

# Housing and Climate Readiness in San Mateo County Toolkit

March 2022



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## Acknowledgements

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Urban Land Institute

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# The Intersection of Housing and Climate Readiness

## Purpose and Need

The last decade has brought record high temperatures, wildfires, and rising sea levels to our San Mateo County communities. The impacts from these hazards not only affect the region's existing housing stock, but also led to concerns about new and proposed housing. While reducing our risk from climate hazards and building new housing may seem at odds with each other, the Housing and Climate Readiness Taskforce believes that there is an opportunity for new housing that supports community resilience and reduces greenhouse gas emissions.

Over the last few years, it has become clear that housing and climate change are deeply connected. San Mateo County is at an inflection point both in producing and preserving homes at all income levels and in planning for the impacts of climate change. These twin priorities call for swift, sustained, and simultaneous action. The intersections of these two challenges present tension points that will require all sectors of our community to innovate and collaborate to find equitable solutions.

Failure to innovate and address the intersection of these complex challenges will result in perpetuating inequities, danger to life and property, and substantial economic losses. When we work collaboratively across sectors, we ensure that the solutions to the housing shortage work in concert with solutions to address climate change rather than intensifying them. We also advance closer to a vision of a San Mateo County with quality homes at all income levels that are reducing and preparing us for the impacts of climate change.

The need to address these challenges has been magnified by compounding challenges, including the COVID-19 pandemic, its subsequent economic recession, intensifying climate events, and renewed calls for social justice. We have seen the true value that homes offer in our community beyond just a place to sleep – as a place to seek comfort and shelter, to cool down, to escape unhealthy air quality, and to be with loved ones. When we all have safe, healthy, affordable homes- built near good transportation, designed to lower our impact on the environment and prepared to withstand the effects of climate change, we create resilient communities that can thrive into the future. A renewed focus on climate-ready homes will also advance our equity goals by ensuring that our most vulnerable residents have a robust infrastructure available to protect them from climate emergencies.

There are several planning efforts underway now that make it an especially promising time to jointly address San Mateo County's housing shortage and the impacts of climate change. These include the planned Countywide Resiliency Strategy, updates to City and County Housing Elements, and Local Hazard Mitigation Plan updates for the County, 20 cities and special districts. Collectively these plans will guide where and how new homes and community resiliency infrastructure will be built.



# Toolkit Goals

This toolkit identifies best practices in site design and land use for decision-makers and practitioners to balance the tension between meeting our housing goals and planning for sea level rise, flooding, wildfires, and extreme heat. The joint task force on Housing and Climate Readiness, comprised of elected officials, non-profit developers, and environmental organizations convened by the County of San Mateo's [Home for All](#) and [Climate Ready](#) initiatives, identified the strategies presented in this toolkit. The research was conducted in partnership with the University of California, Irvine and vetted by regional stakeholders, including public agencies, climate resilience experts, and real estate representatives (see Acknowledgements).

## The Case for Building Climate Ready Housing

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Reduce hazards and losses of human life and property, especially as climate change worsens.

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Reduce the risk of climate-related displacement from vulnerable affordable homes currently in use.

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Avoid business interruptions by ensuring the resilience of housing and supporting infrastructure like roads and utilities.

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Promote green jobs for community members, contractors and builders involved in climate ready housing developments.

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Reduce impacts and disruptions to the agricultural industry from climate-related hazards by supporting farmworkers who live in climate-ready homes in the community.

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Lower insurance premiums by promoting resilience in structures.

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Increase property values by integrating resilience upgrades and reducing the likelihood of repeated property damage.

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## Balancing Priorities: Housing and Climate Change

Creating a diversity of homes that are accessible at all income levels creates opportunities for all San Mateo County residents to live and thrive. When schools, businesses, parks, and other services close because of a climate emergency, workers and residents are impacted, which has rippling effects on how people live. By creating more homes that everyone in our community can afford, that are close to employers, and that are not at risk of climate impacts, we expand opportunities for all San Mateo County residents.

Many San Mateo County residents are affected by the lack of affordable homes in our region. Only 24% of first-time homebuyers can afford to buy a home in the area, and San Mateo County is on track to build only 36% of the moderate, low income and very low-income housing that regional experts say we need as part of our regional housing goals by 2022. These goals are part of our [Regional Housing Needs Allocation](#) (RHNA) and are required to be consistent with the

growth pattern from the region's long-term land use, climate resilience goals, and transportation plan. Between 2023 and 2031, San Mateo County will need to build twice the number of homes than in the previous RHNA cycle.

At the same time, communities are preparing plans to mitigate the root causes and adapt to the impacts of climate change. Climate change will impact all of us in San Mateo County, including inland and coastal areas, which is why we need to take holistic, practical, and common-sense steps to address problems facing our homes and our environment. These impacts include:



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**Debris Flow:** According to statistical modeling developed for the Fourth California State Climate Assessment, rain is expected to increase over time, as is the frequency of wildfires. These factors combined are expected to increase the number of months with debris flows (a type of landslide) by 15% by the year 2070.



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**Extreme Heat:** By 2050, the annual temperature in San Mateo County is projected to increase by 4.4 degrees Fahrenheit. It is expected to rise an additional 1.2 degrees Fahrenheit by 2100.



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**Precipitation:** Due to climate change, what is currently considered a once every 20 years storm event for the Bay Area would become a once every seven years storm event. Additionally, a once every 200 years sequence of storms, comparable to that which caused the great California flood of 1862, could occur every 40-50 years by 2100. Extreme storms may also dump much more water than before.



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**Sea Level Rise:** The county is currently on a path to see up to 2 feet of sea level rise by 2050 and more than 6 feet by 2100, unless we reduce global emissions.



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**WildFires:** The average area burned by wildfires in San Mateo County could increase 77% by 2100, if emissions continue to rise.

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## Strategies to Promote Climate Ready Housing: Site Design Considerations and Land Use Strategies

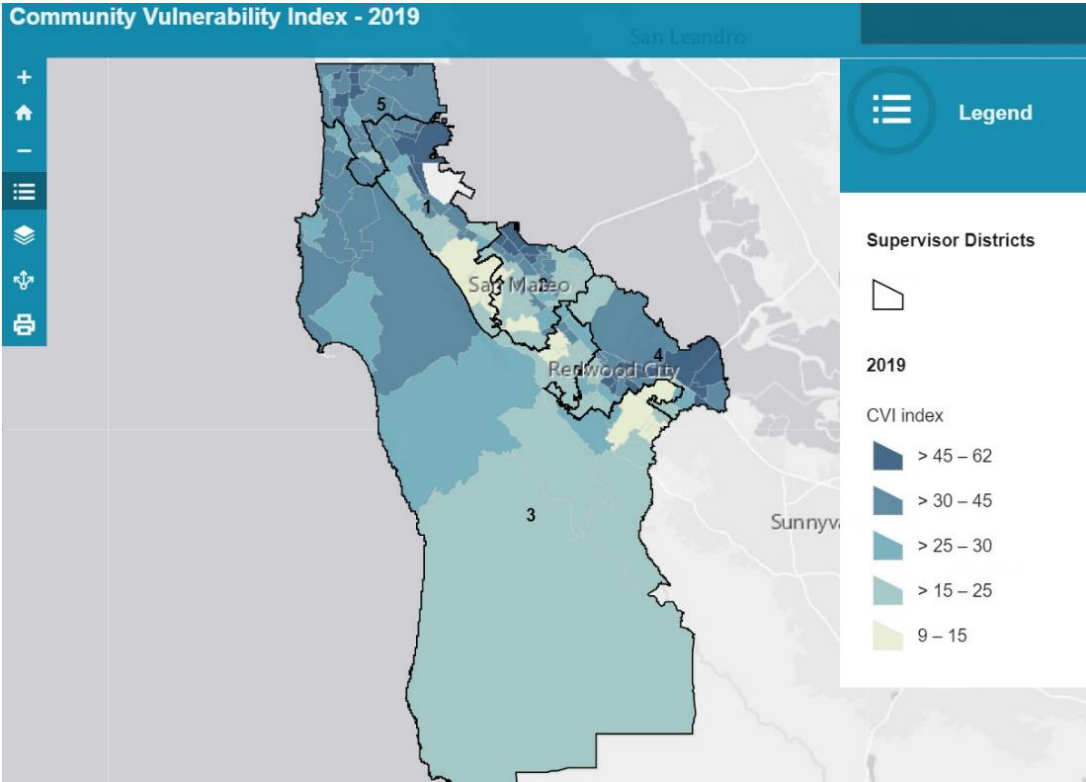
Part of what makes San Mateo County such a desirable place to live, work, and play is its diverse character – ocean bluffs and lush wetlands, soaring redwood forests, and vibrant urban landscapes. The complicated mix of landscapes challenge municipalities and housing developers to implement climate ready housing solutions suitable for these distinct areas.

The following strategies contain best practices for site design and land use planning and policy for community planning, new construction, and retrofit projects. These strategies were sourced from the Housing and Climate Readiness Task Force and consultations with housing and climate experts. The list is not exhaustive, but rather a starting point for our journey towards resilient housing development. They lay the groundwork to jointly address the housing shortage and prepare new and existing homes for climate impacts. This is a living document based on best practices and their

applicability and feasibility, which may change over time. Jurisdictions in San Mateo County will require a case-by-case assessment before using the strategies in this guide as each community faces unique climate pressures. It is also important we prioritize strategies that improve the quality of life and remove risks for the County’s most socially vulnerable communities. See Figure 1 below for details on where socially vulnerable communities in San Mateo County are located.

**Figure 1: Community Vulnerability Index**

*The Community Vulnerability Index (CVI) is one way to visualize the most vulnerable communities in San Mateo County when taking an equity-driven focus to housing and climate resiliency. Darker shaded communities are more vulnerable.*



The primary focus of this toolkit is new housing because it is more feasible to incorporate the proposed strategies into new construction. However, many of the strategies presented in this toolkit can also inform the rehabilitation of existing homes.

**Figure 2: List of Strategies in this Report**

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## Crosscutting Strategies to Address Climate Impacts

### Strategy 1. Require Resilience Considerations in General Plan Updates

**What:** As of late 2021, many cities are updating general plans, including Housing Elements and Safety Elements. Each city and the County of San Mateo will also identify resilience strategies and projects in 2021 as part of the Local Hazard Mitigation Plan. This is therefore a great time to include resilience strategies in planning for future housing.

Actions which jurisdictions can incorporate in general plans to promote climate readiness in housing include:

**Adopt hazard overlays:** Designate land areas at risk and create plans to address specific climate impacts. This may require a technical study, spatial analysis, or a city ordinance. Hazard overlays could also help comply with meeting the requirements of SB 379. Overlaying multiple hazards and social vulnerabilities reduces future risks to housing and communities.

**Promote high-density infill development and increase building height standards in low-hazard areas:** As climate impacts intensify, development will need to be prioritized in areas that have low hazard exposure. With many overlapping impacts and existing land constraints, suitable parcels for development are rare and need to be used to their maximum potential. In the long term, this will make more efficient use of infrastructure as new housing will be concentrated to tighter clusters.

**Establish post-disaster housing plans:** Advance planning for future disaster housing needs can be the key to a swift and equitable recovery. See [FEMA's Planning Considerations for Disaster Housing](#) Guide.

**Conserve open space:** Open space provides a wide range of co-benefits such as capturing and storing the greenhouse gas emissions that cause climate change, supporting biodiversity and ecosystem services, providing access to recreation, and building community character. Access to open space supports the economy and increases home values and, when planned with equity in mind, can protect housing and improve quality of life. Additionally, when planned with climate change in mind, open space can provide a buffer from flooding, reduce heat islands, and hold back fires. Areas that can no longer support housing can also be zoned for open space.

**Identify and improve emergency evacuation routes:** Some communities in the region only have one way in and out. During disasters this can leave some without an escape route. To address this danger, identify key roadways and destination points for residents fleeing emergencies like wildfires or floods.

**Undertake transfer of development rights:** Moving people out of harm's way requires incentives such as allowing them to give their property to a government agency in exchange for increasing density at another property. "A transfer of development rights" allows property owners to purchase certain parcel's development rights within a designated "sending district" and transfer the rights to another "receiving district" to increase the density of their new development and mitigate hazard impacts in existing communities.

**Site critical facilities:** It is important to properly place services and functions essential to a community, especially those needed during and after a disaster. Examples include hospitals, homeless and emergency shelters, clinics, schools, cooling centers, fire stations, and police stations.



**Increase building setbacks where needed:** When structures are distanced from areas at risk of severe climate impacts, such as the shoreline or a wildfire hazard area, this can protect the structure over the long term. Setbacks can be implemented using a phased approach, based on the level of risk expected over time. This process is called an Adaptation Pathways approach and is included in the [City of Pacifica's Draft Local Coastal Plan Update](#).

**Redevelopment and adaptive reuse of existing buildings with technical and financial assistance programs:** This strategy protects vulnerable residents by providing property owners with opportunities to upgrade existing units. Redevelopment of existing buildings can be used to make buildings safer for climate impacts. Examples can include converting the lower level to a parking area, which reduces the impacts of flooding.

**Establish community resilience hubs and supportive policies:** Resilience hubs are community-serving facilities designed to support residents, coordinate services and distribute resources before, during, or after a natural hazard event.<sup>1</sup> Designed well, resilience hubs can equitably enhance community resilience while reducing greenhouse gas (GHG) emissions and improving local quality of life. Resilience hubs can be a smart local investment with the potential to reduce the burden on emergency response teams, improve access to healthcare, foster greater community cohesion, and increase the effectiveness of community-centered institutions. See the [USDN Resilience Hub Guidance Document](#) for more details.

**Community Microgrids:** One option for increasing the resilience of housing developments, especially considering recent Public Safety Power Shutoff events, is establishing community microgrids. A community microgrid is a coordinated local grid served by one or more distribution substations supported by local renewable and other distributed energy resources (DER), such as energy storage and demand response. Microgrids not only increase climate resilience, they also reduce emissions and empower communities to take a larger role in their own energy independence. More information about microgrids can be found in this [nonprofit's writeup about them](#).

**Why:** Identifying and implementing consistent countywide climate planning standards can be a way to enhance coordination among different jurisdiction's climate planning efforts. By not planning across jurisdictions we risk creating inequities in climate impacts and access to safe and resilient housing. Knowing what degree of extreme heat, precipitation, and flooding to prepare for in housing developments is especially useful when coordinating adaptation across jurisdiction boundaries. Similarly, establishing climate goals, such as stormwater capture goals or heat reduction goals, can also promote coordination and consistency across jurisdictions. This set of planning practices allows for more housing in general and concentrates new housing in the least vulnerable areas.

**Where:** These action items have been implemented in several places:

For Transfer of Development Rights strategies, read the [Adaptation Clearinghouse Case Study on Miami-Dade County](#) for an example. Strategies for TDR are also included in [the City of Pacifica's Draft Local Coastal Plan Update](#).

For microgrids, read the [Santa Barbara Unified School District microgrid case study](#) for more details.

For rainwater capture, see the City of Vancouver [Integrated Rainwater Management Plan](#).

For the siting of critical facilities, the County of San Mateo has adopted [a Sea Level Rise Policy for County Assets](#) requiring all County properties to go through a sea level rise risk assessment and adaptation planning process.

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<sup>1</sup> Urban Sustainability Directors Network Resilience Hubs: <https://www.usdn.org/resilience-hubs.html>



### Case Study: Maceo May Affordable Housing Development and Resilience Hub

Maceo May is a new affordable housing development, comprised of 105 units, that is part of a master-planned redevelopment of Treasure Island. The Maceo May resilience approach includes all-electric power (no natural gas), solar photovoltaic (PV) energy generation, and readiness for net-zero carbon operations. Maceo May also features passive design strategies and backup power. A rooftop 123-kilowatt solar PV array with on-site battery storage is designed to prioritize power to a first-floor community room that doubles as a “resilience hub.” Inverters link the array to both battery storage and the local grid so Maceo May has the ability to be self-sustaining. The battery backup system is located on the top floor to prevent problems in the event of flooding. The development team also chose to install an energy recovery ventilator (ERV) with a MERV 13 filter for every residential unit. The ERV reduces HVAC electricity consumption, and the MERV 13 filter will help filter particulate matter and airborne debris to maintain better indoor air quality during wildfire events and heat waves. Passive design strategies and superior ventilation also limit energy use, create good air quality, and support the thermal comfort of residents, especially during potential power outages. More information about Maceo May can be found in its development case study.

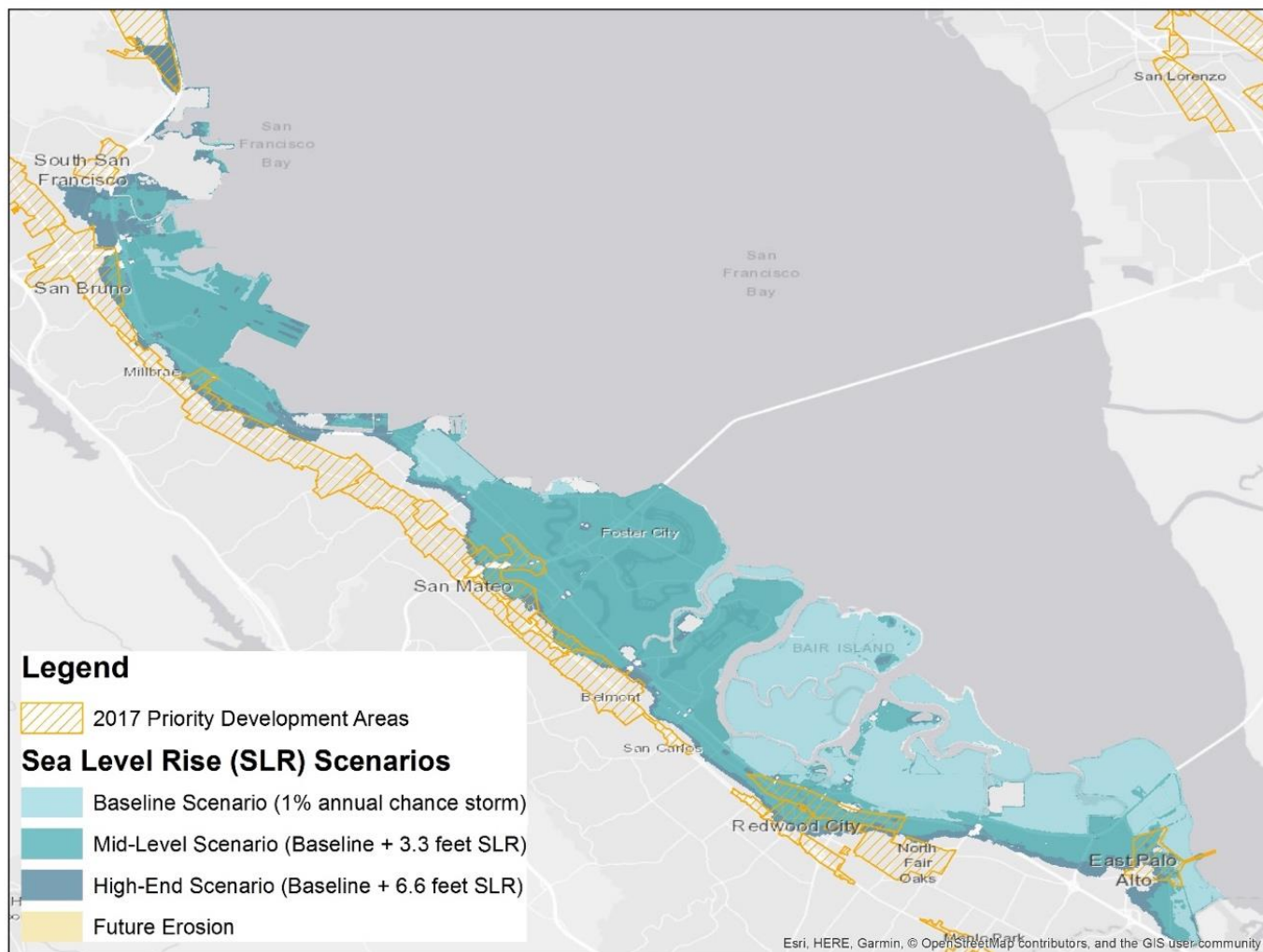


## Sea Level Rise and Creek Flooding

San Mateo County's position, surrounded by the San Francisco Bay and the Pacific Ocean, emphasizes the need for sea level rise adaptation strategies for housing. Sea level rise impacts extend far beyond coastal flooding to erosion, saltwater intrusion, rising groundwater tables, and underlying soil instability. These challenges have rippling impacts on transportation, public health, and housing.

Unlike sea level rise impacts, which are observed primarily in bayside and coastal communities, the impacts of flooding from storm events and precipitation are widely distributed across inland San Mateo County. Flooding from storms can combine with sea level rise and stormwater, especially in the lowlands along the Bay and coast. Rising groundwater tables can lead to additional inland flooding. San Mateo County is part of a [study](#) to evaluate these risks from rising groundwater levels and sea level rise.

As the frequency and intensity of observed climate impacts, including wildfire, extreme heat, flood, and sea level rise, increases, consideration of climate-related variables is essential in the housing planning process. When Priority Development Areas are overlaid with future climate impacts like sea level rise and creek flooding, many of the most promising areas for development are also at significant risk for climate-related hazards.



**Source:** Our Coast, Our Future 2016; Point Blue Conservation Science 2016; USGS; Gulf of the Farallones National Marine Sanctuary; Coravai LCC; U.S. States Geological Survey.

## Strategy 2. City-Level Sea Level Rise Policies

**What:** San Mateo County jurisdictions can consider adopting sea level rise policies that set a standard process for surveying risk to existing land, new developments, and capital projects. This policy typically involves an assessment, implementation plan, and engagement plan. A city-level sea level rise policy is most effective when coordinated with neighboring jurisdictions and local utilities to ensure a holistic and collaborative approach.

**Why:** Sea Level Rise policies preserve housing over the long run by ensuring that new development is concentrated in areas that are at reduced risk of coastal flooding. City-level sea level rise policies aim to answer key building and infrastructure design questions. Policies ensure that sea level protections benefit the entire shoreline and do not distribute uneven burdens to any jurisdiction.

**Where:** See the [County of San Mateo Sea Level Rise Adaptation Policy](#), [City of Palo Alto Sea Level Rise Adaptation Policy](#), [Half Moon Bay Local Coastal Plan](#), and the [Burlingame Road Map to Sea Level Rise Adaptation](#) for local examples.

## Strategy 3. Flood Proof Construction

**What:** New housing developments, especially in areas at risk of flooding and sea level rise, should be designed with flood proof site design. Flexible use of the first floor or modular construction are options for achieving flood proof construction.

**Why:** Flood Proof Construction is a way to allow new housing in flood-prone areas and can be a way to ensure the long-term viability of existing housing in flood-prone areas. A flood proofed ground floor does not address permanent sea level rise flooding because the transportation infrastructure connected to the housing development requires adaptation features, but it can protect lives and property during more frequent and intense storm surges and rainstorms. This strategy is beneficial for non-mixed-use developments in which the ground floor can be used for parking or a community space.

**Where:** See [New York City Planning: Zoning for Coastal Flood Resiliency](#) for an example.

#### Strategy 4. Stormwater Management and Resilience Policies

**What:** Cities can promote green space and improve flood control by integrating stormwater management projects in housing development. Green infrastructure can reduce impacts from local flooding and serve as a short-term solution to climate change impacts from increased precipitation and sea level rise. When implemented across communities, green infrastructure can be a longer-term solution to local flooding and heat islands. However, stormwater management requires adequate space for stormwater capture, and developers have expressed concerns that it has become increasingly hard to include green infrastructure in housing projects. Some green infrastructure requirements are also waived for transit-oriented development, which may raise concerns around equitable access to green space and flood protection.

Communities in both the upstream and downstream parts of watersheds rely on infrastructure located in floodplains, such as transportation networks and wastewater treatment facilities. Paying into a special taxing district is one option that can result in a coordinated approach to more comprehensive action. These strategies will need to be evaluated in light of increasing storm intensities. C/CAG has developed a [set of maps and reports](#) showing the potential impacts of climate change on stormwater in San Mateo County.

Other resilience practices that can be considered to address flooding include:

**Green roof standards:** Green roofs are living plants placed on rooftops designed to capture rainfall and allow it to evaporate back into the air before runoff is created, as well as retain and filter stormwater. With many multifamily developments in the pipeline, green roofs are an opportunity to better integrate green infrastructure projects and meet regional stormwater capture goals. Green roofs provide multiple co-benefits like carbon sequestration, green space, and building cooling. Having consistent countywide design standards for green roofs can simplify the development process and identify areas that may be unsuitable for green roofs. For example, places in the wildland-urban interface are poorly suited for green roofs because of the risk that they will catch fire.

**Alternative stormwater compliance pathways for green infrastructure:** The San Francisco Bay Regional Water Board continues to lower thresholds for including green infrastructure projects, increasing costs to developers. These changes often impose green infrastructure requirements on more and smaller projects than under the previous rules. One potential solution to reduce costs is to offer developers alternative ways to comply with the green infrastructure requirement. Developers and jurisdictions can achieve their green infrastructure requirements by creating a credit trading system, which could allow for an in-lieu fee for funding larger, regional green infrastructure projects. While existing green infrastructure requirements are intended to address water quality, this regional approach could potentially support flood control goals by incorporating new or modified stormwater retention standards in addition to water quality or “greened acreage” requirements.

**Why:** By working across jurisdictions to undertake large-scale, multi-city stormwater management projects, we will maximize equitable benefits across the County and prevent unintended consequences from piecemeal planning. Working collaboratively with special districts and jurisdictions will provide a holistic and equitable plan to address stormwater management and can spur a greater return on investment for all parties involved. Effectively addressing stormwater hazards can protect the survival of new and existing housing. When alternative stormwater compliance pathways are used, new housing may even improve the safety of existing housing by covering the cost of stormwater projects with wide community benefits.



**Where:** San Francisco [passed a policy in 2017](#) requiring most new construction to feature green roofs and/or solar. See also [Green Roof Incentives from the City of Chicago](#). For an alternative stormwater compliance pathway, see [Contra Costa County's Green Infrastructure Work Plan](#).



## Wildfire

Wildfires, including the 2020 CZU Lightning Complex fires in San Mateo County, have highlighted the need to better plan, prepare, and adapt homes for wildfire hazards. As land and housing costs increase in built-up urban areas, demand has surged for homes in high wildfire risk areas. San Mateo County jurisdictions will need to balance priorities and costs around wildfire planning, readiness, and adaptation when siting new homes and protecting existing homes.

Wildfire-related damage to homes can strain the supply of and increase the cost of San Mateo County's housing stock. This side-effect of wildfire damage further increases pressure on our County's most vulnerable residents. By the end of this century, "California's wildfire burn area will likely increase by 77 percent<sup>2</sup>." In San Mateo County, 35% of land area is in the Wildland Urban Interface (WUI).

The Governor's Office of Planning and Research has extensively researched wildfires in California and found that:

- Lower-density developments are experiencing higher losses.
- Interface WUI damage appears to be more common than intermix WUI. Interface WUI refers to areas where there is a clear demarcation or hard edge between developed and undeveloped areas. Intermix WUI refers situations where "structures or semi-developed areas are mixed with wildland areas and vegetation, such as in rural, ex-urban, or large-lot semi-rural developed conditions<sup>3</sup>."
- Extreme wind-driven conditions, ember-casting and ember-driven ignitions are happening over longer distances.
- Models and mapping are not accounting well for non-natural conditions (i.e., homes and landscaping becoming fuel in wildfire events).
- Defensible space, specific building codes for the wildland-urban interface, and other policies can help reduce risk.
- Insurance and financial markets are responding to recent losses and growing risks, adversely affecting insurance policyholders.
- Multi-level and multi-sector planning and implementation are needed to create fire-adapted, resilient communities.

### Strategy 5. Early CAL FIRE Review in General Plan Elements, Hazard Mitigation and Sub-Division Plans

**What:** Following devastating wildfire events across the states and subsequent legislation (AB 2911, SB 1241, AB 747, and SB 99), the California Department of Forestry and Fire Protection also known as CAL FIRE has started several programs for jurisdictions to provide the technical assistance needed for wildfire planning. Early and ongoing engagement with community and fire agencies is critical.

One such opportunity is CAL FIRE's Land Use Planning Program, which assists local governments (cities and counties) throughout California as they address wildfire risks by planning for new development in the State Responsibility Areas and Very High Fire Hazard Severity Zones. CAL FIRE's Subdivision Review Program supports CAL FIRE Units and local jurisdictions in fire hazard planning, working collaboratively with the Land Use Planning Program and local jurisdictions to provide technical assistance for specific fire hazard planning within the Safety Element of the General Plan.

<sup>2</sup> ULI Wildfire Report pg. 8 <https://2os2f877tnl1dvtmc3wy0aq1-wpengine.netdna-ssl.com/wp-content/uploads/2020/11/Firebreak-final-11-20.pdf>

<sup>3</sup> [https://opr.ca.gov/docs/20201109-Draft\\_Wildfire\\_TA.pdf](https://opr.ca.gov/docs/20201109-Draft_Wildfire_TA.pdf) pg. 43

**Why:** It is extremely important that jurisdictions engage with CAL FIRE as they update General Plan elements and other planning documents to develop fire resilient communities. This engagement equips jurisdictions with the best available data, practices, and planning to work with CAL FIRE when disaster strikes. Effectively planning for wildfire risk also ensures that new housing can continue to be built in areas at risk of wildfire.

**Where:** [More information about CAL FIRE's technical assistance programs and legislative information can be found here.](#)

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**Fire safe San Mateo county was the first fire safe council in California and preceded the 1991 Oakland hills fire, which acted as a catalyst for bringing WUI concerns into the national consciousness. More information about WUI codes and homeowner resources can be found at [FIRE SAFE San Mateo](#).**

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**Community Planning Assistance for Wildfire (CPAW) provides communities with land use planning solutions to better manage their WUI. Established in 2015 by [Headwaters Economics](#), funded by the U.S. Forest Service and private foundations, the CPAW team includes planners, foresters, economists, researchers, and wildfire hazard modelers. All services and recommendations come at no cost to the community. Read more about CPAW on their [website](#).**

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## Strategy 6. Wildfire Risk Reduction Measures for Plans, Codes, Ordinances, and Project Designs

**What:** There are a variety of land use and site design strategies that can be used to reduce wildfire risk. Below is a list of considerations for reviewing and updating codes, ordinances, project designs and retrofitting opportunities.

### Land Use

Wildfire hazard overlay zones	Concentrate homes on the inner side of outer roadways
Consider the transfer of development rights or conservation easement programs in high-risk areas	Slope and ridgeline setbacks
Place structures on the least hazardous portion of the site or landscape	Consider ember risk as part of building codes

### Site Design

Buffer homes using agriculture or major landscape features	Maintain defensible space
Cluster lots rather than implement a scatter-shot sprawl pattern	Install dual pane windows (addresses extreme heat as well)
Provide multiple points of ingress/egress	Use a Class A fireproof roof
Designate refuges for sheltering in place	Install metal gutter covers
Use non-flammable features and amenities in ignition zones	Use mesh covering on all vents
Use resilient landscaping standards (native and fire-resistant)	Develop an onsite water supply

**Why:** Adopting policies that anticipate wildfires can reduce wildfire losses and support public safety. This is a key piece of the strategy for fire-safe communities to add more housing to meet their communities' needs.

**Where:** A good example of a policy to make housing more wildfire-resilient is the [fire safety checklist for Accessory Dwelling Units](#) that the City of Portola Valley implemented.

### **Case Study: City of Santa Rosa Resilient City District**

Following the devastating Tubbs and Nuns Fires that damaged or destroyed approximately 3,000 homes and 100 commercial structures within the City of Santa Rosa in 2017, the City took an innovative approach to promote infill development away from its WUI areas. The [Resilient City Development Measures](#), adopted in 2018, encouraged high-density residential development, childcare facilities, lodging facilities and other uses through fee reductions, additional by-right uses, and streamlined review. These Resilient City Development Measures are focused within the City's Priority Development Areas (PDAs), near existing services and high frequency transit. By incentivizing high-density infill development in the urban centers, Santa Rosa focused residential growth away from severe wildfire risk areas in the outer edges of the city and supported the City's long-term housing goals. While the Resilient City Development Measures were scheduled to sunset in May 2021, they were recently extended to December 2023.

To start rebuilding the community as quickly and efficiently as possible, the City took specific steps to assist property owners and ensure that the repair and reconstruction of damaged and destroyed structures could use a streamlined process. Immediately following the Tubbs and Nuns Fires, the City introduced the Resilient City (-RC) zoning district, which was applied to properties impacted by the fires and was intended to streamline the construction of new housing. Santa Rosa's actions included:

- Simplified zoning standards

- Flexible occupancy requirements

- Resilient City Permit Office (devoted entirely to processing rebuild permits) – which expedited review for the reconstruction and repair of damaged structures

- Expedited review: the -RC combining district delegated the review authority for required discretionary planning permits to the Director of Planning, further expediting the process.

- "Pre-approved" plans

The City also allowed property owners to live on site while their homes were constructed; the -RC district allowed for temporary housing including trailers, recreational vehicles, manufactured homes, tiny homes and other similar structures. The construction and occupancy of a new detached accessory dwelling unit (ADU) on site, before constructing a single-family residence on the site, was also allowed. Each of these measures helped to prioritize the needs of those most impacted by the fires.



## Extreme Heat

San Mateo County's housing stock is largely unprepared for rising temperatures. Given that people normally spend nearly 70% of their time at home, home design and equipment present significant opportunities to address extreme heat. As heat waves become more common, dangerous daytime and nighttime temperatures will increase in frequency, magnitude, and duration.

San Mateo County is especially vulnerable to extreme heat impacts given that much of the existing housing stock is older and has poor insulation, ventilation, and cooling, which compounds the effects of extreme heat. A related concern is that San Mateo County has one of the lowest percentages in California of homes with air conditioning units. Heat-vulnerable housing presents higher health risks to sensitive populations, increases energy demand and costs, and increases the risk of disease from mosquitoes and other pests. High heat can decrease indoor and outdoor air quality, with significant impacts to people with respiratory health issues, the elderly, and those with heart issues. The impacts of extreme heat can be exacerbated by bad air quality and limited access to cooling systems during Public Safety Power Shutoff events.

### Strategy 7. Urban Design for Heat Resilience

**What:** Urban design choices can have a considerable impact on severe heat effects. The best near-term strategies depend on local context and climate while considering:

**Urban Geometry/Density:** Urban heat islands are more significant in cities arranged in geometric, grid-like patterns, as heat radiated off buildings is absorbed by other buildings.

**Air circulation:** The air movement through a city or structure helps dissipate heat and increase human comfort.

**Heat Impact Offsets:** Require new development to offset their contribution to urban heat island effects, like how new development is commonly required to mitigate any negative impacts it might have on stormwater runoff.

**Why:** Creating shade and preserving open space are the most universal and effective long-term strategies for reducing urban heat island effects. Smart urban design in new development may have positive impacts on nearby residents, such as when an apartment building with a green roof replaces a surface parking lot.

**Where:** More information can be found on the website of the [Global Cool Cities Alliance](#).

### Strategy 8. Urban Tree Canopy Policy

**What:** Many experts refer to trees as the “cheapest beneficial infrastructure” as they significantly reduce urban heat island effects. Trees can reduce summer air temperatures in their vicinity by 2° to 9°F and surface temperatures by as much as 35°F. Land use planners can use tree canopy indicators, such as the percentage of land with tree cover.

**Why:** By establishing city or countywide urban tree canopy policies that expand native wildfire-resistant and drought-tolerant species<sup>4</sup>, jurisdictions and builders can reduce surface temperatures in urban and suburban areas. Tree canopy policies can center equity by increasing access to green space in areas that have historically had less tree-cover due to disinvestment. By increasing urban canopy, new housing development can have a positive benefit on the existing community.

**Where:** For best practices on greening urban areas without spurring gentrification or displacement, please consider UCLA's [report on “Greening without Gentrification”](#) and Causa Justa's work in collaboration with the Alameda Public Health Department on “Development Without Displacement,” described in this [article](#). Additional information can be found on Los Angeles' urban canopy program in this [article](#). Local examples include [Canopy](#) and [Daly City's Project Green Space](#) Program. Find more about fire scaping in San Mateo County in this [list of native plant species](#).

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<sup>4</sup> [https://www.firesafesanmarateo.org/images/documents/Plant\\_List.pdf](https://www.firesafesanmarateo.org/images/documents/Plant_List.pdf)

## Strategy 9. Passive Building Design

**What:** Passive heating and cooling in housing developments are a key strategy for reducing indoor air temperatures. A passive building is designed and built following these four building-science principles<sup>5</sup>:

- The building employs continuous insulation throughout its entire building envelope and is airtight, preventing infiltration of outside air and loss of conditioned air.
- The building uses high-performance windows (double or triple-paned windows depending on climate and building type) and doors - the design of the building exploits the sun's energy for heating purposes in the winter and minimizes overheating during the summer.
- The building uses some form of balanced heat- and moisture-recovery ventilation to improve indoor air quality and reduce likelihood of mold.

The building minimizes use of conventional air conditioning.

Passive building design can be achieved using heat pumps (water and space), energy storage, ceiling fans, weatherization, and building with heat resistant materials, which overlap with materials that are fire-resistant.

Passive building design can be integrated in building codes or offered as a voluntary strategy for affordable housing developments to score higher in competitive funding applications.

**Why:** Benefits of passive building design include improved indoor air quality, improved energy efficiency, and reduced dependency on the electric grid. Properly implemented, passive cooling can bring down lifecycle operations costs for new development, which can help new affordable housing pencil out.

**Where:** [Peninsula Clean Energy's \(PCE\)](#) and [BayREN](#) offer resources to residents interested in pursuing these strategies. More information can be found at the [Global Cool Cities Alliance website](#).

## Strategy 10. Cool Roof, Wall, and Pavement Standards

Light colored and reflective materials can help reduce surface and indoor temperatures in homes.

Strategy	Description
Cool Roof	Cool roofs are made of highly reflective paints, sheet coverings, or reflective shingles/tiles.
Cool Wall	Cool walls use an exterior wall surface that stays cool by reflecting sunlight and emitting heat. They are not a widespread technology in the United States but have considerable potential because they effectively cool the inside and outside of the building.
Pavement Standards	Cool pavements are light-colored, reflective, or porous and work respectively via increased reflectance and/or heat-dissipating evaporation. There are many types, including light-colored and/or porous coatings, aggregates, cement, and block pavement filled with materials such as soil, vegetation, or gravel.

Source: [Urban Land Institute, Scorched: Extreme Heat and Real Estate Report](#)

Creating consistent standards for cool roofs, walls, and pavement standards can streamline construction rules and provide technical guidance for builders and contractors.

<sup>5</sup> <https://www.phius.org/what-is-passive-building/passive-house-principles>

**Why:** By reflecting more sunlight and absorbing less heat, cool roofs are typically 50° to 60°F cooler than standard roofs during peak summer heat and produce average energy savings of 20 percent. This cooling effect can be one of the benefits that new or retrofitted housing brings to the nearby community.

**Where:** For one example, see the [City of Los Angeles' Cool Roof Ordinance](#). Examples of cool streets are assembled on a [webpage from the Global Cool Cities Alliance](#).

### **Case Study: Leveraging Co-benefits of Energy Retrofits to Reduce Extreme Heat in San Mateo County**

Acterra, El Concilio de San Mateo County, Pacifica Resource Center, Rebuilding Together Peninsula, and Sound of Hope Radio used a Peninsula Clean Energy community grant to help San Mateo County residents understand their PG&E bills and enroll in programs to reduce energy costs.

Since many of the retrofits that support energy efficiency are the same strategies that reduce indoor heat, the collaboration reduced heat in homes on hot days and improved overall home comfort. Their efforts reached up to 100,000 residents throughout San Mateo County in English, Spanish, Chinese, Samoan, and Tongan.

Staff from El Concilio, which led the home assessments, identified opportunities to improve families' safety, health, and comfort. Some of the strategies included replacing carpet with vinyl floors, installing ceiling fans, weatherizing homes, installing heat pumps, and re-roofing with better insulation, among other improvements. These improvements left residents with homes better equipped to withstand extreme heat events.

One of the untapped opportunities the community organizations found was that many of the energy-saving retrofit programs offered by utilities may leave gaps in funding for whole-home upgrades. These comprehensive upgrades can significantly improve a home's overall resilience to withstanding weather events.



# What's Needed to Build Momentum for Climate Ready Homes

To address San Mateo County's housing shortage and prepare homes for climate change impacts, practitioners will need to pursue bold actions and closer coordination. This toolkit's strategies provide examples of options that can be used to tackle these complex challenges. Key opportunities for further action that were identified by **the Housing and Climate Readiness Task Force** include:

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Improved coordination and planning among public and private stakeholders. The task force determined that increased engagement with developers, insurance companies, and labor unions would ensure a comprehensive and collaborative approach.

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San Mateo County can explore bond funding for climate resilience measures.

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Community engagement across all topics is needed.

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Resources detailing best practices for homeowners and developers are needed.

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It would be useful to increase workforce development of contractors and builders to promote skill development in green building construction.

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Some of the conversations that lie ahead include difficult tradeoffs between hazard reduction, equity, economic interests, and other priorities. However, the San Mateo County community has successfully worked together in the past to address critical needs, and we are capable of great progress if we continue the conversation about this important topic.

## Resources

- [ULI Extreme Heat Report](#)
- [ULI Wildfire Resilience Report](#)
- [Environmental Research: Sea level rise and coastal flooding threaten affordable housing](#)
- [Adapting to Rising Tides: Stronger Housing, Safer Communities Strategies for Seismic and Flood Risks](#)
- [Green Building Council Resilience Rating System](#)
- [Sustainability in Affordable Housing Lending Network – Climate Resilience in Multifamily Housing](#)
- [Fire Adapted Communities Learning Network](#)
- [Community Planning Assistance for Wildfire](#)
- [CAL FIRE Wildfire Planning and Engineering](#)
- [HUD Community Resilience Toolkit](#)
- [California Energy Commission: Reimagining Affordable Mixed-Use Development in a Carbon-Constrained Future](#)
- [Climate Ready SMC Webinar on Unlocking the multiple benefits of tree canopy: leveraging data, partnership & policy](#)
- [Climate Ready SMC Webinar on Extreme Heat and Concurrent Hazards](#)
- [Get Health SMC Data Viewer](#)

## Toolkit Appendix

A comprehensive list of strategies around Housing and Climate Change is available for download at <https://homeforallsmc.org/media-and-resources/>.