ATTACHMENT 2

Los Altos
Climate Action & Adaptation Plan

Appendices

"WHAT CAN I DO NOW?"

TRANSPORTATION

- Before leaving home in your vehicle consider walking, biking, taking public transportation, or if not possible combine the activity with another that requires using your vehicle or complete the errand by internet or voice contact.
- Encourage your child to walk or bike to school.
- Arrange a carpool for work, school and activities.
- When you need to replace a vehicle, purchase a new or used electric vehicle.
- Replace your gasoline powered home landscape and maintenance equipment with electric powered equipment.
- Require that your home landscape and maintenance service providers use electric powered equipment.

ENERGY

- Have an energy audit prepared for your residence.
- Complete recommended energy audit efficiency measures for your residence.
- Turn off appliances and lights when not in use. Consider installing motion sensors for light switches.
- Adjust your residence's thermostat a degree or two to reduce energy used for heating and cooling. Install a smart thermostat to reduce energy use when not at home or sleeping.
- Prepare to convert your home appliances from methane gas to electric powered.
- Change your home appliances from methane gas to electric powered when planned or upon burnout. Incentives are available through BayRen and SVCE for heat pump water heaters for example.
- Install solar panels + battery storage in your residence.
- Attend green building seminars hosted by the City.
- If you're not already, become a Silicon Valley Clean Energy customer and opt up to the GreenPrime 100% renewable service option.

RESOURCE CONSERVATION

- Recycle all plastics, paper/ cardboard, glass, cans and food waste. Carefully sort your waste into blue bin recycling (glass, plastic, cans, paper), green bin (yard and food waste), and gray bin (landfill garbage; try to limit to less than 10% of total waste). Rinse plastic and glass containers and cans before sending to recycling.
- Do not purchase food and consumables in single-use plastic containers and packaging.
- Bring your own shopping and produce bags when shopping.
- Donate unwanted reusable items.
- Repair and reuse items.
- Convert residential landscaping to drought tolerant native plants.
- Remove or reduce lawn area if possible. Do not replace with artificial turf.
- Convert landscape irrigation to drip systems.
- Eat more fruits and vegetables and less meat.
- Reduce your water use: take shorter showers (avoid baths), install low flow fixtures (shower heads, toilets and faucets) and consider installing a greywater recycling system.
- When possible, avoid taking planes.

"WHAT CAN I DO NOW?"

MUNICIPAL OPERATIONS

- Support our City's conservation and GHG reduction efforts.

GREEN COMMUNITY

- Eliminate rain and irrigation water runoff from your residence.
- Plant one or more new trees on your property.
- Begin backyard composting and enrich your soil with compost and mulch.
- Do not use non-organic pesticides or herbicides.

CLIMATE RISK

- Evaluate your risk for flooding, excessive heat and poor air quality.
- Consider installing A/C and air purifiers in some rooms.
- Talk to your neighborhood CERT team about local climate risk emergency measures.
- Talk with your homeowner, business, or rental insurance provider about your coverage for flood and wildfire damage.

EMERGENCY MANAGEMENT

- Make sure you have a household emergency plan - know when to evacuate and when to shelter in place.
- Stock an emergency response kit with food, water, flashlights, batteries, N-95 masks, and personal needs.
- Know your vulnerabilities and plan for how to receive necessary assistance.

RESILIENT COMMUNITY

- Get to know your neighbors if you don't already. Talk with them about their emergency plans. If you are part of a building, neighborhood, or homeowner association, make sure you understand how you and your neighbors can communicate before and during a climate disruption or disaster. Assist those with vulnerabilities.
- Participate in Neighborhood Watch and CERT groups.
- Educate yourself and others on how to reduce your carbon footprint.
- Speak out in support of City efforts to implement the CAAP.

CAAP GOAL

Carbon Neutrality by 2035

FOCUS AREA GOALS

TRANSPORTATION

Strategy 1: Reduce City-Wide Vehicle Miles Traveled by 25% by 2035

GOALS:

- Creating a Walkable and Bikeable City
- Promoting Smart Growth Strategies
- Supporting Shared Mobility

Strategy 2: Electrify Transportation

GOALS:

- Reach 80% Community-Wide Electric Vehicle Adoption by 2035
- Accelerate Community-Wide Electric Vehicle Supply Equipment Sufficient to Support 80% EVs

Strategy 3: Electrify Off-Road Mobile Sources

GOAL:

- Eliminate Off-Road Fossil Fuel Engines

ENERGY

Strategy 1: Reduce Emissions from Energy Consumption

GOAL:

- Encourage Energy Conservation Measures in Homes and Businesses

Strategy 2: Facilitate Building Decarbonization

GOALS:

- Require All-Electric New Buildings and Major Retrofits
- Reduce or Eliminate Methane Gas Use in Existing Buildings by Increasing Fuel Switching
- Disincentivize Methane Gas

Strategy 3: Increase Solar Energy Production

GOAL:

- Expand Community Solar and Battery Storage

RESOURCE CONSERVATION

Strategy 1: Reduce Consumption and Waste

GOALS:

- Decrease Landfill Waste by 15% and Eliminate Single-Use Plastics and Construction Waste by 2035
- Reduce Water Use by 15% by 2030
- Promote a Circular Economy

ATTACHMENT 2

APPENDIX B

MUNICIPAL OPERATIONS

Strategy 1: Operate Sustainable Municipal Buildings
GOALS:

- Reduce Municipal Building Energy Use by 30% by 2035
- Install Solar + Battery Storage at City facilities

Strategy 2: Reduce Municipal VMT
GOALS:

- Convert 100% of the City's Fleet to Electric Vehicles by 2030
- Develop Guidelines for Sustainable Employee Commute and Business Travel

Strategy 3: Promote Green Municipal Practices
GOALS:

- Prioritize Responsible Procurement
- Utilize Digital and Remote Systems to reduce VMT

Strategy 4: Integrate Climate Action and Adaptation into City Functions
GOAL:

- Incorporate Climate Action and Adaptation into City Policy, Budget, Planning, & Internal Standards

GREEN COMMUNITY

Strategy 1: Develop Nature-Based Solutions
Goals:

- Expand Green Infrastructure & Improve Water Resilience
- Sequester All Remaining Carbon by 2035

CLIMATE RISK

Strategy 1: Understand and Reduce Physical Risk
Goals:

- Reduce Flood Risk
- Reduce Heat Risk

EMERGENCY MANAGEMENT

Strategy 1: Integrate Adaptation Into Emergency Preparedness and Response
Goals:

- Ensure Safety During Extreme Heat
- Ensure Safety During Wildfire and Unhealthy Air Events

RESILIENT COMMUNITY

Strategy 1: Educate and Protect Residents
Goals:

- Establish Resilience Hubs
- Identify and Protect Vulnerable Community Members
- Improve Climate Literacy and Risk Understanding

ATTACHMENT 2

APPENDIX B

KEY ACTIONS

TRANSPORTATION

1. Fully implement the 2021 Complete Streets Master Plan by 2035 and make adjustments as needed to comply with VMT reduction objectives
2. Create a pedestrian-friendly Downtown and other community and commercial spaces throughout the city
3. Develop and implement a new Parking Management Plan that supports strategic VMT reduction
4. Pilot shared bike, ebike, and escooter programs, and partner with adjacent cities to improve first/last mile options
5. Support Transit-Oriented Development
6. Encourage Live Near Work incentives
7. Promote Work From Home policies and infrastructure
8. Develop an electric shuttle program as an alternative to SOV travel
9. Expand transit service, connectivity, and transit stop amenities
10. Require commercial Transportation Demand Management programs
11. Work with Los Altos School Districts to reduce VMT
12. Develop and promote community carshare and carpool programs
13. Increase education and awareness of available EV resources and incentive programs
14. Actively promote EV adoption and require EV-only parking
15. Increase the number of available Level 2 EV charging stations in workplace, commercial and multifamily areas
16. Create a citywide network of DC Fast Charging (DCFC) stations
17. Expand the current Electric Vehicle charging and pre-wiring requirements in future Reach Code updates
18. Identify grants and incentives to install residential EV charging including DCFD, solar EV charging, and paired EV charging + battery storage systems
19. Phase out off-road fossil fuel engines

APPENDIX B

KEY ACTIONS

ENERGY

1. Support third-party residential and commercial energy efficiency audits
2. Increase residential and commercial energy efficiency
3. Adopt evolving Reach Codes and expand to include large additions and major remodels
4. Accelerate residential HVAC replacements
5. Accelerate residential water heater replacements
6. Accelerate commercial HVAC replacements
7. Accelerate commercial water heater replacements
8. Establish a fee or penalty on the use of methane gas
9. Increase community solar capacity
10. Adopt Net Zero Building requirements for new construction by 2030

RESOURCE CONSERVATION

1. Increase the landfill diversion rate
2. Eliminate non-essential single-use plastics
3. Reduce waste from demolition, construction and building materials
4. Increase community-wide water efficiency
5. Promote sustainable food choices
6. Encourage responsible goods & services consumption

MUNICIPAL OPERATIONS

1. Audit appropriate City facilities and conduct comprehensive energy efficiency upgrades
2. Build new City buildings to Net Zero standards
3. Develop battery storage options and evaluate microgrids for cost savings and resilience
4. Develop a phase-out schedule to replace all City-owned fleet vehicles with electric vehicles
5. Improve City staff use of commute alternatives to single-occupant vehicles
6. Expand Work From Home and flexible schedule policies
7. Develop Work From Home and flexible schedule policies
8. Adopt a zero-waste policy for City facilities and City-sponsored events
9. Continue to allow virtual participation in public meetings
10. Account for climate change in all new City projects
11. Incorporate climate preparedness into City programs, operations, and maintenance protocols
12. Integrate CAAP goals into the budget process

KEY ACTIONS

GREEN COMMUNITY

1. Create water-efficient buildings and landscapes
2. Develop a partnership with the Regional Water Quality Control Plant to use recycled water from the plant
3. Increase urban tree canopy
4. Expand parks and natural wooded spaces
5. Pilot carbon farming opportunities
6. Eliminate the use of non-organic pesticides and herbicides

CLIMATE RISK

1. Update city wide flood risk assessment and capital and policy recommendations
2. Develop and implement comprehensive riparian ecosystem restoration plan and relevant floodplain management policies
3. Expand green infrastructure program to reduce impermeable surface areas and capture runoff from paved areas
4. Conduct heat study/mapping to identify areas of Urban Heat Island
5. Enact reflectivity standards for asphalt and ground level surfaces; enact reflectivity/green roof standards for roofs
6. Promote alternative building cooling strategies; enact standards

EMERGENCY MANAGEMENT

1. Develop temperature/heat safety protocols for outdoor work. Determine education and enforcement mechanisms
2. Adjust/extend park and public facility hours during heat waves
3. Expand public drinking fountains/refillable water stations
4. Update wildfire warning and evacuation protocols
5. Develop an early warning system for air quality alerts
6. Ensure high-air-quality indoor spaces and purchase and distribute N-95 masks to vulnerable outdoor populations

RESILIENT COMMUNITY

1. Identify, fund, and prepare existing and new public facilities to serve as resilience hubs
2. Develop outreach to and comprehensive care strategy for vulnerable populations
3. Update Community Emergency Response Training (CERT) to include growing climate hazards
4. Launch a Community Climate Action Grant

Glossary

Carbon Dioxide Equivalent
The amount of carbon dioxide (CO2) emission that would cause the same integrated radiative forcing or temperature change, over a given time horizon, as an emitted amount of a greenhouse gas (GHG) or a mixture of GHGs[1].

Carbon Neutrality
Reducing as many emissions as possible, sequestering the remaining emissions through nature-based solutions, and utilizing innovative carbon sequestration solutions, community-based sequestration projects, and local carbon offsets to reach zero net emissions.

Carbon Sequestration
The process of storing carbon in a carbon pool[1].

Climate Change
Climate change refers to a change in the state of the climate that can be identified (e.g., by using statistical tests) by changes in the mean and/or the variability of its properties and that persists for an extended period, typically decades or longer[1].

Climate Mitigation
A human intervention to reduce emissions or enhance the sinks of greenhouse gases[2].

Climate Resilience
The capacity of social, economic and environmental systems to cope with a hazardous event or trend or disturbance, responding or reorganizing in ways that maintain their essential function, identity and structure while also maintaining the capacity for adaptation, learning and transformation[2].

Climate Risk
The potential for adverse consequences where something of value is at stake and where the occurrence and degree of an outcome is uncertain. In the context of the assessment of climate impacts, the term risk is often used to refer to the potential for adverse consequences of a climate-related hazard, or of adaptation or mitigation responses to such a hazard, on lives, livelihoods, health and well-being, ecosystems and species, economic, social and cultural assets, services (including ecosystem services), and infrastructure[2].

Climate Vulnerability
The propensity or predisposition to be adversely affected by climate change. Vulnerability encompasses a variety of concepts and elements including sensitivity or susceptibility to harm and lack of capacity to cope and adapt.

Co-benefits
The positive effects that a policy or measure aimed at one objective might have on other objectives, thereby increasing the total benefits for society or the environment[1].

Consumption-Based Inventory
A consumption-based inventory (CBI), or consumption-based emissions inventory (CBEI), is a calculation of all of the greenhouse gas emissions associated with producing, transporting, using, and disposing of products and services consumed by a particular community or entity in a given time period (typically a year). A CBEI is a way to tally up a comprehensive emissions 'footprint' of a community[2].

Decarbonization
The process by which countries, individuals or other entities aim to achieve zero fossil carbon existence. Typically refers to a reduction of the carbon emissions associated with electricity, industry and transport[1].

Drought
A period of abnormally dry weather long enough to cause a serious hydrological imbalance. Drought is a relative term, therefore any discussion in terms of precipitation deficit must refer to the particular precipitation-related activity that is under discussion[1].

Electric Vehicle
A vehicle whose propulsion is powered fully or mostly by electricity[1].

Equity
Equity is the principle of fairness in burden sharing and is a basis for understanding how the impacts and responses to climate change, including costs and benefits, are distributed in and by society in more or less equal ways. It is often aligned with ideas of equality, fairness and justice and applied with respect to equity in the responsibility for, and distribution of, climate impacts and policies across society, generations, and gender, and in the sense of who participates and controls the processes of decision-making[3].

Global Warming
The estimated increase in global mean surface temperature (GMST) averaged over a 30-year period, or the 30-year period centered on a particular year or decade, expressed relative to pre-industrial levels unless otherwise specified[2].

[1] IPCC, 2018: Annex I: Glossary [Matthews, J.B.R. (ed.)]. In: Global Warming of 1.5°C. An IPCC Special Report on the impacts of global warming of 1.5°C above pre-industrial levels and related global greenhouse gas emission pathways, in the context of strengthening the global response to the threat of climate change, sustainable development, and efforts to eradicate poverty [Masson-Delmotte, V., P. Zhai, H.-O. Pörtner, D. Roberts, J. Skea, P.R. Shukla, A. Pirani, W. Moufouma-Okia, C. Péan, R. Pidcock, S. Connors, J.B.R. Matthews, Y. Chen, X. Zhou, M.I. Gomis, E. Lonnoy, T. Maycock, M. Tignor, and T. Waterfield (eds.)]. In Press

[2] Urban Sustainability Directors Network website: What is a CBEI, retrieved 1.23.22

Glossary

Green Infrastructure
The interconnected set of natural and constructed ecological systems, green spaces and other landscape features. It includes planted and indigenous trees, wetlands, parks, green open spaces and original grassland and woodlands, as well as possible building and street-level design interventions that incorporate vegetation[2].

Greenhouse Gas
Greenhouse gases are those gaseous constituents of the atmosphere, both natural and anthropogenic, that absorb and emit radiation at specific wavelengths within the spectrum of terrestrial radiation emitted by the Earth's surface, the atmosphere itself and by clouds. This property causes the greenhouse effect[2].

Heat Island Effect
Heat islands are urbanized areas that experience higher temperatures than outlying areas[4].

Microgrid
A microgrid is a self-sufficient energy system that serves a discrete geographic footprint, such as a college campus, hospital complex, business center, or neighborhood[5].

Reach Code
In California, Title 24 of the Code of Regulations sets the building code standards for all jurisdictions statewide. However, local governments can adopt more stringent requirements, which are known as reach codes[6].

Sustainability
A dynamic process that guarantees the persistence of natural and human systems in an equitable manner[2].

Smart Growth
"Smart growth" covers a range of development and conservation strategies that help protect our health and natural environment and make our communities more attractive, economically stronger, and more socially diverse[7].

Transit-Oriented Development
Transit-oriented development, or TOD, includes a mix of commercial, residential, office and entertainment centered around or located near a transit station. Dense, walkable, mixed-use development near transit attracts people and adds to vibrant, connected communities[8].

Transportation Demand Management
Transportation demand management (TDM), or simply demand management, is defined a set of strategies aimed at maximizing traveler choices[9].

Zero Net Energy Building
An energy-efficient building where, on a source energy basis, the actual annual consumed energy is less than or equal to the on-site renewable generated energy[10].

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[3] IPCC, 2018: Annex I: Glossary [Matthews, J.B.R. (ed.)]. In: Global Warming of 1.5°C. An IPCC Special Report on the impacts of global warming of 1.5°C above pre-industrial levels and related global greenhouse gas emission pathways, in the context of strengthening the global response to the threat of climate change, sustainable development, and efforts to eradicate poverty [Masson-Delmotte, V., P. Zhai, H.-O. Pörtner, D. Roberts, J. Skea, P.R. Shukla, A. Pirani, W. Moufouma-Okia, C. Péan, R. Pidcock, S. Connors, J.B.R. Matthews, Y. Chen, X. Zhou, M.I. Gomis, E. Lonnoy, T. Maycock, M. Tignor, and T. Waterfield (eds.)]. In Press

[4] US EPA website: Heat Island Effect, retrieved 1.23.22

[5] Microgrid Knowledge website: What is a microgrid, retrieved 1.23.22

[6] BayREN website: Reach Codes & Polices, retrieved 1.23.22

[7] US EPA website: About Smart Growth, retrieved 1.23.22

[8] Federal Transit Administration website: Transit-Oriented Development, retrieved 1.23.22

[9] Federal Highway Administration website: Transportation Demand Management, retrieved 1.23.22

[10] CA Public Utilities Commission website: Zero Net Energy, retrieved 1.23.22

ATTACHMENT 2

APPENDIX D

ACTIONS LIST

		Action #	Action	Description	GHG reductions (MTCO2e)
Mitigation Actions	Focus Area: Transportation		**Strategy: Reduce City-Wide Vehicle Miles Traveled by 25% by 2035**		
			Goal: Create a Walkable and Bikeable City		
		1.1 A	Fully implement the 2022 Complete Streets Master Plan by 2035 and make adjustments as needed to comply with VMT reduction objectives	Work closely with Complete Streets commission to fully implement the 2022 Complete Streets Master Plan by 2035, with a focus on specific measures to reduce VMT. Reassess the development of specific citywide protected bike corridors. Maintain and expand access to businesses while promoting slow streets with biking and walking access. Improve the safety and attractiveness of walking downtown through traffic calming, dedicated pedestrian trails and streets, accelerating the development of green downtown plazas, and other strategies. Fully implement all Safe Routes to School programs in the CSMP. Consider an ordinance to reduce speed limits.	2269
		1.1 B	Create a pedestrian-friendly Downtown and other community and commercial spaces throughout the city	Establish Car-Free zones and one-way traffic Downtown and in other commercial and community areas to encourage non-vehicular travel. Expand sidewalk space and dedicate specific streets for pedestrian and cycling use only. Create safe, sheltered, outdoor areas for pedestrians and increase the number of bicycle racks for cyclists. Base development on 15-minute city principles.	supportive of 1.1 A
		1.1 C	Develop and implement a new Parking Management Plan that supports strategic VMT reduction	Develop and implement a community-wide Parking Management Plan that reduces minimum requirements and sets upper limits on parking spaces for new development. Ensure the strategy is based on three principles: increasing dedicated EV and handicapped parking spaces in key commercial areas, reducing the parking footprint (turn into green space), and add specific drop-off and pick up zones at strategic locations. Plan for street and parking lot changes to accommodate conversion to passenger pick-up and drop-off stops at commercial and other public land use locations.	1300
		1.1 D	Pilot shared bike, ebike, and escooter programs, and partner with adjacent cities to improve first/last mile options	Develop pilot bike, ebike and escooter sharing programs by 2025. Expand programs by 2030 based on lessons learned. Explore regulations to promote the safe and responsible operation of ebikes and escooters including issuing permits to private companies and designating dedicated parking spaces at key locations. Partner with adjacent cities to enable first/last mile travel shuttles to train stations/commuter hubs, including regional networks of ebike, scooter, shuttle, and TNC routes.	255
			Goal: Promote Smart Growth Strategies		
		1.2 A	Support Transit-Oriented Development	Require increased residential and commercial density and diversity along main corridors and commercial areas, including affordable multi-family housing and mixed-use developments. Encourage Transit-Oriented Development along major bus routes within and outside of the City to attract new employers and better serve the daily needs of residents and employees. Set a target of at least a 15% increase in the percent of the city's population living in high-density Transit-Oriented Development by 2035. Integration with the City's Housing Element (ensure meeting RHNA commitments encourages high-density & affordable housing in transit-accessible/walkable areas).	1206
		1.2 B	Encourage Live Near Work incentives	Work with Los Altos employers and schools to develop a plan to provide affordable housing or rent assistance for employees to live close to work. Develop plans to offer rent assistance. Ensure new low-income and multiuse development is high density housing located no more than a 10-minute walk or bike ride from transit stops.	17
		1.2 C	Promote Work From Home policies and infrastructure	Require new multifamily residential developments with 10 or more units to provide Work From Home spaces. Support future conversion of commercial developments to residential uses as appropriate. Work with local Wi-Fi providers to expand coverage and speed.	735
			Goal: Support Shared Mobility		
		1.3 A	Develop an electric shuttle program as an alternative to SOV travel	Work with local public and private organizations to develop an electric shuttle program for cross-town traffic, including "short hops" along main streets and key commercial areas. Explore autonomous options when the program is mature and expand as needed.	supportive (grouped strategy)
		1.3 B	Expand transit service, connectivity, and transit stop amenities	Engage with transportation partners like VTA to expand zero emission transit service in City limits. Explore the creation of shaded and green commuter amenities and increased bicycle parking in order to help promote a public transit culture. Develop a green mobility app that would allow users to check on EV shuttle routes and arrival times, see where available bikes and scooters are and potentially reserve directly on the app. Include VTA transit routes and schedule, location of EV chargers and whether they're free. Provide City funding or seek other funding sources to support these efforts.	1274
		1.3 C	Require commercial Transportation Demand Management programs	Implement, mandate, enforce, actively promote, and use Transportation Demand Management strategies (TDM is defined as a set of strategies aimed at maximizing traveler choices). Require new nonresidential developments greater than 10,000 square feet or anticipated to include businesses with more than 50 employees to reduce VMT through TDM programs.	1275
		1.3 D	Work with Los Altos School Districts to reduce VMT	Support a rotating car-free day program at local schools and as part of other local events to raise awareness about school commute alternatives. Encourage partnerships with private schools to develop and implement school bus programs that reduce school-related SOV commutes. Work with School Districts in Los Altos and surrounding cities (Mountain View, Palo Alto, Cupertino, Los Altos Hills) to encourage EV shuttle service for students living >1mile from their neighborhood schools.	1661
		1.3 E	Develop and promote community carshare and carpool programs	Explore opportunities with carsharing companies to add or expand service in Los Altos. Develop a target number of shared cars available to individuals. Mandate that all shared vehicles be EV. Follow progress of shared autonomous vehicle testing regionally and consider developing ordinances and policies to guide shared AV use in City limits.	119
	Focus Area: Transportation		**Strategy: Electrify Transportation**		
			Goal: Reach 80% Community-Wide Electric Vehicles Adoption by 2035		
		1.4 A	Increase education & awareness of available EV resources and incentive programs	Develop a yearly EV fair with participation from local dealerships and owners. Develop a map of the city charging network and available dedicated parking spaces. Create a webinar series on EV ownership.	supportive of 1.4 B
		1.4 B	Actively promote EV adoption and require EV-only parking	Negotiate a discount program with local car dealerships to offer rebates or other incentives to car buyers purchasing new or used EVs. Require businesses to set aside a percentage of parking spaces for EVs.	6854
			Goal: Accelerate Community-Wide Electric Vehicle Supply Equipment Sufficient to Support 80% EVs		
		1.5 A	Increase the number of available Level 2 EV charging stations in workplace, commercial and multifamily areas	Increase the number of available Level 2 EV charging stations at businesses with >50 employees, multifamily homes of >10 units, and in commercial areas.	supportive of 1.4 B
		1.5 B	Create a citywide network of DC Fast Charging (DCFC) stations	Create a network of DC Fast Charging (DCFC) stations Downtown and in other commercial areas, as well as along major vehicle corridors. Set a 1-mile target for DCFC stations. Engage local gas stations to explore conversion to DCFC centers.	supportive of 1.4 B

		Action #	Action	Description	GHG reductions (MTCO2e)
Mitigation Actions	Focus Area: Transportation	1.5 C	Double the current Electric Vehicle charging and pre-wiring requirements in future Reach Code updates	Continue the current requirements for EV pre-wiring and Level 2 charging in new single-family development and extend to include large remodels and additions, and double the requirements for new multi-family and commercial development as part of future Reach Code updates	supportive of 1.4 B
		1.5 D	Identify grants and incentives to install residential EV charging including DCFC, solar EV charging, and paired EV charging + battery storage systems	Identify grants and incentives available through State, federal, or local agencies that may be used to support solar EV charging and battery storage. Work with SVCE to expand existing EV resources and programs.	supportive of 1.4 B
				Strategy: Electrify Off-Road Mobile Sources	
				Goal: Eliminate Off-Road Fossil Fuel Engines	
		1.6 A	Phase out off-road fossil fuel engines such as landscaping and construction equipment	Accelerate phase out small off-road fossil fuel engines such as landscaping equipment through bans, replacement ordinances, and/or incentives for electric alternatives. Work to reduce construction-related GHG emissions.	1319
	Focus Area: Energy			**Strategy: Reduce Emissions from Energy Consumption**	
				Goal: Encourage energy conservation measures in homes and businesses	
		2.1 A	Support 3rd party residential and commercial energy audits	Provide resources to support energy audits including listing of approved providers, listing of incentives programs, and other resources. Work with approved providers to perform energy audits.	supportive
		2.1 B	Increase residential and commercial energy efficiency	Develop a program to increase energy efficiency in existing residential buildings including wall and ceiling insulation, roof replacements, new ducting and windows, lighting upgrades, and outdoor amenities upgrades. Identify outside funding and provide City funding to perform upgrades identified in energy audits performed under action 2.1 A, and ensure eligible residents and businesses take advantage of all available energy efficiency incentive programs.	6163
				Goal: Require All-Electric New Buildings and Major Retrofits	
		2.2 A	Adopt evolving Reach Codes and expand to include large additions and major remodels	Adopt Reach Codes that go beyond Title 24 standards during every code cycle, including Zero Net Energy (ZNE) requirements. Expand new building codes to include large remodels and Accessory Dwelling Units (ADUs).	8999
				Goal: Reduce or Eliminate of Methane Gas Use in Existing Buildings by Increasing Fuel Switching	
		2.3 A	Accelerate residential HVAC replacements	Develop a program to replace methane gas HVAC (heating, ventilation, and air conditioning) units in existing residential buildings with electric alternatives. Require permits and enforce compliance for HVAC replacements. Develop a "Replace upon Burnout" and "Replace upon Sale/Remodel" ordinance for HVAC units. Adopt an ordinance making it mandatory to replace all methane gas HVAC units with electric alternatives by 2035, with exemptions for low-income residents and Seniors. Provide education and outreach to residents and property owners.	18869
		2.3 B	Accelerate residential water heater replacements	Develop a program to replace methane gas hot water heaters in existing residential buildings with electric alternatives. Require permits and enforce compliance for water heater replacements. Develop a "Replace upon Burnout" and "Replace upon Sale/Remodel" ordinance for water heaters. Adopt an ordinance making it mandatory to replace all methane gas water heaters with electric alternatives by 2035, with exemptions for low-income residents and Seniors. Provide education and outreach to residents and property owners.	16780
		2.3 C	Accelerate commercial HVAC replacements	Develop a program to replace methane gas HVAC units in existing commercial buildings with electric alternatives. Require permits and enforce compliance for HVAC replacements. Waive permit fees for electric HVAC units. Consider a "Replace upon Burnout" and "Replace upon Sale/Remodel" ordinance for HVAC units. Adopt an ordinance making it mandatory to replace methane gas HVAC units with electric alternatives by 2035.	1310
		2.3 D	Accelerate commercial water heater replacements	Develop a program to replace methane gas hot water heaters in existing commercial buildings with electric alternatives. Require permits and enforce compliance for water heater replacements. Waive permit fees for electric water heaters. Consider a "Replace upon Burnout" and "Replace upon Sale/Remodel" ordinance for water heaters. Adopt an ordinance making it mandatory to replace methane gas water heaters with electric alternatives by 2035.	1193
				Goal: Disincentivize Methane Gas	
		2.4 A	Establish a fee or penalty on the use of methane gas	Work with PG&E and community partners to develop or expand a fee on the use of methane gas within City limits. Set up a City-led Task Force in 2022 to lead this effort. Funds collected will be used to fund incentives for electric appliances adoption. Potential estimated funds available each year of at least $500k.	supportive
				Strategy: Increase Solar Energy Production	
				Goal: Expand Community Solar and Battery Storage	
		2.5 A	Increase community solar capacity	Increase solar panel requirements in new construction from 4KWh to 6KWh minimum, and add solar panel requirement for large additions and remodels (>4KWh). Ensure residents and businesses are aware of and take advantage of incentive programs for solar panels.	1
		2.5 B	Adopt Net Zero Building requirements for new construction by 2030	Adopt Net Zero Building requirements following New Building Institute guidelines by 2030. Add requirements of 12 kW or more to future Reach Code updates by 2030 at the latest. Encourage battery storage systems of 10 kW or more through promotion of incentive or rebate programs, educational campaigns, and/or pilot programs. Encourage participation in demand response programs to improve grid resiliency.	2
	Focus Area: Resource Conservation			**Strategy: Reduce Consumption and Waste**	
				Goal: Decrease Landfill Waste 15% and Eliminate Single-Use Plastics and Construction Waste by 2035	
		3.1 A	Increase the landfill diversion rate	Increase landfill diversion rate to 90% by 2030 and 95% by 2035, negotiated in the next Franchise Agreement. Launch an education and awareness campaign for residents and businesses to help promote best practices.	421
		3.1 B	Eliminate non-essential single-use plastics	Adopt a new ordinance to eliminate non-essential single-use plastics and prioritize reusable foodware and utensils. Ensure all new single-use foodware and utensils are compostable per guidelines from the Franchise Waste Hauler.	supportive
		3.1 C	Reduce waste from demolition, construction and building materials	Develop an ordinance requiring the deconstruction of old buildings instead of demolition and the recycling/re-use of materials. Provide incentives to builders for the use of environmentally friendly construction materials.	1

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		Action #	Action	Description	GHG reductions (MTCO2e)
Mitigation Actions	Focus Area: Resource Conservation			Goal: Reduce Water Use At Least 15% by 2030	
		3.2 A	Increase communitywide water efficiency	Increase education and awareness of water efficiency programs through Calwater and other organizations. Continue to support implementation of the 2015 UWMP through enforcement of the 2015 Model Water Efficient Landscape Ordinance. Develop an ordinance requiring conversion of grass lawns to low-water landscaping. Consider an update to the building code prohibiting new grass lawns.	78
				Goal: Promote a Circular Economy	
		3.3 A	Promote sustainable food choices	Expand consumer education and awareness of sustainable and plant-based food choices through City media channels, speaker series, and other methods. Work with the current vendor to expand the farmers market into a year-round event. Work with local restaurants to increase organic, vegetarian, and farm-to-table menu options and reduce food waste.	supportive
		3.3 B	Encourage responsible goods & services consumption	Increase education & awareness of circular economy concepts, including responsible purchasing habits and the promotion of a Repair, Reuse, Recovery, and Refurbishment economy. Provide support and resources to help local businesses participate in green business programs.	supportive
	Focus Area: Municipal Operations			**Strategy: Operate Sustainable Municipal Buildings**	
				Goal: Reduce Municipal Building Energy Use 30% by 2035	
		4.1 A	Audit appropriate City facilities and conduct comprehensive energy efficiency upgrades	Audit appropriate City facilities and conduct comprehensive energy efficiency upgrades focusing on energy-efficient lighting, motion sensors, appliances, and HVAC systems. Develop a 10-year phase-out program in which all existing methane gas appliances are replaced with comparable electric alternatives.	118
				Goal: Install Solar + Battery Storage at City facilities	
		4.2 A	Build new City buildings to Net Zero standards	Ensure all new buildings are Net Zero with solar panels, battery storage and electric efficient appliances. Align with CA Public Utilities Commission Zero Net Energy goals and definitions.	supportive
		4.2 B	Develop battery storage options and evaluate microgrids for cost savings and resilience	Install ground- or roof-mounted solar panels at select City buildings and facilities. Explore options, including local examples at fire stations, for microgrids capable of going into "island mode" and serving as resilience hubs during power outages.	supportive
				Strategy: Reduce Municipal VMT	
				Goal: Convert 100% of the City's Fleet to Electric Vehicles by 2030	
		4.3 A	Develop a phase-out schedule to replace all City-owned fleet vehicles with electric vehicles	Develop a phase-out schedule to replace all City-owned fleet vehicles with comparable electric versions by 2030. Conduct a feasibility study to determine the optimal number and location of municipal and public chargers at City facilities and properties, and install sufficient Level 2 charging to charge EV fleet and staff-owned EVs.	146
				Goal: Develop Guidelines for Sustainable Employee Commute and Business Travel	
		4.4 A	Improve City staff use of commute alternatives to single-occupant vehicles	Increase options for commute alternatives, including information and materials that identify available transit and alternative transportation routes. Encourage staff to buy and use EVs through incentives, free charging at City facilities, and incentives for EV purchases.	5
		4.4 B	Expand Work From Home and flexible schedule policies	Expand the current policy to facilitate alternative work schedule or telecommuting options for City staff to reduce daily commute trips. Evaluate flexible employee schedules that allow for at least 50% remote work while maintaining City hours of operation.	9
				Strategy: Promote Green Municipal Practices	
				Goal: Prioritize Responsible Procurement	
		4.5 A	Adopt a zero-waste policy for City facilities and City-sponsored events	Adopt a policy that requires City-owned buildings and facilities to be zero waste. Develop an action plan to eliminate waste through diversion and recycling. Work with event vendors and participants to eliminate waste at City-sponsored events.	89
				Goal: Utilize Digital and Remote Systems to reduce VMT	
		4.5 B	Continue to allow virtual participation in public meetings	Decrease community Vehicle Miles Traveled by continuing to allow virtual participation at all public meetings. Allow for public comment by virtual participants.	supportive
Cross-Cutting Actions				**Strategy: Integrate Climate Action and Adaptation into City Functions**	
				Goal: Incorporate Climate Action and Adaptation into City Policy, Budget, Planning, & Internal Standards	
		4.6 A	Account for climate change in all new City projects	Establish an interdepartmental working group to integrate climate preparedness in planning, maintenance, and capital improvements though the development of work plans, screening of capital improvements, and cross-sector collaboration. Establish protocols for mitigating public health impacts from heat and air quality with regional agencies and partners.	n/a
		4.6 B	Incorporate climate preparedness into City programs, operations, and maintenance protocols	Ensure that maintenance reflects expected future climate conditions and variability and not historical climate data for all City buildings, facilities, structures, and infrastructure.	n/a
		4.6 C	Integrate CAAP goals into City projects as an order of business	Integrate annual CAAP goals during the budget review process at the direction of the City Manager. Plan to inventory City GHG emissions every two years using ClearPath and track against targets.	n/a
	Focus Area: Green Community			**Strategy: Develop Nature-Based Solutions**	
				Goal: Expand Green Infrastructure & Improve Water Resilience	
		5.1 A	Create water-efficient buildings and landscapes	Update building code to incentivize rainwater harvesting and greywater recycling. Install systems at municipal facilities. Develop resources to help residents purchase water-saving equipment, and encourage rainwater harvesting strategies. Adopt mandatory guidelines requiring a set of stormwater and greywater management features in new construction. Implement porous paving in parking lots and driveways, and other water percolation methods like bioswales to reduce stormwater runoff to streets. Utilize reissuance of City's National Pollution Discharge Elimination System (NPDES) permit starting July 2022 to lower threshold for regulation. Partner with local and global organizations to identify space and resources to enhance the natural environment and rural feel of the city.	supportive
		5.1 B	Develop a partnership with the Regional Water Quality Control Plant to use recycled water from the plant	Work with the Wastewater Treatment Plant to implement upgrades to provide a drought resilient, local water supply to increase the amount of recycled water production.	n/a
				Goal: Sequester As Much Remaining Carbon As Possible by 2035	
		5.2 A	Increase urban tree canopy	Set a goal of at least 10,000 new City trees by 2035. Develop a city-wide Green Infrastructure Plan.	11
		5.2 B	Expand parks and natural wooded spaces	Work with community partners to expand the number and size of parks and wooded spaces within City limits.	supportive
		5.2 C	Pilot carbon farming opportunities	Identify land to plant intensive urban forests following the Miyawaki Method. Explore opportunities to develop carbon farming pilots for carbon sequestration. Partner with local organizations with available greenspace.	supportive
		5.2 D	Eliminate the use of non-organic pesticides and herbicides	Ban the use of non-organic pesticides and herbicides throughout City green spaces. Develop education and incentivization programs for residents about use of alternatives to synthetic pesticides and herbicides.	supportive

		Action #	Action	Description	GHG reductions (MTCO2e)
Cross-Cutting Actions	Focus Area: Climate Risk	**Strategy: Understand and Reduce Physical Risk**			
		Goal: Reduce Flood Risk			
		6.1 A	Update city wide flood risk assessment and capital and policy recommendations	The hydraulic analyses that form FEMA's FIRM (Flood Insurance Rate Map) are decades old. Hire a company to perform hydraulic analyses of existing creek crossings and culverts to determine how many, if any, are undersized based on changing precipitation patterns (climate is typically based on 30-year data cycles). Replace/rebuild undersized culverts and creek crossings as needed. Work with FEMA to update the FIRMs.	n/a
		6.1 B	Develop and implement comprehensive riparian ecosystem restoration plan and relevant floodplain management policies	Work with Valley Water to revitalize and restore creeks, learning from case studies like Adobe Creek Reach 5 Restoration. Restore the riparian ecosystem of creeks flowing through Los Altos, add managed ponds and dams to slow the flow of water, and increase percolation to the ground. Increase natural floodplain management through policies and education to establish "Buffer Zones" and limit new construction.	n/a
		6.1 C	Expand green infrastructure program to reduce impermeable surface areas and capture runoff from paved areas	Implement porous paving in sidewalks, parking lots and driveways, and other water percolation methods like bioswales to reduce stormwater runoff to streets.	n/a
		Goal: Reduce Heat Risk			
		6.2 A	Conduct heat study/mapping to identify areas of Urban Heat Island	Conduct heat study/mapping to identify areas of Urban Heat Island with capital and policy recommendations.	n/a
		6.2 B	Enact reflectivity standards for asphalt and ground level surfaces; enact reflectivity/green roof standards for roofs	Require light-colored roofs and/or a minimum specified reflectance for commercial roofs when new or at replacement. Explore and implement guidelines to resurface streets and sidewalks with heat reflective surfaces.	n/a
		6.2 C	Promote alternative building cooling strategies; enact standards	Promote alternative cooling strategies like shade trees, green roofs, and building awnings. Determine and enact standards for new buildings	n/a
Adaptation Actions	Focus Area: Emergency Management	**Strategy: Integrate Adaptation into Emergency Preparedness, Response**			
		Goal: Ensure Safety During Extreme Heat			
		7.1 A	Develop temperature/heat safety protocols for outdoor work. Determine education and enforcement mechanisms.	Adjust construction policies to allow extended work hours (earlier or later than usual) to avoid peak daytime heat. Adjust/extend construction hours in Ordinance 6.16 Noise Control, Section 70 Prohibited Acts during heat waves to avoid peak daytime heat. Work with community groups and residents to determine best methods of outreach and communication with outdoor workers. Educate employers and workers about existing worker rights and protections and ways to protect outdoor workers from the effects of extreme heat	n/a
		7.1 B	Adjust/extend park and public facility hours during heat waves	Adjust park facility hours to discourage active recreation during peak periods and extend open hours to early morning/late evening. Develop community cooling centers at City and non- City sites. Ensure temporary shade structures are provided for community events.	n/a
		7.1 C	Expand public drinking fountains/refillable water stations	Locate at bus stops, Downtown shopping areas, trailheads, community centers, and sport courts/fields.	n/a
		Goal: Ensure Safety During Wildfires & Unhealthy Air Events			
		7.2 A	Update wildfire warning and evacuation protocols	Ensure existing alert systems and safety measures are updated to address increasing climate risk and vulnerable, not easily mobile populations.	n/a
		7.2 B	Develop an early warning system for air quality alerts	Partner with regional agencies to make wildfire and air quality prediction data widely used and accessible to all, including through an early warning system. If not feasible, develop Los Altos-specific warning system based on available and accessible data.	n/a
		7.2 C	Ensure high-air-quality indoor spaces and purchase and distribute N-95 masks to vulnerable outdoor populations	Two-pronged strategy to retrofit and/or install air filtration systems on resilience hubs, schools, and other facilities. Separately, provide face masks to filter air for outdoor workers and other vulnerable populations who need to be outdoors before and during bad-air-quality days.	n/a
	Focus Area: Resilient Community	**Strategy: Educate and Protect Residents**			
		Goal: Establish Resilience Hubs			
		8.1 A	Identify, fund, and prepare existing and new public facilities to serve as resilience hubs	Conduct interviews with facility staff to determine their resilience to extreme heat, power outages, floods, and poor air quality. Compile and analyze to help prioritize investments and coordination. Identify suitable locations for/upgrade evacuation centers to serve as resilience hubs, safe zones, cooling centers, etc., depending on the event, with the capabilities to provide disaster assistance.	n/a
		Goal: Identify and Protect Vulnerable Community Members			
		8.2 A	Develop outreach to and comprehensive care strategy for vulnerable populations.	Conduct survey of and outreach to vulnerable populations (e.g. isolated seniors, outdoor workers, long-term care residents) and the people and institutions that care for them. Collaborate with community-based organizations to develop an inventory of locations with isolated seniors and develop a plan for a social support network during heat waves, bad air quality days, and other emergencies. Plan should include orders of assistance, including temporarily moving vulnerable populations to and from resilience hubs.	n/a
		Goal: Improve Climate Literacy & Risk Understanding			
		8.3 A	Update Community Emergency Response Training (CERT) to include growing climate hazards	Form partnerships with neighborhood-based organizations and businesses to develop Neighborhood Resilience Hub programs and prepare residents and respond to climate change. Develop community outreach and engagement materials.	n/a
		8.3 B	Launch a Community Climate Action Grant	Establish an annual micro-grant program to support local citizen-led projects and programs that will reduce emissions, adapt to climate change and enhance equity.	n/a

TECHNICAL APPENDIX

This appendix contains a brief summary of changes between 2005 and 2018 emissions, as well as the data sources, assumptions, and methodologies used in the development of the CAAP.

Greenhouse Gas Inventory and Results

Los Altos' 2018 inventory is actually comprised of two inventories, one for the community and one for municipal operations. The International Council for Local Environmental Initiatives (ICLEI) provides protocols for both, which were used for these inventories. A base year of 2018 was chosen based on data quality and availability.

Based on ICLEI guidance and in keeping with the 2013 CAP, the sectors included in the community inventory were:

- Transportation
  - On-road emissions
  - Off-road emissions
- Energy
  - Residential energy
  - Commercial energy
- Solid waste
- Water & wastewater

The sectors included in the municipal inventory were:

- Building energy
- Vehicle fleet
- Employee commute
- Solid waste
- Water & wastewater
- Streetlights & traffic signals
- Fugitive emissions

The most recent emissions factors for each source category were determined, and multiplied by the activity data to arrive at metric tons of carbon dioxide equivalent (MTCO2e). Results of these inventories show that Los Altos emitted 111,330 emissions in 2018, 110,202 arising from the community and 1,128 from municipal operations.

Of the community emissions, 63,288 came from the transportation sector, 43,198 from the energy sector, 2,653 from waste, and 1,063 from water and wastewater pumping and treatment. Of the municipal operations, 445 came from employee commute to and from work, 351 came from the City's vehicle fleet, 172 came from solid waste, 134 from energy use, and 26 from all other sources.

When comparing 2005 and 2018 emissions, an overall reduction of 73,395 emissions was achieved, a reduction of 40 percent, exceeding the City's 2020 reduction target by 25 percent. A large percentage of emissions reductions between 2013-2018 came as a result of joining the local Community Choice Aggregation (CCA) electricity provider. Silicon Valley Clean

Energy (SVCE). In addition to joining SVCE, Los Altos' government has upgraded all City accounts to GreenPrime, SVCE's 100% renewable generation service. The remaining reductions came as a result of increases in fuel economy, increased renewable energy used in wastewater treatment at the regional treatment facility, and the effects of actions adopted as part of the 2013 CAP.

The largest source of 2018 municipal emissions was from employees commuting to and from work, creating 445 tons of CO2e. However, the volume of emissions created decreased from 697 MTCO2e in 2005 to 445 MTCO2e in 2018, most likely attributable to the increase in vehicle fuel efficiency over that time. Next were emissions from the City's fleet of vehicles with 351 MTCO2e, then emissions from city-owned buildings and facilities with 134 MTCO2e, and then emissions from solid waste, water and wastewater treatment, and fugitive emissions with 198 MTCO2e combined. Emissions from streetlights and traffic signals were reduced to zero with the upgrade of all City accounts to GreenPrime.

The largest source of community emissions was from transportation and mobile sources, resulting in 63,288 MTCO2e. Overall though, emissions from transportation were reduced from 96,610 MTCO2e to 63,288 MTCO2e, a decrease of 34 percent. This decrease can likely be attributed to increases in fuel efficiency, increased electric vehicle adoption, and actions taken as part of the 2013 CAP. Next were emissions from residential and commercial energy, creating 35,661 and 7,537 MTCO2e respectively, then emissions from solid waste with 2,653 MTCO2e, and then water and wastewater treatment with 1,063 MTCO2e.

Joining SVCE helped reduce emissions from energy by 34 percent between 2005 and 2018. The remaining emissions came from a combination of natural gas, non-SVCE electricity customers, and the small percentage of non-renewable electricity supplied in 2018 by SVCE.

Overall, these results reflect a shift away from electricity production as a major source of emissions, with transportation and natural gas use by buildings remaining as large sources. Emissions from solid waste continue to decrease as diversion rates increase, and emissions from water and wastewater treatment decrease as the efficiency of processing equipment and renewable energy use both increase over time.

On the municipal side, employee commute is still the largest source of emission, but is somewhat beyond the direct control of the City and can be difficult to influence. Electrification of the vehicle fleet and the greening of City-owned building and facilities has reduced municipal emissions, but there is still room for improvement in these areas which are addressed in the 2022 CAAP.

Business-As-Usual Forecast

A business-as-usual (BAU) forecast was developed in order to see what the City's emissions might be in the future. By developing a set of forecasts using the inventory results as a baseline, the City was able to better understand what the remaining sources may be and how many emissions will need to be reduced to meet their climate goals. In general, community emissions were escalated by the rate of population growth, and municipal emissions were escalated by the rate of growth in number of households. Both assumptions are consistent with ICLEI guidance. Absent any other changes, the City's emissions would increase slowly from 117,631 to over time as the population grows.

Adjusted Business-As-Usual Forecast

In addition to the BAU forecast, an adjusted business-as-usual (ABAU) forecast was developed to include the impacts of federal, State, and local actions already underway, as well as the expected increase in EV adoption rates and expected increase in AC use due to climate change.

An ABAU + Impacts of Existing Actions was also developed to model the effects of actions taken as part of the 2013 CAP. The following carbon intensity factors were applied to each forecast series to arrive at the ABAU and the ABAU + Impacts of Existing Actions forecasts.

Sector	Carbon Intensity Factors
Residential electricity	Impacts of Title 24 + Increase in AC use
Commercial electricity	Impacts of Title 24 + Increase in AC use
Community transportation	EV adoption increase + Impacts of Pavley II standard

The ABAU forecast shows that, including the impacts of federal, State, and local actions and the impacts of EV adoption and AC use increase, the City's emissions would be expected to decrease to 70,793 MTCO2e by 2050.

The Table of Methodology & Assumptions is contained in the following pages

	Action #	Quantification method(s)	Assumptions	GHG calculations	Cost source/methodology
Mitigation Actions	1.1 A	ClearPath, CAPCOA SDT-1, CAPCOA SDT-2	-3.3 person trips/day, avg. trip length 6 miles, 3.7% increase in bicycle mode share -Assumes 1.4% VMT reduction -Assumes 1% VMT reduction	trips x trip length x increased mode share Baseline VMT x % reduction Baseline VMT x % reduction	CSMP
	1.1 B	CAPCOA SDT-4 (grouped strategy)	n/a	n/a	0.1 FTE to develop and maintain program Assumed $25k consultant fee to design outdoor pedestrian areas Assumed 2 miles of bike lane at $25k/mile Assumed 5k sqft new sidewalk at $5/sqft Assumed 20 bus stops at $2k/stop
	1.1 C	CAPCOA PDT-1, 2 and 3	Assumes 5.0% VMT reduction	Baseline VMT x % reduction	Assumed $400k to develop PMP
	1.1 D	CAPCOA TRT-12, SDT-4, SDT-5 and LUT-9	Assumes 1% VMT reduction	Baseline VMT x % reduction	Assumed $25k consultant fee to design programs 0.1 FTE to adminsiter program 0.05 FTE/year to engage with partners
	1.2 A	ClearPath	Assumes 100% of population currently medium-high population density	Based on at least 15% shift to high-density	0.25 FTE/year to develop and adminsiter program
	1.2 B	CAPCOA LUT-6	Assumes 0.4% VMT reduction	Baseline VMT x % reduction	0.1 FTE/year Assumed 500 employees are low-income Assumed $500 incentive per employee
	1.2 C	CAPCOA TRT-6	Assumes 5.5% commute VMT reduction	5.5 x 0.2 (% of work trips) x 1.21 (avg. work trip length/avg. trip length)	0.1 FTE to develop and implement program (assume program is maintained 10 years and then is self-sufficient) 0.1 FTE to work with local wifi providers
	1.3 A	CAPCOA TST-6	grouped strategy	n/a	Based on a survey of other CA programs
	1.3 B	CAPCOA TST-2, 3 and 4	Assumes 5% VMT reduction	Baseline VMT x % reduction	0.05 FTE/year to engage partners Assumed $25k consultant fee for Green Commuter Amenities plan Assumed $50k for green mobility app
	1.3 C	target recommended by Fehr & Peers	5% VMT reduction target	Baseline VMT x % reduction	0.5 FTE/year to develop, implement, and enforce TDM program
	1.3 D	CAP 2013	Assumes 50% of youth ride bus, 3 miles/trip	Youth not riding bus x trip length x number of events/year	0.2 FTE
	1.3 E	CAPCOA TRT-9	Assumes 0.4% VMT reduction	Baseline VMT x % reduction	0.05 FTE/year to engage carsharing companies and follow AV progress
	1.4 A	GHG reductions included in 1.4 B	n/a	n/a	0.1 FTE/year to develop and administer programs Assumed $3,000 to develop EV fair Assumed $2,000 to develop webinar series
	1.4 B	ClearPath	Assumes 30% increase in EV adoption beyond ABAU to 80% Assumes 23.6 MPG average fleetwide fuel economy Assumes 99 MPG average EV fuel economy (includes 45% hybrid)	Percent change in EV x change in fuel economy x Percent of gas vehicles displaced	Assumed $50,000 in incentives 0.1 FTE to develop program (1-time cost) 0.1 FTE/year to administer program for 10 years
	1.5 A	supportive of 1.4 B	n/a	20 public chargers/year x per-charger VMT reduction 50 private chargers/year x per-charger VMT reduction	0.1 FTE to develop ordinance 0.1 FTE/year to administer program
	1.5 B	supportive of 1.4 B	n/a	n/a	0.2 FTE/year to develop and implement program Assumes $50k per charger
	1.5 C	supportive of 1.4 B	n/a	10 new public chargers/year x per-charger VMT reduction	0.1 FTE
	1.5 D	supportive of 1.4 B	n/a	n/a	0.05 FTE/year to research funding opportunities and engage with partners
	1.6 A	CAP 2013	n/a	n/a	0.1 FTE to develop and administer program Assumed 1,000 leaf blowers replaced Assumed $50 incentive per leaf blower

Action #	Quantification method(s)	Assumptions	GHG calculations	Cost source/methodology
2.1 A	GHG reductions included in 2.1 B	n/a	n/a	0.2 FTE/year to develop and administer program Assumed $500/audit Assumed 100 incentives/year
2.1 B	Built Environment Calculator	Assumes 665 units retrofitted/year Assumes an average of 1,462 kWh and 1,070 therm savings/year/unit	Number of appliances replaced x per-appliance savings (cumulative)	0.5 FTE Assumes $1,000 per incentive Assumes 100 incentives/year
2.2 A	Built Environment Calculator	Assumes 14 new MFD or retrofits/year Assumes 417 kWh savings per MFD Assumes 150 new SFD or retrofits/year Assumes 165 kWh savings per SFD	Number of new or retrofitted MFD/SFD x per-MFD/SFD increase/decrease (cumulative)	0.1 FTE to develop ordinances
2.3 A	Built Environment Calculator	Assumes 665 HVACs replaced/year Assumes an average of 2,370 kWh increase and 319 therm decrease/unit/year	Units replaced x per-unit savings (cumulative)	0.25 FTE/year to develop and administer program Assumed $5k for seminars and educational material
2.3 B	Built Environment Calculator	Assumes 665 DHWs replaced/year Assumes an average of 1,416 kWh increase and 239 therm decrease/unit/year	Units replaced x per-unit savings (cumulative)	0.25 FTE/year to develop and administer program Assumed $5k for seminars and educational material
2.3 C	Built Environment Calculator	Assumes 43 small business and 36 medium-sized business HVACs replaced/year Assumes all hotel HVACs replaced by 2035 Assumes an average of 4,980 kWh increase and 575 therm decrease/unit/year	Units replaced x per-unit savings (cumulative)	0.25 FTE/year to develop and administer program Assumed $5k for seminars and educational material
2.3 D	Built Environment Calculator	Assumes 43 small business and 36 medium-sized business HVACs replaced/year Assumes all hotel DHWs replaced by 2035 Assumes an average of 4,312 kWh increase and 519 therm decrease/unit/year	Units replaced x per-unit savings (cumulative)	0.25 FTE/year to develop and administer program Assumed $5k for seminars and educational material
2.4 A		n/a	n/a	0.1 FTE/year to develop and administer program
2.5 A	ClearPath		Installed kWh x electricity emissions factor	0.05 FTE/year to develop and administer program
2.5 B	Built Environment Calculator		Installed kWh x electricity emissions factor	0.05 FTE/year to develop and administer program
3.1 A	ClearPath	Assumes a 17% increase in waste diversion (78% to 95%)	Tons diverted x per-ton emissions factor	0.2 FTE
3.1 B	n/a	n/a	n/a	0.1 FTE to develop ordinance
3.1 C	grouped strategy (GHG reductions included in 3.1 A)	n/a		0.1 FTE to develop ordinance 0.1 FTE/year for monitoring & compliance Assumes $1,000 per incentive Assumes 100 incentives/year
3.2 A	CAP 2013	n/a	kWh reduction x electricity emissions factor	0.1 FTE to develop ordinance 0.1 FTE/year for outreach & education
3.3 A	n/a	n/a	n/a	0.1 FTE/year to develop and expand programs, permitting, signage, etc.
3.3 B	no methodology	n/a	n/a	0.10 FTE/year for outreach & education
4.1 A	CAP 2013	Assumes 30% reduction in energy use	kWh/therm reduction x kWh/therm emissions factors	Estimated $60k per building, for 10 buildings
4.2 A	no data	n/a	n/a	0.1 FTE to develop guidelines
4.2 B	City's electricity is carbon-free; no GHG reductions	n/a	n/a	Assumed $40k for solar + storage installation Assumed $2.1M for 1MW of microgrid capacity 0.05 FTE/year to monitor system
4.3 A	ClearPath	Assumes current 22 MPG for fleet Assumes fleet mileage grows at rate of household growth	Change in fuel economy x change in VMT replaced	0.1 FTE/year to administer program Assumed $500k incremental cost of EVs Assumed $100k in EVSE
4.4 A	CAPCOA TRT-1	Assumes 2% VMT reduction	VMT reduction x per-mile emissions factor	Assumed total cash incentives of $10k 0.05 FTE/year to develop and administer programs

	Action #	Quantification method(s)	Assumptions	GHG calculations	Cost source/methodology
	4.4 B	CAPCOA TRT-6	Assumes 5.5% employee commute VMT reduction	VMT reduction x per-mile emissions factor	0.05 FTE to develop program
	4.5 A	CAP 2013	Assumes 100% waste diversion	Tons diverted x per-ton emissions factor	0.05 FTE to develop program
	4.5 B	n/a	n/a	n/a	
Cross-Cutting	4.6 A	n/a	n/a	n/a	
	4.6 B	n/a	n/a	n/a	
	4.6 C	n/a	n/a	n/a	
	5.1 A	n/a	n/a	n/a	0.05 FTE/year to develop and administer programs
	5.1 B	n/a	n/a	n/a	
	5.2 A	CAP 2013	Assumes 10,000 new trees by 2035	# of new trees x per-tree energy savings	Assumes $300/tree 0.5 FTE/year to administer program
	5.2 B	n/a	n/a	n/a	
	5.2 C	n/a	n/a	n/a	0.1 FTE/year to identify partners and develop program
	5.2 D	n/a	n/a	n/a	0.05 FTE to develop ordinance
	6.1 A	n/a	n/a	n/a	
	6.1 B	n/a	n/a	n/a	
	6.1 C	n/a	n/a	n/a	Assumes $300,000 per impervious acre managed. Memo from Geosyntec consultants (2018) estimates an average range of $100-200K/acre impervious area treated with green infrastructure. The Santa Clara Valley Urban Runoff Pollution Prevention Program's Stormwater Resource Plan (2019) lists a range of $35K-$600K/acre impervious area treated with green infrastructure. Lower costs are typically for much larger sites like stormwater detention ponds.
	6.2 A	n/a	n/a	n/a	
	6.2 B	n/a	n/a	n/a	
	6.2 C	n/a	n/a	n/a	
Adaptation	7.1 A	n/a	n/a	n/a	
	7.1 B	n/a	n/a	n/a	
	7.1 C	n/a	n/a	n/a	
	7.2 A	n/a	n/a	n/a	
	7.2 B	n/a	n/a	n/a	
	7.2 C	n/a	n/a	n/a	
	8.1 A	n/a	n/a	n/a	
	8.2 A	n/a	n/a	n/a	
	8.3 A	n/a	n/a	n/a	
	8.3 B	n/a	n/a	n/a	

ATTACHMENT 2

APPENDIX F

IMPLEMENTATION LEADS, PARTNERS, COSTS, AND FUNDING SOURCES

	Action #	Implementation lead	Implementation partners	Estimated cost	Funding source(s)	Funding program(s)
Mitigation Actions	1.1 A	Engineering	Finance/Executive	$ 44,778,000	Caltrans U.S. DOT Calbike	Active Transportation Program Surface Transportation Block Grant Program Funding Sources list
	1.1 B	Engineering/Planning	Chamber of Commerce	$ 215,000	BAAQMD Caltrans	Vehicle Trip Reduction Grant Program Sustainable Transportation Planning Grants
	1.1 C	Planning/Engineering	Environmental Commission/ Complete Streets Commission/ Planning Commission	$ 400,000	BAAQMD	Vehicle Trip Reduction Grant Program
	1.1 D	Economic Development	Engineering	$ 135,000		
	1.2 A	Planning Commission/Planning	VTA	$ 300,000	Metropolitan Transportation Commission	Transportation project grants
	1.2 B	Executive/Sustianability	Chamber of Commerce	$ 380,000		
	1.2 C	Economic Development	Chamber of Commerce	$ 110,000		
	1.3 A	Economic Development		$ 250,000	BAAQMD Caltrans Caltrans	Vehicle Trip Reduction Grant Program Active Transportation Program Sustainable Transportation Planning Grants
	1.3 B	Engineering/Planning	VTA	$ 140,000	Metropolitan Transportation Commission	Transportation project grants
	1.3 C	Sustainability/Economic Development	Neighboring jurisdictions	$ 650,000		

IMPLEMENTATION LEADS, PARTNERS, COSTS, AND FUNDING SOURCES

1.3 D	Complete Streets Commission/ Planning Commission	Planning	$ 200,000		
1.3 E	Parks & Recreation/Economic Development	Executive/ Los Altos School District	$ 5,000		
1.4 A	Economic Development/Sustainability	Finance	$ 15,000		
1.4 B	Economic Development/Sustainability	SVCE	$ 160,000	Silicon Valley Clean Energy (technical assistance) CARB U.S. DOT	FutureFit Assist Clean Vehicle Rebate Project RAISE grants
1.5 A	Economic Development	Executive	$ 140,000	CA Energy Commission U.S. DOE	California Electric Vehicle Infrastructure Project (CALeVIP) Electric Vehicle Supply Equipment Loan and Rebate Program (small businesses)
1.5 B	Economic Development/Executive	SVCE	$ 1,350,000	CA Energy Commission U.S. DOE	California Electric Vehicle Infrastructure Project (CALeVIP) Electric Vehicle Supply Equipment Loan and Rebate Program (small businesses)
1.5 C	Sustainability/Economic Development/Engineering	SVCE	$ 10,000		
1.5 D	Planning Commission	Sustainability/Building	$ 50,000	Silicon Valley Clean Energy (informational resource)	eHub
1.6 A	Sustainability/Planning	SVCE	$ 150,000		
2.1 A	Maintenance Services	BAAQMD/SVCE	$ 900,000		

IMPLEMENTATION LEADS, PARTNERS, COSTS, AND FUNDING SOURCES

2.1 B	Building/Planning	SVCE/ PG&E	$ 63,000	PG&E PG&E BayREN Santa Clara County BRACE Grants U.S. Dept. of Energy CA Public Utilities Commission	Residential Rebates (thermostats, water heaters, etc.) Business Rebates Home Energy Advisor program Property Assessed Clean Energy (PACE) Financing Energy Upgrade California
2.2 A	Building/Planning	SVCE/ PG&E	$ 10,000		
2.3 A	Sustainability/Building/Planning	SVCE/ PG&E	$ 305,000	Silicon Valley Clean Energy BayREN EPA CA Energy Commission	FutureFit Program Single-family and multi-family electrification programs Solar Energy System tax credits Low Interest Loans
2.3 B	Building	Planning/ SVCE/ PG&E	$ 305,000	BayREN	Home Energy Advisor program
2.3 C	Building	Planning/ SVCE/ PG&E	$ 305,000	BayREN	Home Energy Advisor program
2.3 D	Building	Planning/ SVCE/ PG&E	$ 305,000	BayREN	Home Energy Advisor program
2.4 A	Building	Planning/ SVCE/ PG&E	$ 130,000		
2.5 A	Environmental Commission/Planning Commission	Building/Planning SVCE	$ 65,000	Silicon Valley Clean Energy CA Energy Commission	Lights On Silicon Valley Low Interest Loans
2.5 B	Building	Planning	$ 65,000		
3.1 A	Engineering	Building/ MTWS	$ 20,000		
3.1 B	City Council	Sustainability/Engineering	$ 10,000		

IMPLEMENTATION LEADS, PARTNERS, COSTS, AND FUNDING SOURCES

3.1 C	City Council	Building/Engineering/MTWS	$ 63,000		
3.2 A	Planning/Building	Calwater	$ 100,000	CalWater	Residential and Commercial water efficiency rebate programs
3.3 A	Economic Development/Sustainability	Chamber of Commerce	$ 130,000		
3.3 B	Economic Development/Sustainability	GreenTown Los Altos	$ 130,000		
4.1 A	Building/Planning	SVCE/ PG&E	$ 600,000		
4.2 A	Building	Planning	$ 10,000	California Energy Commission	CEC grants
4.2 B	Building	Planning	$ 2,200,000		
4.3 A	Maintenance/Finance	Executive	$ 700,000	BAAQMD	Carl Moyer Program
4.4 A	Human Resources	Executive	$ 75,000		
4.4 B	Human Resources	Executive	$ 5,000		
4.5 A	Sustainability/Engineering	Finance/ MTWS	$ 5,000		
4.5 B	Executive	Human Resources	Low		

IMPLEMENTATION LEADS, PARTNERS, COSTS, AND FUNDING SOURCES

Cross-Cutting Actions	4.6 A	Executive	All Dept.	Low		
	4.6 B	Executive	All Dept.	Low		
	4.6 C	Finance	Executive/All Dept.	Low		
	5.1 A	Environmental Commission/Planning Commission	Building/Planning	$ 65,000	Water Resources Control Board Valley Water	Division of Financial Assistance Landscape Rebate Program
	5.1 B	Maintenance	Calwater	Medium	Natural Resources Agency	Landscape Rebate Program
	5.2 A	Engineering	City of Palo Alto Public Works	$ 3,650,000	CA Natural Resources Agency CAL FIRE CA ReLeaf	Urban Greening Program Urban and Community Forestry Grant Program Urban forestry grants
	5.2 B	Maintenance	Planning/Engineering	High	CA Natural Resources Agency CAL FIRE CA ReLeaf	Urban Greening Program Urban and Community Forestry Grant Program Urban forestry grants
	5.2 C	Parks & Recreation	Engineering/Maintenance	$ 100,000		
	5.2 D	Sustainability	Engineering	$ 5,000		
	6.1 A	Maintenance	Parks & Recreation	Cost for analysis likely to be $50,000 - $500,000. Design/construction order of magnitude more.	FEMA/Cal Offices of Emergency Services	Building Resilient Infrastructure and Communities (BRIC) Flood Mitigation Assistance (FMA)

IMPLEMENTATION LEADS, PARTNERS, COSTS, AND FUNDING SOURCES

	6.1 B	Planning	Engineering	Medium	Department of Water Resources Wildlife Conservation Board	Habitat Restoration Program Urban Water Management Grants Stream Flow Enhancement Program Wildlife Corridors/Fish Passage
	6.1 C	Planning	Engineering Valley Water	$1.5 M to construct systems to manage 5 acres of runoff/5 year period, beyond what is already funded	Natural Resources Agency Wildlife Conservation Board Water Resources Control Board	Urban Greening Program Protect Fish and Wildlife from Changing Conditions Section 319 Nonpoint Source Pollution Grants
	6.2 A	Engineering	City Council/Planning Commission	Low	Office of Planning and Rese	Climate Adaptation & Resilience Planning Grants
	6.2 B	Engineering	Planning	Low	California Transportation Commission	Transportation Improvement Fees (Highway Users Tax Account (0062))
	6.2 C	Planning/Building	Environmental Commission/Planning Commission	Low	California Energy Commission	CEC grants
Adaptation Actions	7.1 A	Planning	Building	Medium	Office of Planning and Research	Climate Adaptation & Resilience Planning Grants
	7.1 B	Human Resources/Emergency Op	Building/Planning/ BAAQMD/ Santa Clara County Public Health	Low		
	7.1 C	Maintenance	Executive	Medium		
	7.2 A	Maintenance	Executive/ Valley Water	Medium	Public Information Officer	Santa Clara County Fire Department
	7.2 B	Emergency Op	Police/ BAAQMD	Medium	Office of Planning and Research	Regional Climate Collaboratives

	7.2 C	Emergency Op	Santa Clara County Public Health	Medium		
	8.1 A	Engineering	Emergency Op/ Finance/ Santa Clara County Public Health	Medium	Office of Planning and Research	Climate Adaptation & Resilience Planning Grants
	8.2 A	Emergency Op	Sustainability/ Santa Clara County Public Health	Medium	Office of Planning and Research	Climate Adaptation & Resilience Planning Grants
	8.3 A	Emergency Op	Sustainability	Low	Office of Planning and Research	Climate Adaptation & Resilience Planning Grants
	8.3 B	Environmental Commission	City Council	Low		

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APPENDIX G

IMPLEMENTATION TIMELINE AND KPIs

	Action #	2022-2025	2026-2030	2031-2035	KPI	2025	2030	2035
Mitigation Actions	1.1 A	x	x	x	Miles of bike path built Miles of pedestrian path built Number of traffic calming projects completed	7 miles of bike trail built 2 miles of pedestrian path built 5 traffic calming projects completed	20 miles of bike trail built 5 miles of pedestrian path built 10 traffic calming projects completed	38 miles of bike trail built 10 miles of pedestrian path built 22 traffic calming projects completed
	1.1 B		x	x	Car-Free Zone initiative developed (Y/N) Pedestrian areas created Miles of downtown bike lane Sqft new sidewalks created New bus stops built	Initiative developed	All Car-Free Zones completed 50% of pedestrian areas, bike lanes, sidewalks, and bus stops completed	All pedestrian area, bike lanes, sidewalks, and bus stops completed
	1.1 C	x	x	x	Number of EV-only, handicapped, and total parking spaces Number of drop-off/pick-up zones	PMP started	PMP completed and adopted	track
	1.1 D	x	x		Number of bikes, ebikes, and escooters available to community members Number of partnerships formed/active	bike, ebike, and escooter pilots launched	programs scaled based on pilot program results	track
	1.2 A	x	x	x	Additional percent of population living in high-density areas	5%	18%	20%
	1.2 B	x	x	x	Number and amount of incentives provided	track	track	track
	1.2 C	x	x	x	Community-wide VMT reduction	track	track	25% of employees telecommuting 1.5 days/wee
	1.3 A		x	x	Program developed (Y/N) Partners identified (Y/N)	Program developed Partners identified	Program implemented	track
	1.3 B	x	x	x	Number of transit riders Green Transit App progress Percent of population living within 10 min walk from transit	Green Transit App Ready		100% population within 10 min walk from transit
	1.3 C	x	x	x	Number of employees participating in TDM programs Communitywide VMT reduction	track	track	5% VMT reduction achieved
	1.3 D	x	x	x	Number of Car-free days/month Percent of students taking the bus	1 car-free day/month	2 car-free days/year	2 car-free days/month 60% reduction in school related SOV travel
	1.3 E	x	x	x	Number of shared cars (EV and fossil fuel) available to community members	track	50% of shared vehicles EV	100% of shared vehicles EV
	1.4 A	x	x	x	Number of EV fairs held EVSE/EV-only parking map complete (Y/N) Webinar series published (Y/N)	track	track	track

IMPLEMENTATION TIMELINE AND KPIs

1.4 B	x	x	x	Percent of community-wide vehicles that are EV	10% higher annual EV adoption beyond ABAU	20% higher annual EV adoption beyond ABAU	30% higher annual EV adoption beyond ABAU
1.5 A	x	x	x	EVSE Master Plan developed and adopted Number of publicly available chargers Number of workplace chargers	EVSE Master Plan developed and adopted 70 workplace L2 chargers	240 workplace L2 chargers	400 workplace L2 chargers
1.5 B	x	x	x	Number of publicly available DCFC	4 DCFC stations	12 DCFC stations	22 DCFC stations
1.5 C	x	x	x	Number of new permits	track	track	track
1.5 D	x	x	x	Percent of residences with access to home charging	50% of residents with access to home charging	70% of residents with access to home charging	100% of residents with access to home charging
1.6 A	x	x		Type and number of equipment replaced Number/value of incentives provided	track	track	track
2.1 A	x	x	x	Number of audits performed Number/value of incentives provided	track	track	track
2.1 B	x	x	x	Number of buildings retrofitted with energy-efficient appliances and building envelope	3,325	5,985	9,310
2.2 A	x	x	x	Number of new buildings and remodels per year and total	track	track	track
2.3 A	x	x	x	Number of residential HVAC replaced with all-electric alternatives	3,325	5,985	9,310
2.3 B	x	x	x	Number of residential water heaters replaced with all-electric alternatives	3,325	5,985	9,310
2.3 C	x	x	x	Number of commercial HVAC replaced with all-electric alternatives	395	711	1,106
2.3 D	x	x	x	Number of commercial water heaters replaced with all-electric alternatives	395	711	1,106

IMPLEMENTATION TIMELINE AND KPIs

2.4 A	x	x	x	Task Force formed Program implemented Funds raised per year and total		Task Force formed Program implemented	track
2.5 A	x	x	x	Yearly and total installed capacity (kW)	120 kW new capacity	320 kW new capacity	520 kW new capacity
2.5 B	x	x	x	Number and capacity of new battery storage systems	track	track	track
3.1 A	x	x	x	Landfill diversion rate	85% diversion	90% diversion	95% Diversion
3.1 B	x			New ordinance passed (Y/N)	Ordinance passed		
3.1 C	x	x		Ordinance developed and adopted Number of yearly and total buildings deconstructed	Ordinance adopted	track	track
3.2 A	x	x	x	Community-wide water use	track	track	track
3.3 A	x	x	x	Farmers Markets held/year Local businesses contacted	track	track	track
3.3 B	x	x	x	Individuals and businesses contacted Articles published Certified Green Businesses in the community	track	track	track
4.1 A	x	x	x	Number of audits performed % reduction in energy use	10% reduction in municipal energy use	20% reduction in municipal energy use	30% reduction in municipal energy use
4.2 A	x	x	x	Number of new municipal buildings	track	track	track
4.2 B		x	x	Solar capacity installed Battery systems installed Microgrids built	track	Microgrid pilot developed track	track
4.3 A	x	x		Percent of municipal fleet that is electric	25%	100%	100%
4.4 A	x	x	x	Percent of staff taking alternatives to SOV commute	track	track	track
4.4 B	x	x		Percent of staff working alternative schedules or telecommuting	track	track	track
4.5 A	x			Tons of waste diverted from the landfill	track	track	track

IMPLEMENTATION TIMELINE AND KPIs

	4.5 B	x	x	x	Number of remote participants at City meetings	track	track	track
Cross-Cutting Actions	4.6 A	x	x	x	Up-to-date list of City projects with descriptions of sustainable procedures, project lifespan, climate parameters and emissions scenario considered	List completed, current, and published annually		
	4.6 B	x			Number and percent of City plans and standards incorporating climate change. Number and percent of city departments with staff with designated climate mitigation and/or adaptation roles.	track	track	track
	4.6 C	x	x	x	Annual Goals for CAAP advancement; annual reports on CAAP Advancement	track	track	track
	5.1 A	x	x	x	Percent of Buildings with Rainwater Harvesting Systems. Percent of Buildings with Greywater Systems. Acres private Greenstormwater Infrastructure as reported to the Santa Clara Valley Urban Runoff Pollution Prevention Program (SCVURPPP) and submitted as part of City's annual stormwater report to the Water Board Number of Systems at Municipal Facilities. Percent of Municipal Facilities with Greywater. Percent of Municipal Facilities with Rainwater Harvesting. Number and amount of incentives/rebates provided	track	track	track
	5.1 B	x	x		Determination/Memo from RWQCP of availability Receipt of proposal for reuse	10% 35 acres	25% 40 acres	40% 45 acres
	5.2 A	x	x	x	Number of Existing Public and Private Trees Number of Trees Planted Percent Survival of Planted Trees after 2 years, 5 years, 10 years	2,000 98%	6,000 96%	10,000 95%
	5.2 B	x	x	x	Acres of wilderness/natural areas Acres of Impervious Park Area	Plus 0.5 Acres Plus 2 Acres	Plus 2 Acres Plus 5 Acres	Plus 5 Acres Plus 15 Acres
	5.2 C	x	x	x	Number and square footage fo carbon farming pilots	track	track	track
	5.2 D	x			Ordinance developed and adopted	Ordinance adopted		
	6.1 A	x	x			Citywide Flood Risk Study Completed with policy and capital project recommendations at conceptual design	Updated FIRM Policies Implemented 10% of projects completed 25% of projects in construction 25% of projects in design	40% of projects completed 30% of projects in construction 30% of projects in design
	6.1 B		x			Comprehensive Riparian Ecosystem Restoration Plan Developed. Pilot projects funded.	Pilot projects constructed, monitored, evaluated.	Projects completed

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IMPLEMENTATION TIMELINE AND KPIs

	6.1 C	x			Number of green infrastructure installations Acres of public impervious area managed by GSI submitted as part of City's annual stormwater report to the Water Board.	25 acres	35 acres	45 acres
	6.2 A	x			Percent of projects completed, in construction, in design	Heat Study conducted with policy and capital project recommendations.	Implemented 10% of projects completed 25% of projects in construction 25% of projects in design	40% of projects completed 30% of projects in construction 30% of projects in design
	6.2 B	x				Heat Management Plan Developed and Piloted		
	6.2 C	x				Standards enacted		
Adaptation Actions	7.1 A	x			Number of engagements	Heat Safety Protocols Enacted. Education and Enforcement Mechanisms Piloted	Education and Enforcement Mechanisms finalized	
	7.1 B	x				Policy enacted, staff overtime paid for		
	7.1 C	x			Number of drinking fountains/refillable water stations	Existing public fountains identified, new sites identified, 25% of projects completed, 75% of remaining sites funded		
	7.2 A	x				Protocols and city documents updated		
	7.2 B	x				Early warning system developed and tested		
	7.2 C	x			Number of masks distributed Percent of community facilities with air filtering	50%	100%	
	8.1 A	x	x		Number of existing facilities surveyed Number and percent of upgrades completed Number and percent of new facilities completed	Facilities identified, immediate actions undertaken, upgrades and/or new facilities identified and costed, 75% funded, 25% constructed, 25% in construction, 50% in design	100% of upgrades and/or new facilities funded, 75% constructed, 25% in construction	100% of upgrades and/or new facilities constructed
	8.2 A	x	x		Number of people engaged Number of caregivers engaged	Vulnerable Populations identified. Education and resource program established.		
	8.3 A	x			CERT materials updated	All new volunteers trained using updated CERT	All new volunteers trained using updated CERT	All new volunteers trained using updated CERT
	8.3 B	x			Grant criteria established Number of grants awarded	Micro-grant program established, 5 grants awarded	30 grants awarded	75 grants awarded

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APPENDIX H:
CLIMATE VULNERABILITY ASSESSMENT FOR THE CITY OF LOS ALTOS, CA

Prepared by EcoShift Consulting

Executive Summary

The City of Los Altos (Los Altos) is located on the eastern edge of the Santa Cruz mountains, roughly 15 miles East of the Pacific Ocean and 5 miles from the San Francisco Bay. Proximity to these large water bodies has made for a stable climate and will somewhat temper future climate hazards compared to other areas in California.

This Vulnerability Assessment is intended to assist Los Altos in understanding the climate risks it faces under future emissions scenarios. In keeping with California Senate Bill 379, the assessment relies on resources provided by the California Governor's Office of Emergency Services (OES) including Cal-Adapt and the California Adaptation Planning Guide to describe how the *frequency* and *intensity* of climate hazards are changing. The Vulnerability Assessment is just the first step in Los Altos' effort in planning for and adapting to climate change, outlined in Los Altos' Climate Action & Adaptation Plan (CAAP). The Vulnerability Assessment is an appendix to the CAAP. The documents should be read together.

Purpose of SB 379
Senate Bill No. 379 of the California Legislature requires local jurisdictions to address climate adaptation and resiliency strategies in either the local hazard mitigation plan or an update to the safety element of a jurisdiction's General Plan, depending on the date of adoption of a local hazard mitigation plan. The update includes a climate vulnerability assessment "identifying the risks that climate change poses...and the geographic areas at risk," along with a set of goals and strategies to address those risks.

The Cal-Adapt tool and projections of climate change taken from other government plans describe how climate is changing, but they do not describe what the impact will be on Los Altos. The goal of the Vulnerability Assessment is to understand how and how much a changing climate will impact the community sectors - assets, people, economy - that make Los Altos what it is. Adaptation strategies developed in response to the Vulnerability Assessment are described in the CAAP.

APPENDIX H: CLIMATE VULNERABILITY ASSESSMENT FOR THE CITY OF LOS ALTOS, CA CONTINUED

Introduction

Natural variability in the climate and weather produce extreme events like droughts, wildfires, and floods over long time periods. While natural systems respond to and even rely on these phenomena, our dense settlement and production of greenhouse gas emissions have greatly changed the impacts of climate hazards. Increased capture of solar radiation, generally referred to as global warming or climate change, is having massive and long-term effects on climatic conditions and global systems like the water cycle, jet stream and ocean currents that transfer energy. Generally, the oceans are rising and temperatures are increasing. Disruptions in jet stream patterns have caused highly unseasonal weather. Some naturally occurring hazards are expected to occur more frequently and with greater intensity, putting our infrastructure, environment, housing, and populations at greater risk.

Indicators of Climate Change in California, a report prepared by the Office of Environmental Health Hazard Assessment, describes the rapidity with which climate change has impacted the state. Included are the following statements.[1]

- Average maximum temperatures have increased by 2.2˚Farenheit over the past century
- The 2012 to 2016 drought was the most extreme since instrumental records began, producing a moisture deficit not seen in the last 1,200 years. It is consistent with a trend of California becoming increasingly dry.
- Glaciers in the Sierra Nevada have decreased in area dramatically, with several of the largest glaciers decreasing by half.
- The amount of water stored in the state's snowpack has been highly variable from year to year, dropping to a record low 5% of the historical average in 2015. Snowmelt runoff during April through July has declined.
- The area burned by wildfires across the state is increasing.
- Over the past 80 years, California's forests have been changing in response to decreasing water availability, driven by warmer temperatures. Small trees and oaks have increased, while pines have decreased.

While efforts at the State and County levels have addressed climate risks and methods to mitigate them, this document is the first to consider the climate risk to Los Altos on the local level, in accordance with SB 379. Although future climate conditions are not certain, models developed by the scientific community and recommended by the California Governor's Office of Emergency Services (OES) provide a range of possible changes to the climate and serve as the technical basis for understanding Los Altos' climate risk.

[1] Office of Environmental Health Hazard Assessment, California Environmental Protection Agency (2018). Indicators of Climate Change in California. Sacramento, California.

APPENDIX H: CLIMATE VULNERABILITY ASSESSMENT FOR THE CITY OF LOS ALTOS, CA CONTINUED

Background

California has been divided into 16 different climate zones based on shared characteristics to understand the energy needs for heating and cooling throughout the year. Los Altos is in California Climate Zone 4, which uses San Jose as a reference city. The climate in Zone 4, of which Los Altos is at the very northern boundary, is inland enough to have hot summers but is influenced by the ocean which moderates high and low temperature extremes. Much of the year falls within the comfort zone of 68-80F. Typically, winters are cool and wet. However, Los Altos is in a "rain shadow" of the Santa Cruz mountains, limiting winter precipitation, as well as wind and fog as shown in Figure 1.

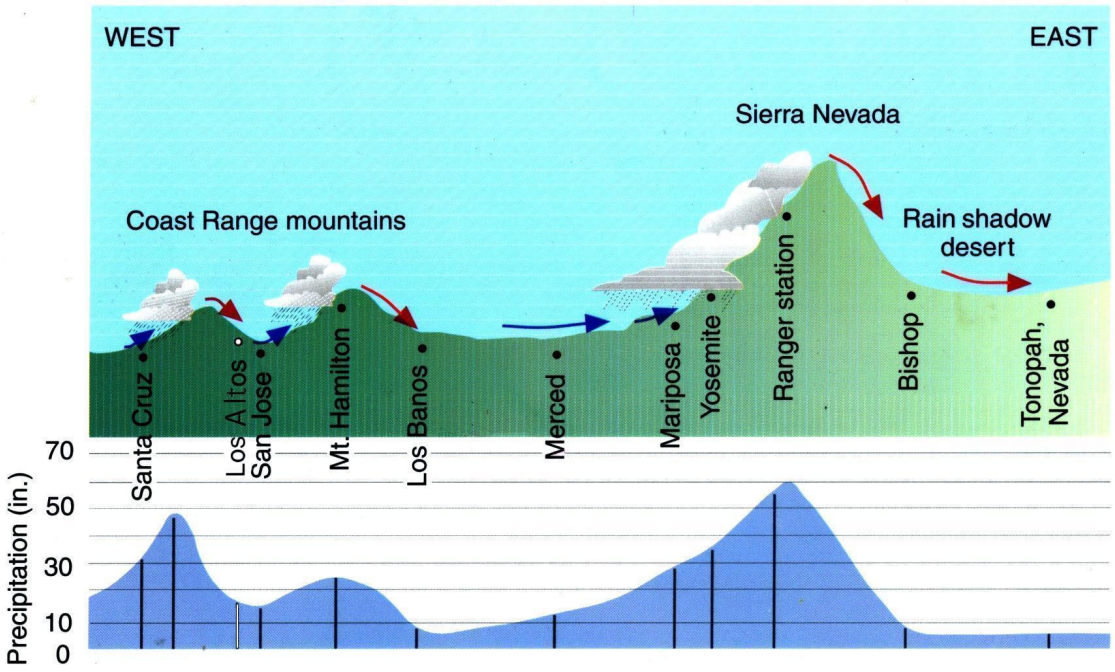

Figure 1: Relationship Between Topography and Precipitation in Simplified Cross Section of California showing how Los Altos is in a rain shadow of the Santa Cruz Mountains (Modified from: C. Ahrens, *Essentials of Meteorology*, 2nd Edition)

Climate Hazard History in Los Altos

Los Altos has experienced many climate hazards since its incorporation almost 75 years ago and more in recorded history. The frequency of these hazards provides a baseline for considering future hazards, even if Los Altos continues to change and the rate of climate change is increasing. Greenhouse gas emissions will change the *frequency* and *intensity* of experienced climate hazards but will not introduce new hazards altogether. Many of these experienced hazards are enumerated in Table 1 of Federally declared disasters. Table 1 indicates the relative prevalence of climate

APPENDIX H: CLIMATE VULNERABILITY ASSESSMENT FOR THE CITY OF LOS ALTOS, CA CONTINUED

hazards that reach the level of Federal disaster declaration. Severe winter storms that caused flooding were the most frequent climate event followed by wildfires. Since the Federal government declares disasters at a county-wide scale, the severity of damage to Los Altos specifically is difficult to ascertain from this data set alone.

Incident Type	Declaration Title	Date	FEMA Declaration
Biological	COVID-19	March 13, 2020	EM-3428-CA
	COVID-19 PANDEMIC	March 22, 2020	DR-4482-CA
Coastal Storm	COASTAL STORMS, FLOODS, SLIDES & TORNADOES	February 9, 1983	DR-677-CA
Drought	DROUGHT	January 20, 1977	EM-3023-CA
Earthquake	LOMA PRIETA EARTHQUAKE	October 18, 1989	DR-845-CA
Fire	GRASS, WILDLANDS, & FOREST FIRES	July 18, 1985	DR-739-CA
	CROY FIRE	September 25, 2002	FM-2465-CA
	SUMMIT FIRE	May 22, 2008	FM-2766-CA
	WILDFIRES	June 28, 2008	EM-3287-CA
	SCU LIGHTNING COMPLEX FIRE	August 21, 2020	FM-5338-CA
	WILDFIRES	August 22, 2020	DR-4558-CA
Flood	SEVERE STORMS, FLOOD, MUDSLIDES & HIGH TIDE	January 7, 1982	DR-651-CA
	SEVERE STORMS & FLOODING	February 21, 1986	DR-758-CA
	SEVERE WINTER STORMS, FLOODING, AND MUDSLIDES	April 1, 2017	DR-4308-CA
Freezing	SEVERE FREEZE	February 11, 1991	DR-894-CA
Hurricane	HURRICANE KATRINA EVACUATION	September 13, 2005	EM-3248-CA
Severe Storm(s)	SEVERE WINTER STORMS, FLOODING, LANDSLIDES, MUD FLOWS	January 10, 1995	DR-1044-CA
	SEVERE WINTER STORMS, FLOODING LANDSLIDES, MUD FLOW	March 12, 1995	DR-1046-CA
	SEVERE STORMS, FLOODING, MUD AND LANDSLIDES	January 4, 1997	DR-1155-CA
	SEVERE WINTER STORMS AND FLOODING	February 9, 1998	DR-1203-CA
	SEVERE WINTER STORMS, FLOODING, AND MUDSLIDES	February 14, 2017	DR-4301-CA

APPENDIX H: CLIMATE VULNERABILITY ASSESSMENT FOR THE CITY OF LOS ALTOS, CA CONTINUED

Table 1: Relative prevalence of climate hazards that reach the level of Federal disaster declaration

FEMA declares disasters on a county level, even if the disaster only affected part of the county. Pandemics and earthquakes, though shown in Table 1, are not climate hazards so are not discussed in this report. Notably absent from the table are several multi-year droughts, based on how FEMA calculates event losses. The only FEMA-declared emergency classified as a drought - in all of California's history - occurred in 1977. However, Santa Clara County has experienced three additional extended year droughts: 1987-1992, 2007-2009, 2012-2017. As of this writing (summer 2021), California is experiencing persistent severe drought.

Based on this history and Cal-Adapts projections, this vulnerability assessment has been framed around three climate-related groups of hazards:

1. Temperature, Extreme Heat & Drought
2. Precipitation & Flooding
3. Wildfires & Air pollution

Reports produced by other jurisdictions may include different climate variables and climate hazards, or categorize the variables and hazards differently based on their climate conditions.

Temperature, Extreme Heat & Drought

Average temperatures and the number of extreme heat days are projected to increase throughout the century, according to Cal-Adapt. The number of extreme heat days are projected to be almost 300% more in a high emissions scenario than in a medium emissions scenario.

Whether or not droughts get worse depends on the definition of drought. One definition is a prolonged period with below-average or no precipitation. The length of dry spells is expected to increase as much as 15%, while average annual precipitation is not expected to change. Higher temperatures combined with less consistent rain will impact both water supply and outdoor water demand.

Climate Hazards like droughts, heat waves, and air pollution are stressors that are usually less dynamic than floods or wildfires. Droughts occur on a slower timeline and can last longer than other climate hazards. Droughts may not cause a loss of property or impair infrastructure like other hazards, but prolonged droughts impact the environment, the economy, and residents' quality of life. The Santa Clara County Operational Area (OA) Hazard Mitigation Plan declares:

> Historical drought data regarding Santa Clara County OA indicate four significant droughts over the last 40 years, with drought occurring in 12 of those 40 years. Based on risk factors and this history, droughts likely will continue to occur in the Santa Clara County OA. Moreover, as temperatures increase, probability of future droughts will

> likely increase as well. Therefore, droughts likely will occur in Santa Clara County at varied severities in the future, even after conclusion of the current [2012-2017]drought.[2]

Similarly, across Santa Clara County, several extreme heat events were experienced in the past 20 years, including during 2000, 2006, and 2009. None of these were Federally-declared disasters. Yet heat waves have become stronger across the region, including mid-summer night-time heat waves and increases in day-time heat waves. Though heat waves are invisible, they can have great impacts on human health, particularly for vulnerable populations.

Precipitation & Flooding

Los Altos has experienced numerous severe winter storms that have caused flooding, and multiple climate models predict at least one severe storm a year under high emissions scenarios by the end of the century (See the section Future Changes to Climate Hazards, below). Interestingly, while severe storms will happen more frequently, they will not be much more intense according to projections produced by Cal-Adapt. Similarly, the average annual precipitation is not expected to change.

Floods are caused by the duration, intensity, and spatial distribution of precipitation interacting with terrain and land use characteristics like ground cover. In other words, floods are not exclusively a climate hazard. They are the result of a climate phenomenon in interaction with physical conditions. These local conditions that influence flooding range from short-term characteristics such as soil moisture to long-standing features like the size of storm sewers. Similarly, the impact of floods depend on what is flooded: The storms of 1998 caused overtopping of Adobe Creek, flooding properties and damaging structures in Los Altos Redwood Grove Nature Preserve, but producing much less damage than if somehow downtown were flooded.

Wildfires & Air Pollution

Despite increased temperatures, wildfires are not projected to be a significantly worse threat in the future for Los Altos, based on the average area burned by wildfires. That indicator of wildfires is projected to *decrease* as Los Altos urbanizes. Regionally, Los Altos and the surrounding area is not high risk, though the relative risk for natural areas in the Santa Cruz mountains is projected to increase slightly. CAL FIRE's somewhat outdated maps do not consider Los Altos or most of the areas around Los Altos to be very high fire hazard severity zones because they are urban. The closest very high fire hazard areas are in southern Cupertino and Saratoga. Some areas west of Los Altos are in a high hazard severity zone.

However, the analysis is limited to direct wildfire impact in Los Altos – acres burned. Secondary impacts like air pollution can be significant and prolonged.

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[2] *Santa Clara County Operational Area Mitigation Plan*, Office of Emergency Services, p. 117, http://sanjose.granicus.com/MetaViewer.php?event_id=2690&meta_id=642821, accessed June 8, 2021

APPENDIX H: CLIMATE VULNERABILITY ASSESSMENT FOR THE CITY OF LOS ALTOS, CA CONTINUED

In some ways, wildfires are an interesting analog to floods, influenced both by weather and local conditions. The Santa Clara County Climate Adaptation Guidebook describes this complexity. "Weather is one of the most significant factors in determining the severity of wildfires; [however,] natural fire patterns are driven [both] by conditions such as drought, temperature, precipitation, and wind, and also by changes to vegetation structure and fuel (i.e.) biomass availability." Just as floods are exacerbated by high soil moisture, wildfires are more destructive when they occur on top of strong droughts.

Of course, wildfires can start from any number of human sources and not only during dry weather. Like floods, wildfires present the greatest risk to life and property when they cross the wildland urban interface into developed areas. However, the spread and duration of wildfires is less predictable than floods. Wildfires are most likely to spread through embers directed by wind and the air currents of the fire itself.

These air currents can bring particulate matter hundreds of miles from the fire. During the SCU Fire and even the Paradise Fire, Los Altos was impacted by poor air quality which kept people in their homes.[3] Summer can already produce poor air quality due to photochemical (sunlight) smog and the long-term suspension of particulate matter that rain in the winter and spring dissolves. These periods of air pollution increase the health risk for people with pre-existing respiratory conditions and/or who experience occupational hazards through outdoor work.

[3] As shared in the Apr. 23, 2021 focus group

APPENDIX H: CLIMATE VULNERABILITY ASSESSMENT FOR THE CITY OF LOS ALTOS, CA CONTINUED

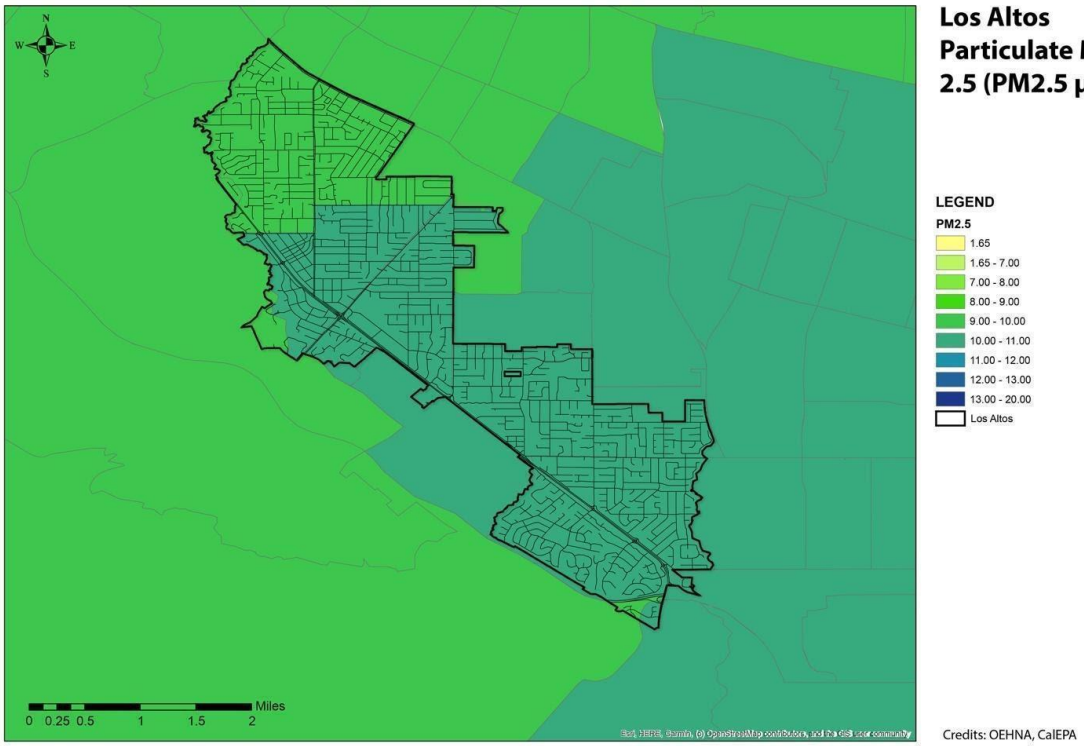

Figure 2: Average concentration of particulate matter 2.5 in Los Altos and surrounding area

Although a verdant city, Los Altos has only average air quality. The Bay Area as well as the Central Valley south of Sacramento are all non-attainment areas for ambient air quality standards. Figure 2 shows the concentration of Particulate Matter 2.5, a specifically harmful irritant. According to OEHHA, "PM2.5…can have adverse effects on the heart and lungs, including lung irritation, exacerbation of existing respiratory disease, and cardiovascular effects. The US EPA has set a new [in the last decade] standard for ambient PM2.5 concentration of 12 µg/m3, down from 15 µg/m3." Most of Los Altos is higher than 10 µg/m3. The EPA classifies the whole of Santa Clara County as "moderate" in the category of PM 2.5. It should be noted that ozone, another indicator of air quality, has improved considerably throughout the Bay Area since the 1960s. Given the moderate baseline air quality, added pollution from wildfires even far from Los Altos can create unhealthy levels of PM2.5

APPENDIX H: CLIMATE VULNERABILITY ASSESSMENT FOR THE CITY OF LOS ALTOS, CA CONTINUED

Future Changes to Climate Hazards

There are several sources of information about future climate hazards and their impact on Los Altos. Described below is information from several State, County, and local documents and tools. These sources are not exhaustive, nor are they entirely in agreement, however, together they provide a helpful composite.

California State Hazard Mitigation Plan

The California State Hazard Mitigation Plan is the state's primary document which describes historical and current hazards and articulates goals to mitigate those hazards to reduce injury, death, and damage. The Hazard Mitigation Plan is helpful background for the Vulnerability Assessment, although hazard mitigation is not exactly the same as climate adaptation. Specifically, the goal of hazard mitigation planning is to understand the probability and impact of natural and man-made hazards and to outline actions to reduce or eliminate the loss of life and property from those hazards. Some of the hazards in the hazard mitigation plan are natural hazards and most of those natural hazards are climate related. The plan lists fire, flood, and earthquake as the primary hazards based on number of events, deaths, and cost. Climate change, it says, will result in "more frequent incidence of severe events, such as extreme rainfall, wind, wildfire, extreme heat, and extended drought."[4]

California's Fourth Climate Change Assessment – San Francisco Bay Area Region Report

California's fourth climate change assessment was produced in 2018. Given the size and physical diversity of California, the assessment was divided into region-specific reports. The San Francisco Bay Area Region report describes that temperatures in the Bay Area rose almost 2˚F between 1950 and 2005 and are expected to rise significantly by mid-century. If emissions continue through the end of the century, temperature changes will be major, with an increase of 7.2˚F. However, inland areas will heat up more than coastal areas, both generally and when comparing the hottest day of the year in each area.

According to the report, precipitation will continue to vary significantly year to year, based on the occurrence and path of winter jet stream flows which produce "atmospheric rivers." Winter storms from the atmospheric rivers will continue to produce significant snowfall in the Sierra Nevada and heavy rainfall capable of causing floods. Under a high emissions scenario, the wettest day of the year in 2100 may produce 30% more rain. The Bay Area may experience precipitation "whiplash" year to year:

[4] California State Hazard Mitigation Plan, California Office of Emergency Services, 2018, Section 4.3 – p. 129

APPENDIX H: CLIMATE VULNERABILITY ASSESSMENT FOR THE CITY OF LOS ALTOS, CA CONTINUED

Even if total precipitation increases, changes in the timing and form of precipitation (rain or snow) along with expected increases in temperature are likely to cause longer and deeper droughts. Average Sierra snowpack is expected to decline between 30% and 60% by mid-century and over 80% by the end of the century under a high emissions scenario.

Future fire activity is expected to increase as climate warms; however, the distribution of risk is uncertain because it depends on changes in urban development. Where the wildland-urban interface expands, fire risks will increase. Rural and suburban areas that urbanize will see a decline in fire risk.

Santa Clara County Operational Area Hazard Mitigation Plan

The Santa Clara County Operational Area Hazard Mitigation Plan is the county-wide hazard mitigation plan for Santa Clara County. The plan describes briefly how climate will impact the frequency and severity of climate hazards. Specifically, it describes that the number and length of heat waves is expected to increase, as are the number of single-day extreme heat days. According to the document, "precipitation projections for California remain uncertain," however, the combination of temperature increases combined with the timing and form of precipitation is expected to change stream flow and river flooding. Wildfire risk as defined by area burned in Santa Clara County is not expected to change significantly by mid-century. The average area burned is expected to *decrease* by 10-20% by 2085.

Los Altos Hazard Mitigation Plan Annex

The Los Altos Hazard Mitigation Plan Annex is a Los Altos-specific addition to the Santa Clara County Hazard Mitigation Plan. The Los Altos Hazard Mitigation Plan Annex not only lists the history of declared disasters, it also ranks natural hazards based on their probability and their impact. According to the Hazard Mitigation Plan Annex, the hazard with the highest risk score (probability x impact) is earthquake (48) followed by severe weather (33), flood (18), drought (9), dam and levee failure (6), wildfire (3) and landslide (3). Severe weather includes severe storms from atmospheric rivers or thunderstorms, extreme heat and frosts/freezes, high winds, and so-called space weather, which refers to disruptive variations in the sun's energy.

The risk score ranking is useful for understanding how the hazards compare to one another. While earthquakes are a natural hazard, it is not considered in this climate Vulnerability Assessment.[5]

[5]With the exception of sea level rise increasing the liquefaction risk in coastal areas outside of Los Altos, there is no relation between atmospheric phenomena and earthquake risk. More simply, whether we reverse or continue climate change will not increase or decrease the risks of earthquakes. Earthquakes are well considered in the Hazard Mitigation Plan for Santa Clara County and its Los Altos Annex.

APPENDIX H: CLIMATE VULNERABILITY ASSESSMENT FOR THE CITY OF LOS ALTOS, CA CONTINUED

Rankings of the CAAP Task Force

The CAAP Task Force is a group of City staff and Environmental Commission members who guided the development of the CAAP. They are involved in many aspects of Los Altos operations, planning, and environmental management and so were asked what climate hazards they were most concerned about in the future. They ranked their concern (high, medium, low) for primary and secondary climate hazards. Primary climate hazards are phenomena that are climate variables. Temperature and precipitation *define* climate. Secondary climate hazards are hazards resulting from changes in primary climate hazards in relation to community sectors like the natural environment, the economy, and the public. All twelve respondents on that Task Force completed the survey ranking hazards of concern. Responses are shown below

Primary Climate Hazards	Score
Temperature Increase	2.4
Precipitation Changes	1.8
Sea Level Rise	1.3

Table 3: Average Scores and Ranking for Primary Climate Hazards according to the CAAP Task Force

Secondary Climate Hazards	Score
Drought	2.8
Extreme Heat/Heat Waves	2.4
Wildfire	2.4
Air Pollution	2.4
Flooding (Riverine, Areal)	2.3
Urban Heat Island	1.9
Flooding (Coastal)	1.4
Landslide	1.3

Table 4: Average Scores and Ranking for Secondary Climate Hazards according to the CAAP Task Force

The CAAP Task Force was most concerned about increasing temperatures and changes in precipitation patterns. Each of the hazards of high and medium concern were related to the impacts of heat, with drought receiving the highest average score and extreme heat, wildfire, and air pollution receiving the next highest scores. The hazard with the highest score, drought, is driven both by heat and by precipitation. Air pollution, wildfires, and urban heat island are hazards that are not entirely a natural phenomenon.

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Cal-Adapt & Adaptation Planning in California

The OES issued the **California Adaptation Planning Guide (APG)** to help municipalities and all stakeholders involved in the vulnerability assessment process with recommendations and tools to develop a scientifically grounded, relevant, and actionable adaptation plan.

One of the public resources provided by OES to be used in consult with the (APG) is a web-based climate projection tool called Cal-Adapt. **Cal-Adapt provides historical and projected climate information, including "local snapshots" of several different climate phenomena under different emissions scenarios through 2100.** The global climate models selected by OES are particularly well matched to California's climate.

Cal-Adapt was used for this vulnerability assessment to predict what future temperature and precipitation Los Altos will experience based on scenarios of future global emissions or Representative Concentration Pathways, RCP 4.5 and RCP 8.5, adopted by the International Panel on Climate Change. These emissions scenarios are based on models of population growth, economic growth, food production, technological advancement, political activities to curb greenhouse gas emissions and other factors. RCP 2.6 represents a "very stringent" pathway, in which emissions start declining by 2020 and go to zero by 2100. It is not included in Cal-Adapt. RCP 4.5 represents a global growth scenario in which emissions continue to 2040 and then decline. RCP 8.5 represents a "business as usual" scenario in which emissions continue unabated. Because these scenarios and models are global, they do not consider how Los Altos reduces its emissions.

Cal-Adapt plugs these global emissions scenarios into global climate models (GCMs) to produce local information about areas in California, including Los Altos. Cal-Adapt describes the process on its Guidance on Using Climate Projections webpage, from which the text below is reproduced.

> Climate scientists create projections of future climate using powerful tools called global climate models. Global climate models are complex pieces of computer software that crunch through thousands of mathematical equations representing the scientific theory of how the climate system works. They can be used to simulate climate over past periods, or to run experiments in which scientists impose certain conditions on the model to see how the climate system responds. A future climate projection is the product of global climate model experiments in which scientists impose upon the model some scenario of the future atmospheric concentration of greenhouse gases [eg. RCP 4.5 and RCP 8.5].
>
> When climate scientists run a climate model, they divide the area of study into a grid, and the model performs calculations for each

APPENDIX H: CLIMATE VULNERABILITY ASSESSMENT FOR THE CITY OF LOS ALTOS, CA CONTINUED

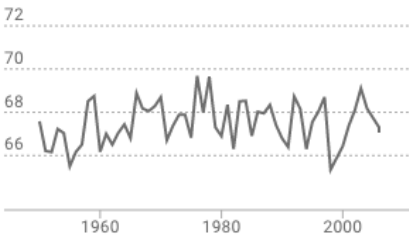
individual cell within the grid. The output from those calculations can then be visualized on a map, similar to the visualizations in Cal-Adapt [shown in Figures 3-9]. In climate model projections, for any given snapshot in time, each grid cell is represented by a single value for temperature, precipitation, or other climate variable of interest.

The grid cells in most global climate models are very large—from 100 to 600 kilometers [roughly 100 to 375 miles] squared. This coarse resolution is OK when scientists are studying climate on the global scale, but it is not very useful when we are trying to understand climate change on smaller scales. We know that present-day climate varies greatly from region to region in California, and so we expect future climate to vary accordingly. But that detail is lost in the global climate models, in which all of California may be represented by just a few grid cells. To be able to plan for the future, we need to produce higher-resolution projections of future climate. Climate scientists do just that by using various techniques to "downscale" global climate model output to finer spatial scales. The data in Cal-Adapt is taken from a selection of global climate models and downscaled to about 7-kilometer [roughly 4.5 mile] resolution.

Understanding Cal-Adapt Graphs

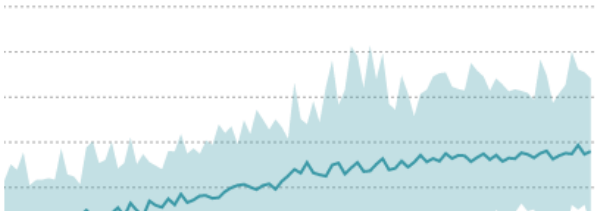
The Cal-Adapt graphs presented in this Vulnerability Assessment display several types of data illustrating how variables like temperature, extreme heat, drought, precipitation, and wildfire are expected to change as climate change continues. The next series of images describes how information on the Los Altos graphs are displayed.

The line in grey represents historical observed values for each year shown on the graph. The year-to-year differences represent the natural variation in climate. Although the planet is warming over the long term, some years are still cooler or warmer than others.



The colored areas of the graph below represent projections under different emissions scenarios, RCP 4.5 representing continued global emissions until 2040 and RCP 8.5 representing continued global emissions through the end of the century.

RCP 4.5 is shown in a light blue or teal color. The blue line represents the most likely



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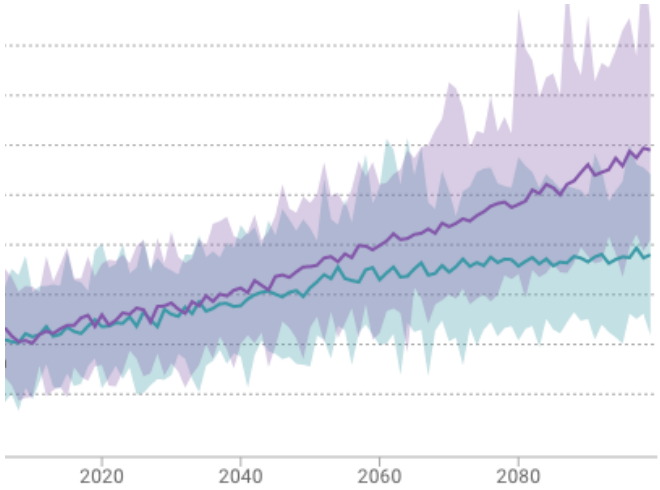
outcome for whatever variable is being graphed. Because it is produced by averaging multiple climate models, it smooths out the year-to-year variability that each model predicts. The line does not indicate that year-to-year variability will disappear. (Figure 6 in the following pages shows how much variability is predicted year-to-year in individual models)

The shaded blue or teal area around the line represents the full range of climate projections for the variable across all the models. If one model predicts a high value and one model predicts a low value, that information is shown in the shaded area.

In sum, under a medium emissions scenario, Los Altos may experience any value within the shaded blue area and is most likely to experience the value on the blue line.

The same explanation for the image holds true under a high emissions scenario, shown in light purple. The purple line represents the most likely outcome for the variable, and the shaded area around the line represents the full range of climate projections for the variable across all models.



When both emissions scenarios are graphed, the darker purple-grey area represents the possible values which are projected in both medium emissions and high emissions scenarios. For some climate variables, like temperature, differences between emissions scenarios become clear later in the century by less and less overlap in blue and purple shaded areas, indicating that reducing emissions will reduce how much temperatures rise. For other variables, like precipitation, there is not a significant visual difference between the blue and purple shaded areas, indicating that the range of values for precipitation is more or less the same in either emissions scenario.

APPENDIX H: CLIMATE VULNERABILITY ASSESSMENT FOR THE CITY OF LOS ALTOS, CA CONTINUED

Precipitation & Flooding

Figure 3 shows the observed and projected annual precipitation for Los Altos. The graph indicates that there is expected to be little change in annual average precipitation in a medium or high emissions scenario for both Los Altos and Santa Clara County (not shown), a remarkable reality considering that many areas across California and the country are projected to experience much greater drought in the future. As shown in Table 5, average annual precipitation is projected to increase marginally.

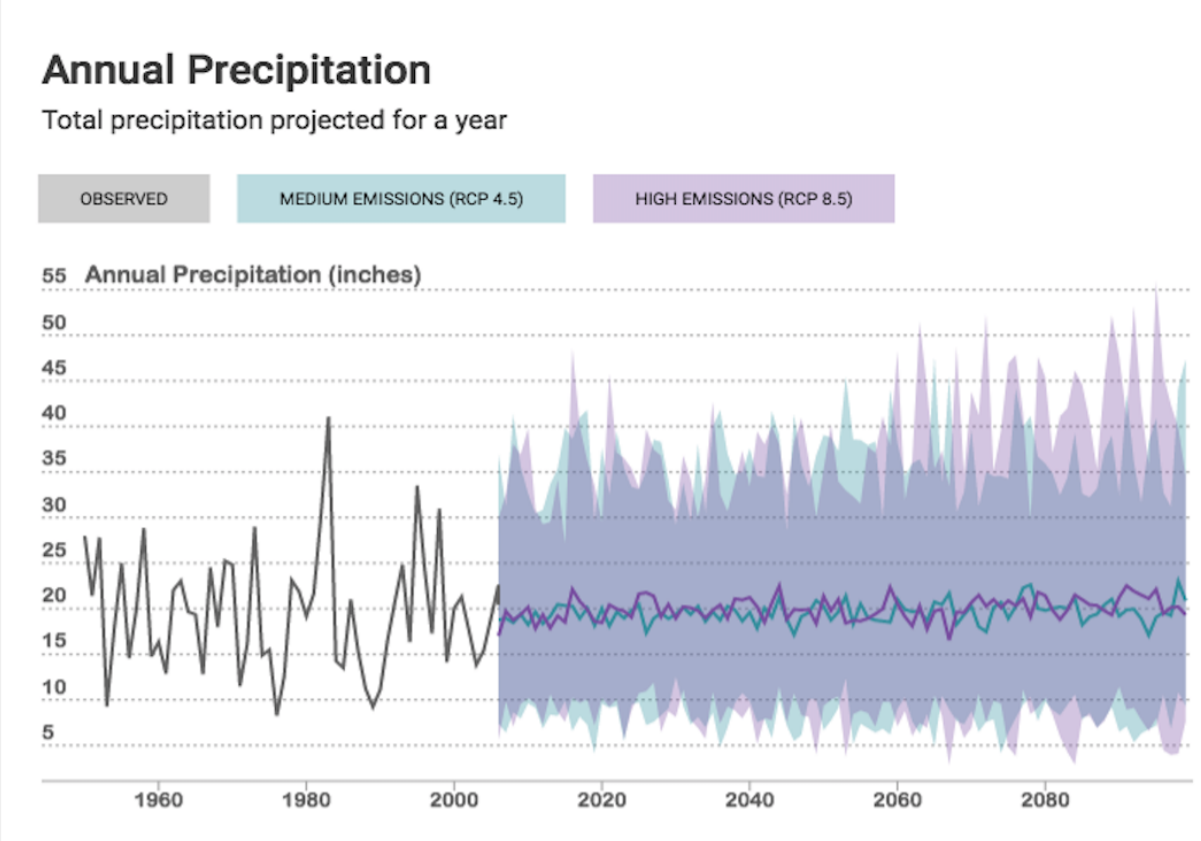


Figure 3: Annual total precipitation, observed and projected under medium and high emissions scenarios. The shaded area represents the range of likely annual precipitation totals in each scenario; the colored lines represent the most likely precipitation total in each scenario. Produced using Cal-Adapt.

Period	Years	Emissions Scenario	Average	Range of Averages	Units
Baseline	1961-1990	Observed	19		inches
Mid-Century	2035-2064	Medium (RCP 4.5)	20.1	17.5 - 26.4	inches
End-Century	2070-2099	Medium (RCP 4.5)	20.6	16.7 - 25.2	inches
Mid-Century	2035-2064	High (RCP 8.5)	20.5	16.4 - 26.1	inches

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End-Century	2070-2099	High (RCP 8.5)	21.3	14.7 - 28.6	inches

Table 5: Annual total precipitation, observed and projected under medium and high emissions scenarios over 30-year periods according to Cal-Adapt. The numbers in the average column represent the averages of the most likely outcome over the 30-year periods. The numbers in the range of averages column represents the averages from all climate models over the 30-year periods. The range of averages is generally greater in the high emissions scenario, indicating the greater uncertainty under high emissions.

Even if annual precipitation is expected to remain consistent as an annual average, the timing of rainfall is expected to vary from the existing seasons. Winters may be wetter and spring and autumn may be drier. The variability may include more intense, infrequent rainfall causing riverine flooding, preceded and followed by longer dry spells without any precipitation. The maximum 1-day precipitation event is expected to increase marginally.

Flooding is likely to increase as a result of an increased number of days with extreme rainfall events. That increased risk may be compounded with a slight increase in the number of wildfires in areas uphill and upstream from Los Altos that reduce the ability of plants and soils to absorb rainfall. Conversely, back-to-back extreme rainfall events in late winter may fall on areas already saturated and unable to absorb rainfall. The result in either case is a change in the intensity and pattern of flooding. Determining flood risk requires hydrologic and hydraulic analyses that are outside the scope of this assessment- the last study performed for FEMA was in 1977, indicating that a new analysis should be performed.

APPENDIX H: CLIMATE VULNERABILITY ASSESSMENT FOR THE CITY OF LOS ALTOS, CA CONTINUED

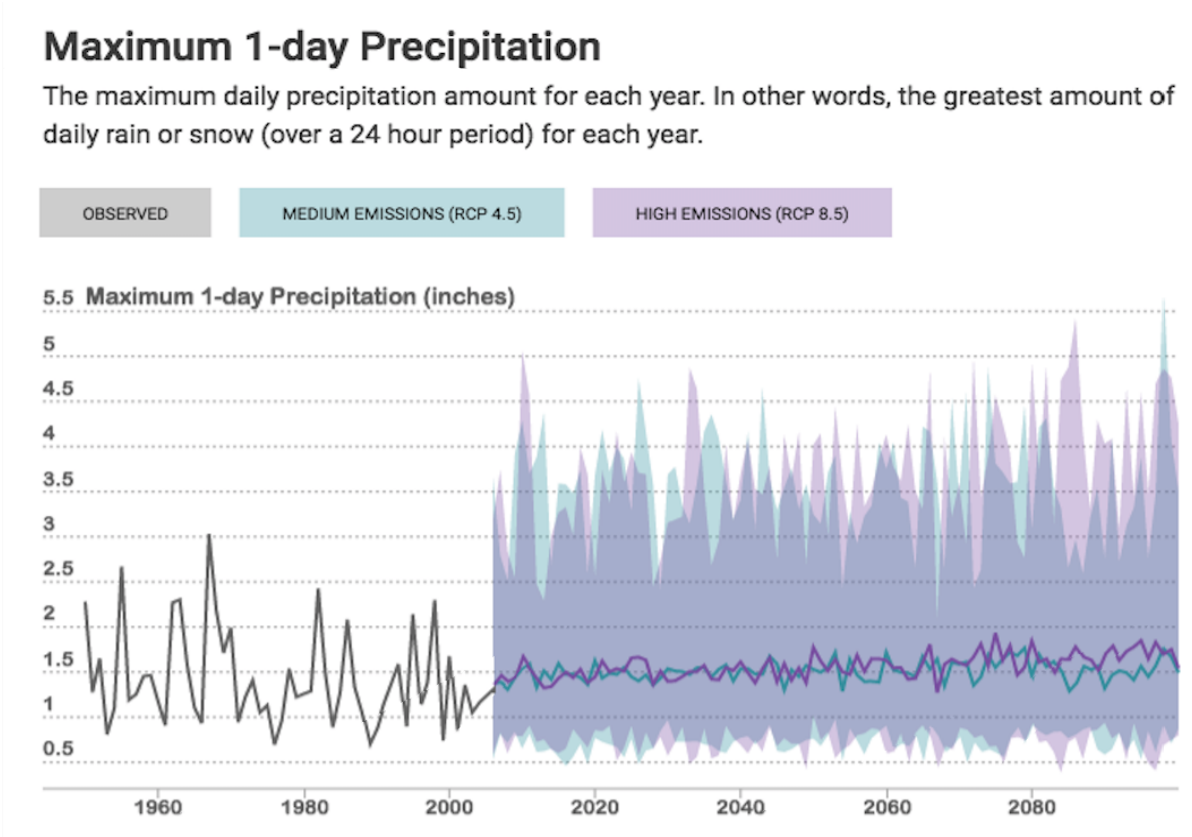


Figure 4: Maximum 1-day precipitation, observed and projected under medium and high emissions scenarios. The shaded area represents the range of likely precipitation totals in each scenario; the colored lines represent the most likely total in each scenario. Produced using Cal-Adapt.

Period	Years	Emissions Scenario	Average	Range of Averages	Units
Baseline	1961-1990	Observed	1.5		inches
Mid-Century	2035-2064	Medium (RCP 4.5)	1.6	1.35 - 2.06	inches
End-Century	2070-2099	Medium (RCP 4.5)	1.6	1.36 - 2.01	inches
Mid-Century	2035-2064	High (RCP 8.5)	1.6	1.35 - 1.86	inches
End-Century	2070-2099	High (RCP 8.5)	1.7	1.36 - 2.29	inches

Table 6: Maximum 1-day precipitation, observed and projected under medium and high emissions scenarios over 30-year periods according to Cal-Adapt. The numbers in the average column represent the averages of the most likely outcome over the 30-year periods. The numbers in the range of averages column represents the averages from all climate models over the 30-year periods.

APPENDIX H: CLIMATE VULNERABILITY ASSESSMENT FOR THE CITY OF LOS ALTOS, CA CONTINUED

Figure 5 shows a slightly different representation of future precipitation under a high emissions scenario and, using four models recommended by Cal-Adapt, shows an increase in the number of extreme precipitation events annually. Through mid-century, all of the models predict some years with no extreme precipitation events annually. By the end of the century, three of the four models predict several extreme events annually – it will be more likely than not to experience at least one extreme event annually. Since the annual precipitation is not expected to increase, it can be assumed that there will be a decrease in the amount of precipitation occurring during non-extreme precipitation events.

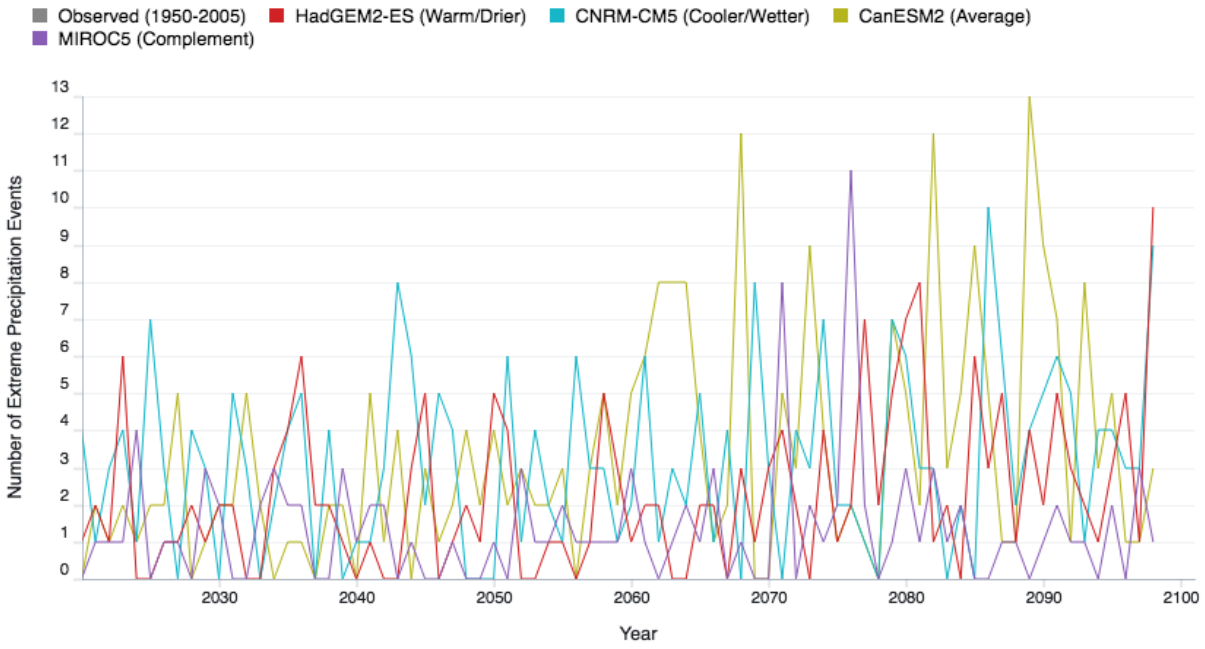


Figure 5: Number of extreme precipitation events projected under high emissions scenarios according to 5 different global climate models (GCMs) recommended by Cal-Adapt.

Temperature, Extreme Heat & Drought

As shown in Figure 6, the annual average maximum temperature is expected to increase over the rest of the 21st century. Under the high emissions scenario (RCP 8.5), temperature is projected to increase nearly 8 degrees F, nearly twice as much as under a medium emissions scenario (RCP 4.5). Table 7 indicates the certainty of temperature increases. Even the low end of the range of averages is higher than the observed average, 1961-1990.

APPENDIX H: CLIMATE VULNERABILITY ASSESSMENT FOR THE CITY OF LOS ALTOS, CA CONTINUED

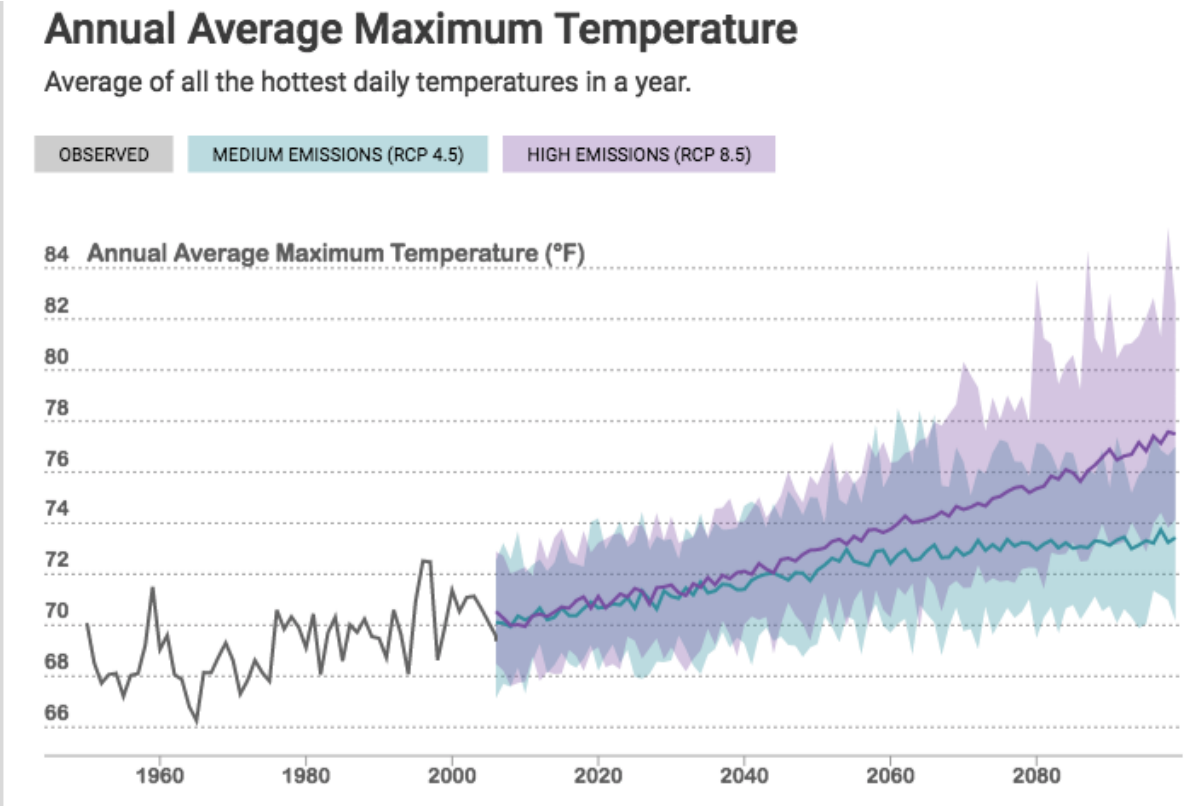


Figure 6: Annual average maximum temperatures, observed and projected under medium and high emissions scenarios. The shaded area represents the range of likely temperatures in each scenario; the colored lines represent the most likely temperature in each scenario. Produced using Cal-Adapt.

Period	Years	Emissions Scenario	Average	Range of Averages	Units
Baseline	1961-1990	Observed	67.7		°F
Mid-Century	2035-2064	Medium (RCP 4.5)	70.3	68.8 - 71.8	°F
End-Century	2070-2099	Medium (RCP 4.5)	71.4	69.5 - 73.7	°F
Mid-Century	2035-2064	High (RCP 8.5)	71.1	69.2 - 72.9	°F
End-Century	2070-2099	High (RCP 8.5)	74.3	71.5 - 78.1	°F

Table 7: Annual Average Maximum Temperature, observed and projected under medium and high emissions scenarios over 30-year periods according to Cal-Adapt. The numbers in the average column represent the averages of the most likely outcome over the 30-year periods. The numbers in the range of averages column represents the averages from all climate models over the 30-year periods.

APPENDIX H: CLIMATE VULNERABILITY ASSESSMENT FOR THE CITY OF LOS ALTOS, CA CONTINUED

Drought

As a product of increasing temperatures and increasing precipitation variability, including less spring and autumn precipitation, drought may increase. The maximum length of dry spell is expected to increase by 10-15% as shown in the table below.

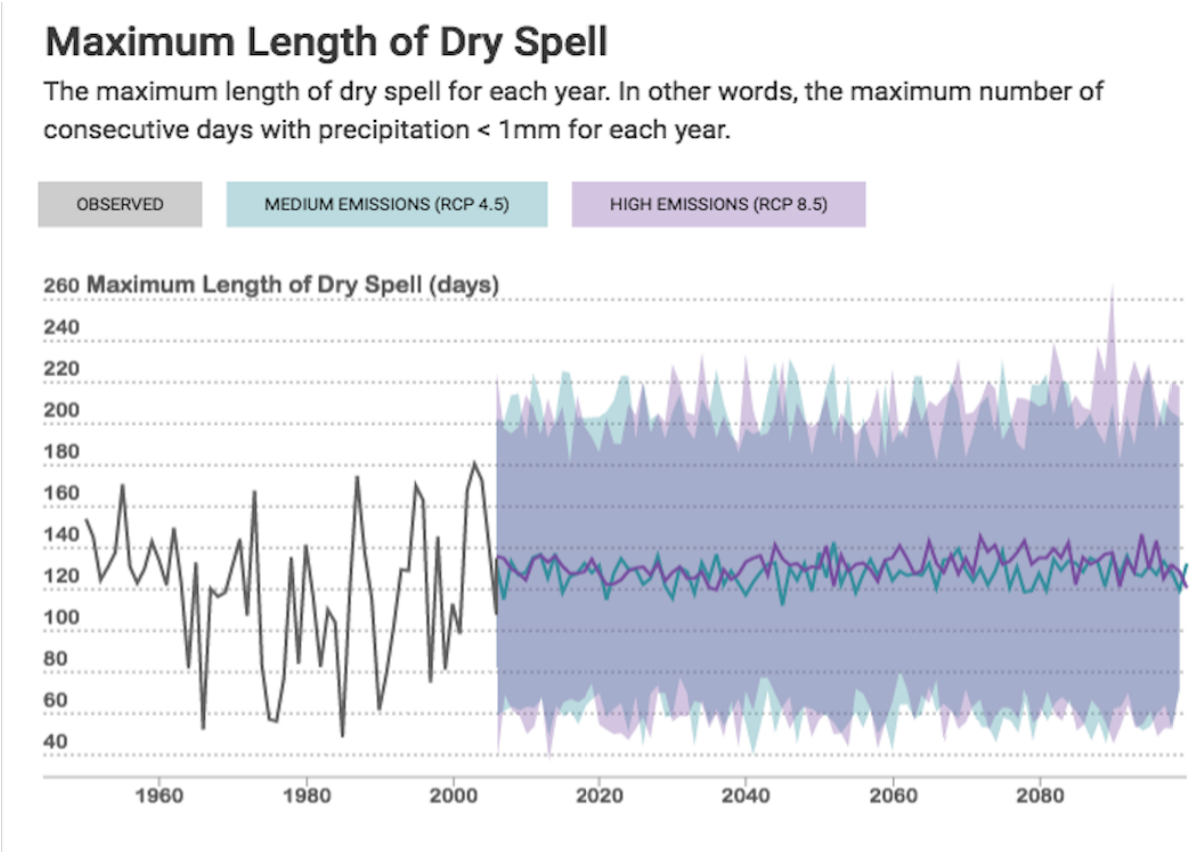


Figure 7: Maximum length of dry spell, observed and projected under medium and high emissions scenarios. The shaded area represents the range of likely number of days of dry spell totals in each scenario; the colored lines represent the most likely maximum length in each scenario. Produced using Cal-Adapt.

Period	Years	Emissions Scenario	Average	Range of Averages	Units
Baseline	1961-1990	Observed	120		days
Mid-Century	2035-2064	Medium (RCP 4.5)	133	119 - 151	days
End-Century	2070-2099	Medium (RCP 4.5)	135	115 - 150	days
Mid-Century	2035-2064	High (RCP 8.5)	137	125 - 151	days
End-Century	2070-2099	High (RCP 8.5)	140	112 - 172	days

APPENDIX H: CLIMATE VULNERABILITY ASSESSMENT FOR THE CITY OF LOS ALTOS, CA CONTINUED

Table 8: Maximum length of dry spell, observed and projected under medium and high emissions scenarios over 30-year periods according to Cal-Adapt. The numbers in the average column represent the averages of the most likely outcome over the 30-year periods. The numbers in the range of averages column represents the averages from all climate models over the 30-year periods. Under a high emissions scenario, the range of averages at the end of century (112-172 days) is significantly wider than the range of averages mid-century (125-151 days), indicating the uncertainty of the impact of high emissions longer term.

Average temperatures and days with extreme heat are expected to increase, increasing evaporation and evapotranspiration (release of water vapor by plants) in turn. Residential water use for landscaping may increase in response. Defining drought as simply the length of a dry spell obscures the complexity of Los Altos' water supply and use. Future droughts will be defined not just by precipitation and temperature, but by water supply storage levels across the water system and water use by end users. In other words, drought is not an entirely natural phenomenon.

Extreme Heat/Heat Waves

Heat waves are expected to increase in severity, frequency, and duration.

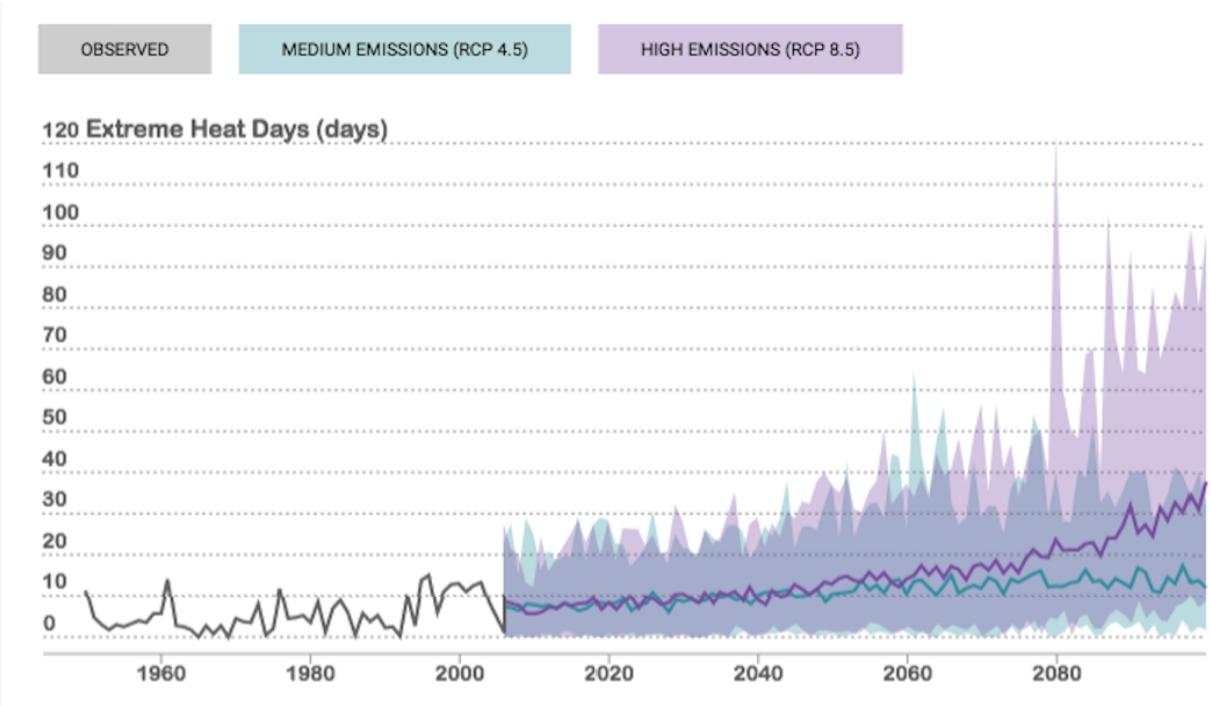


Figure 8: Number of extreme heat days, observed and projected under medium and high emissions scenarios. The shaded area represents the range of likely number of extreme heat days in each scenario; the colored lines represent the most likely number of extreme heat days in each scenario. Produced using Cal-Adapt.

APPENDIX H: CLIMATE VULNERABILITY ASSESSMENT FOR THE CITY OF LOS ALTOS, CA CONTINUED

Period	Years	Emissions Scenario	Average	Range of Averages	Units
Baseline	1961-1990	Observed	4		days
Mid-Century	2035-2064	Medium (RCP 4.5)	11	7-17	days
End-Century	2070-2099	Medium (RCP 4.5)	13	9-23	days
Mid-Century	2035-2064	High (RCP 8.5)	14	8-20	days
End-Century	2070-2099	High (RCP 8.5)	24	13-49	days

Table 9: Number of extreme heat days, observed and projected under medium and high emissions scenarios over 30-year periods according to Cal-Adapt. The numbers in the average column represent the averages of the most likely outcome over the 30-year periods. The numbers in the range of averages column represents the averages from all climate models over the 30-year periods.

As shown in Figure 8, the number of extreme heat days (defined as days with high temperatures above 90.2F for Los Altos) is expected to increase above 10 by mid-century. By the end of the century, Cal Adapt projects more than three times as many days of extreme heat under the medium emissions scenario and as many as 40 days of extreme heat under the high emissions scenario.

Wildfires & Air Pollution

Remarkably, given the expected increases in average and extreme temperatures, the area of Los Altos burned by wildfires is projected to *decrease,* according to Cal Adapt, under both medium and high emissions scenarios.

APPENDIX H: CLIMATE VULNERABILITY ASSESSMENT FOR THE CITY OF LOS ALTOS, CA CONTINUED

End-Century	2070-2099	High (RCP 8.5)	19	14.9 - 22.7	acres

Table 10: Number of average acres burned, modeled and projected under medium and high emissions scenarios over 30-year periods. The average number of acres burned is expected to decrease under both medium emissions and high emissions scenarios.

Additional Sources for Wildfire

Since the Cal-Adapt projections and the Local Hazard Mitigation Plan Annex indicated that wildfire was low risk and yet wildfire was a relatively high concern of the CAAP Task Force, additional research was conducted on the future risk of wildfires. Sources identified were the Santa Clara County Climate Adaptation Guidebook, Caltrans Vulnerability Assessment for District 4 (San Francisco Bay Area), and CAL FIRE.

According to the Santa Clara County Climate Adaptation Guidebook, climate change is projected to increase the frequency of wildfires, the extent of burned areas, and the duration of wildfire seasons. "Wildfire seasons are projected to begin earlier in the spring due to drier and warmer spring conditions on average." However, this increase in wildfire seems to be minor in the areas surrounding Los Altos and other already urbanized areas, as shown in the CALFIRE maps of Santa Clara County.

APPENDIX H: CLIMATE VULNERABILITY ASSESSMENT FOR THE CITY OF LOS ALTOS, CA CONTINUED

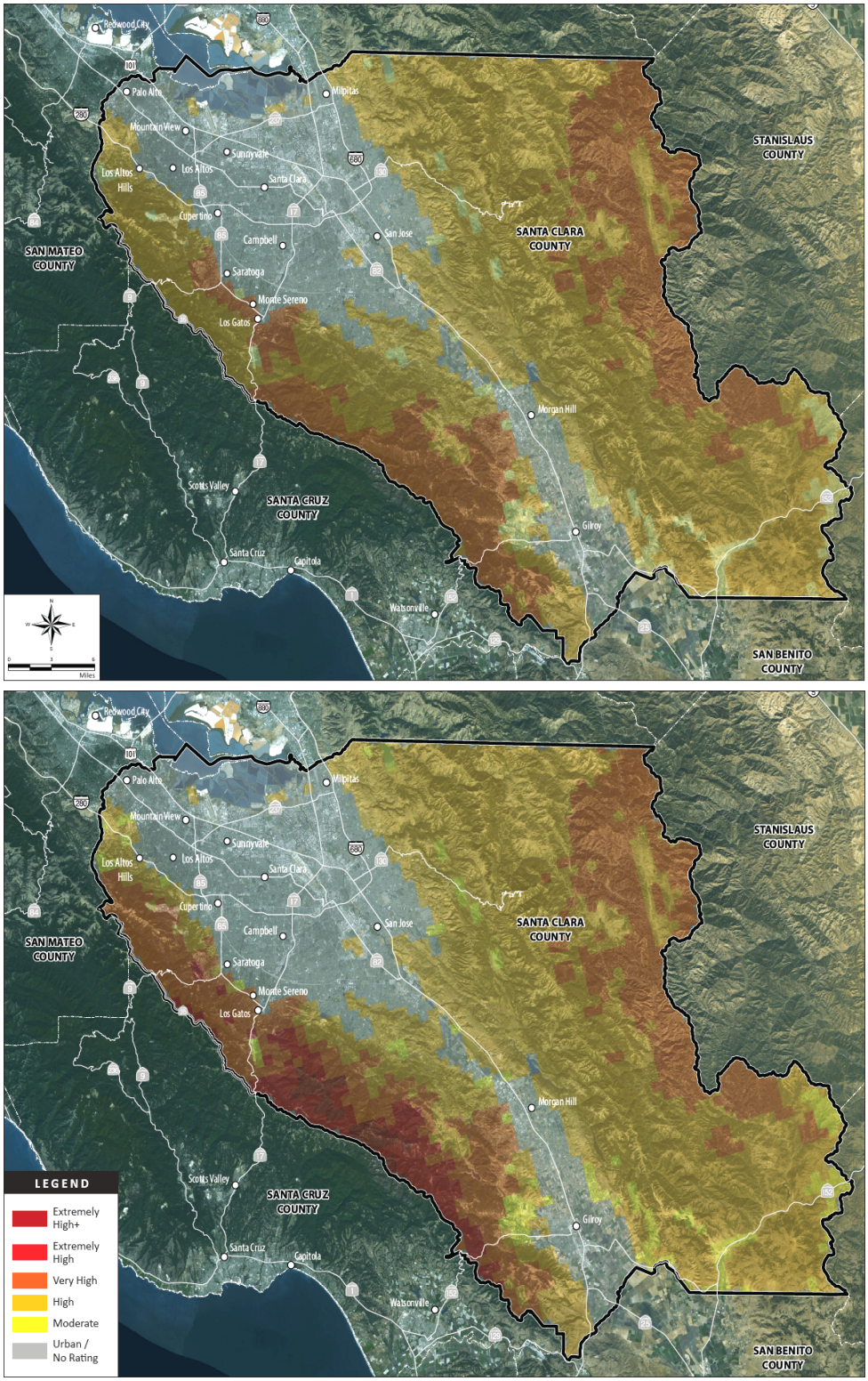
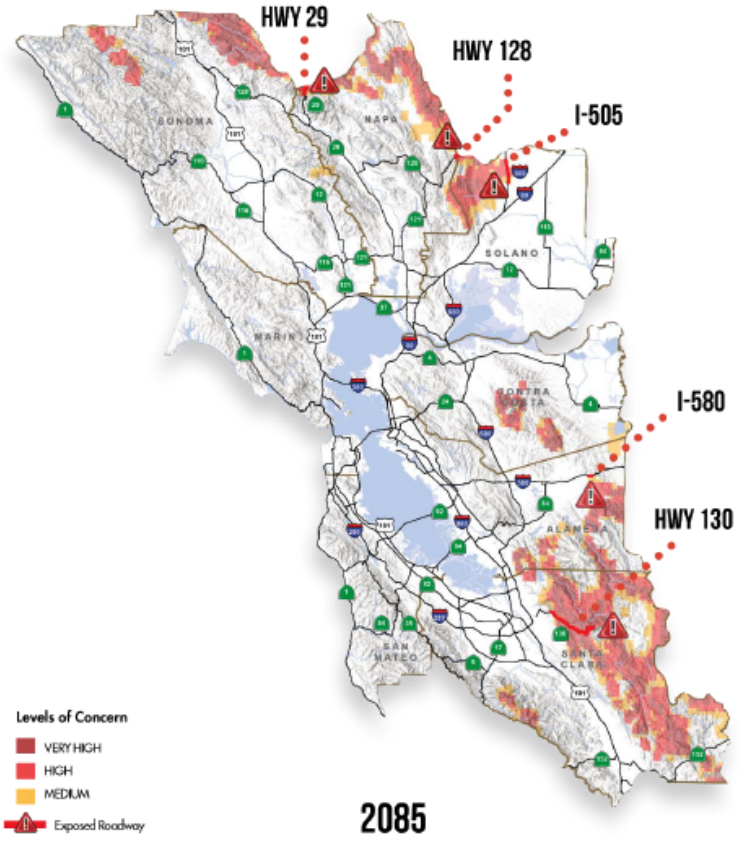


Figure 10: Maps of Santa Clara County indicating current (above) and future (below) wildfire risk level, according to CAL FIRE.

APPENDIX H: CLIMATE VULNERABILITY ASSESSMENT FOR THE CITY OF LOS ALTOS, CA CONTINUED

In Figure 10, some mountainous areas west of Los Altos move from "moderate" to "high" risk and a large area southwest of Los Altos moves from "high" to "very high" risk.

The section of Caltrans' Vulnerability Assessment focusing on wildfire risk shows the likelihood of wildfire in 2085 increasing in some areas of Santa Clara County, but not Los Altos or the entire San Francisco Peninsula.



Increased Likelihood of Caltrans State Highway System Exposed to Wildfires within District 4 in Future Years

Figure 11: Caltrans' Vulnerability Assessment focusing on wildfire risk showing the likelihood of wildfire in 2085.

Air Pollution/Air Quality

The minor increase in risk of wildfire in areas surrounding Los Altos may relatively worsen air quality in Los Altos, however, climate projections focus on the relative risk of areas to wildfire, not to air quality impacts based on prevailing wind patterns. Air quality was not a climate variable for which Cal-Adapt produced projections. The California State Hazard Mitigation Plan describes how air pollution could deteriorate in the future

> Climate change has the potential to worsen PM concentrations in California due to increased incidence of wildfire as well as the increased temperature and reduced precipitation in many locations. Smoke and ash produced by fire increase PM concentrations. Similarly, dry, warm weather can result in greater amounts of dust being blown and suspended in air.[6]

In summary, even if Los Altos isn't as vulnerable to direct impacts from wildfires, it should be prepared for the indirect impact of air pollution.

Impacts on Los Altos' Assets/Community Sectors

Information about the impacts of climate hazards was supplemented by a survey of the CAAP Task Force and a focus group with City staff and non-profit leaders. Specifically, the CAAP Task Force was asked to rank what natural and built assets and facilities and what sectors of the economy were most important to Los Altos' quality of life. Results receiving 40% or more are shown below.

Natural Environment

Assets

Asset	Percent of Respondents answering as Most Important
Managed landscapes (yards, parks, street trees)	80%
Air & air quality	70%
Natural habitat (soil, plants, wildlife)	40%
Creeks, rivers and other water bodies	40%

Local Assets

A former orchard, Los Altos has an incredible canopy of native and non-native trees on streets, in parks, and in homeowner's yards. Those trees, along with a creek and the Santa Cruz mountains, grace the seal of the City. According to the City's website, there are approximately 12,000 trees on Los Altos streets creating a stunning tree canopy, which helps to promote better air quality, cooler summers, natural shade and less reliance on air conditioning."[7]

In addition to trees, yards and parks are well regarded by residents. Shoup Park and the Redwood Grove Nature Preserve were mentioned multiple times by respondents as assets that provide a real sense of nature. The Hillside Trail connecting both parks features a boardwalk along Adobe Creek.

[6] California State Hazard Mitigation Plan, California Office of Emergency Services, 2018, SECTION 9.1 - PAGE 583

[7] https://www.losaltosca.gov/publicworks/page/tree-maintenance, accessed May 6, 2021

APPENDIX H: CLIMATE VULNERABILITY ASSESSMENT FOR THE CITY OF LOS ALTOS, CA CONTINUED

Adobe Creek along with Stevens Creek, Permanente Creek and Hale Creek are significant natural features that provide habitat corridors that connect beyond Los Altos' boundaries and contribute to groundwater recharge. Their importance is demonstrated by a pending (2021) lawsuit regarding pollution from a permit for Lehigh Quarry expansion upstream.

In such a verdant city, it is not surprising that many respondents in the CAAP Task Force mentioned air quality as an important asset. Outdoor recreation and outdoor living are prized and are dependent on comfortable temperatures and clean air.

Description of Impacts & Sensitivities

Temperature, Extreme Heat & Drought

The biggest impact of extreme temperatures and extended heat waves on the natural environment will be heat stress on plants with the potential for slow native species die-out and replacement by non-native species. These tipping points will depend on many factors including species and age.

Managed landscapes will require greater care and watering. California Water Service predicts roughly 3.5% increase in mean temperature by 2040 and will correspond to a roughly 2% increase in demand.[8] Home gardeners and city staff may find formerly tried and true ornamental plants less reliable – or untenable due to new ordinances or demand management measures. Having dealt with drought, Parks & Facilities staff has a reasonable capacity to manage the landscape for temperature increases and increased drought. The capacity of native, non-native, and ornamental plants to survive in a hotter, drier climate is not known.

Precipitation & Flooding

Severe precipitation and repeated flooding may increase stream bank erosion and flooding and erosion of managed landscapes. As the probability of multiple severe winter storms increases toward the end of the century, downed trees may be more common as trees rooted in soils saturated from previous storm events contend with heavy winds.

Wildfires & Air Pollution

Acres burned in Los Altos is expected to decrease. Increases in acres burned in the Santa Cruz mountain areas surrounding Los Altos are expected to be minor. Thankfully, Redwood Grove is being managed by Parks & Facilities staff for wildfire, as redwoods are not native to Los Altos and so require extra care. The greatest wildfire risk to Los Altos is expected to be from wildfires in and even beyond the Santa Cruz mountains creating unhealthy levels of air pollution in Los Altos.

Built Environment

[8] 2015 Urban Water Management Plan Los Altos Suburban District, p. 36

APPENDIX H: CLIMATE VULNERABILITY ASSESSMENT FOR THE CITY OF LOS ALTOS, CA CONTINUED

Assets

Asset	Percent Selecting as Most Important
Housing	80%
Schools	60%
Transportation (roads, sidewalks, buses, trains, parking spots & bike racks)	40%
Utilities (power, drinking water, stormwater & sewer, natural gas, phone, internet)	40%

Description of Local Assets

Buildings

The built environment includes all the public and private buildings, structures, and infrastructure that people in Los Altos rely on for shelter, commerce, and the functions of daily life. (Commercial assets are described in the Economy section.)

Los Altos is primarily a bedroom community where most residents live in single-family homes, although there is multi-family housing as well. Many elderly residents live in retirement communities and senior centers. Housing was the asset most chosen by CAAP Task force members as most important.

Los Altos has more than a dozen school facilities across multiple campuses, as well as more than thirty child care/day care facilities, preschools, and tutoring centers that provide care and education to the youth of the City.

Focus group participants shared that theatres, galleries, and other cultural assets contribute to quality of life and should also be included as built environment assets.

In addition to the assets listed above, Los Altos has buildings for daily and emergency government services. Critical facilities include an Emergency Operations Center (EOC) co-located in the Municipal Service Center, the City Hall and Police Department, and Fire Stations. There are no hospitals located in Los Altos.

Infrastructure

Transportation assets include, most importantly, roads and bridges that connect drivers, bikers, and pedestrians to different neighborhoods, shopping centers, the freeway, and areas outside the City. Public parking supports commercial areas.

Water supply is a complex multi-jurisdictional hybrid natural and built system, including groundwater supply, surface water, and recycled water sources. While the sources are natural, the management includes sophisticated, interconnected built assets. CalWater (California Water Services) Los Altos Suburban District water supply comes from both wells and purchases from Santa Clara Valley Water District

(SCVWD) which partially imports water from the Federal Central Valley Project and San Francisco Power and Utility Corporation's Regional Water System. The Los Altos Suburban District includes Los Altos, Cupertino, and other areas. There are a handful of water pumping stations in Los Altos.

Los Altos has a minority stake in the Palo Alto Regional Water Quality Control Plant (WQCP) along with Palo Alto, Mountain View, East Palo Alto, Stanford University, and Los Altos Hills. The City also owns a wastewater pump station to convey waste to the WQCP.

Stormwater management is provided naturally by Los Altos' four creeks as well as by the Permanente Creek Diversion Channel and the storm sewer system – storm drains, catch basins and pipes below the street.

Description of Impacts & Sensitivities

Temperature, Extreme Heat & Drought

Increases in temperature and extended heat waves will change the cooling needs of all building types and may tax the energy grid. Pacific Gas & Electric's Public Safety Power Shutoffs (PSPS) to reduce wildfire risks during heat waves will require alternative and off-grid energy sources to cool homes, commercial, and government buildings. The recently constructed/renovated Los Altos High School and the Los Altos Community Center are high-performance buildings that may be better able to maintain comfortable temperatures during extreme heat.

In general, homeowners in Los Altos have the financial resources to adopt new technologies to manage heat and produce and store renewable energy. Fixed income homeowners and renters have less of an adaptive capacity.

Assisted care facilities have backup generators. Senior centers do not, according to discussions with the City's emergency management coordinator. The City relies on Santa Clara County to provide cooling centers, in the form of public libraries.

Most transportation infrastructure will be unaffected by extreme heat and drought. Risk of asphalt softening is limited to extended temperatures above 100°F. Safety power shut offs and brownouts caused by heat can cause outages of traffic signals and street lights. Extreme heat will increase use of private vehicles at the expense of walking, biking, and taking public transit.

Temperature changes and extreme heat throughout the region will impact the availability of the water supply in SCVWD's system, which supplies as much as 65% of the water in the Los Altos Suburban District.[9] Los Altos water is sourced locally and imported, although not from snow-fed Hetch Hetchy.[10] If the Los Altos

[9] 2015 Urban Water Management Plan Los Altos Suburban District, p. 47
[10] Santa Clara County Operational Area Hazard Mitigation Plan, Office of Emergency Services, 2017, p. 113.

APPENDIX H: CLIMATE VULNERABILITY ASSESSMENT FOR THE CITY OF LOS ALTOS, CA CONTINUED

Suburban District is partially protected from the risk of decreased snowpack in the Sierra Nevada mountains, nevertheless supply is projected to decrease by 3-18% by mid-century and 10-28% by 2100.[11]The projected decrease underscores how many of the critical systems and natural resources of Los Altos extend beyond its borders where climate change may produce more extreme impacts.

Water supply issues are heavily regulated and very much in the public eye, in contrast to the climate risk of extreme heat. To a degree, water suppliers are already preparing for climate change. CalWater is developing new water supplies to improve reliability. The impacts from climate change to Los Altos water availability may come indirectly through external adaptive measures like increased regulations, including updates to the State's Model Water Efficient Landscape Ordinance, prohibitions, and demand management measures, rather than severe restrictions.

Safety power shut offs and brownouts caused by heat can disrupt pumps in the water supply and wastewater systems.

Precipitation & Flooding[12]

Severe precipitation and repeated flooding may increase stream bank erosion and flooding, causing scour under the numerous bridges and creek crossings. Buried pipes may be exposed and/or damaged. Storm sewers may get backed up and cause localized flooding. With multiple heavy storms occurring yearly by the end of the century, wear and tear on roads and within pipes may require repair and replacement more frequently than planned for.

Los Altos has experienced limited flooding of homes or structures, although there are many buildings that have a 0.2 percent annual chance of flooding, according to FEMA flood maps. Hydrologic and hydraulic modeling outside of this report scope would be needed to understand how the risk of flooding in specific areas may increase in the future.

Los Altos already has a Green Stormwater Infrastructure Plan which includes an assessment of flood-prone storm drain catchments among its prioritization criteria. With some changes, this document and the capital planning that results from it can integrate climate risks to adapt to the risks from precipitation changes.

Wildfires & Air Pollution

Wildfires pose a greater hazard to structures, including homes and above ground assets, than to underground assets. Air pollution from wildfires outside of Los Altos

[11] 2015 Urban Water Management Plan Los Altos Suburban District, p. 70. Projections estimated based on climate change impacts on the mix of groundwater, local surface water, and purchased imports relative to the historic average of available supply.

[12] Although Los Altos is not coastal and so not directly at risk from sea level rise, sea level rise will have an impact on groundwater supply and the Palo Alto Regional Water Quality Control Plan.

does not have a significant impact on buildings and infrastructure, simply requiring changing filters on buildings and vehicle fleets more frequently.

Economy

The impact of climate hazards on the economy are hard to predict. Climate extremes will generally cause more wear and tear of physical assets, leading to shorter lifespans and faster replacement cycles for buildings and infrastructure. Increased spending on maintenance will be needed. Disasters cause a drop and then rise in expenditures, following Federal assistance and insurance payouts, though in sum disasters produce both environmental and economic losses.

Description of Local Assets

Los Altos has several areas of economic activity, as listed in the economic element of the General Plan. Listed roughly from north to south, these are Sherwood Gateway (including the Village Court Shopping Center), El Camino Real, Downtown, Rancho Shopping Center, Loyola Corners, Woodland Plaza, and Foothill Plaza.

When asked what sectors of the economy were most important to quality of life, most survey participants responded that School District/City Spending (60%) and Restaurants (60%) were most important. Half of survey participants responded that real estate, development, and construction as a single sector were important. Fewer than half of respondents selected retail, the service sector, or tech/IT.

Property taxes on Los Altos housing provides the key revenue source for City finances. At the same time, the affordable housing shortage throughout the Bay Area extends to Los Altos, affecting the disposable income available for other purchases.

Description of Impacts & Sensitivities

Temperature, Extreme Heat & Drought

Temperature, extreme heat, and drought are most likely to cause a negative effect on the economy as residents and businesses spend more on air conditioning (and California-wide on food) to maintain the same quality of life. Outdoor living is important to quality of life and outdoor comfort is an important free asset for downtown restaurants and retail businesses.

Decreasing comfort negatively impacts worker productivity and may disrupt outdoor businesses like landscaping and construction. Temperature-related mortality is also a projected loss. Power outages and brownouts caused by extreme heat will also negatively impact the economy through everything from loss of perishable items to adding uncertainty to business operations. Expensive solutions for managing electricity unreliability like diesel generators add environmental externalities. At the same time, the COVID-19 pandemic has been longer lasting and more far reaching than most of the direct climate hazards of the near future.

APPENDIX H: CLIMATE VULNERABILITY ASSESSMENT FOR THE CITY OF LOS ALTOS, CA CONTINUED

Precipitation & Flooding

Property damage and temporary disruption of utilities and infrastructure can create temporary or extended loss of operations for businesses, particularly for businesses with non-durable goods. Even perceptions of flood risk and flood safety can influence the housing market.

Wildfires & Air Pollution

Temporary disruption of utilities and infrastructure from wildfire-related PSPS can create temporary or extended loss of operations. When poor air quality keeps people in their home, they are less likely to spend in Los Altos' commercial centers.

Vulnerable Populations

Description of Impacts & Sensitivities

Temperature, Extreme Heat & Drought

Projected temperature changes will impact the seasonality and frequency of outdoor recreation, biking and walking, and even passive enjoyment of the outdoors. Outdoor comfort will increase in winter, spring, and fall and decrease in summer. Parks, yards, and other outdoor areas will become undesirable during heat waves, and parking lots and streets may become dangerous to certain populations during extreme heat.

From medical and sociological research, we know that certain populations are more vulnerable to extreme heat. However, not all of these populations exist in Los Altos. Based on CAAP Task Force survey respondents, the vulnerable populations present in Los Altos include the elderly, people with chronic or pre-existing medical conditions, people with disabilities, children, and people with limited English proficiency. If projected temperature changes are experienced, incidences of heat stroke, hospitalization, and heat-related mortality will increase first and foremost within these groups.

While only 40% of Task Force survey respondents selected "people who work outside" as a vulnerable group, a subsequent focus group confirmed that day laborers in landscaping and construction are a vulnerable population who may commute into Los Altos to work outdoors. Los Altos does not have experience providing services or communications to this population, so managing their health risk will be a challenge.

The focus group additionally identified seniors who are "house rich, cash poor," and may potentially be impacted by increased costs of energy as temperatures increase. Assisted care facilities have backup generators, but senior centers do not. Santa Clara County libraries act as the city's cooling centers.

APPENDIX H: CLIMATE VULNERABILITY ASSESSMENT FOR THE CITY OF LOS ALTOS, CA CONTINUED

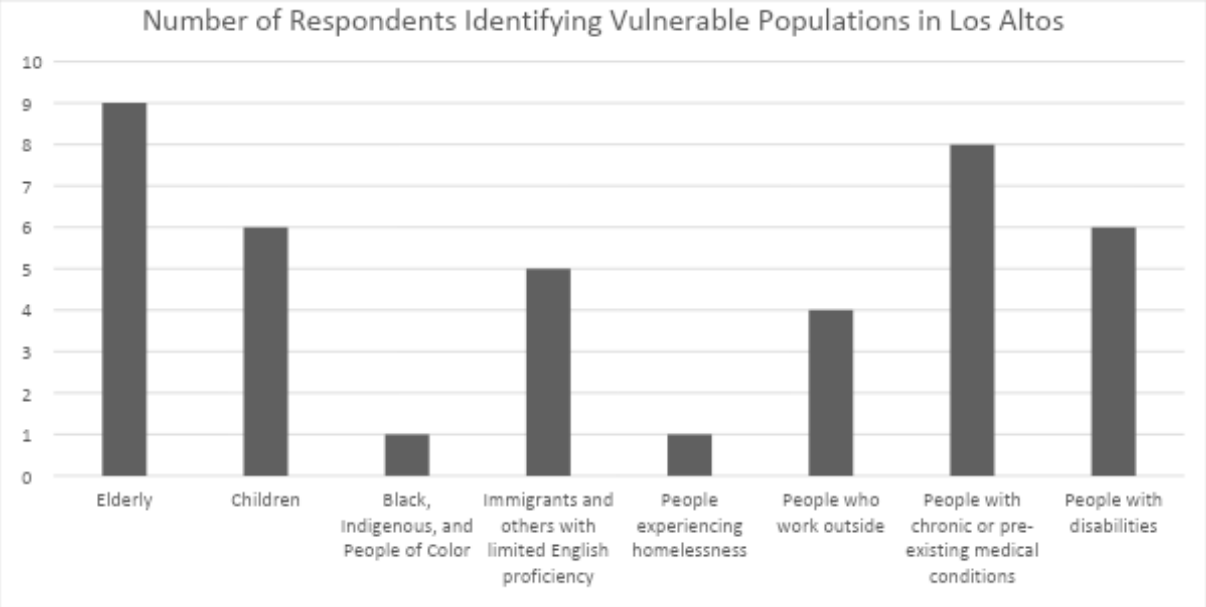


Figure 12: Graph showing how CAAP Task Force members responded to question asking them to identify which vulnerable populations are present in Los Altos

Precipitation & Flooding

Vulnerable populations often have fewer resources and/or limited mobility. Preparations for flooding, evacuations, and clean-ups are all made more difficult by these circumstances.

Wildfires & Air Pollution

While flooding is likely to be limited to areas near the City's four creeks, the impacts of wildfires may be felt citywide. Like flooding though, preparations, evacuations, returns, and clean up are all more difficult for vulnerable populations: people with limited mobility and functionality, people with chronic or pre-existing medical conditions which could be exacerbated by poor air quality, and people with limited financial resources.

Long before emergency situations, air pollution will directly impact people with respiratory conditions and people who work outside. Wildfires far outside of Los Altos can create unhealthy levels of PM 2.5, especially since existing air quality is only moderate to start with. Air pollution can limit the mobility and quality of life of sensitive groups.

The N-95 masks which are now easy to obtain and with which people are now very familiar with as a result of the Covid-19 pandemic may mean that air quality will not limit activity for vulnerable groups as much as it might have without the pandemic.

APPENDIX H: CLIMATE VULNERABILITY ASSESSMENT FOR THE CITY OF LOS ALTOS, CA CONTINUED

Summary

Los Altos appears better off than many other areas in California with regards to climate change. Los Altos is not directly coastal so it will not experience the impacts of sea level rise, but its relative proximity to the Pacific Ocean and San Francisco Bay should temper climate extremes in the near term. Earthquakes are projected to be a relatively more common and more damaging hazard than any single climate hazard.

Many of the impacts of climate change on Los Altos will not be direct but instead reverberations from nearby. Los Altos depends on the natural environment, the water supply system, and the energy grid outside of its borders, so the availability and affordability of water and energy within Los Altos are likely to be jeopardized by climate change across the Bay Area and California as a whole.

Within Los Altos itself, by mid-century particularly under a high emissions scenario, the number of extreme heat days are projected to increase substantially. Heat and poor air quality from wildfires outside of Los Altos are most likely to impact the quality of life, particularly for vulnerable populations, and increase energy demands for additional building air cooling/filtering. Extreme heat, poor air quality, and blackouts or PSPS that occur simultaneously will present novel emergency situations that have the potential to strain or overwhelm City resources.

Similarly and more uncertain will be the resilience of Los Altos natural and maintained landscapes. The annual precipitation amounts in Los Altos are not likely to change, but will become less consistent and in combination with expected temperature increases will in turn increase the amount of water that plants need. Considering water pressure outside of Los Altos, it is likely that water customers will face financial incentives and regulatory pressure to reduce daily water use.

In the winter and spring, seasonal storms which Los Altos has experienced in the past are likely to continue. Rainfall amounts that used to occur once every several years are projected to occur multiple times a year by the end of the century, increasing the need for maintenance and repair of stormwater infrastructure on building sites and across the city.

Los Altos' government, residents, and businesses are somewhat prepared after living through years of drought and the COVID pandemic. The scale of climate change and the need to reach new vulnerable populations during heat waves may be challenging.