Alameda Active Transportation Plan

Appendix C: Existing Conditions Report

TOOLE DESIGN

EXISTING CONDITIONS REPORT

Alameda Active Transportation Plan

January 24, 2020

CONTENTS

ALAMEDA TODAY

Alameda is a thriving community with approximately 80,000 residents. Alameda is known for its family-friendly small town atmosphere, extensive shoreline and maritime activities, and ample recreational opportunities. The city is comprised of three distinct geographic areas, as listed below and shown in Figure 2.

- Alameda Island – *An island located on the Oakland Estuary across from the City of Oakland*
- Bay Farm Island – *A peninsula that is directly connected to the City of Oakland and adjacent to Oakland International Airport*
- Coast Guard Island – *An island located in the Oakland Estuary between Alameda Island and the City of Oakland*

Due to Alameda's unique geography, the city's transportation network plays a critical role connecting its two downtowns (Park Street and Webster Street, both located on Alameda Island) to the mainland, shaping the city's economy, determining redevelopment patterns, and providing job opportunities for Alamedans. The transportation system is also a large determinant of quality of life for residents and a primary contributor to Alameda's environmental footprint. Understanding how Alameda's transportation network operates today is an important first step in determining what can be done to improve the active transportation network tomorrow.

LAND USES AND CHARACTER

Alameda's initial development was shaped largely by the construction of transbay railroad connections and investment in military installations. Transcontinental and regional rail service terminated at the Alameda Mole on the western portion of the island, where passengers transferred to ferries that carried them across the bay to San Francisco. Commercial and residential developments were located along the rail lines and resulted in the business districts along Park and Webster Streets and the high-density residential development along Central Avenue. Direct railroad service to Alameda was eventually terminated and the former mole redeveloped into the Naval Air Station Alameda, which closed in 1997. The Coast Guard still operates a base on Alameda's Coast Guard Island, which is only accessible via a bridge from Oakland's Embarcadero Cove neighborhood.

Today, businesses along the former railroad corridors on Park and Webster Streets comprise the city's two primary commercial areas. Other commercial areas include the South Shore Center at the southern end of Park Street and Alameda Landing on the northern end of Webster Street near the tunnel connection to Downtown Oakland. The site of the former Naval Air Station is home to industrial uses and is being redeveloped into new commercial and residential land uses which will include an entirely new neighborhood on the west side of Alameda Island called Alameda Point. The north side of Alameda Island is home to office parks and numerous maritime-related businesses.

Bay Farm Island is home to large business and industrial parks adjacent to the Alameda/Oakland city limits and Oakland International Airport. The remainder of the city is primarily residential, comprised of a variety of housing ranging from single-family homes on Bay Farm Island to apartment complexes along Central Avenue on Alameda Island. Other major land uses in Alameda include numerous marinas along the city's extensive waterfront, Robert Crown State Beach on the southern side of Alameda Island, and Corica Park Golf Course on Bay Farm Island.

Schools and the Alameda County Safe Routes to Schools (SR2S) Program

The Alameda Unified School District has 17 schools, including nine elementary schools, two middle schools, four high schools, one preschool, and one adult school. All schools are located on Alameda

Island, except for two elementary schools on Bay Farm Island. Coast Guard Island has no schools. Alameda is also home to the College of Alameda, a two-year community college that is part of the Peralta Community College District, as well as several private schools. In general, schools are distributed throughout the city and located in residential neighborhoods.

The Alameda County Safe Routes to Schools (SR2S) Program is a program of the Alameda County Transportation Commission and serves public schools throughout Alameda County, including in Alameda. The program's mission is to improve student safety and health, and promote students traveling to school using active or shared modes of transportation. The SR2S Program offers schools educational programming, event support, school safety assessments, and other support to implement the program.

Fourteen schools in Alameda are active in the SR2S Program, including schools in the Alameda Unified School District and some charter schools. The program includes mostly elementary and middle schools, and also includes two high schools (Island High and Alameda High). The participating schools are very active in the SR2S Program and regularly hold walk and roll events (such as walking schools buses and bike trains) (see Figure 1); participate in countywide events, such as International Walk and Roll to School Day and Bike to School Day; and take advantage of the educational programs offered by the SR2S Program, such as bike rodeos.

Figure 1: Students and parents participate in a walking school bus to Paden Elementary School.

Each spring, the program collects "hand tally" data on how students get to school. During a specific three-week time period, students at participating schools are asked how they get to school by a show of hands, and their responses are recorded. **Compared to other school districts throughout the county, Alameda has high rates of students walking and biking to schools.** In 2018, the countywide average of walking and biking rates were 27 percent and 3 percent respectively, based on reported hand tally data from participating schools

Table 1 and 2 lists the hand tally data for Alameda schools from the past two years. Note: Donald D. Lum Elementary, the Academy of Alameda (middle), and Will C. Wood Middle participate in the Alameda County SR2S Program, but did not collect hand tally data in 2017 or 2018.

Table 1: Hand Tally Data from Spring 2017

School Name	Spring 2017						
	Walk	Bike	School Bus	Family Vehicle	Carpool	Transit	Other
Bay Farm Elementary	31%	14%	0%	46%	6%	0%	2%
Edison Elementary	48%	3%	0%	40%	6%	0%	3%
Frank Otis Elementary	*Did not collect data in 2017*						
Lincoln Middle	24%	22%	0%	33%	14%	7%	0%
Love Elementary	30%	3%	3%	59%	1%	1%	1%
Maya Lin Elementary	30%	6%	3%	50%	5%	1%	4%
Nea Community Learning Center (Elementary-High)	26%	1%	0%	55%	13%	2%	3%
Ruby Bridges Elementary	*Did not collect data in 2017*						
Average	32%	8%	1%	47%	8%	2%	2%

Table 2: Hand Tally Data from Spring 2018

School Name	Spring 2018						
	Walk	Bike	School Bus	Family Vehicle	Carpool	Transit	Other
Bay Farm Elementary	*Did not collect data in 2018*						
Edison Elementary	43%	5%	0%	45%	2%	1%	4%
Frank Otis Elementary	36%	10%	0%	39%	6%	0%	8%
Lincoln Middle	22%	25%	1%	33%	7%	11%	1%
Love Elementary	32%	3%	1%	56%	4%	1%	4%
Maya Lin Elementary	28%	9%	2%	52%	4%	2%	4%
Nea Community Learning Center (Elementary-High)	24%	2%	0%	53%	18%	0%	2%
Ruby Bridges Elementary	35%	3%	0%	52%	7%	1%	3%
Average	31%	8%	1%	47%	7%	2%	4%

The SR2S Program also conducts school safety assessments which assesses the walking and biking infrastructure around schools, generally within a two-block radius, and makes recommendations for safety improvements. Jurisdictions are responsible for implementing the physical changes, and the City of Alameda has taken an active role in upgrading the infrastructure around schools based on the school safety assessment recommendations. Currently, school safety assessments have been conducted at

seven schools in Alameda (see Table 3), and two are planned for 2020, at Earhart Elementary and Ruby Bridges Elementary.[1]

Table 3. Schools that have conducted school safety assessments as a part of the Alameda County SR2S Program

School	Year Conducted
Edison Elementary	2019
Franklin Elementary	2017
Nea Community Learning Center	2017
Academy of Alameda	2016
Love Elementary (formerly Henry Haight)	2016
Maya Lin Elementary	2016
Wood Middle	2016

ROADWAY NETWORK

Alameda's roadway network was constructed over many decades and therefore has different characteristics in different parts of the city. Most streets throughout Alameda are 25 mph, except for major arterials such as Ralph Appezzato Memorial Parkway, Main Street, Constitution Way, Tilden Way, Doolittle Drive, Island Drive, North Loop Road, South Loop Road, and Harbor Bay Parkway. All streets are City-maintained, and currently, the City has a large backlog of roadway maintenance projects. *City staff: Please verify this last statement.*

Alameda Island

Alameda Island was developed in the late 1800s and early 1900s when it was common for cities to develop along rail lines and with grid street networks. Subsequently, Alameda Island consists of a dense street grid with many parallel east-west and north-south streets.

Bay Farm Island

Bay Farm Island was primarily developed in the 1970s and 1980s when it was common to develop automobile-oriented, disconnected, and circuitous local residential streets that feed into larger arterials. This part of the city does not have a grid network, as on Alameda Island.

Coast Guard Island

Coast Guard Island features a small roadway grid of several north-south and east-west streets.

Connections to Oakland

Alameda has seven connections to Oakland, the only city it borders. The roadway connections, from north to south, are:

- California State Route 61 (SR-61) to Downtown Oakland via the Posey and Webster Tubes;
- Campbell Boulevard to Oakland's Embarcadero Cove neighborhood via the Coast Guard Island Bridge;
- Park Street to Oakland's Jingletown neighborhood via the Park Street Bridge;
- Fruitvale Avenue to Oakland's Fruitvale neighborhood via the Fruitvale Bridge;
- High Street to Oakland's Fruitvale neighborhood via the High Street Bridge;
- Doolittle Drive (SR-61) to Oakland International Airport via Bay Farm Island; and

[1] More information about the recommendations from the school safety assessments can be found on the Alameda County SR2S Program website here: http://alamedacountysr2s.org/our-program/school-safety-assessments/

- Ron Cowan Parkway to Oakland International Airport via Bay Farm Island.

Within Alameda, there are two connections between Alameda Island and Bay Farm Island – the Bay Farm Island Bridge which serves vehicles, and a bike and pedestrian bridge immediately to the east. Coast Guard Island is isolated from the rest of Alameda and can only be directly accessed from Oakland.

SR-61 is the only state highway in Alameda, and there are no limited access freeway facilities within Alameda, other than the brief stretches of SR-61 in the Webster and Posey Tubes. Regional roadway connections are provided via Interstate 880 which runs parallel to Alameda in Oakland, approximately half a mile north of the Oakland Estuary.

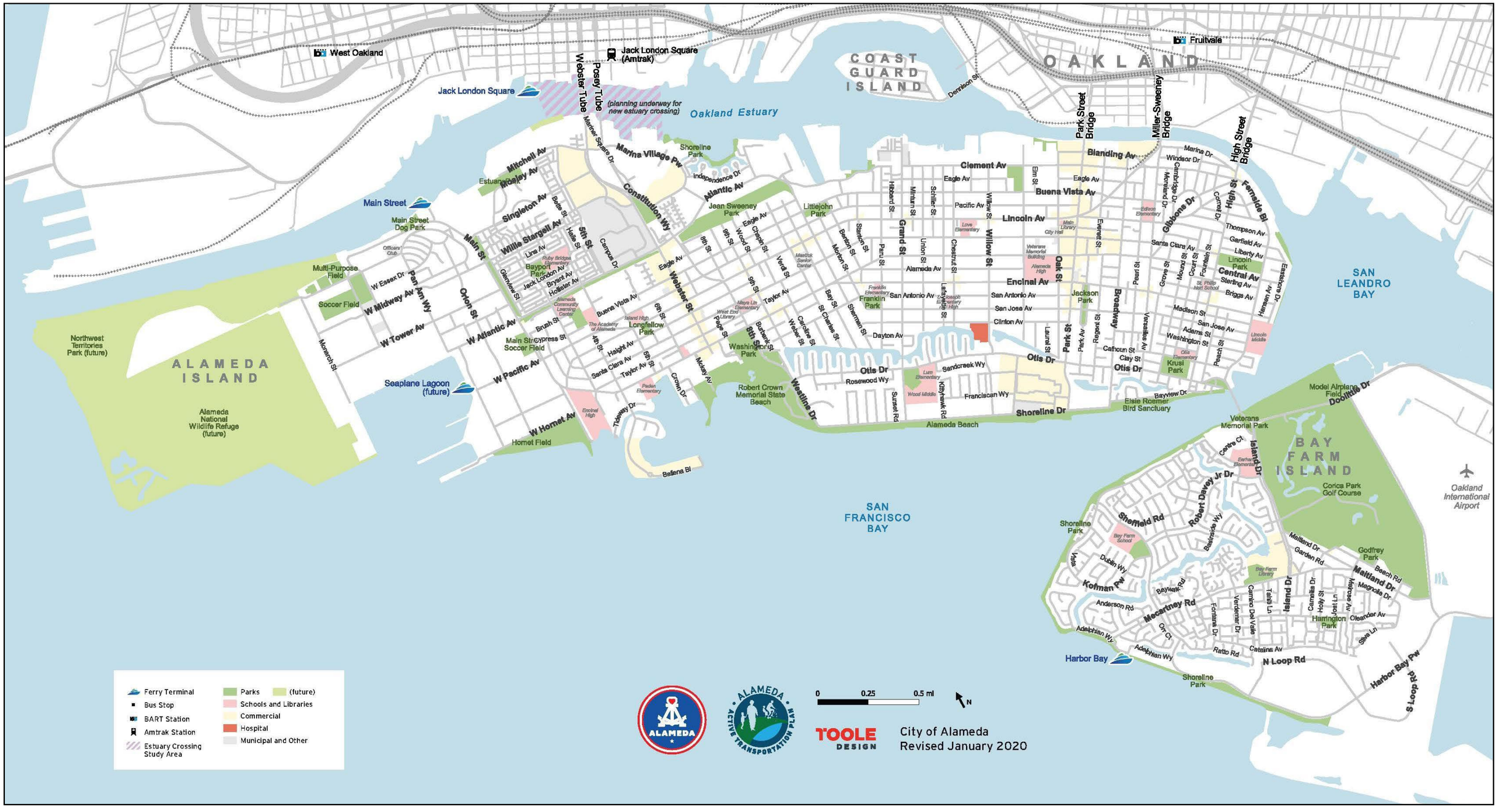


Figure 2: Map of the City of Alameda

TRANSIT SERVICE

Alameda is directly and indirectly connected to several mass transportation networks. AC Transit provides local bus service throughout the city with connections to major destinations such as the South Shore Center, Alameda Landing, College of Alameda, and Webster and Park Streets commercial districts. Santa Clara Avenue is the main east-west transit corridor in Alameda, and Webster Street, Park Street, and Broadway are the main north-south transit corridors. AC Transit's local service also provides connections to key destinations in adjacent Oakland such as Downtown Oakland, BART stations, and Oakland International Airport. AC Transit provides express transbay bus services to San Francisco.

Alameda is also home to ferry service, provided by the San Francisco Bay Ferry. There are two ferry terminals in Alameda: the Main Street Terminal is located on the north side of Alameda Island approximately one mile west of Webster Street, and the Harbor Bay Ferry Terminal is located on Bay Farm Island approximately one mile southwest of SR-61 (Doolittle Drive). A third ferry terminal, the Seaplane Lagoon Ferry Terminal, is currently under construction on Alameda Island's south side near the former Naval Air Station.

Rail service does not directly serve Alameda; however, an Amtrak station and several BART stations in Oakland are close to Alameda. The Jack London Square Amtrak Station in Oakland is approximately a quarter of a mile south of the Webster and Posey Tube portals and provides intercity rail service to Sacramento and San Jose. The Lake Merritt BART Station is approximately half a mile east of the Webster and Posey Tube portals in Oakland's Chinatown neighborhood and provides regional rail service throughout the Bay Area. The Fruitvale BART station is approximately half a mile northeast of the Fruitvale Bridge in Oakland's Fruitvale neighborhood and also provides regional rail service throughout the Bay Area. The Lake Merritt BART station is primarily used by West End residents and employees, and the Fruitvale BART station is primarily used by East End residents and employees.

DEMOGRAPHICS AND TRAVEL PROFILE

Who lives in Alameda?

The population in Alameda in 2017 is estimated to be 78,246, according to the 2017 American Community Survey 5-year estimates. The population is 48 percent White, 7.5 percent African American, and 31.5 percent Asian. The share of women is slightly higher than men – 51 percent and 49 percent, respectively.

The largest age groups in Alameda are under 20 (21.4 percent), 20-44 (35 percent), and 45-64 (28.7 percent), with 14.8 percent of the population over 65. Often, people in age groups under 18 and over 65 are less likely to drive or own a car and are more likely to rely on active transportation, either for a part or for their entire trip.

The largest household income share is under $50,000 (28 percent), followed by over $150,000 (25 percent), then $50,000 - $75,000 (16 percent). Figure 3 visually captures this data.

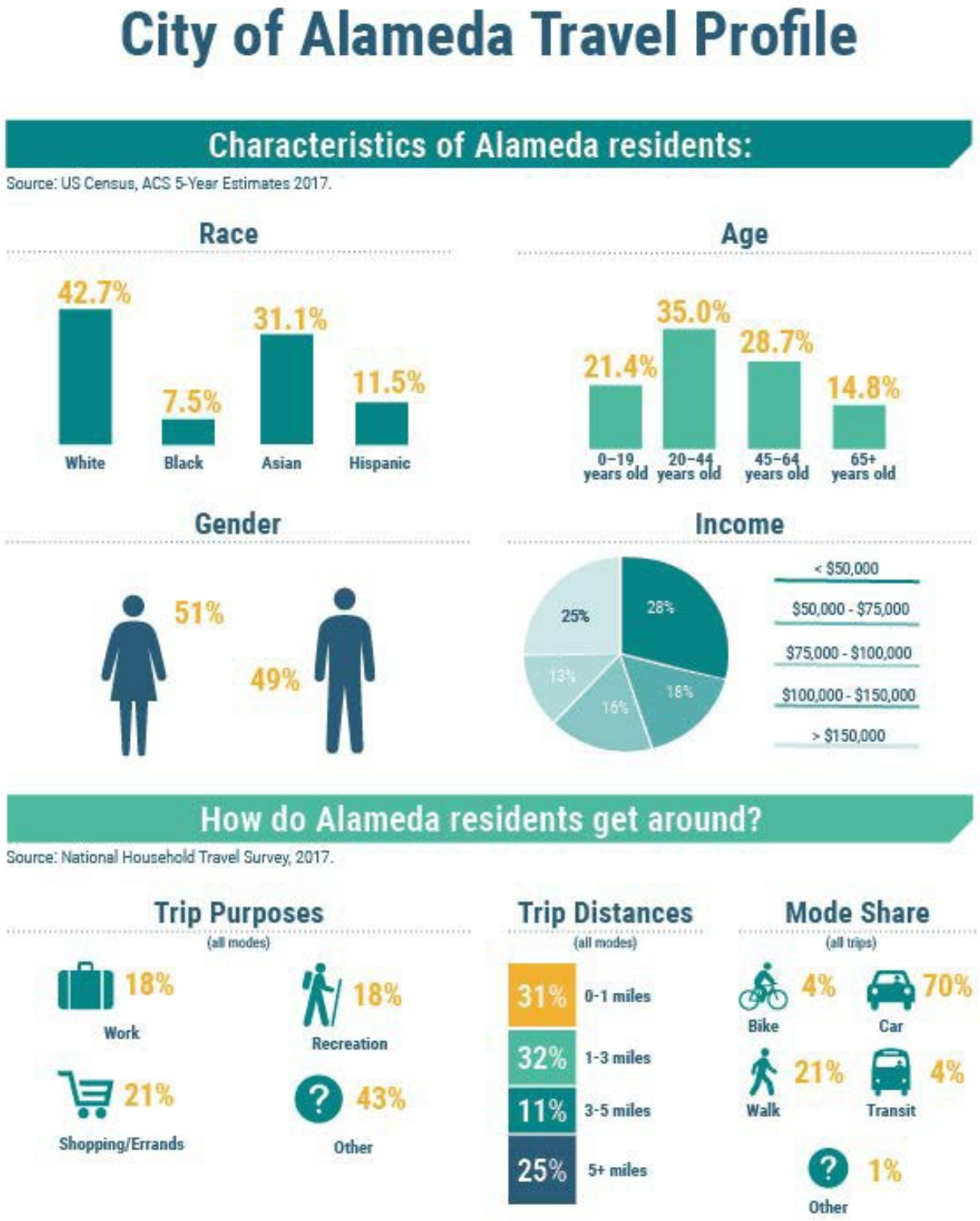
How do Alamedans get around?

Trips in Alameda, based on the 2017 National Household Transportation Survey, are primarily by driving (70 percent); however, there is a large share of walking trips (21 percent). The share of people biking and taking public transit are equal (4 percent each).

The purpose of trips is largely for social or recreational purposes (20.8 percent), followed by commuting (18.4 percent) and shopping (17.8 percent). The average distance of trips is 5.6 miles. Most trips (63.7 percent) are under three miles, which is considered a bikeable distance. The sample size of trips in

Alameda is 888, according to the 2017 National Household Travel Survey, and should be kept in mind when considering these data.

Figure 3: Alameda Demographics and Travel Profile, 2017



VULNERABLE COMMUNITIES

Alameda is home to a racially and socioeconomically diverse population. All transportation planning efforts, including this Active Transportation Plan, must take into consideration Alameda's diverse population to ensure that recommendations are equitable and work to reduce disparities between socioeconomic groups.

Social Vulnerability Assessment

In 2019, the City of Alameda adopted the Climate Action and Resiliency Plan (CARP) which addresses the threat of climate change to the city (see the Existing Plans and Policies Review section of this report for more information). As a part of the CARP, the City developed a Social Vulnerability Assessment because the City recognizes that vulnerable populations are more likely to experience climate change impacts and are least able to protect themselves against them. Examples of vulnerable populations included in the CARP are people who are transit-dependent, children and elderly, disabled, or very-low income.[2]

The assessment identifies neighborhoods that have the highest concentrations of households with socioeconomic characteristics that make them more vulnerable to the impacts of climate hazards. The City used the results of the assessment to propose the equitable, inclusive resiliency actions found in the CARP.

As a part of this active transportation planning effort, the project team conducted a Bicycle Level of Traffic Stress analysis and a Pedestrian Level of Traffic Stress analysis.

- The Bicycle Level of Traffic Stress (BLTS) analysis identifies the areas of Alameda that are not currently well-served by a low-stress bicycle network.
- The Pedestrian Level of Traffic Stress analysis describes the level of comfort for pedestrians when crossing an intersection or painted mid-block crossing.

For more information about these analyses, see the Level of Traffic Stress and Trip Potential memorandum.

The project team overlaid the results from the Bicycle Level of Traffic Stress analysis and the Pedestrian Level of Traffic Stress analysis onto the areas in Alameda that were found to have the high and highest levels of social vulnerability, based on the Social Vulnerability Assessment in the CARP. See Figures 4 and 5.

The key findings of this analysis include:

- There is no difference between the proportion of high-stress crossings in the high/highest areas of social vulnerability compared to other areas.
- One in three streets (33 percent) are considered high stress for bicyclists (BLTS 3 or 4) in the high/highest areas of social vulnerability.
- One in five streets (18 percent) are considered high stress for bicyclists (BLTS 3 or 4) in areas not identified as high/highest areas of social vulnerability.

[2] The Social Vulnerability Assessment used 10 indicators of social vulnerability based on census household data. These indicators include: transit-dependent (no personal vehicle); renters; severe housing cost burden; residents under 5; residents over 65 living alone; disabled; single-parent households; no high school degree; very low-income; communities of color; limited English proficiency; and not U.S. citizens. See Appendix F of the 2019 Climate Action and Resiliency Plan for more information.

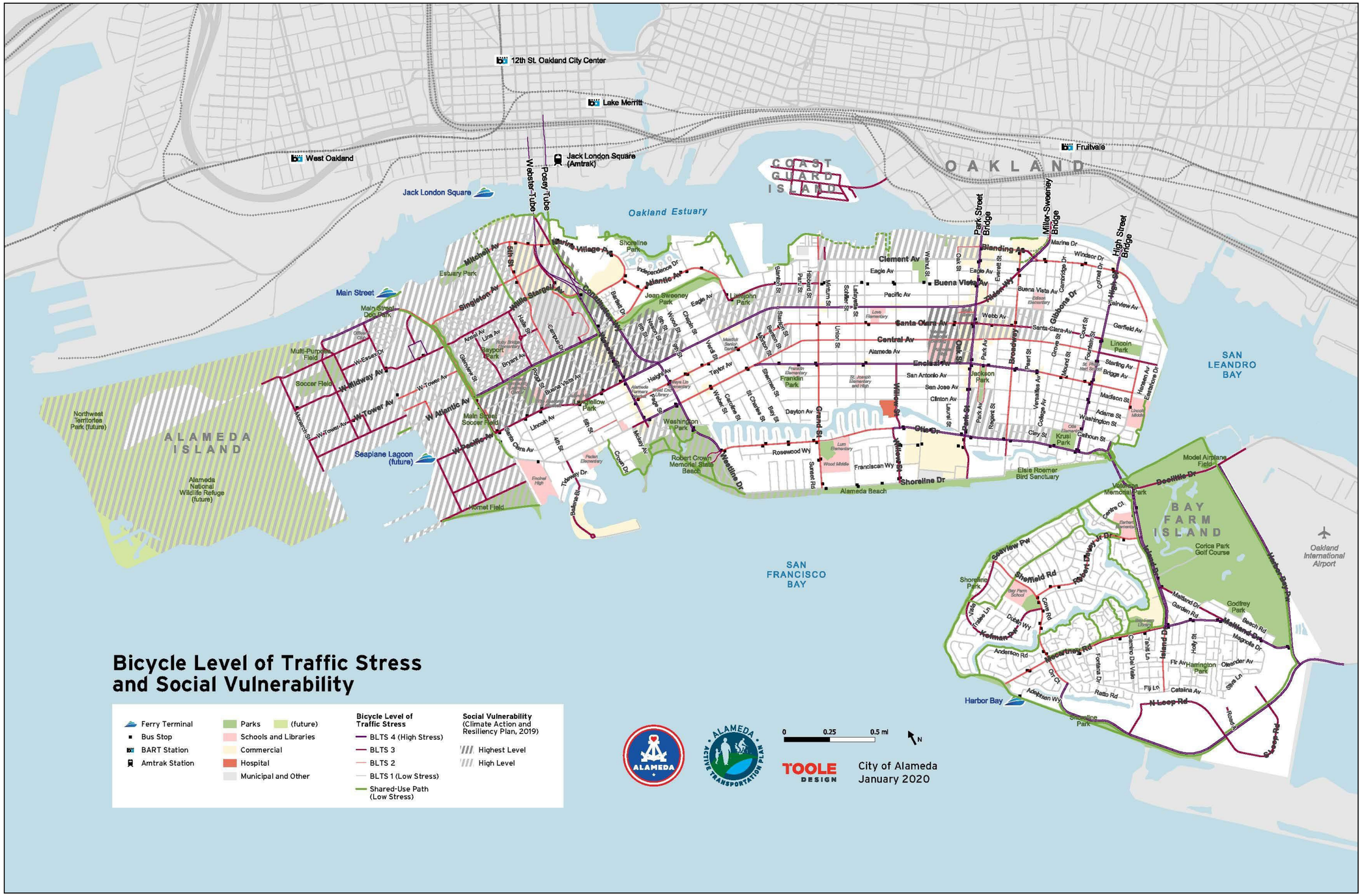


Figure 4: Bicycle Level of Traffic Stress and Social Vulnerability

Figure 5: Pedestrian Level of Traffic Stress and Social Vulnerability

CalEnviroScreen

Another equity analysis tool is CalEnviroScreen, developed by the State of California, to identify communities that are disproportionately burdened by pollution. In addition to pollution burden, CalEnviroScreen scores take into account socioeconomic factors and sensitive populations (i.e., people more susceptible to pollution due to socioeconomic conditions, age, or health).

As shown in Figure 6, Alameda census tracts are home to an array of CalEnviroScreen scores, ranging from scores in the lowest pollution burden decile (1-10 percent) on portions of Bay Farm Island to those in the third highest decile (71-80 percent) on the western extent of Alameda Island and in Central Alameda. Discrepancies arise due to differing environmental and socioeconomic factors between different parts of the city. For instance, Bay Farm Island is located far from or upwind of major pollution generators such as Oakland International Airport. In contrast, western Alameda Island is located downwind of the Port of Oakland, a major generator of pollution.

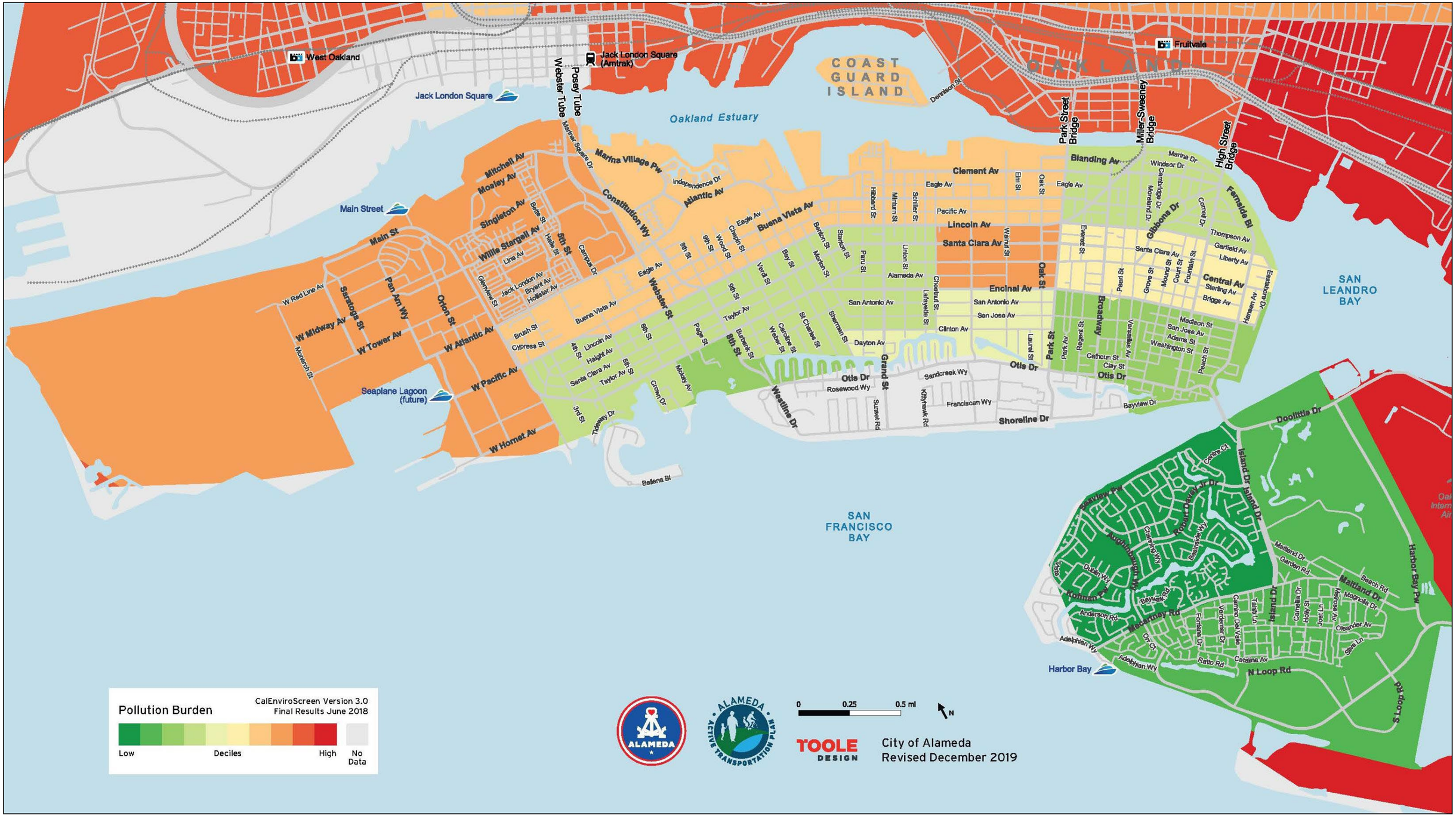


Figure 6: CalEnviroScreen Scores for City of Alameda Census Tracts

ACTIVE TRANSPORTATION NETWORKS

Alameda has a variety of bicycling and walking infrastructure. Understanding the current bicycle and pedestrian networks helps to determine where connectivity gaps exist and what improvements can be made to make bicycling and walking more convenient and attractive for Alamedans of all ages and abilities.

EXISTING BICYCLE NETWORK

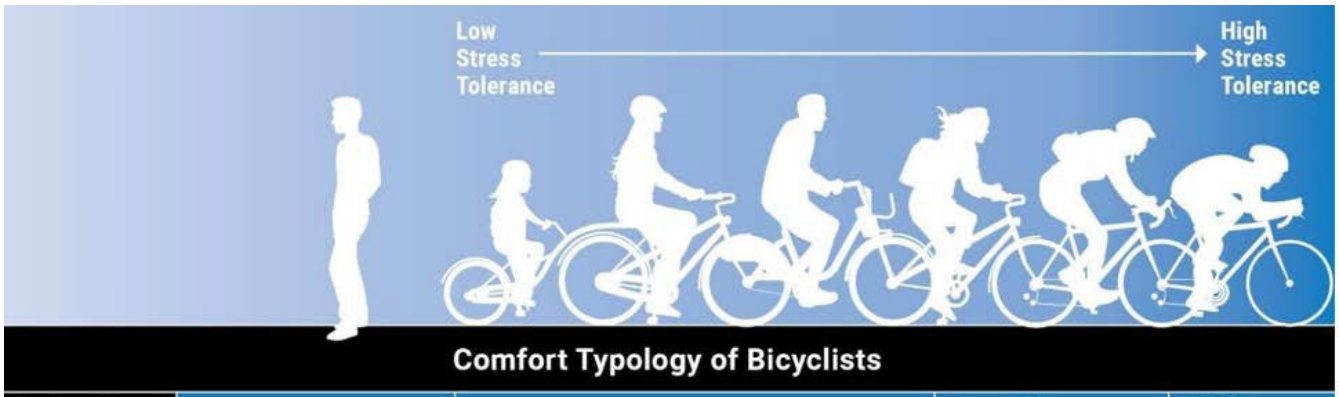
The City of Alameda's existing bicycle network includes a mix of shared-use paths, separated bike lanes, bike lanes (standard and buffered), and shared lanes (bike routes). Some facilities, such as the Cross Alameda Trail through the Jean Sweeney Open Space Park, are a pleasure for all to use. Other facilities, such as shared lanes and bike lanes along major streets, only provide access for people willing to ride in and adjacent to high-speed, high-volume vehicular traffic.

This Active Transportation Plan seeks to close gaps in the existing bicycle network, expand the network with new bikeways, better link destinations and neighborhoods within Alameda and to Oakland, and create a low-stress network that serves all bicyclists.

Who are we planning for?

Many factors contribute to whether or not people choose to ride a bicycle for utilitarian trips, like commuting to work or school or running errands. One of the largest considerations is safety and comfort. Research has found that a large percentage of the American population is interested in bicycling for transportation but does not currently do so because they feel unsafe or uncomfortable. In fact, most people in the U.S. (between 50 and 60 percent) have little tolerance for interacting with motor vehicle traffic unless volumes and speeds are very low.[3] This group of bicyclists is referred to as "Interested but Concerned," reflecting both their interest in bicycling for transportation as well as concerns about safety and comfort when interacting with motor vehicle traffic. Interested but Concerned riders feel safest and most comfortable riding on low-traffic, low-speed streets or on separate paths or other facilities that provide protection or physical separation from fast-moving traffic[4]. Unfortunately, these facilities are oftentimes nonexistent, inconvenient, or indirect. Figure 7 denotes the percentage of Alamedans that make up each group of bicyclist, with nearly half of all Alamedans falling into the "Interested by Concerned" category.

[3] Studies, such as the one referenced below, show that approximately one third of the adult population is not currently interested in bicycling or able to bicycle.
[4] Source: Dill, J. McNeil, N. "Revisiting the Four Types of Cyclists: Findings from a National Survey" Transportation Research Board 95th Annual Meeting, 2016.



Design User Profile	Not Interested or Able	Interested but Concerned	Somewhat Confident	Highly Confident
Percent of Alamedans	22%	46%	26%	7%

Figure 7: Stress Tolerance for Different Types of Bicyclists in Alameda

When assessing Alameda's existing bicycle network, this Plan uses the framework of bicyclist types presented above and aims to understand if the existing bikeway network is comfortable for Interested but Concerned bicyclists. This framework will also be used when developing the proposed bicycle network.

Existing and Planned Bikeways

The City of Alameda's existing bicycle network includes approximately 64.5 miles of bikeways. This mileage number includes the new bikeways that the City is planning to construct between 2020 and 2024, per the City's current five-year Capital Improvement Program. Table 4 provides an overview of the existing and planned bikeway mileage in Alameda, and Figure 8 maps these facilities. Table 5 provides a more detailed list of bicycle facilities to be constructed from 2020-2024.

Table 4: Mileage of Existing Bikeways and Bikeways to be Constructed 2020-2024 in Alameda

Bikeway Type	Miles
Shared-Use Path	26.2
Separated Bike Lane	6.5
Buffered Bike Lane	3
Bike Lane	17.8
Neighborhood Greenway	0
Bike Route	10.9
Facility type to be determined	0
Total	**64.5**

Table 5: Bikeways to be Constructed 2020-2024

Street	Project Limits	Facility Type(s)	Anticipated Construction Year
Pacific Avenue	Main Street to 4th Street	Bike Lane	2020
Otis Drive	Westline Drive to Willow Street	Bike Lanes, Separated Bike Lanes	2020
Ferry Point	Seaplane Lagoon Ferry Terminal (future) to West Atlantic Avenue	Separated Bike Lanes	2020
5th Street Extension	North of Mitchell Avenue	Bike Lanes	2021
Clement Avenue	Grand Street to Broadway	Separated Bike Lanes	2021
Clement Avenue/ Tilden Way	Broadway to Fruitvale Bridge	Shared-Use Path	2022
Various Streets in Alameda Point	Alameda Point, west of Main Street	Bike Lanes, Separated Bike Lanes	2022
Central Avenue	Pacific Avenue to Sherman Street	Bike Lanes, Separated Bike Lanes, TBD	2022/2023
New Waterfront Trail	Bette Street to 5th Street	Shared-Use Path	2024
New Waterfront Trail	Grand Street to Willow Street	Shared-Use Path	2024
Clement Avenue Extension	Sherman Street to Entrance Road	Separated Bike Lanes	2024

Figure 8: Existing Bicycle Network in Alameda

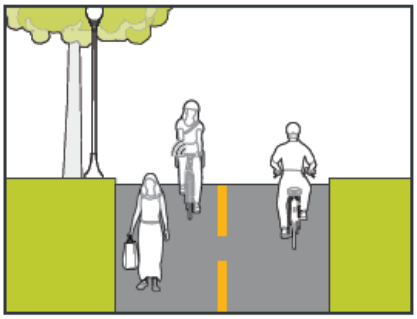
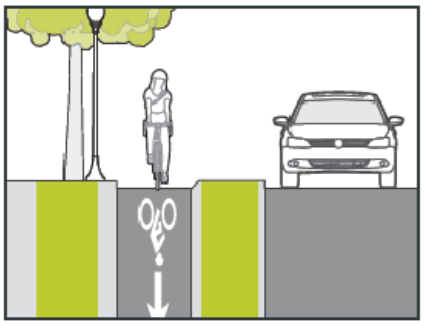
Existing Bicycle Facility Types

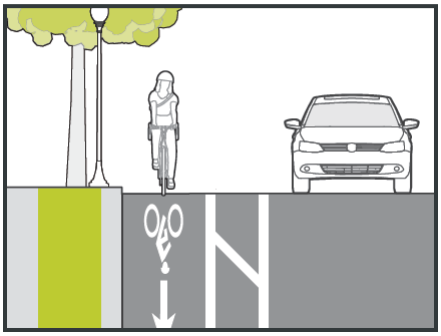
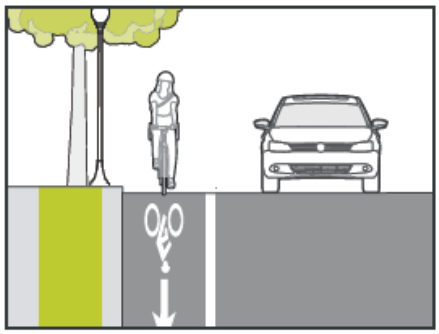
The existing network consists of the following facility types, listed from most separation from vehicular traffic to least separation. These bikeway types are discussed in greater detail in Table 6.

- Shared-Use Paths
- Separated Bike Lanes
- Buffered Bike Lanes
- Standard Bike Lanes
- Shared Lane (bike routes)

The existing and planned network provides some east-west connectivity on Alameda Island's grid street network. The network consists of on-street bike lanes (standard and buffered) and shared lanes (bike routes), augmented with several separated on-street facilities and off-street facilities. Separated on-street infrastructure includes separated bike lanes like those on Shore Line Drive and Fernside Drive, and off-street facilities include shared-use paths like the Bay Trail and Cross Alameda Trail. Bay Farm Island has a robust network of off-street shared-use paths and some on-street bike lanes. Coast Guard Island has no bicycle facilities.

Table 6: Existing Bikeway Types in Alameda

Bikeway Type	Description
Shared Use Path 	• Off-street pathway designed for use by bicyclists, pedestrians and other active transportation users. • Variation: Parallel but separated biking and walking paths • Stress level: Low. Has the least potential number of interactions between bicyclists and vehicles, compared to other facility types • Caltrans classification: Class I • **Examples in Alameda:** Bette Street path, Bay Farm Island shoreline trails
Separated Bike Lane 	• Designated lane or lanes for bicycles (and other active transportation devices with comparable speeds, such as electric scooters) separated from vehicular traffic and the sidewalk by a vertical element (e.g., flexible posts, planters, parked vehicles, curbs, etc.) The more robust the buffer's vertical and horizontal separation, the more comfortable the separated bike lane is for bicyclists. • City policy is to provide separated bicycle lanes instead of standard bicycle lanes unless infeasible. (General Plan) • Variations: Can be one-way, on each side of the street, or two-way, on one side of the street. • Stress level: Low, even on roads with high vehicle speeds and volumes • Caltrans classification: Class IV • **Examples in Alameda:** Shore Line Drive, Fernside Drive, Clement Avenue

Bikeway Type	Description
Buffered Bike Lane 	• Bicyclists ride next to vehicular traffic in a lane designated by paint only, with a striped buffer area between the bicyclist and travel lane that neither vehicles nor bicyclists should use. • Stress level: Medium. Can be considered lower stress for most adults, if installed on roadways with vehicle speeds of 30 mph or less and lower traffic volumes. However, stress level can increase with adjacency to on-street parking. • Caltrans classification: Class IIB • **Examples in Alameda:** portions of Robert Davey Jr. Drive, Fernside Drive, and Willie Stargell Avenue
Bike Lane 	• Bicyclists ride adjacent to vehicular traffic in a lane designated by a painted line only. • Stress level: Medium to High. Stress level can increase with adjacency to on-street parking. • Caltrans classification: Class II • **Examples in Alameda:** Central Avenue, Broadway, Mecartney Road
Bike Route 	• Bicyclists share travel lanes with vehicular traffic. Bicycle route signage and optional pavement markings (e.g., sharrows) are typically included to increase driver awareness of bicyclists and aid bicyclists with navigation • Stress level: Medium to High, depending on amount and speed of vehicle traffic. Stress level can increase with adjacency to on-street parking. • Caltrans classification: Class III • **Examples in Alameda:** Oak Street, Pacific Avenue, Versailles Avenue

Intersection Treatments

In addition to low-stress bikeways along streets, spot treatments at intersections – such as bike lane extensions, bike boxes, and bicycle detection – are important to maintain the continuity and comfort of bicycle facilities.

Bike Lane Extensions

Bike lane extensions are installed at intersections to increase the conspicuity of bicyclists and increase driver awareness of potential conflicts with bicyclists. They can either be dashed white line extensions of bike lanes or include green paint to further increase visibility. In Alameda, the intersection of Tilden Way and Broadway have chevrons with dashed white line extensions to guide bicyclists through the intersection (see Figure 9).

Figure 9. Bike lane extensions, using painted white dashed lines and chevrons, at the intersection of Tilden Way and Broadway.

Bike Boxes

Bike boxes provide a dedicated space at intersections between the crosswalk and motor vehicle stop line where bicyclists can wait during the red-light phase at signalized intersections. Bike boxes enable bicycles to take a visible position in front of vehicles at the intersection, allowing bicyclists to "claim the lane" if desired. Bike boxes also aid bicyclists making left turns and provide additional space for more bicyclists to wait at the intersection compared to standard bike lanes. Bike boxes may be painted green to increase bicyclist conspicuity. An example of bike boxes in Alameda is located at Park Street and Blanding Avenue (see Figure 10).

Figure 10. Bike box at the intersection of Park Street and Blanding Avenue.

Two-Stage Left Turn Box

Two-stage left turn boxes are installed at intersections, signalized and unsignalized, to facilitate left turns by bicyclists. They are an alternative to bicyclists merging into vehicular traffic to make a left turn from the leftmost travel lane. To use a two-stage left turn box, bicyclists enter the intersection, cross to the opposite side as if they are continuing straight, and then pull into the turn box (to the right outside of the vehicle path of travel and adjacent to the crosswalk, if present). Within the turn box, bicyclists turn left to align with the travel

lane on the street they wish to ride on. Bicyclists queue in the turn box until they either have a green light (signalized intersections) or there is a gap in traffic (unsignalized intersections), and then they continue straight to complete the movement. Two-stage left turn boxes consist of a bicycle symbol and left arrow surrounded by a white rectangle that delineates the turn box area, which are painted green for additional visibility. Turn boxes should be sized based on anticipated left turning bicycle volumes; however, they must always be located outside of the vehicle path of travel to provide a safe space for bicyclists to queue. A two-stage left turn box is also located at the Park Street and Blanding Avenue intersection (see Figure 11) as well as Tilden Way and Broadway.

Figure 11. Two-stage left turn box located at the Park Street and Blanding Avenue intersection.

Bike Detection

Bicycle detection at intersections ensures that bicyclists waiting at a red light will trigger the light to turn green, even in the absence of a vehicle traveling in the same direction. Bicycle detection is only needed at intersections with actuated signals that operate based on demand, not at pretimed signals that give each roadway green time regardless of actual demand. Bicycle detection is already employed at various intersections throughout Alameda. Depending on the intersection capabilities, a combination of video detection cameras and in-pavement loop directors are used.

End-of-Trip and Support Facilities

Alameda has many end-of-trip and support facilities that make it easier to bicycle throughout the city. These facilities include bicycle racks, bike lockers, and bike repair stations.

The majority of **bicycle racks** are clustered around Alameda's two commercial districts - Park Street and Webster Street. Other City-maintained bike parking locations can be found near shopping centers, parks, and the College of Alameda. BikeLink lockers and additional bike racks not maintained by the City are located at the Main Street and Harbor Bay ferry terminals, and at Alameda Landing, a shopping center near the Webster Tube.

The city has 44 **bicycle lockers**, including 38 existing and six planned. Table 7 includes information about the existing lockers.

Table 7. Existing Bicycle Lockers

	Location Name	Street Name	Cross Street	Owner	Locker Type	# of Lockers	# of Spaces	Date Installed
1	Harbor Bay Ferry Terminal	Mecartney	Ferry Terminal entrance	City	On-demand, metal, stainless steel	8	16	2009
2	Main Street Ferry Terminal (WETA)	Main St	Ferry Terminal entrance	WETA	On-demand, metal, stainless steel	5	20	2016

	Location Name	Street Name	Cross Street	Owner	Locker Type	# of Lockers	# of Spaces	Date Installed
3	Civic Center Parking Garage	Oak	Central	City	On-demand, metal, carbon steel	8	16	2011
4	Alameda Landing (5 pod locations)	5th St	Stargell	Private	On-demand, metal	11	22	2015
5	Atlantic & Webster (future CAT Plaza)	RAMP	Webster	City	On-demand, metal	6	12	2017
6	Seaplane Lagoon Ferry Terminal	Ferry Point		City	On-demand, metal, stainless steel	6	24	Coming soon - 2020

New bicycle lockers are planned for the following locations:

- Main St Ferry Terminal
- Bay Farm Ferry Terminal
- Park & Ride Lot on Island Drive (Bay Farm Island)
- Main Library
- Webster Street and Santa Clara Avenue
- City Hall
- City-owned off-street parking lots

Additional bike parking is provided in private buildings for tenants and occupants. This parking is required by a bike parking ordinance which is discussed in the plans and policies section later in this document.

The city has three **bike repair stations**; one in Alameda Landing near 5th Street and Willie Stargell Avenue. The second is located near the Alameda Free Library at Oak Street and Lincoln Avenue, and the third at the West End Branch of the Alameda Free Library.

Key Issues and Opportunities

Alameda has a strong bicycling culture, many people and families who bicycle, and a well-connected existing bicycle network upon which to build. Many schools are connected by bicycle facilities, and large numbers of schoolkids ride their bicycles to school. East-west connectivity in Alameda good, with multiple routes that are closely spaced.

Alameda's bicycling culture is supported by Walk Bike Alameda, a volunteer advocacy organization that works to create safer streets, slower traffic, a strong business community, and healthier residents.

While the existing bicycle network covers much of the city and includes some high-comfort bikeways, there is room to improve. Key opportunities include:

- Connecting major destinations via the bicycle network;
- Closing gaps in the existing network;
- Upgrading existing facilities to create more low-stress, comfortable bikeways that serve Interested but Concerned riders;
- Addressing recent collisions involving children bicycling and walking to school with infrastructure and programmatic investments;
- Improving north-south connectivity, which has fewer routes and greater distances between routes, compared to east-west connectivity;

- Adding connections to popular low-stress facilities (e.g., the Shore Line Drive separated bike lane and the Cross Alameda Trail); and
- Ensuring that large streets do not create high-stress barriers to bicycling.

EXISTING PEDESTRIAN NETWORK

The City of Alameda's existing pedestrian network includes a combination of on-street sidewalks and off-street walkways and shared-use paths. Most walkways are paved, but some are not. Marked crosswalks are provided at intersections or midblock crossings on major streets. Some midblock crossings are enhanced with flashing beacons to increase pedestrian conspicuity to drivers and increase driver awareness of potential conflicts with pedestrians. A variety of pedestrian treatments are installed at intersections to increase pedestrian safety and priority, as discussed in more detail below.

Existing and Planned Pedestrian Infrastructure

Alameda has over 200 miles of sidewalks, which cover about two-thirds of the city's 180 miles of roadway. This figure includes existing sidewalks, and sidewalks are planned for construction between 2020-2024, as a part of the City's current five-year Capital Improvement Program. The city has 7.5 miles of paved walkways (not including Class I Shared-use Paths), and 1.7 miles of unpaved trails. Figure 15 illustrates the existing pedestrian network.

Facility Types

The pedestrian network is comprised of three walking facility types:

Sidewalks are located along streets, typically on both sides. They can be immediately adjacent to vehicular travel lanes or offset by a landscaping strip. The larger the offset from the roadway, and the lower traffic speeds and volumes are, the more comfortable sidewalks are for people walking. Examples of sidewalks with and without a landscaping offset from the roadway can be found along Central Avenue and Grand Street, respectively Figure 12.

Figure 12: Sidewalks along Grand Street (left) and Central Avenue (right)

Off-street walkways are off-street walking facilities solely intended for pedestrians. They can either be paved or unpaved. Paved walking surfaces are typically concrete or pavement, while unpaved surfaces are oftentimes compacted soil, decomposed granite, or crushed gravel. Examples of off-street walkways are those in Jean Sweeney Park (see Figure 13).

Shared-use paths are off-street facilities intended to be used by both pedestrians and bicyclists. The design characteristics of shared-use paths, such as width and configuration (i.e., a mixed pedestrian and bicyclist operating environment versus delineated space for each mode) are determined by the anticipated pedestrian and bicyclist volumes and the proportion of pedestrians versus bicyclists. See Figure 14 for an example of a shared-use path on Bay Farm Island.

Figure 13: An Off-Street Walkway in Jean Sweeney Park

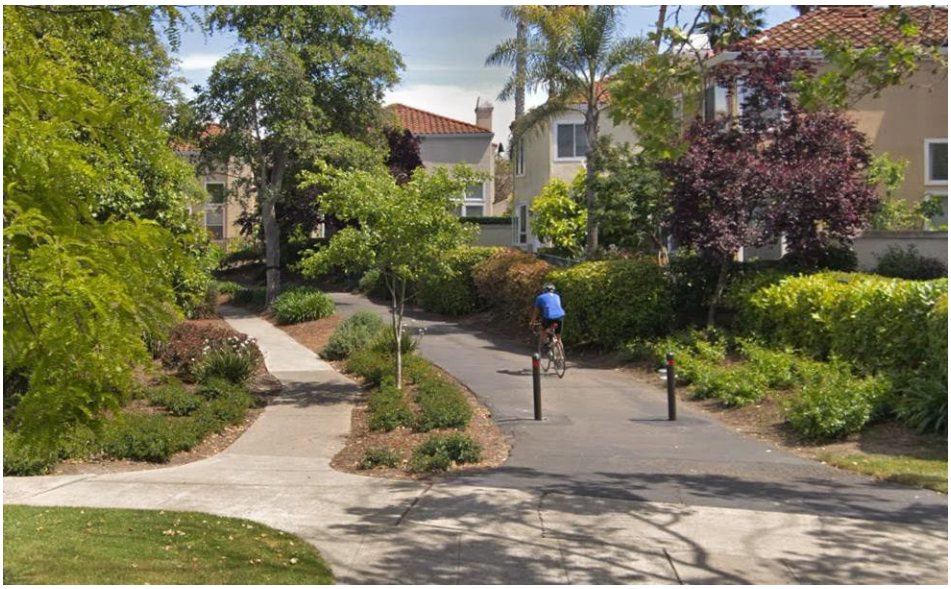


Figure 14: A Shared-Use Path on Bay Farm Island

Figure 15: Existing Pedestrian Network in Alameda

The existing and planned pedestrian network provides excellent connectivity to neighborhoods and destinations in Alameda. The on-street network is augmented by a connected off-street network comprised of shared-use paths and some unpaved walkways that fills in gaps in the on-street network and provides recreational access. Bay Farm Island's off-street walking network is particularly dense with a system of shared-use paths, including trails along the lagoons, that provide greater connectivity than the street network.

Intersection and Crossing Treatments

In addition to on- and off-street pedestrian infrastructure, crossing treatments at intersections and midblock locations are important to maintain the continuity and comfort of the overall pedestrian network. Examples of intersection treatments in Alameda include daylighting intersections, high-visibility crosswalks, curb ramps, pedestrian warning signage, audible pedestrian pushbuttons, median refuge islands, curb extensions, beacon-enhanced crossings, leading pedestrian intervals, and pedestrian countdown signals.

Daylighting Intersections

Daylighting intersections restricts parking near intersections to improve visibility for drivers and pedestrians. The City has passed a policy instituting daylighting, and in Alameda, most daylighting is achieved with a painted red curb.

Curb Extensions

Curb extensions, also known as curb bulbouts, are used to shorten pedestrian crossing distances and reduce corner radii at intersections. Reduced pedestrian crossing distances increase pedestrian safety by reducing pedestrians' exposure time to vehicular traffic and by making pedestrians and drivers more visible to one another. Smaller corner radii increase pedestrian safety and priority by reducing speeds of right turning vehicles and increasing the likelihood of drivers yielding to pedestrians waiting to cross the street. Examples of curb extensions can be found at the intersection of Lincoln Avenue and Park Street (see Figure 16).

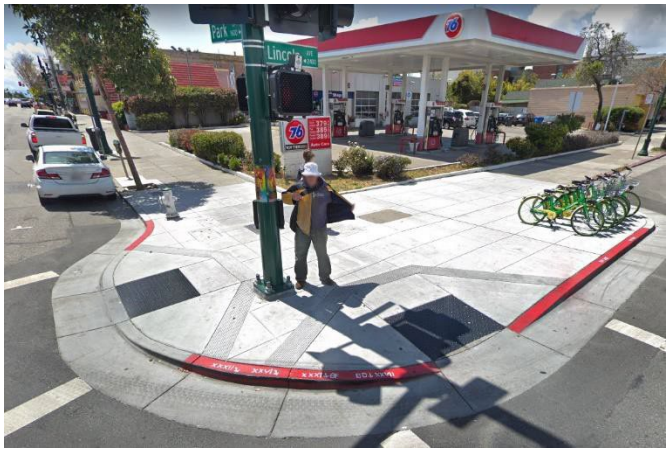


Figure 16: Curb Extension at the Intersection of Lincoln Avenue and Park Street

Median Refuge Islands

Median refuge islands are used to break pedestrian crossings at uncontrolled midblock locations into two stages, one for each direction of vehicular traffic (see Figure 17). Refuge islands increase pedestrian safety by reducing pedestrians' exposure to vehicles and enabling them to focus on one direction of traffic at a time before crossing. Pedestrian refuge islands must be a minimum of six feet in width, with wider refuges preferred to increase pedestrian comfort and accommodate crossing bicyclists. An example of a median refuge island can be found at the intersection of Island Drive and Garden Road on Bay Farm Island.

Figure 17: Median Refuge Island at the Intersection of Lakeshore Avenue and Cleveland Cascade in Oakland.

High-Visibility Crosswalks

High-visibility "ladder" and "continental" crosswalk markings increase driver awareness of pedestrian crossings, as these crosswalks are more visible than standard longitudinal crosswalk markings. Examples of high visibility crosswalks in Alameda include the ladder-style crosswalks located at the intersection of Constitution Way and Atlantic Avenue (see Figure 18).

Figure 18: Ladder Style Crosswalks located at the Intersection of Constitution Way and Atlantic Avenue

Beacon-Enhanced Crossings

Beacon-enhanced crossings use flashing lights in addition to signage and pavement markings to increase pedestrian conspicuity and visibility to drivers at uncontrolled crossings. Beacons come in many forms, including rectangular rapid-flashing beacons (RRFBs) or LED-enhanced signage. Beacons are typically activated by pedestrians; thus, they only operate when a pedestrian is present at a crossing. Beacons also promote pedestrian priority and increase the likelihood that drivers will yield to a pedestrian trying to cross the street. An example of a beacon-enhanced crossing is the intersection of Mecartney Road and Belmont Place on Bay Farm Island (see Figure 19).

Figure 19: Pedestrian Crossing with an RRFB at the Intersection of Mecartney Road and Belmont Place on Bay Farm Island

Curb Ramps

Curb ramps enable people using wheelchairs, pushing strollers, or pulling luggage or carts to easily ramp from sidewalk level down to street level to cross the street. Per Section 504 of the Rehabilitation Act of 1973 and Title II of the Americans with Disabilities Act, curb ramps are a requirement at all new pedestrian crossings and must be installed as retrofit projects at existing pedestrian crossings without ramps. In Alameda, curb ramps are currently installed as diagonal ramps that serve both crossings on a street corner or separate directional ramps that align with each crosswalk on a street corner. Directional ramps are preferred since they align people with the crosswalk as opposed to angling them into the center of the intersection, as with diagonal ramps. Examples of directional ramps in Alameda include those at the intersection of Park Street and Santa Clara Avenue (see Figure 20).

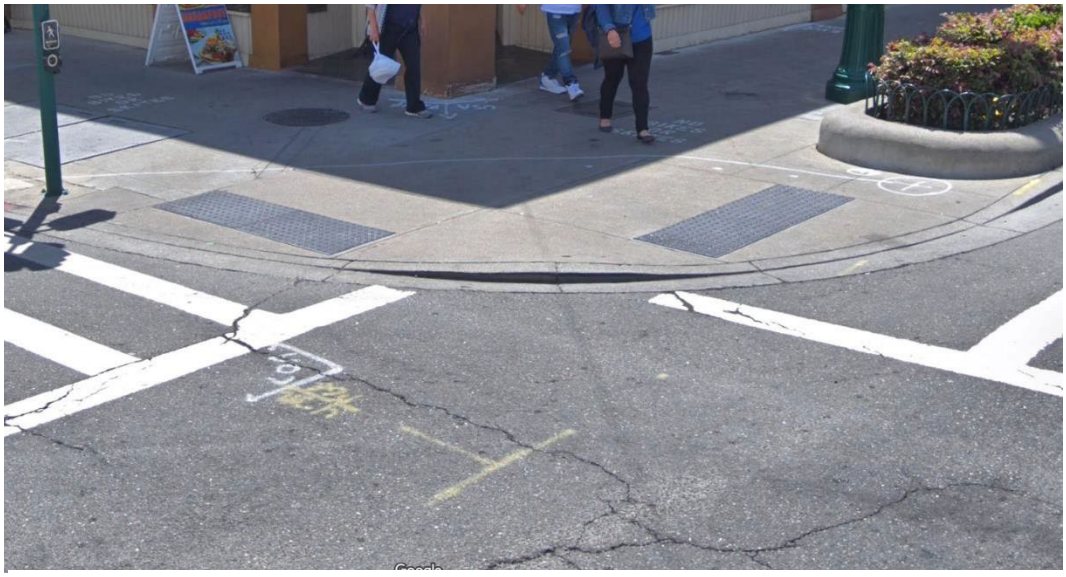


Figure 20: Directional Curb Ramps at the Intersection of Park Street and Santa Clara Avenue

Pedestrian Warning Signage

Pedestrian warning signage installed in advance of and at pedestrian crossings increases pedestrian conspicuity to drivers and increases driver awareness of potential conflicts with pedestrians. Furthermore, signage may be installed in-street on the centerline to enhance crossing visibility and reinforce pedestrian priority. Examples include the warning signage at the intersection of Santa Clara Avenue and Willow Street (see Figure 21).

Figure 21: Streetside and In-Street Pedestrian Warning Signage at the Intersection of Santa Clara Avenue and Willow Street

Audible Pedestrian Pushbuttons

Audible pedestrian pushbuttons help visually-impaired pedestrians locate the pushbutton and pedestrian crossings at signalized intersections and intersections with pedestrian-activated beacons. The pushbuttons indicate when pedestrians have a walk signal at signalized intersections and when beacons are flashing at beacon-enhanced crossings. Examples of audible pushbuttons include those installed at the signalized intersection of Webster Street and Lincoln Avenue (see Figure 22).

Figure 22: Audible Pedestrian Pushbutton at the Intersection of Webster Street and Lincoln Avenue

Leading Pedestrian Intervals

Leading pedestrian intervals (LPIs) are a signalization strategy which provide pedestrians with a walk signal three to seven seconds before vehicles traveling in the same direction receive a green signal. This helps pedestrians establish the right of way in the crosswalk and is especially helpful in areas with high pedestrian volumes. An example of an LPI can be found at the intersection of Park Street and Buena Vista Avenue (see Figure 23) and at several other intersections along Park Street. As signals are upgraded, Alameda plans to install LPIs at every signal and increase the lead time from three to five seconds.

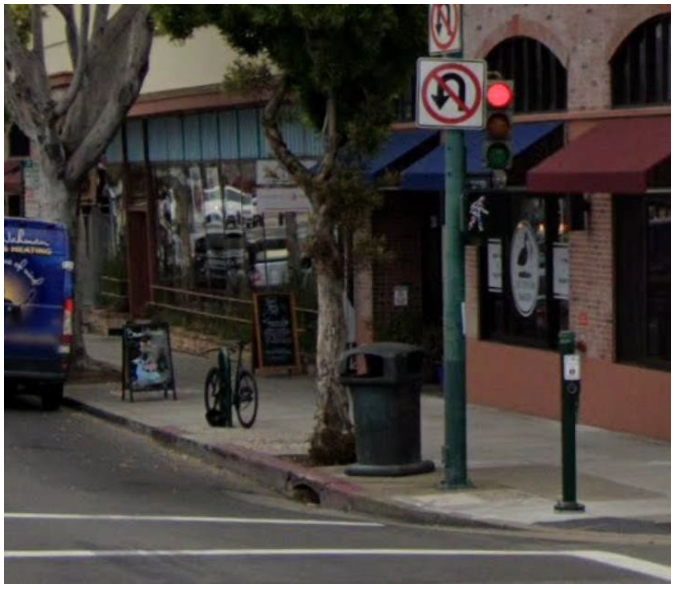


Figure 23: LPI at the Intersection of Park Street and Buena Vista Avenue

Pedestrian Countdown Signals

At signalized intersections, pedestrian signal heads with countdowns communicate to pedestrians and drivers how much time remains in the "walk" interval before a "don't walk" interval begins. This helps pedestrians judge whether or not they have adequate time to cross the street. Examples of pedestrian countdown signals are those found at the intersection of Willie Stargell Avenue and Webster Street (see Figure 24).

Pedestrian Amenities

Streetscape amenities such as lighting, benches, and tress can create a more welcoming and comfortable pedestrian environment. Pedestrian-scale lighting is important for security and safety, and can also contribute to a sense of place along a corridor. Lighting that illuminates crossings can help drivers see pedestrians in low light conditions. *City staff: Please add additional context about lighting in different areas of the city.*

Figure 24: Pedestrian Countdown Signal at the Intersection of Willie Stargell Avenue and Webster Street

Benches create a comfortable pedestrian environment by providing people with a place to rest, wait, and congregate. In Alameda, benches tend to be installed near shopping areas, parks, and schools. Some AC Transit bus stops have shelters and benches.

Trees are also an important element in creating welcoming places to walk, providing shade and fresh air, and acting as wind and sound barriers. The city has over 19,500 City-maintained street trees. In 2010, the City updated its Master Street Tree Plan which identifies specific species of trees to be planted within the city.

Key Issues and Opportunities

The existing pedestrian network in Alameda provides coverage of most of the city. Sidewalks exist on at least one side of most streets throughout in the city and are augmented by a network of off-street walkways and shared-use paths. The existing pedestrian network provides access to key destinations throughout Alameda, ranging from businesses and residences to parks and schools. In addition, the City has installed numerous treatments at pedestrian crossing locations to increase pedestrian safety, visibility, and priority when crossing the street.

While the existing walking network is extensive and covers much of Alameda, there is room to make walking more comfortable, attractive, convenient, and lower stress for all Alamedans. At pedestrian crossings, facilities oftentimes feel unsafe or do not exist at all, which discourages walking. Some crossings are not accessible to people using wheelchairs or visually-impaired pedestrians because they lack infrastructure such as curb ramps or audible pedestrian signals. Furthermore, pedestrian treatments like beacon-enhanced crossings and in-street warning signage can be added in school areas to further increase the visibility and priority of schoolkids walking to school. The City is already making physical changes around schools to improve the safety of students walking and biking to school. Finally, high-speed, high-volume streets like Encinal Avenue (SR-61) create high-stress barriers to walking in Alameda, and improvements at these locations will help to enhance the comfort of the citywide pedestrian network.