACTION
4.2b	Vulnerable Population Registry Trainings. Develop a program to train first responders, caregivers, and cooperating agencies on how to use the Vulnerable Population Registry during hazard events. Consider needs related to early communication, transportation and specialized care.	Police	LA County Fire	Emergency Services	Medium (2-5 Years)	$	Planning
4.3a	Resilience Center Designations. Designate public facilities as resilience centers for community members to gather during an emergency or hazard event. Work with other Peninsula jurisdictions to consider a peninsula-wide resilience center network.	Community Development	Public Works, Police, Neighboring Jurisdictions, PVPUSD, LA County Fire	Emergency Services, Flooding, Fire, Extreme Heat, Geologic Hazards, Earthquake, Emergency Preparedness & Evacuation	Medium (2-5 Years)	$	Planning
4.3b	Resilience Center Upgrades. Update facilities serving as Resilience Centers to ensure that they are ADA compliant, air conditioned, have accessible restrooms, refrigerators, and back up power. As possible, plan to have an entertainment space for children and a separate space for pets.	Public Works	Police, LA County Fire, Community Development	Emergency Services, Flooding, Fire, Extreme Heat, Geologic Hazards, Earthquake, Emergency Preparedness & Evacuation	Long (5+ Years)	$$	Capital Improvement or Purchasing
4.3c	Emergency Supplies. Allocate funds to the District Disaster Program to ensure that shelters are stocked with emergency supplies such as face masks, bottled water, or food for use during emergency events.	Finance	Police	Emergency Preparedness & Evacuation	Ongoing	$	Capital Improvement or Purchasing
4.4a	Emergency Communication and Testing. Continue to use multiple methods for emergency communication, including Nixle, Alert South Bay, Zone Haven and social media. Consider emerging methods as applicable. Test methods annually.	Police	Neighboring Jurisdictions, LA County Fire	Emergency Services	Ongoing	$	Capital Improvement or Purchasing, City Operations

ACTION	DESCRIPTION	RESPONSIBLE DEPARTMENT	PARTNERS	HAZARD	PRIORITIES	COST	TYPE OF ACTION
5.1a	EOC Siting. Conduct feasibility analyses to develop an alternative or backup Emergency Operations Center (EOC) location with the capacity to host all necessary staff during any type of emergency. In the interim, consider partnerships with other agencies or organizations for mutual aid opportunities regarding an EOC, such as the Palos Verdes Peninsula Unified School District.	Police	Public Works, Community Development, LA County Fire, Palos Verdes Peninsula Unified School District	Emergency Services	Medium (2-5 Years)	$$	Capital Improvement or Purchasing, Planning
5.1b	EOC Technology. Conduct a periodic review of technology used to support the EOC to ensure systems are updated and effective.	Police	LA County Fire, IT	Emergency Services	Ongoing	$	Capital Improvement or Purchasing
5.1c	Staff Training. Continue regular EOC training for City staff with EOC responsibilities, and cross train city staff at various EOC positions.	Police	Community Development, Public Works, LA County Fire, IT	Emergency Preparedness & Evacuation	Ongoing	$	City Operations
5.1d	First Responder Training. Continue to train designated emergency personnel based on recommendations from the National Incident Management System and Standardized Emergency Management System.	LA County Fire, Police		Emergency Preparedness & Evacuation, Emergency Services	Ongoing	$	City Operations
5.2a	Palos Verdes Peninsula CERT. Provide Palos Verdes Peninsula CERT leaders with necessary resources and assistance to host regular community events and recruit volunteers.	Police	LA County Fire	Emergency Preparedness & Evacuation, Emergency Services	Ongoing	$	Engagement
5.2b	Reduce Barriers for CERT Trainings. Consider modifications to CERT trainings offered to reduce barriers and expand the audience. This could include developing a shortened course that could be offered to classrooms, businesses, or local organizations.	Police	LA County Fire, PVPUSD	Emergency Preparedness & Evacuation, Emergency Services	Medium (2-5 Years)	$	Planning, Engagement

ACTION	DESCRIPTION	RESPONSIBLE DEPARTMENT	PARTNERS	HAZARD	PRIORITIES	COST	TYPE OF ACTION
6.1a	City Operations Contingency Planning. Make department-level contingency plans that note necessary operations and allow continued essential city operations during and immediately after a hazard event or emergency. Communicate with other peninsula jurisdictions to consider the possibility of mutual aid facility sharing for certain necessary operations.	All Departments		Recovery	Long (5+ Years)	$	City Operations, Planning
6.1b	Public Aid Resource Database. Create a list of public aid organizations that may be of assistance to residents recovering from hazard events. Ensure that these organizations want to be included as a resource and publish this resource so that it is accessible to the public.	Community Development	Police, LA County Fire	Recovery	Medium (2-5 Years)	$	Planning
6.1c	Important Document Backups. Continue to convert important physical documents to digital copies to reduce the risk of loss due to a fire or other hazard.	All Departments		Emergency Preparedness & Evacuation, Recovery	Ongoing	$	City Operations
6.2a	Maintain Redevelopment Fire Requirements. Plan to facilitate efficient post-fire redevelopment that complies with the most current version of the California Building Codes and California Fire Code.	Community Development		Fire, Recovery	Ongoing	$	Ordinance
6.2b	Pre-Application Screenings. Develop a free pre-application screening service for property owners rebuilding after a major hazard. This would include an in-person meeting with staff that provides information on parcel data, setback and zoning requirements, assessor resources and utility connections to help with the building application submittal process.	Community Development		Fire, Earthquake, Geologic Hazards	As-Needed	$	City Operations
6.2c	Post-Fire Erosion and Flood Control. Work with applicable federal and state agencies to develop and provide oversight, guidance, and resources for post-fire erosion control measures.	Community Development	Public Works, LA County Fire	Fire, Geologic Hazards, Flooding	Long (5+ Years)	$	Planning