Appendix A

PERSONAL MOBILITY DEVICE GUIDELINES

PURPOSE AND NEED

These micromobility device guidelines provide a framework for the SFMTA to facilitate the use of a wide range of micromobility devices in the biking and rolling network. San Francisco's biking and rolling network was designed primarily for bicyclists, but with the proliferation of new micromobility devices, defined as light personal vehicles including electric scooters, electric skateboards, shared bicycles, powerchairs and electric bicycles, the SFMTA wishes to accommodate and support these devices while maintaining the safety and comfort of all users. This document provides information on how to design for, accommodate, and integrate micromobility devices into the biking and rolling network.

Understanding how different devices operate, how to accommodate the speed differential between different device types, and how to accommodate all network users is imperative to designing effective facilities.

LEGAL FRAMEWORK

A review of local regulations was conducted to understand the current legal context that governs micromobility device use. The SFMTA currently has no agency-specific regulations other than those for shared micromobility device operators. To understand the current context, this section answers the following questions:

- *What legal definitions does California use for micromobility devices?*
- *What devices can legally be used in San Francisco's bike lanes?*
- *What are the current rules regulating micromobility device usage?*

What legal definitions does California use for micromobility devices?

SFTMA primarily defers to the legal definitions of micromobility devices provided by the State of California Vehicle Code (CVC), in below.

Table 1: California Vehicle Code Definitions Relevant to Bicycles and Mobility Devices

Vehicle Type	CVC Section	California Vehicle Code Text
E- Bike	400	(a) An "electric bicycle" is a bicycle equipped with fully operable pedals and an electric motor of less than 750 watts. (1) A "class 1 electric bicycle," or "low-speed pedal-assisted electric bicycle," is a bicycle equipped with a motor that provides assistance only when the rider is pedaling, and that ceases to provide assistance when the bicycle reaches the speed of 20 miles per hour. (2) A "class 2 electric bicycle," or "low-speed throttle-assisted electric bicycle," is a bicycle equipped with a motor that may be used exclusively to propel the bicycle, and that is not capable of providing assistance when the bicycle reaches the speed of 20 miles per hour. (3) A "class 3 electric bicycle," or "speed pedal-assisted electric bicycle," is a bicycle equipped with a motor that provides assistance only when the rider is pedaling, and that ceases to provide assistance when the bicycle reaches the speed of 28 miles per hour, and equipped with a speedometer. (b) A person riding an electric bicycle, as defined in this section, is subject to Article 4 (commencing with Section 21200) of Chapter 1 of Division 11.
Motorcycle	400	(a) A "motorcycle" is a motor vehicle having a seat or saddle for the use of the rider, designed to travel on not more than three wheels in contact with the ground. (b) A motor vehicle that has four wheels in contact with the ground, two of

		which are a functional part of a sidecar, is a motorcycle if the vehicle otherwise comes within the definition of subdivision (a).
Motor-Driven Cycle	405	A "motor-driven cycle" is any motorcycle with a motor that displaces less than 150 cubic centimeters. A motor-driven cycle does not include a motorized bicycle, as defined in Section 406.
Moped	406	(a) A "motorized bicycle" or "moped" is a two-wheeled or three-wheeled device having fully operative pedals for propulsion by human power, or having no pedals if powered solely by electrical energy, and an automatic transmission and a motor that produces less than 4 gross brake horsepower and is capable of propelling the device at a maximum speed of not more than 30 miles per hour on level ground.
E-Scooter (Privately Owned)	407.5.	(a) A "motorized scooter" is any two-wheeled device that has handlebars, has either a floorboard that is designed to be stood upon when riding or a seat and footrests in place of the floorboard, and is powered by an electric motor. This device may also be designed to be powered by human propulsion. For purposes of this section, a motorcycle, as defined in Section 400, a motor-driven cycle, as defined in Section 405, or a motorized bicycle or moped, as defined in Section 406, is not a motorized scooter. (b) A device meeting the definition in subdivision (a) that is powered by a source other than electrical power is also a motorized scooter.
E-Scooter (Shared)	554	"Shared mobility device" means an electrically motorized board, as defined in Section 313.5, motorized scooter, as defined in Section 407.5, electric bicycle, as defined in Section 312.5, bicycle, as defined in Section 231, or other similar personal transportation device, except as provided in subdivision (b) of Section 415, that is made available to the public by a shared mobility device service provider for shared use and transportation in exchange for financial compensation via a digital application or other electronic or digital platform.
Power Chair	407	A "motorized quadricycle" is a four-wheeled device, and a "motorized tricycle" is a three-wheeled device, designed to carry not more than two persons, including the driver, and having either an electric motor or a motor with an automatic transmission developing less than two gross brake horsepower and capable of propelling the device at a maximum speed of not more than 30 miles per hour on level ground. The device shall be utilized only by a person who by reason of physical disability is otherwise unable to move about as a pedestrian or by a senior citizen as defined in Section 13000.
Segway	313	The term "electric personal assistive mobility device" or "EPAMD" means a self-balancing, non-tandem two-wheeled device, that is not greater than 20 inches deep and 25 inches wide and can turn in place, designed to transport only one person, with an electric propulsion system averaging less than 750 watts (1 horsepower), the maximum speed of which, when powered solely by a propulsion system on a paved level surface, is no more than 12.5 miles per hour.
E-Scooter /Skateboard / One Wheel / E-Unicycle	313.5.	An "electrically motorized board" is any wheeled device that has a floorboard designed to be stood upon when riding that is not greater than 60 inches deep and 18 inches wide, is designed to transport only one person, and has an electric propulsion system averaging less than 1,000 watts, the maximum speed of which, when powered solely by a propulsion

		system on a paved level surface, is no more than 20 miles per hour. The device may be designed to also be powered by human propulsion.

In California, what devices can legally be used in bike lanes, and what are the current rules regarding micromobility device usage?

Figure 1 below summarizes what devices can be used in bike facilities as well as rules and regulations specific to each device type.

Vehicle Type and Speed	Do I need a license?	Do I need to register my vehicle?	Where can I ride?	Do I need to wear a helmet?
Class I E-Bike Pedal-assisted to 20 mph	No	No		
Class II E-Bike Throttle to 20 mph, Operable pedals*	No	No	Bikeways, trails, and non-freeway streets	**Recommended** for all, Required for 17 and under
Class III E-Bike Pedal-assisted to 28 mph	No	No		
Moped With or without pedals Up to 30 mph	**Yes** Driver's License and M1 or M2 Motorcycle License	**Yes** Must register with DMV to get License Plate and Moped ID. Insurance required.	Vehicular lanes on streets with speed limits up to 30 mph	**Yes** Required by law
E-Scooter With or without pedals Up to 30 mph	**Yes** Must be 16 with any Driver's License	No**	Bikeways, trails, and non-freeway streets	**Recommended** for all, Required for 18 and under
Segway Up to 12.5 mph **Hoverboard E-Skateboard E-Unicycle *(two kinds)*** Up to 20 mph	No	No	Bikeways, trails, and non-freeway streets	**Recommended** for all, Required for 18 and under

**Pedal assist may be provided in addition to the throttle on Class II E-Bikes*
***See CVC Section 407.5 for additional information on manufacturer notification re: insurance; insurance recommended for privately owned E-Scooters*

Figure 1: Summary of Personal Mobility Devices and Basic Regulations

DESIGN GUIDANCE

Designing for a broad range of micromobility increases safety and comfort for all street users. This section addresses best and emerging design practices, approaches, and resources. While these best practices provide some guidance and considerations for designing a more inclusive network, research and design guidance gaps exist and are continually evolving. This appendix focuses on design guidance for best accommodating a range of micromobility devices. The Biking and Rolling plan provides complementary policy, programming, and community-based solutions to support safe, comfortable, and accessible micromobility device use.

BEST AND EMERGING PRACTICES

The emergence and growth of new micromobility devices has led to ongoing research and evaluation of how to integrate these devices safely and successfully into existing street networks and infrastructure originally designed for bicyclists. This research and evaluation has led to emerging best practices for designing for different micromobility devices, including:

Inclusive Terminology

With a wider range of micromobility devices, there is discussion within the transportation industry to develop an all-encompassing term for biking and rolling infrastructure than solely *bike facilities*. While many practitioners and agencies are still comfortable with the term *bike facilities,* as this terminology is recognized and established in existing policy, some cities are renaming facilities to be more inclusive of different devices. For example, the City of Atlanta uses Light Individual Transportation (LIT) Lanes. In the San FranciscoBiking and Rolling plan, the term *biking and rolling network* refers to the entire on-street system that accommodates bikes as well as other micromobility devices.

Bike Facility Width

The range of micromobility devices is constantly evolving, and includes vehicles that are longer and wider than traditional bicycles, as well as electric-assist vehicles, including both bikes and scooters. Electric-assist vehicles have a greater range in speed than human-powered devices and can result in more frequent passing. Wider bike facilities can better accommodate passing and side-by-side riding.

Interactions with Pedestrians

The greater range of speeds and the relatively quiet operation of many micromobility devices requires increased design consideration, including signing and striping, in areas where pedestrians interact with micromobility devices, including intersections and transit stops.

Surface Type and Condition

Micromobility devices with smaller wheels are much more sensitive to pavement conditions than those with larger wheels. For example, multiple studies[1],[2] have shown that when pavement quality in bike facilities is substandard, users of those devices will prefer to ride on the sidewalk, where they compete for space, and cause conflicts with, pedestrians. Providing smooth surfaces for micromobility devices support

Parking

The SFMTA has developed parking requirement guidelines for shared mobility programs that aim to ensure clear paths of travel. These same practices can apply to public device storage. On-street bike corrals can be designed with extra space reserved for e-scooters; on sidewalks, designating and delineating space in the furniture zone may encourage better parking behavior. Agencies and vendors can assist with education campaigns, e.g., website graphics, videos, and app splash screens, and some vendors have added photo requirements, geolocation technology, or enforcement to assist with parking compliance.

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[1] https://www.portland.gov/transportation/escooterpdx/documents/2019-e-scooter-findings-report/download

[2] https://media.licdn.com/dms/document/media/D561FAQFaGJSiia4zXw/feedshare-document-pdf-analyzed/0/1702456048684?e=1707350400&v=beta&t=EBf7mFuZNwOfEc34hb6U0BdKYvPrPrQ1drmrZ9uJ41M

Holistic Design

Good riding and driving behaviors can be influenced and promoted through a holistic design approach that includes education, encouragement, and engineering. For example, a recent study[3] found that considering the characteristics of individual riders, roadway and environmental conditions, and social and cultural factors may impact e-scooter riding behavior (while this study focused on e-scooter riders specifically, we can assume this to be true for other similar micromobility devices). Figure 2 below depicts how a holistic design approach can impact riding behavior.

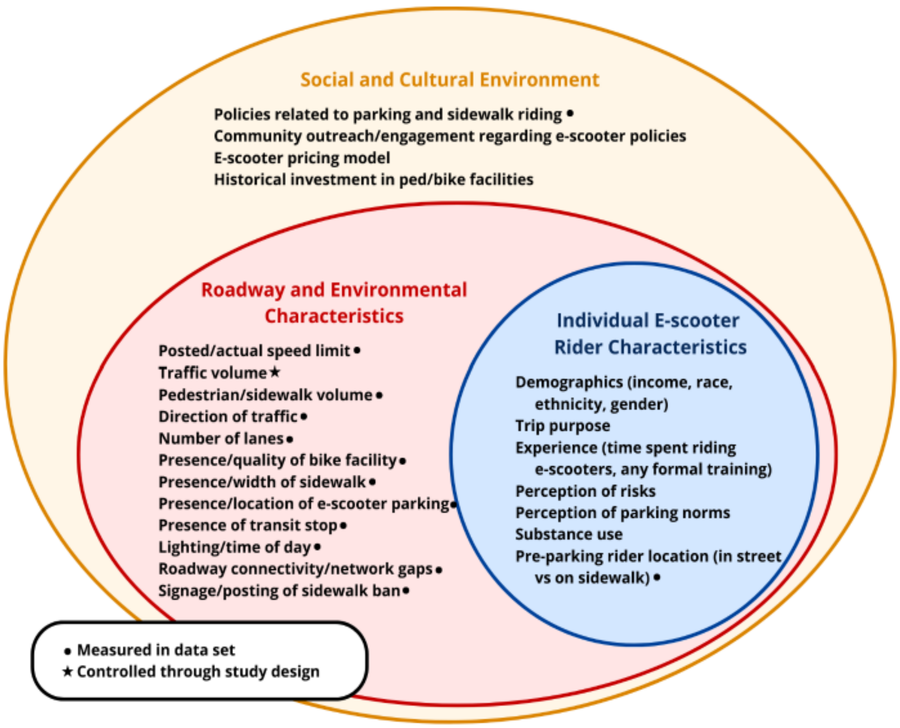

Figure 2: Holistic Design Approach

DESIGN APPROACH

The biking and rolling network in San Francisco was designed primarily for bicycles, and these facilities are generally the safest and most comfortable option for people using micromobility devices. However, accommodating the ever-growing range of micromobility devices requires planning and designing for a broader speed profile and different-sized devices within bike facilities.

Safety and comfort are the guiding principles for designing a transportation network that increases biking and rolling and greater use of micromobility devices. Micromobility device users should be considered vulnerable road users, as they operate without a protective shell and have unique operating characteristics (e.g., speeds, size, and acceleration rates) than motor vehicles.

This section presents four high-level design approaches for abiking and rolling network that prioritizes safety and comfort for all users:

- Inclusivity
- Accessibility
- Connectivity
- Clear Expectations

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[3] National Academies of Sciences, Engineering, and Medicine. 2023. *E-Scooter Safety: Issues and Solutions*. Washington, DC: The National Academies Press. Figure 27. https://doi.org/10.17226/27252.

Inclusivity

Biking and rolling networks should be inclusive of all users the different devices using the network. Bicycles and micromobility devices are important tools in addressing transportation system inequities, as they provide viable options for those who lack access to personal vehicles or reliable transit. However, inequities can continue to exist if a network is not inclusively designed.

The biking and rolling network should be designed to accommodate all ages and abilities and varying device types, taking into consideration different operating envelopes, speed profiles, and other operating characteristics.

Accessibility

All streets should be safe and accessible by the full range of micromobility devices except where they are specifically prohibited by law and clearly signed. San Francisco has a wide range of facility types that make up the biking and rolling network, providing a range of options for people on various devices. While bikeways are intended for micromobility device use and are not required to meet pedestrian accessibility guidelines, to the maximum extent practicable, efforts should be made to make the facility as accessible to, and usable by, individuals with disabilities.

Connectivity

A continuous and connected network allows users to get to their destinations conveniently, cost-effectively, and reliably. Connectivity means that residences, places of employment, shopping centers, schools, transit stations, and other community amenities are safely and directly accessible by a continuous network of facilities. Consistent application of design elements and facility type, and clearly marking known gaps, are key elements to a connected and continuous network.

Clear Expectations

A legible network makes it easy for people to navigate the network and to know where—and where not to—ride. Network structure, bikeway types, and bikeway designs should be intuitive to navigate. The biking and rolling network should be consistently signed and marked and be easily identifiable to all roadway users so that expectations are established, and conflicts are minimized.

DESIGN USER

DESIGN USER CHARACTERISTICS

Abiking and rolling network that accommodates all ages and abilities needs to account for human factors, including physical ability, experience, and ability to perceive potential conflicts. Designers should also pay close attention to the characteristics of the micromobility devices being employed. Designing for the widest range of users will accommodate a greater share of users.

Figure 4 provides high-level considerations and characteristics of people using different micromobility devices.

Bikes & E-Bikes	People ride bikes for a wide range of reasons and have varying levels of skill, comfort, and confidence. Their needs also vary depending on trip purpose; people may take one route for their ride to work, but choose different roads or paths when riding with their child. The unique needs of people with disabilities, low-income people, people of color, bike share users, children, and seniors should be considered.	
Cargo & Oversized Bikes	There are many different cargo bikes or bikes pulling trailers available to carry multiple passengers and/or goods. These vehicles increase the types of trips that can be made by bike, and often require facilities that are wider and consider their size and manueverability needs. Bike parking areas should also account for these vehicles and include spaces large enough to park and lock up to.	
E-Scooters & Kick Scooters	Like bikes, there is a wide range of users and trip purposes for Scooters. Most E-scooters are part of shared programs, though there is an increasing number of privately owned vehicles. Due to the smaller wheels, smooth surfaces are typically preferred, if not required, for these vehicles to operate safely. Kick Scooters without a motor are also common and users generally skew younger.	
Other Electric Personal Mobility Devices	There is a wide range of different types and styles of personal mobility devices that are typical: electric skateboards, segways, hoverboards, one-wheels/electric unicycles, etc. These users are generally accommodated by the typical design of bikeways, but are likely less expected and/or familiar to other users so consideration should be given to the signage and messaging to the community.	
Power Chairs & Scooters	Power Chair/Scooter users typically are accommodated on the sidewalk, though there may be occasions where a high quality bikeway is preferred. This may be due to no sidewalk or curb ramps being available or if the sidewalk is in poor condition (e.g. tree roots pushing up the sidewalk, significant street furniture, etc.) and unusable.	
Various Sidewalk Users	There is a wide range of people that use the sidewalk and are often forced to share relatively little space. Generally, these users are moving slow enough they can negotiate potential conflicts without issue. Providing separated spaces for people riding bikes, e-scooters, and other vehicles is key to ensuring the sidewalk is safe and comfortable for all.	

Figure 3: Design Considerations and Micromobility User Types

Vehicle Types

Technical details, including include typical variations in height, width, and length, of common device types typically found on San Francisco streets and trails are shown in Figure 5. While some devices are not depicted, such as one-wheel hoverboards, electric unicycles, electric skateboard/longboards, seated e-scooters, etc., they are generally similar or smaller in footprint than the vehicles shown 5.

Minimum facility widths for bike lanes, shared use paths, and sidewalks within the SFMTA's existing guidance do not accommodate the full range of these devices, particularly when considering the mix and interaction of devices and the space they occupy while operating. Designers should aim to meet or exceed the preferred widths where possible, using the guidance in Table 4 in the following section.

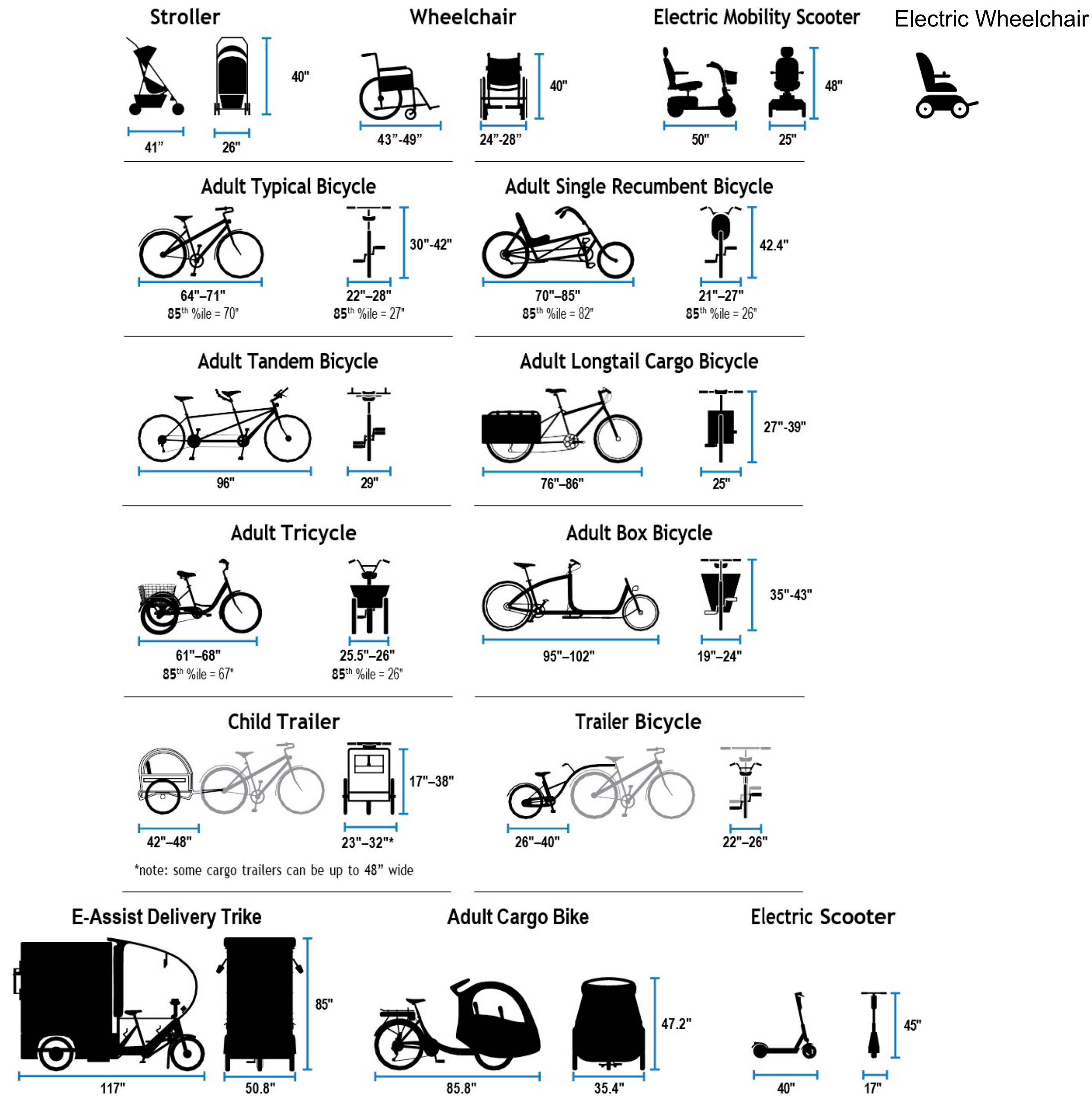

Figure 4. Typical Design Parameters for Common Vehicle Types

RECOMMENDED GUIDELINES

Planners and designers should consider the ever-evolving variety of micromobility devices and users when deciding on design elements such as lane widths, passing opportunities, queuing spaces, grade changes, ramps and transitions, surface materials, and maintenance protocols. The following guidelines provide key considerations for roadway and intersection design that best accommodates a range of devices.

Lane Widths

The appropriate width for a bike facility is dependent on facility type, context, expected volumes, vehicle types, and mix of users. As the number of users grows and the mix and type of micromobility devices increases, there is an increasing need for wider facilities. This section provides guidance on determining facility width for typical operations expected in San Francisco, and contexts for where additional space may be needed.

Operating Space, Shy Distance, and Passing Considerations

The *operating space*, or riding space, is the physical space occupied by the micromobility device and its rider plus the lateral space needed to operate the device comfortably and safely. The physical space is determined by the width of the widest portion of the device, typically the handlebars for bicycles and e-scooters, or the wheelbase on adult tricycles, child or cargo trailers, adult box bicycles, hoverboards, segways and e-unicycles. The physical space of different types of bicycles and other micromobility devices commonly seen on the streets of San Francisco are shown on Figure 5.

The *lateral space* needed to operate the device ranges from one foot for more comfortable riders to two and a half feet for more novice riders[4]. Designers should consider the types of devices expected on the facility. For example, the physical widths of some of the micromobility devices can approach four feet or more and their operational width can approach six feet. Bike facility widths should be designed to account for the operational and passing space required to accommodate the expected mix of micromobility devices plus any shy distance to vertical obstructions.

Table 2 provides a summary of the riding and passing space requirements for some of the more common vehicle types.

Table 2. Operating space needed for riding and passing a range of micromobility vehicles

Vehicle Type	Space Required for One-Way Bikeway		Space Required for Two-Way Bikeway	
	For riding	For passing	For riding	For passing
Typical bike	3.5’ to 4.5’	3’	8’ to 10’	11’ to 13’
Cargo bike	4.5’ to 5.5’	3.5’	9’ to 11’	12’ to 14’
Extra-large / freight bike	6.5’ to 7.5’	5’	12’ to 14’	15’ to 17’
Skateboarders/Inline skaters	5’ to 6’	3’	10’ to 12’	13’ to 15’
***Based off of NACTO Designing for Small Things With Wheels and other best practice guidance**				

Calculating Facility Width

To determine the ideal width for a bike facility that best accommodates a range of devices, designers should start by identifying the widest vehicle that is anticipated to frequently use the facility as the *design vehicle*, and then identifying the widest vehicle that is expected to occasionally use the facility as the *control vehicle*.

With the design and control vehicles identified, Table 2 can be used to calculate the usable width, which is the riding space of the control vehicle *plus* the passing space of the control vehicle. For two-way facilities, the usable width is double

[4] https://nacto.org/wp-content/uploads/2023/03/WP_designing_for_small_things_with_wheels_FINAL_March1-2023.pdf

the riding space of the control vehicle, with an additional three feet for busy facilities or where high volumes of larger devices are anticipated. See Figure 7 for an example of how these widths are combined.

Bicyclists and other micromobility device users avoid vertical obstructions to avoid handlebar and pedal strikes. Recommended and minimum shy distances adjacent to vertical elements (e.g., curbs, flexible delineators, barriers, railings) are provided in Table 3. Figure 7 shows details of recommended shy distance for four typical curb types. Designers should account for shy distance needs on both sides of the bike facility where applicable.

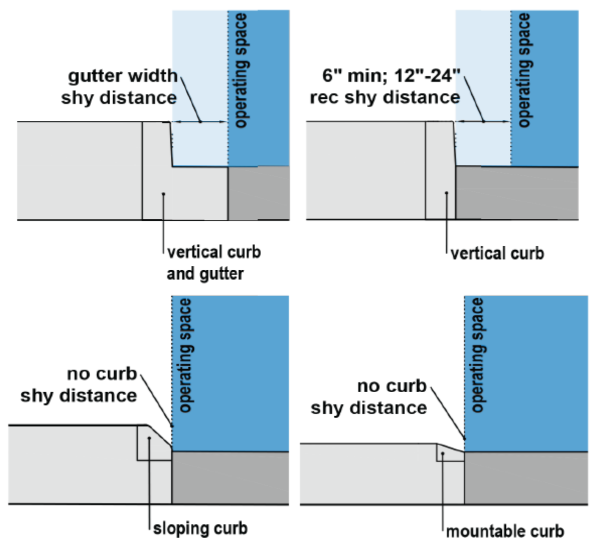

Figure 7: Recommended Shy Distance by Curb Type

Table 3. Bicyclist Lateral Shy Distance to Vertical Elements

Physical Element	Shy Distance (in.)	
	Minimum	Recommended Range
Intermittent Elements (e.g., trees, flex posts, poles**) ***	0	24 – 36
Traffic Signs and Supportive Posts on Curbed Roadways	12	24 – 36
Traffic Signs and Supportive Posts adjacent to Paths	24	36 – 48
Continuous Elements (e.g., fence, railing, barrier, planter)	12	24 – 36
Vertical Curbs (see **Figure 9**)	6	12 – 24
Mountable / Sloping Curbs (see **Figure 9**)	0	6 – 12
**To reduce crash risks, eliminating the shy distance is not preferable and any additional shy distance will be beneficial*		

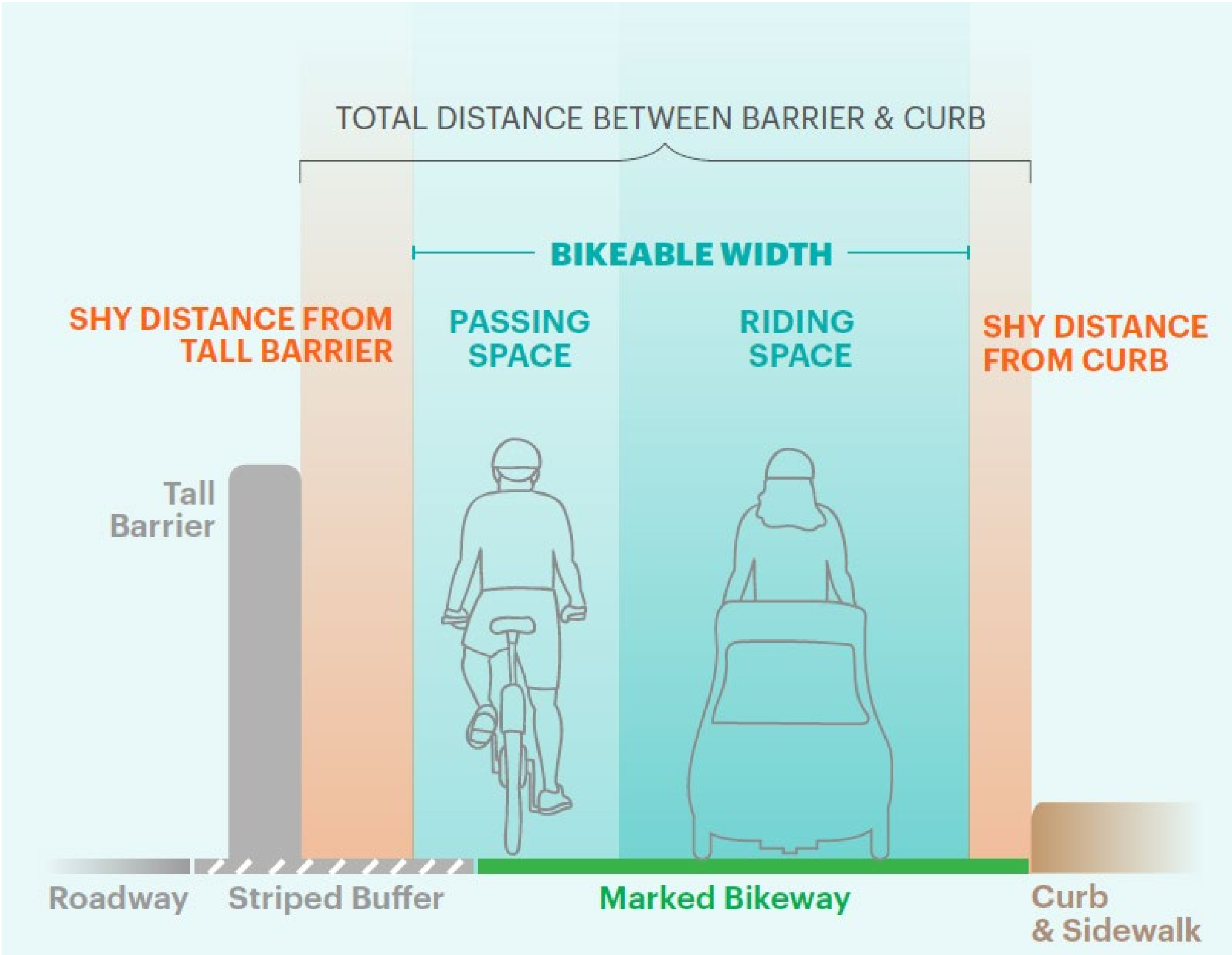

Figure 8. Recommended facility width based on design and control vehicle dimensions.
Source: NACTO Designing for Small Things With Wheels

Table 5 provides existing the SFMTA guidance as well as best practices on minimum and preferred widths for paths, protected bike lanes, and bike lanes.

Table 4. Summary of Bike Lane Widths by Bikeway Type (Existing Guidance)

Bikeway Type	Existing SFMTA Guidance	Best Practice Guidance

Paths *(Class I)*	• **No pedestrians (rare):** 8' minimum, 10' preferred.
	• **Low pedestrian volumes:** 10' min., 12' preferred.
	• **Moderate pedestrian volumes:** 12' min., 16' preferred.
	• **Heavy pedestrian volumes:** separate into low-speed and high-speed lanes – 16' min., 20'+ preferred.
		• Minimum and preferred widths are in line with the best practices above.
		• The recommended number of operational lanes based on volumes are summarized below
		  ○ 2 lanes for peak hour volumes (phv) of 150-300 users
		  ○ 3 lanes for phv of 300-500
		  ○ 4 lanes for phv of 500 or more

Protected Bike Lane *(Class IV)*	• **Lane width:** 5' absolute minimum, 7' preferred minimum, 8' desirable. • **Street buffer:** 1'absolute minimum, 2' preferred minimum, 3''+ desirable, 7' maximum* **If extra space available, add to lane width. Do not want vehicles to park in buffer.*	• Lane width based on volumes: <150 phv, 6.5'-8.5' preferred 150-750 phv, 8.5-10' preferred >750 phv, >10' preferred • To accommodate extra-large vehicles such as a delivery trike and also allow a typical bicyclist to pass, a lane width of 10' is needed, see Table 3 for riding and passing space of typical vehicles to inform design of both one-way and two-way facilities
Lanes *(Class II)*	• 4' minimum, 5' if adjacent to parking. • 6-8' preferred*. **If 8' or more is available, consider a painted buffer or a protected bike lane*	• A 4' minimum is only recommended for cases where the lane is adjacent to the edge of pavement (no curb) or in between painted buffers (e.g., a bike lane between parking and a travel lane with buffers on both sides) • A 6.5' minimum is required to allow occasional passing, occasional side-by-side bicycling, or where larger cargo bikes or other devices are anticipated

Contexts for Enhancements

Meeting or exceeding the higher range of widths summarized in Table 5 is recommended where one or more of the following conditions exist:

- Where it is desirable to allow micromobility users and pedestrians to travel side-by-side throughout a corridor and still accommodate passing from the other direction (e.g., three lane operation, see *Speed Management* section below).
- Where it is desirable to allow micromobility users to operate at speeds of 20-30 mph to minimize conflicts with other users. This may be applicable for regional routes or facilities that are long and have relatively few conflict points.
- If the path is a regionally significant bicycle travel corridor.
- Where groups of pedestrians, golf carts, skaters, adult tricycles, children, or other users that need more operating width are likely to exceed 30% of the path volume.
- Where the off-street path is used by larger maintenance vehicles.
- On steep grades to provide additional passing area and shy distances for faster downhill users (see *Surfaces and Gradients* section below).
- Through curves and tunnels to provide more operating space where it would otherwise feel constrained.

Designing an biking and rolling network inclusive of the wide range of micromobility users also requires considering where higher-quality facility may be appropriate. There are a variety of situations that may indicate the need for greater separation between people rolling and motor vehicles (such as additional buffer width, additional vertical buffer elements, or other measures) than what is determined based solely on roadway speeds and volumes. These include the following:

Unusual Motor Vehicle Peak Hour Volumes

Bike facilities that accommodate all ages and abilities are generally sufficient on n streets with annual average daily traffic volumes (AADTs) below 8,000 to 10,000 vehicles per day. However, if peak hour volumes make the street feel like a higher volume street, the facility may benefit from being a path or separated bike lane. This may be particularly beneficial when the peak hour for motor vehicles coincides with the peak hour for micromobility users. Some examples with unusually high peak volumes may include local streets near schools, hospitals, or popular event locations, such as stadiums.

Many school zones experience particularly high-volume peak periods with intensified conflicts between motorists and micromobility users where parent pickup/drop-offs make up a high percentage of trips. Providing additional separation may be appropriate in these cases, especially if the facility is intended for children, vulnerable populations, or serves as an important link in the bicycle network.

Traffic Vehicle Mix

Higher percentages of trucks and buses increase crash risks and discomfort for micromobility users due to vehicle size, weight, and sight line limitations (i.e., blind spots). This is a particular concern for right turn conflicts, where large vehicles may appear to be proceeding straight or even turning left prior to making a right turn movement. Additional buffer width between a separated bike lane and the motor vehicle travel lane at the intersection can improve visibility in these locations. Additional separation between micromobility users and motorists is particularly important on streets where heavy vehicles are more than five percent of traffic.

Parking Turnover and Curbside Activity

Conflicts with parked or temporarily stopped motor vehicles present a risk to micromobility users. High parking turnover and curbside loading may expose users to being struck by vehicles making parking maneuvers, opening vehicle doors, people walking to or from their vehicle in the bike lane, vehicles stopped within the bike lane, etc. In locations with high parking turnover or curbside loading needs, providing physically separated bike lanes can help alleviate conflicts. Common locations may include metered and short-term on-street parking zones, commercial districts, loading zones, hotel valet services, and locations with high ride-hailing demand.

Vulnerable Populations

The volume of children and seniors should be considered during project planning and facility selection. These groups may only feel comfortable traveling on physically separated facilities, even where motor vehicle speeds and volumes are relatively low. They may be less confident in their riding abilities and, in the case of children, less visible to motorists, have inadequate experience operating in the roadway environment, and have reduced traffic awareness skills compared to adults. There may also be potential conflicts where these road users are expected to share space as pedestrians. Common locations may include areas near hospitals, schools, senior centers, and parks.

Network Connectivity Gaps

Even if not warranted, providing separated facilities may be applied to provide a consistent bikeway along a corridor, particularly to improve legibility and set clear expectations to other road users. Examples include on-street connections between two major paths, where routes connect to parks or other recreational opportunities, or where a primarily separated bike lane facility passes through a neighborhood on a local street for a segment of the corridor.

Transit Considerations

On-street bike facilities on streets with relatively frequent transit headways will result in interactions between the transit vehicle pulling to the curb and micromobility users using the bike facility. This can impact bus operations and negatively impact a micromobility user's level of comfort. The FHWA's *Separated Bike Lane Planning and Design Guide* provides options for minimizing conflicts with transit, including creating floating bus stops where the bike lane transitions to sidewalk level and wraps behind or through the bus stop area, placing the bike facility on the left side of a one-way street (out of the way of transit stops along the right side), or choosing to install a bike facility on a nearby parallel street away from transit.

Speed Management

The speed capabilities for the range of micromobility devices commonly found in San Francisco varies considerably. Designers should consider a combination of maximum speeds and more typical sustained speeds when possible, and understand the need to manage speed where users have the potential to come into conflict. While research shows that micromobility technologies can operate at sustained higher speeds over longer distances, this research also finds that people operate these devices similar to conventional bicycles.[5]

Design Speed

Design speed is a fundamental design control used to determine various geometric features of bikeways as well as some signal timing and street crossing parameters. It is common practice to use the design speed of a typical adult bicyclist to ensure that geometric design characteristics (e.g., turn radii) can accommodate faster users and, by default, users moving more slowly, such as children, seniors, and less-confident adult bicyclists. The prevalence of electrified or other micromobility devices with higher sustained speed may require different design parameters or benefit from providing separate facilities to accommodate different speed devices.

The speed of a micromobility user is dependent upon several factors, including the age and physical condition of the user; the type and condition of the user's equipment – particularly if it has an electric motor or is e-assist; the purpose and length of the trip; the condition, location, and grade of the facility; the prevailing wind speed and direction; and the number and types of other users on the facility. For these reasons, there is no single design speed that is recommended for all facilities.

Standard bicycle speeds range from 4-18 mph, and e-bike speeds range from 12-28 mph, though higher speeds may be achieved on downhills or long, straight segments. E-Scooters are typically capable of up to 20 mph speeds, though most shared micromobility operators can cap the maximum speed of the fleet to minimize risk. Other micromobility device speeds typically range from 5-15 mph with the capability of up to or over 20 mph. This range of speeds should be accommodated for all bike facilities.

Some design choices may need to account for slower speeds. This could include developing signal timings that account for slower users (e.g., children and seniors) who need more time to cross intersections.

Speed Considerations at Conflict Points

Lower operating speeds at conflict points allow micromobility users, motorists, and pedestrians more time to perceive potential conflicts. Geometric design and traffic control devices can be used to reduce the speed differential between users. The effectiveness of speed control through geometric design is limited if bicyclists can adjust their travel path to "straighten out" curves, and speed limit signs on bike lanes may not be effective because most bicyclists do not use speedometers. Where physical features do not limit the bicyclist's travel path, the designer should consider the bicyclist speed along the fastest path. Figure 11 shows a built example in Vancouver BC outside of a hospital Emergency Room where the protected bike lane has horizontal and vertical deflection to draw attention to the potential conflict point and slows users as they approach the driveway, alerting them to look for turning vehicles.

Figure 5: Protected Bike Lane in Vancouver, BC outside an Emergency Room provides horizontal and vertical deflection at the conflict point

[5] *Langford, B.C.; Chen, J.; Cherry, C.R. Risky riding: Naturalistic methods comparing safety behavior from conventional bicycle riders and electric bike riders. Accid. Anal. Prev. 2015, 82, 220–226.*

Separation of Modes and Shared Spaces

Separating different modes and users can reduce conflicts and create more comfortable facilities for all users when there is enough space to do so. It is important to note that in urban environments where there are more constrained spaces, the amount of space available limits the amount of separation between modes. Designers minimize mixing a range of speeds in one space. The various options shown in Figure 11 depict scenarios to separate pedestrians from cyclists and micromobility device users.

Option 1: A 15 foot or wider path can be provided which separates users with pavement markings. The designation of space for different users is suggested using pavement markings, but the full width of the path must be pedestrian accessible.

Option 2: A 15 foot or wider path can be provided which separates users with a traversable surface delineation. In this case, the designation of space for different users is suggested through different surface materials, but the full width of the path must be pedestrian accessible.

Option 3: Paths can be designed so that the uses are physically separated. In this case, wheeled users and pedestrians are provided two parallel paths designed as a sidewalk and a protected bike lane, or as two parallel shared use paths with pavement markings and signing suggesting the preferred users for each path; in the latter case, both paths will need to be pedestrian accessible.

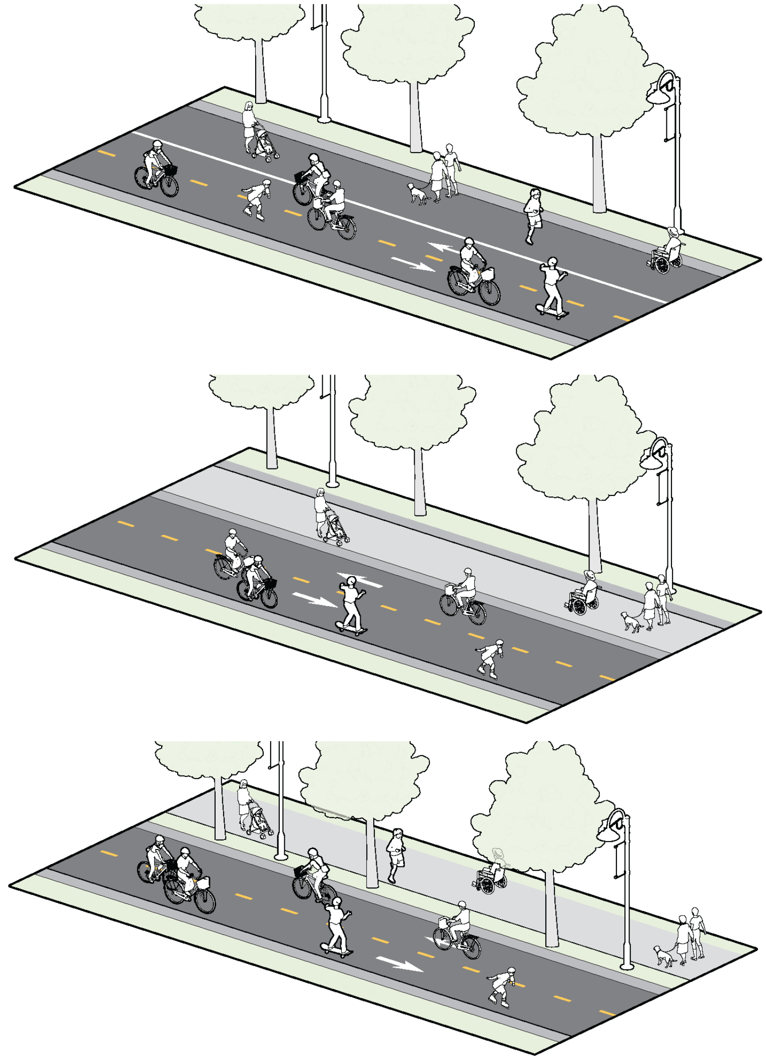

Figure 6: Options for Separating Micromobility Users from Pedestrians (from top to bottom: Option 1, Option 2, Option 3)

For wide paths where separation is provided with pavement markings, pedestrians are typically provided with a bi-directional walking lane on one side, while bicyclists are provided with directional lanes of travel on the opposite side. This solution should only be used when a shared use path width of at least 15 ft is provided, with at least 10 ft provided for the two-way bicycle traffic, and at least 5 ft for pedestrians as shown in the top schematic in Figure 11. Where this type of separation is used on a path with a view (e.g., adjacent to a lake or river), the pedestrian lane should be placed on the side with the view.

Surfaces and Gradients

It is important to construct and maintain a smooth ridable surface on bike facilities. Hard, all-weather pavement surfaces such as concrete or asphalt pavement are recommended for on-street protected bike lanes and standard bike lanes. Paths and promenades must meet pedestrian accessibility surface requirements, which require a smooth, stable, and slip resistant surface. All-weather pavement is preferred compared to unpaved surfaces such as crushed aggregate, stabilized earth, or limestone screenings.

While unpaved surfaces may be appropriate in less dense or more natural areas, they provide less traction, decrease braking ability, and can cause bicyclists to more easily lose control. Bicyclists and other wheeled users must travel at lower speeds compared to on paved surfaces. Some micromobility devices, especially those with small wheels such as skates, skateboards, and scooters will find it extremely challenging to use unpaved paths. In areas that experience frequent or even occasional flooding or drainage problems, or in areas of moderate or steep terrain, unpaved surfaces will often erode and require substantial maintenance. The increase in micromobility users and devices is likely to increase the need for paved surfaces.

Asphalt or concrete provides a good quality, all-weather pavement structure. Advantages of concrete include longer service life, reduced susceptibility to cracking and deformation from roots and vegetation, and a more consistent riding surface even after years of use and exposure to the elements. On concrete pavements, transverse control joints may be sawcut to provide a smoother surface for bicycling, as opposed to tooled joints which are wider. Joints will be more significantly felt by users riding micromobility devices with smaller wheels. A disadvantage of concrete pavements is that pavement markings can have a lower contrast against the concrete surface; markings typically have a higher contrast on an asphalt surface, particularly at night.

Advantages of asphalt include a smoother surface with fewer joints, and typically lower initial construction costs than with concrete. Asphalt surfaces are softer and are therefore preferred by runners and walkers over concrete. However, asphalt pavement is less durable and often requires more interim maintenance.

Ongoing Maintenance

On-street bike facilities are susceptible to the accumulation of debris, leaves, and vegetation which can create hazardous conditions for micromobility users. In locations where regular cleaning of a bicycle lane is not practical, a wider bicycle lane may be beneficial to allow more space for debris to accumulate while maintaining a ridable path. Additionally, the design and placement of bike facilities should consider in-road utilities, stormwater grates, and typical repairs. Maintenance operations should take extra care to ensure that smooth, ridable surfaces are maintained. Any lips resulting from roadway patching or resurfacing should be limited to 0.5 inches to reduce the potential for a tripping hazard or balance of a micromobility user.

Uphill / Passing Lanes

Given some of the steep street grades in San Francisco, designers should consider ways to provide the most comfortable facilities possible on these streets. This is particularly important when an inclined road is the only connection between communities and key destinations.

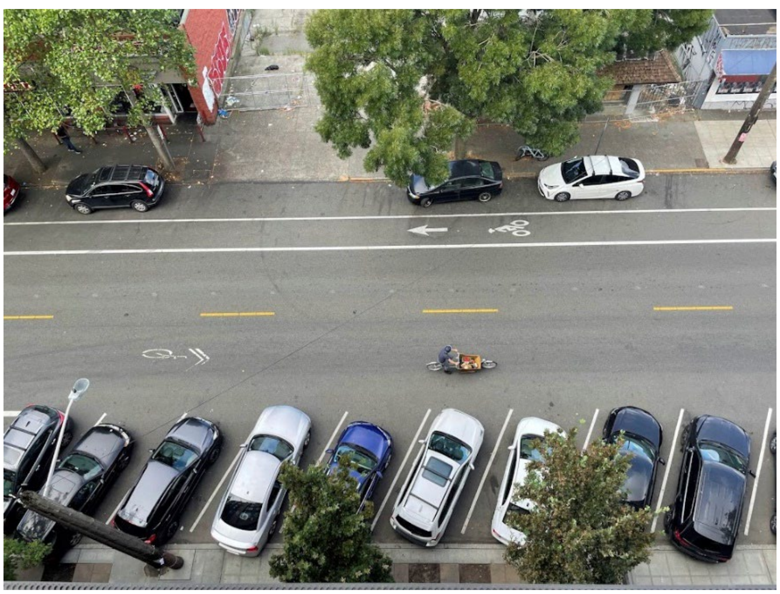

Figure 7: Example of an uphill climbing lane with shared lane markings in the downhill direction

On streets where downhill grades are long enough to result in bicycle speeds similar to typical motor vehicle operating speeds, designers can consider using shared-lane markings in the downhill direction to provide a wider bicycle climbing lane in the uphill direction (see Figure 12). Where the grades change, it may be desirable to switch sides of the street to maintain the bicycle lane in the uphill direction. It is generally preferable for the transition from a bike facility to a shared lane to occur at an intersection with stop or signal control where bicyclists can move into the travel lane while vehicles are stopped, however the transition may need to occur midblock.

This design can be advantageous on streets where fast downhill bicycle speeds have the potential to increase the likelihood of crashes with motorists opening parked vehicle doors or exiting driveways.

In situations where there is a large volume of riders in the uphill direction, a bicycle passing lane may help to sort bicyclists – particularly when they are starting from a stop or a signalized intersection as shown in the example in Figure 13.

Figure 8: Example of a passing lane on a high-volume inclined bike lane

Intersections

Protected intersections include design elements that increase safety and comfort for all users and are the preferred treatment for intersections with separated bike facilities on an approaching roadway. Well-designed protected intersections are intuitive, promote predictable movements, and allow bicyclists, pedestrians, and motorists to communicate using eye contact. Protected intersections can be implemented as part of roadway reconstruction projects or using low-cost vertical materials during resurfacing projects.

Key design features include horizontally offset bike facilities to the right of vehicle travel lanes leading up to the intersection, and a corner deflection island which slows right-turning vehicles and increases driver awareness of crossing pedestrians and bicyclists.

Potential elements of a protected intersection are shown in Figure 14 and high-level descriptions and considerations for each numbered element are summarized below. While fully built out protected intersections may not always be feasible, elements below are still applicable when designing standard intersections and can be applied to the extent possible.

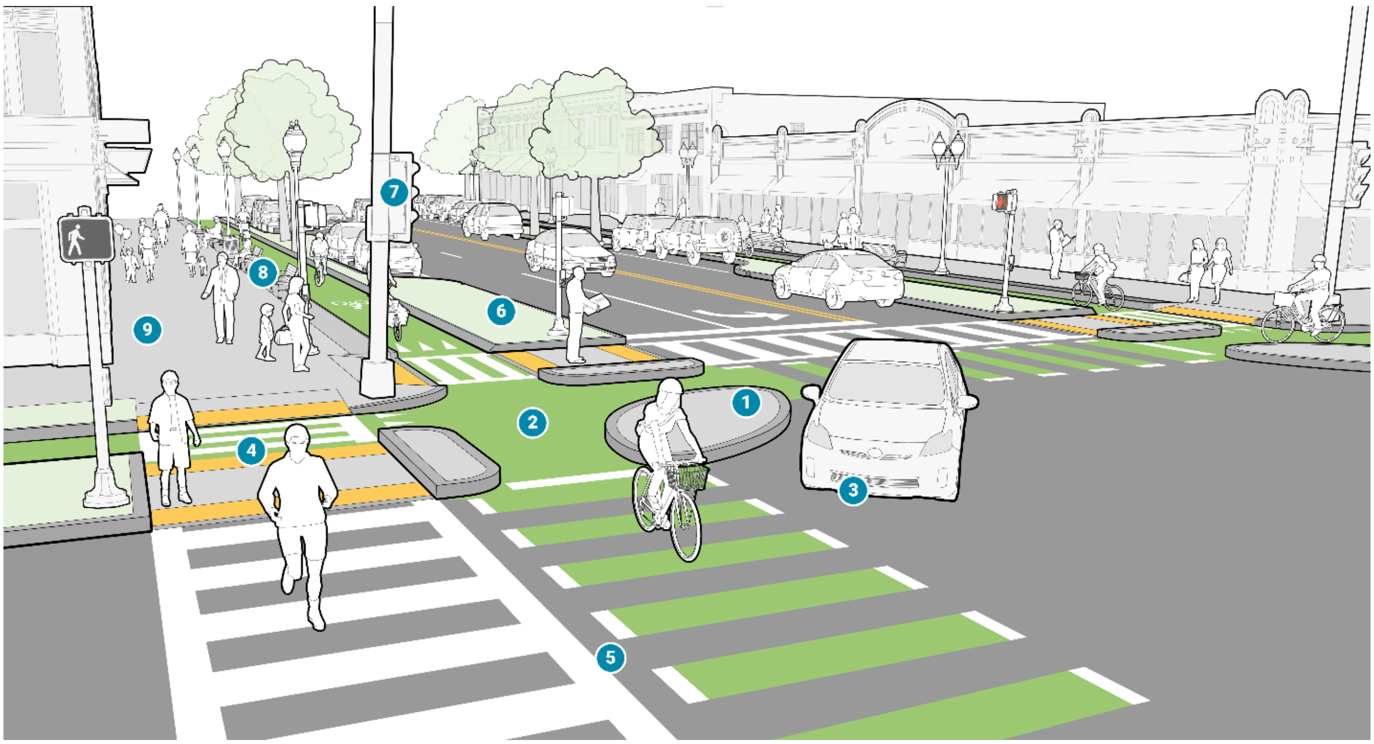

Figure 9. Elements of a Protected Intersection

Features of protected intersections include:

Corner Islands (1)

Corner refuge island allow bike facilities to be physically separated from traffic up to the crossing point and protect bicyclists from right-turning vehicles. Mountable truck aprons can be considered for corner refuge islands where design vehicles exceed SU-30. A corner island may be implemented without construction using materials such as pavement markings, flexible bollards, planter boxes, or other elements to provide vertical barriers between people biking and motor vehicles. They are generally considered interim facilities and can provide flexibility for design modifications before full reconstruction.

The SFMTA has a growing number of locations where they are implementing a protected corner treatment via "turn wedges". This is an example of using interim materials and can help to dramatically decrease the risk of a driver colliding with a person on a bike or a pedestrian. Turn wedges should be designed to encourage drivers to reach a maximum speed of 5 mph and force the turn to be at a 90-degree angle. Turn wedges are often combined with painted safety zones, which are the khaki-colored painted areas that wrap around sidewalk corners in San Francisco. These painted safety corners can also be applied as a standalone treatment at intersections without bike lanes. These are significantly less expensive than constructing a full curb extension and can achieve similar goals.

Queuing Areas (2)

Queuing areas provide micromobility device users space to wait ahead of the crosswalk for a green signal or a gap in traffic, shortening the crossing distance and helping to position users in the direction they are heading while ensuring visibility to and from turning cars. The size of the queue area should take into consideration the size, mix, and volumes of anticipated users. Designers should understand that the existing volumes and vehicle mix may increase substantially after the implementation of protected bike lanes and intersection treatments. A queue area should be 6.5 feet deep to fit the minimum range of users, but 10 feet or more may be needed to best accommodate trailers, cargo bicycles, and high volumes. The opening at the entrance and exit of the crossing to the street should typically have the same operating width as the bike facility.

Motorist Yield Zones (3)

Bicycle and pedestrian crossings set back from the intersection create space for turning motorists to yield to bicyclists and pedestrians. Research indicates safety benefits at locations where bicycle crossings are offset from the motorist travel way at a preferable distance of between 6 and 16.5 feet[6],[7].This offset provides the following benefits:

- Improves motorist view of approaching bicyclists by reducing the need for motorists to scan behind them.
- Potentially creates space for a motorist to yield to bicyclists and pedestrians without blocking traffic approaching from the rear (for right turns) or the side (for left turns across two-way streets)
- Provides more time for all users to react to each other and negotiate the crossing.

Pedestrian Curb Ramps and Refuge Medians (4)

This design provides a pedestrian refuge median between the bike facility and the travel lanes, separating the crossing into two phases. An ADA accessible curb ramp is required, and when an island is used, tactile domes should be placed as shown in Figure 14 to provide clear guidance to users that there are distinct crossings. In constrained conditions where there is insufficient width to provide a 6 foot wide pedestrian refuge median, it is possible to provide a narrower median; however narrower medians are not considered to be a pedestrian refuge median. In these cases, accessibility features (e.g., detectable warning surfaces, signal buttons) should be placed at the curb ramps prior to the pedestrian crossing of the bike lane.

Bicycle and Pedestrian Crossings of Travel Lanes (5)

As shown in Figure 14, micromobility users cross the motorist travel lane between the motorist yield zone and pedestrian crossing. Continental crosswalks are the current standard in San Francisco, consisting of white stripes running parallel to the curb and provide high visibility (as opposed to the previous standard of two thin transverse lines the width of the street). Crosswalks near K-12 schools must be painted yellow.

Micromobility Parking (6)

On-street micromobility parking (often referred to as a bike corral, or parking corral) reduces conflicts between micromobility users and pedestrians, helps preserve sidewalk clear zones, provides direct connections to bike lanes, and increases micromobility parking capacity and visibility. On-street micromobility parking is typically found in medium to high density, mixed-use areas with programmable space and pedestrian zones; however, may also be located anywhere where there is a desire to maximize sidewalk clear space by encouraging bicyclists to park within the street. Bike corrals are typically a series of bicycle racks located on a street in unused space, curb extensions defined with vertical elements, or in place of a car parking space. A bike corral can include space without racks to accommodate larger bicycles or other micromobility devices.

For scootershare services, the SFMTA has a detailed guide on parking standards.

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6 Childs. C.R., T. Fujiyama, D.K. Boampong, C. Holloway, H. Rostron, K. Morgan, and N. Tyler. Shared Space Delineators: Are They Detectable?. Transport for London, 2010.
7 University College London. Testing Proposed Delineators to Demarcate Pedestrian Paths in a Shared Space Environment. Guide Dogs for the Blind Association, United Kingdom, January 2008.

Signal Operations (7)

Bicycle signals improve safety at signalized intersections by designating when bicyclists have right-of-way through an intersection, reducing the number of interactions between people in vehicles and people on bicycles. Bike signals visually indicate when bicyclists should enter the intersection and are paired with vehicle signals that direct turning drivers to either yield to bicyclists or to stop and wait until their designated time to enter the intersection. When designing a bike signal, it is important to consider dedicated phases for bicycle movement to a signalized intersection requires reallocating time from other traffic movements, which may have cascading effects on nearby intersections.

To install new bicycle signals, the underground electrical conduit system must have room to accommodate additional wires and existing poles and must have space to mount more signal heads in positions that are clearly visible to approaching traffic. The act of installing new poles or upgrading underground conduits triggers further coordination with utility companies and other City departments, adding to overall timelines and costs. An additional option, which has a lower cost and is easier to implement, is a Leading Pedestrian Interval (LPI), also known as a “pedestrian head start”. This is a type of traffic signal timing change that gives people the walk signal before vehicles are given a green light in the same direction. This low-cost improvement allows pedestrians more time to cross the street and enhances the visibility of people crossing the street to other road users. Enhanced visibility of people crossing the street increases the likelihood of people who are driving to yield to people walking. LPIs also provide more time for people who may be slower to start walking in the intersection. An LPI may also be utilized by bicyclists and other micromobility users via the inclusion of a bicycle signal or signage indicating bicycles use the pedestrian signal.

Sidewalk Buffers (8)

Sidewalk buffer zones separate the sidewalk from the separated bike facility, communicating that the sidewalk and the separated bike facility are distinct spaces. By separating people walking and bicycling, encroachment into these spaces is minimized and safety and comfort is enhanced for both users. There are varying degrees of separation that can be provided, and the most appropriate design should consider the safety and comfort of users, available right-of-way, drainage and maintenance needs, and the adjacent land uses. One key design consideration is to provide a continuous detectable edge in the sidewalk buffer so pedestrians with vision disabilities can distinguish the sidewalk space from the bike facility zone. For people who are blind or have low vision, it can be difficult or impossible to detect the presence of a separated bike lane, particularly when the bike lane is at the same elevation as the sidewalk.

Any of the curb types discussed previously can be used to separate the bike facility from the adjacent sidewalk and provide a detectable edge. A continuous landscape bed is another effective buffer zone treatment that can provide a detectable edge for pedestrians with vision disabilities. Finally, street furniture or other detectable features (such as a row of street trees) can be an effective method of separation, provided that a clear and accessible path of travel and sufficient sidewalk width is maintained for unobstructed pedestrian flow. This treatment is most effective when the vertical elements provide a consistent buffer along the sidewalk. The placement of vertical elements in the sidewalk buffer should consider the shy distances for the range of users as discussed previously.

Wide Sidewalks (9)

Providing enough clear and usable space for pedestrians and other users of sidewalks best supports all roadway users and minimizes conflicts with micromobility device users. Wherever possible, sidewalks should have a furnishing zone (or sidewalk buffer as discussed above), a pedestrian through zone, and a frontage zone (when applicable to the land use). This will allow for the range of sidewalk furniture and business operations to not interfere with the clear space used by pedestrians. Figure 15 provides examples of these zones as they may apply to San Francisco streets with and without bicycle facilities.

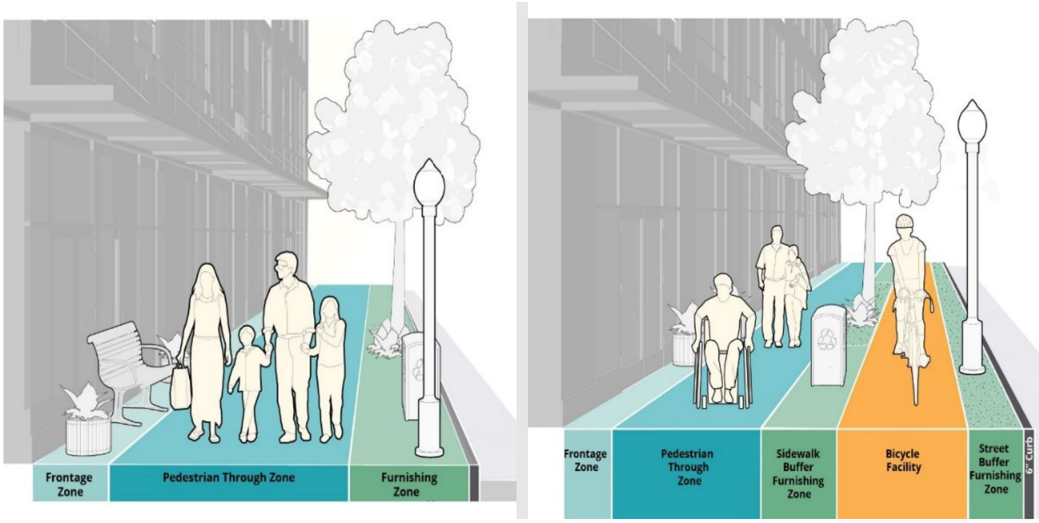


Figure 10. Example Sidewalk Zones for Streets with and without Bikeways

Note: when bikeways are level with sidewalk, a detectable edge is required. This can include: raised curbs, islands, landscaping, truncated domes, and the trapezoidal delineator

Network Legibility

Safe and comfortable biking and rolling networks are easy for all roadway users to understand. Information on signs and markings should be used to help indicate where micromobility devices are allowed to travel and what to expect.

RESOURCES

Many different resources were used to help compile this document and are listed below:

- NACTO provides an large amount of design guidance and publications, all of which are available online. Key documents are noted and linked below.
    - Urban Street Design Guide
    - Urban Bikeway Design Guide
    - Designing For Small Things with Wheels
    - Designing for All Ages Abilities
    - Material Success Designing Durable Bikeways
    - Don't Give Up at the Intersections
    - Bike Share Siting Guide
    - Complete Connections Building Equitable Bike Networks
- ITE Micromobility Facility Design Guide
- ITE Recommended Practices on Accommodating Pedestrians and Bicyclists at Interchanges
- FHWA Guide for Maintaining Active Transportation Infrastructure for Enhanced Safety
- AASHTO Guide for the Development of Bicycle Facilities, 4th Edition
- AASHTO Guide for the Planning, Design, and Operation of Pedestrian Facilities, 1st Edition
- Caltrans Highway Design Manual Chapter 1000 Bicycle Transportation Design
- Caltrans Class IV Bikeway Guidance (DIB -89-02)

Appendix B

Appendix B: Bicycle Parking Guidelines

SF Bike Parking
Concept, Approaches, Challenges and Recommendations

Introduction – Why is Bike Parking Important?

For San Francisco to achieve Transit First, Vision Zero, and Climate Change goals related to mode shift, the city must consider specific requirements of secure bike storage and provide sufficient facilities to encourage bicycling.

Shifts in bicycle design also make providing secure storage a necessity. The popularity of e-bikes and cargo frames is growing because they support a wider range of trip purposes and geographies, which makes them a viable alternative to car-ownership. These bikes are often larger and/or more expensive than traditional bikes. To function as a public good, bike parking design needs to mirror trends in bicycle design.

Growth of ebike delivery also changes the context of bicycle parking. Electric bikes allow more bicycle access in the city, especially given the hilly terrain. Ebike commercial trips are more economical, nimble, and dependable, requiring fewer resources than driving in the urban environment. Other dense cities are seeing the ebike delivery expansion trend and without proper bike parking, sidewalk clutter becomes a public realm nuisance.

This section lays out a conceptual framework for thinking through the range of bike parking options. It identifies challenges and recommendations for the types of bike parking San Francisco currently has, and it imagines new possibilities to explore in the future.

Bike Parking Categories

Two convenient axes help comprehensively categorize bike parking infrastructure. First, consider whether the user parks the bike by themselves, or whether it requires a staff person. Second, consider if the facility is for short- or long-term storage.

<table>
<tr><th></th><th>Self-Parking</th><th>Staffed Parking</th></tr>
<tr><td>Short Term</td><td>Rack
Corral</td><td rowspan="2">Valet</td></tr>
<tr><td>Long Term</td><td>Locker
Hangar</td></tr>
</table>

Self-Parking

Within the public-realm, San Francisco only has self-parking facilities. Self-parking facilities tend to be lower cost than staffed parking since it does not require operational labor cost, though this also means it tends to be less secure.

The SFMTA implements self-parking facilities by request and proactively.

Short-Term Parking

The SFMTA provides short-term bike racks and corrals because they are affordable and demonstrably beneficial. Short-term facilities are inconsistently distributed throughout the city. Residential areas have more private space for secure storage. Other areas, like parks, commercial districts, schools, and public service buildings, should have predictably available short-term parking.

SHORT-TERM PARKING RECOMMENDATION

The SFMTA should consistently provide short-term parking options uniformly across a designated range of land uses and public facilities, especially when other options like corrals or valets are not available.

Racks

Photo of a sidewalk bike rack

Bike racks are the basic unit of bike parking. They are mostly installed on the sidewalk in the furnishing zone between the curb lane and outside the pedestrian right of way. Established guidelines direct placement and design. In addition to SFMTA installations, bike racks are also installed as part of developer agreements. Sometimes other public jurisdictions owned by other departments (e.g. Port, RPD, RED) install racks as well. There are currently more than 10,000 publicly accessible bike racks in San Francisco.

Most bike rack installations are simple. In the same way that the SFMTA can immediately install signs or meters in the sidewalk furnishing zone, bike racks can also be implemented easily since they provide such an obvious value, and they have minimal impact on the built environment. Still, some can become controversial since merchants or residents may view them as a nuisance when the rack location fronts private property.

In places without racks, bicyclists often lock to parking meters however with citywide expansion of multi-space parking meters the supply of meters poles and associated bike parking is diminishing.

RACK RECOMMENDATION

Bike rack implementation should continue throughout the city with an installation rate of 1,000 per year.

Bike rack implementation should continue to be documented within the SFMTA's management efforts for record-keeping and for future assessment and evaluation of bike parking supply and demand.

Bike rack installations should be closely coordinated with meter removal. Traditional ring-style attachments to meter poles were rejected as viable options for SFMTA Shop staff based on installation challenges. The SFMTA should consider simpler bolt-on options, or other creative solutions that can convert select remaining meter poles into bike parking.

When bike rack placement adheres to established design guidelines, private annoyance over properly placed bike racks should be disregarded if no better solution is possible.

Corrals

Photo of an on-street bike corral

Bike corrals are clusters of bike racks placed on-street. Corrals have the benefit of helping to bicycles from being ridden on the sidewalk, which is illegal and degrading to the pedestrian realm. There are currently 130 bike corrals installed on streets throughout San Francisco.

Bike corrals can avoid the controversy of sidewalk bike racks. But because they're on-street, corral installation can face public scrutiny related to parking loss or roadway maintenance. Parking impacts should be disregarded since mode shift goals are fundamentally about making transportation alternatives to driving comparatively easier to choose over driving.

Corrals were traditionally sponsored by residents or merchants who agreed to sweep and maintain them free of trash and debris. More recently, the city has started to implement corals proactively without sponsors—often in red zones and "daylighting" areas near crosswalks and intersections for increased visibility. Corrals can provide value as vertical obstructions to prevent large vehicles from parking in the red zone, still preserving the safety benefits of increased visibility.

Sidewalk widths in the city can be narrow, many too constrained to support bike racks without bikes infringing into the pedestrian right-of-way. In these locations, daylighting corrals may be the only tangible option to provide more bike parking supply.

CORRAL RECOMMENDATION

Bike corrals for daylighting should continue to be installed. Guidelines for corrals in a spectrum of land use could be helpful, especially in relation to density or surrounding uses.

Bike corrals are starting to be hosted by neighborhood associations and commercial districts, not just private property owners and tenants. More outreach describing the role of corrals should continue.

Bike corrals should be prioritized over concerns of on-street vehicle parking loss.

Bike corral implementation should continue throughout the city with an installation rate of 18 per year. This will likely require dedicated staffing for design as well as installation. Concerted efforts to provide the associated labor should address understaffing issues, which will likely require collaboration across subdivisions, including Livable Streets, Sign Shop, and Human Resources. All parties should be aware of these installation targets as a motivation for establishing a dependable stream of labor.

Bike corral outreach is needed in specific neighborhoods where there is an abundance of narrower sidewalks. Daylighting corrals should be discussed with the community prior to any implementation since some opponents may complain that corrals prevent temporary loading . The SFMTA should disregard these complaints because the motivation for daylighting is to provide visibility for safety.

Long term parking

San Francisco provides long-term lockers and hangars in a handful of public realm locations. Long term parking needs more security hardening compared to short-term options since the window of opportunity for theft or robbery is larger. These facilities require more expensive hardware and service contracts with vendors for procurement and servicing. While lockers and hangars do not require on-site staffing, they currently have contracts with private vendors for procurement and operations, which requires ongoing telecommunications service, cleaning, maintenance, and enforcement.

Long Term Parking Recommendation

The city should consider more long-term parking options. Public campaigns should educate communities on why these are important for mode shift. Outreach should collect feedback to identify desirable co-located services and amenities, like electric vehicle charging, or community programming for mobility hubs.

Bike Lockers

Photo of SFMTA-owned bike lockers (22nd Street Caltrain Station)

Bike Lockers are more secure since they provide enclosed parking for individual bikes. They are in parking garages and near major transit hubs, like the 22nd Street Caltrain Station and the Transbay Terminal. There are currently 64 SFMTA-owned bike lockers; an additional 192 publicly accessible bike lockers exist on non-SFMTA property such as at BART stations, City College, and UCSF. Users pay $.05/hour to use the locker space and must register with the partnering locker operator.

Lockers have a relatively large footprint compared to bike racks because they enclose more space around an individual bike, which can accommodate fully loaded bikes with racks and panniers. Despite securing more space, newer larger bikes, like e-cargo bikes, do not fit in typical bike lockers.

Because lockers are limited access, they can also lead to other security concerns for major events, like visiting heads of state, or large sports events.

LOCKER RECOMMENDATION

The city should continue to monitor bike locker demand, consider the cost and benefit of staffed-parking alternatives, and expand locker access at places with major trip generators, with more security needs, when there are no staffed-parking options.

Existing and future lockers design may need to be modified to accommodate larger bicycles. The city should attempt to make 25% of all lockers large enough to accommodate larger bikes.

<u>Hangars</u>

Left: photo showing Bikehangar at Howard & Second Streets
Right: photo showing inside of Bikehangar at 4th & Minna Streets

Hangars are currently piloted in the Yerba Buena district at two on-street locations; they enclose up to six bicycles. The hangars provide access to a group of registered users to store their bikes for $.05/hour.

On-street hangar implementation can attract public opposition due to parking impacts and they currently do not accommodate larger e-cargo bikes.

In other cities, on-street hangars have shared access between a limited number of households who collectively need to share bicycle storage. In San Francisco, we have yet to try this model.

HANGAR RECOMMENDATION

The city should continue to monitor hangar use, consider the cost and benefit of staffed-parking alternatives, and experiment with other hangar pilots in areas with other land uses. More demand and regular use are likely in older dense multi-family residential and commercial areas where private secure long-term storage is harder to find or access.

Staffed Parking (Bike Valet)

San Francisco does not have any permanent valet bike parking in the public realm. Valets can be found at private large sports/concert venues, and occasionally at large private events that choose to provide valet services. Parking duration is flexible with bike valets Since someone is monitoring the bike, users can leave them with valets for either short- or long-term parking.

Valet services can be the most expensive because they require both associated capital land cost for storage and operational labor costs for staffing. There may be technology-informed visions of sufficient autonomous bike parking facilities *without humans*. Therein lies the true value of staffed parking. It offers the unique benefits of involving other humans, community, empathy, care, and employment. Self-parking options may be affordable, but they can't be as comprehensively secure, safe, or relatable as staffed parking.

One challenge of bike valet is labor hours. For bike valet to function around the clock, solutions may be needed to partition space between staffed services during busy hours and non-staffed services during low-demand times.

VALET RECOMMENDATION

San Francisco should consider staffed parking in more places to accommodate growing short- and long-term parking options. Valet services could combine services with other SFMTA programming, including community outreach, education and customer service.

Staffed parking venues could provide community bike shop space, to non-profit efforts. These might also be desirable in empty storefronts along commercial corridors as supplemental short or long-term parking.

Until recently, bike valet was required to some extent at publicly permitted street fairs in conjunction with Transit First goals. Major musical events in Golden Gate Park sometimes feature bike valet. A more consistent policy around pop-up bike valet is recommended.

The SFMTA should actively try and establish permanent bike valet parking at the Ferry Building and the SF Transbay Terminal. These locations are major regional transit hubs, linking multiple service providers, including ferries, buses, and rail and are prime locations to encourage multimodal trips, which could be fostered with monitored bicycle storage or e-charging facilities. The ferry building is on Port property and the SF Transbay Terminal is governed by the Transbay Joint Powers Association, and cooperation would require partnership with TJPA and potentially the Metropolitan Transportation Commission.

An older bike valet business plan commissioned by the SFMTA also identified West Portal as a potential location for bike valet. The Bike Parking Program should develop a combined effort with OEWD that works with Community Benefit Districts to utilize empty store fronts for bicycle valet. This effort could host operational benefits for everyone, including the following.

- Short- and long-term bike parking
- In-person community feedback collection
- Transportation concierge services—assisting people interested in learning about more mobility options, especially transit dependent communities like seniors and students
- Micromobility management services, tidying up misparked devices and assisting with rebalancing needs
- Non-profit community partnership (e.g. youth programming, community bike repair, or safety campaign education)
- Changing rooms and shower facilities

Auxiliary Programs and Facilities

Bike parking is fundamentally about securing bicycles for storage so that users are comfortable to try, or continue, bicycling with less worry of theft. However, a thorough understanding of bike parking challenges would be remiss without a holistic approach in considering other solutions to theft, as well as other barriers to mode shift which might benefit from adjacent amenities.

First, secure storage is not the only way to alleviate concerns about theft. Bikeshare is another way to minimize user worry since the bicycles in the system don't belong to the user. Bikeshare solves storage challenges through large scale proprietary design. This allows replacement of bikes and components to be easy and affordable, and part of the shared service cost. Bikeshare effectively *shares* the worry of bike storage.

BIKESHARE RECOMMENDATION

There may be richer collaborative opportunities between bikeshare and other secure bike storage facilities. Bike valet staff could accommodate bikeshare operations like rebalancing needs, or temporary nodes at major destinations.

Bikeshare requires storage in the public realm, and other bike parking facilities like corrals and hangars could fluidly be converted to bikeshare stations, or vice versa.

Second, major barriers to bicycling also include insecurity about rider presentation, sweatiness, or professional attire. Bike parking facilities could be implemented in partnership with access to showers, changing rooms, and other public amenities.

ADJACENT AMENITIES RECOMMENDATION

San Francisco should intentionally provide access to other bicycling-related amenities like changing rooms and showers near bike parking, especially in central areas with dense employment. Programming could take advantage of established facilities required by new development mandates, or partner with nearby private venues with the requisite space and utilities.

Appendix C

Appendix C: Biking and Rolling Plan Recommended Programs - Draft

Biking and Rolling Plan Draft Programs

Contents

Biking and Rolling Programs

Programs can encompass many aspects of the proposed work in the San Francisco Biking and Rolling Plan. For the purposes of this document, the organizing of SFMTA's Streets Division's roadway design, bicycle parking and other work programs that guide the implementation of the City of San Francisco's work will be incorporated in the implementation section when this document returns for approval, once the list of recommended projects has been created. The programs presented below are external facing and engage with the public as the direct receiver of benefits of the program.

Programs are organized into three key areas that were identified and developed with community stakeholders to better identify what work was being proposed and approved in each of the key focus areas.

Economic and workforce development

San Francisco is a city of neighborhoods supported by local commercial districts, as well as a nation-leading economic innovator supported by a significant downtown/financial district and convention center. The long-term viability and strength of each of these areas relies heavily on transportation access and mobility. As the city and region continue to grow, space on city streets will be available at more and more at a premium, necessitating on-going changes to accommodate shifting transportation modes and an increase in the number of people visiting the commercial areas of the City. The programs identified in this plan work to ensure that our commercial areas are safe for those who visit, that efficient use of city street space ensures that deliveries and trips for those who need to arrive by car are competing less for the limited space available. Programs will be developed based on the individual needs and characteristics of the local neighborhood to ensure that benefits are maximized for businesses and residents while supporting the city's transportation and climate goals. While not listed in the programs section, this plan includes both increased communications and outreach to San Francisco's business communities and owners and recommendations on addressing concerns related to construction disruption, parking availability and deliveries.

Business Incentives and Benefits

SFMTA will work with the Office on Economic and Workforce Development, as well as the Small Business Commission and related organizations to develop programs that support increases in the use of bicycles and other active transportation for:

- Employee access to work, including incentives, including for bikeshare, and transportation support
- Customer access to business via bicycle and other wheeled apparatus

*Development of bicycle/rolling-friendly business recognition program to increase visibility for local businesses*E-Bike Delivery Support

Based on the finding of the pilot program implemented by the San Francisco Environment Department (SFE), look to expand the transition of app-based delivery drivers to electric bikes (e-bikes). The one-year pilot program is scheduled to be completed in the Spring of 2024 with results completed before the finalization of this plan, further program details will be included in the final document.

Education and encouragement

In support of San Francisco's Vision Zero policy to eliminate all roadway fatalities, this plan recommends continuing and expanding long-provided safety programs that focus on creating safer streets for people who bike and roll. The programs also aim to increase the number of people relying on zero-emission, environmentally friendly modes of transportation and reduce the cost-to-entry. Specifically including costs related to financial, language, cultural, and gender hurdles, for shared transportation and electric assist apparatus to ensure equitable access for all.

Mobility Education

Safe Driving Program

Working with City partners, continue to develop education related to increasing street safety for people who bike and roll. As many collisions that involve people on bikes, scooters and other rolling modes involve people driving vehicles inappropriately, targeted education and high-visibility-enforcement efforts will be developed or re-launched to increase safety on city streets.

Adult Bicycle Education

Continue the SFMTA's bicycle safety program. The program provides on-street bicycle riding and bicycle maintenance classes to adults and youth. All of the bicycle safety classes are free and open to the public, and all skill levels are welcome to attend. The program will continue to offer a wide range of classes from teaching people to ride a bicycle for the first time, to helping existing riders feel more comfortable and confident riding in San Francisco. Offerings will also include e-bike trainings and adaptive bicycle classes as well.

Scooter Safety Education

Continue the SFMTA's scooter safety education program. The program provides on-street scooter riding classes to adults and youth. All of the scooter safety classes are free and open to the public, and all skill levels are welcome to attend. The program will continue to offer a wide range of classes, from teaching people to ride a scooter for the first time, to helping existing riders feel more comfortable and confident riding in San Francisco. Classes, as well as accompanying public education materials and ads, will also focus on how to ride safely and legally.

School Safety programs

In-School Bicycle Education

The In-School Bicycle Education Program will deliver basic bicycle handling and safety curriculum to students in the 2nd, 6th and 9th grades at San Francisco Unified School District (SFUSD) schools, first teaching students how to balance on a bike and then to safely ride on San Francisco streets. The 9th grade students are also taught basic maintenance skills. In addition to promoting lifelong fitness, the program builds a culture in San Francisco, beginning at a young age, which embraces sustainable transportation alternatives and understanding the rules of the road. While some aspects of this program have been in place for over a decade, the goal of this program is to implement a permanent, in-school bike education program at all 72 elementary schools, 21 middle schools and 19 high schools in San Francisco within the timeline of this plan.

Safe Routes to School

Working with San Francisco Unified School District, the Safe Routes To School program will coordinate efforts to ensure all students in San Franscisco have safe ways to get to school, whether they are walking and bicycling and increasing the number of families who are choosing to do so. Additionally, this program will support stronger connections between school communities and increase communications with SFMTA's implementing teams to ensure that safety concerns are known and addressed in a timely manner.

Biking and Rolling Events and Event Support

Sunday Streets

Sunday Streets is a program of the nonprofit Livable City presented in partnership with the SFMTA, San Francisco Department of Public Health, and the City and County of San Francisco. During 10 annual events, Sunday Streets reclaims 1-4 miles of car-congested streets and transforms them into temporary open spaces filled with free recreational activities. With a focus on serving communities of concern throughout San Francisco, Sunday Streets encourages physical activity and community building to reduce health disparities citywide and inspire residents to think differently about how their streets can be used as public, community spaces for health and well-being.

Tourist bike/roll support program

As a part of a broader, tourist-focused campaign, develop a program to inform people coming to San Francisco about their many options for visiting highlights in the city by bike, including maps of the high-quality bike network, bikeshare and scootershare opportunities, bicycle rentals and other resources.

Bicycle/Rolling event access education and outreach

Develop educational outreach materials, campaigns, and requirements for large events, including sporting events, concerts, and conventions, to better encourage bike/roll access to larger venues, such as Golden Gate Park, Chase Center, Oracle Park, Moscone Convention Center, and other venues.

Affordability and access

In working to increase safe streets for people walking and rolling, it's important that we ensure that the safe, low-carbon transportation options are available and accessible for all San Franciscans who want to use them. As new forms of shared transportation and electric bicycles, scooters, etc. are providing broader access to useful options, this plan aims to ensure that no one is left behind due to cost impacts.

Reducing the cost of active transportation

E-Bike Rebates and Leasing

Develop a rebate and lease-to-buy program for e-bikes that provides real access to electric bicycles to qualifying households who want one to ensure that the cost of purchasing an electric bicycle is not a hurdle to getting one.

Lending and Sharing

Adaptive Bikeshare

Started in 2019 as the Adaptive Bikeshare Pilot and made more permanent in 2022, the SF Adaptive Bike Program is available from April through October in Golden Gate Park. Riders with disabilities are able to access adaptive bikes thanks to BORP Adaptive Sports and Recreation, the San Francisco Recreation and Parks Department, the Metropolitan Transportation Commission, and the SFMTA.

Trained staff from BORP, the region's leading provider of accessible recreation and adaptive sports for people with mobility-related disabilities, are on-hand to fit, train and assist riders on how to use the adaptive bikes. The program offers hand cycles, foot trikes and tandem bikes, along with supportive pedals, seats and straps and hand pedals for quad-level SCI (spinal cord injury) riders.

The program runs on Saturdays behind the Music Concourse Bandshell between 10 a.m. and 2 p.m., and bikes are available on a first-come-first-serve basis. Contact cycling@borp.org or (510) 848-2930 for more information.

SFMTA should look to form a more permanent partnership with MTC, BORP (or similar organization) and Recreations and Parks to expand the program to more locations across the city.

Bikeshare

Bikeshare aligns with city goals including Transit First, Vision Zero, and the Climate Action Plan. As more people bike, we reduce congestion, competition for parking, encourage safety in numbers, and reduce externalities from driving related traffic collisions, and emissions. Bikeshare ridership in San Francisco has continued to grow since expansion efforts began in 2017 and in 2024 the system is experiencing all-time highs in ridership.

Bikeshare lowers the barriers to bicycling by removing rider worry related to storage, theft, and maintenance. It also provides a more flexible mobility options since one can bike for part of a trip and use another mode without needing to bring that bike along. Multimodal bikeshare trips are not often discussed, but one effective example is how bikeshare could allow a driver to park farther out from a destination in a congested area, in an area where parking is abundant, and take bikeshare the last mile to the destination. This helps everyone by reducing congestion and allowing the user greater parking options.

The current contract for bikeshare ends in 2027. In the future, the SFMTA should continue to grow bikeshare ridership by developing ways to make it more affordable. A number of combinations for governance and ownership are possible to accomplish this. The SFMTA might decide to own and operate the system; the city could own the system and contract a private servicer (eg non-profit or for-profit), or the city could continue to work with a private partner who owns and operates the system. All options come with benefits and risks, which will need to be assessed as the contract termination approaches.

Scootershare

SFMTA's scootershare and adaptive scooter program teams will continue to coordinate with local and regional partner agencies, managing the review and permitting process for existing and new operators to ensure that as options for scootershare and adaptive scooters in the Bay Area keep expanding they work for the City and County of San Francisco and its residents and businesses.

Community Bike Shops

Support the expansion of options for the purchase and repair of bicycles, etc. including Bike Kitchen-style models as well as supporting the establishment of bike shops in neighborhoods that currently don't have one to ensure that all neighborhoods have access to bikes and bicycle maintenance.

Funding note

The above programs are not easily funded by grants, which typically do not fund on-going program operations and are competitively procured, reducing the ability for funding stability. In adopting this plan, SFMTA's Board acknowledges that pursuing permanent funding from MTC and other local, regional and state sources will be necessary in order to include these programs or that their projected costs will necessitate an agency commitment to provide funding within SFMTA's operating budget in the future to ensure that they are offered.

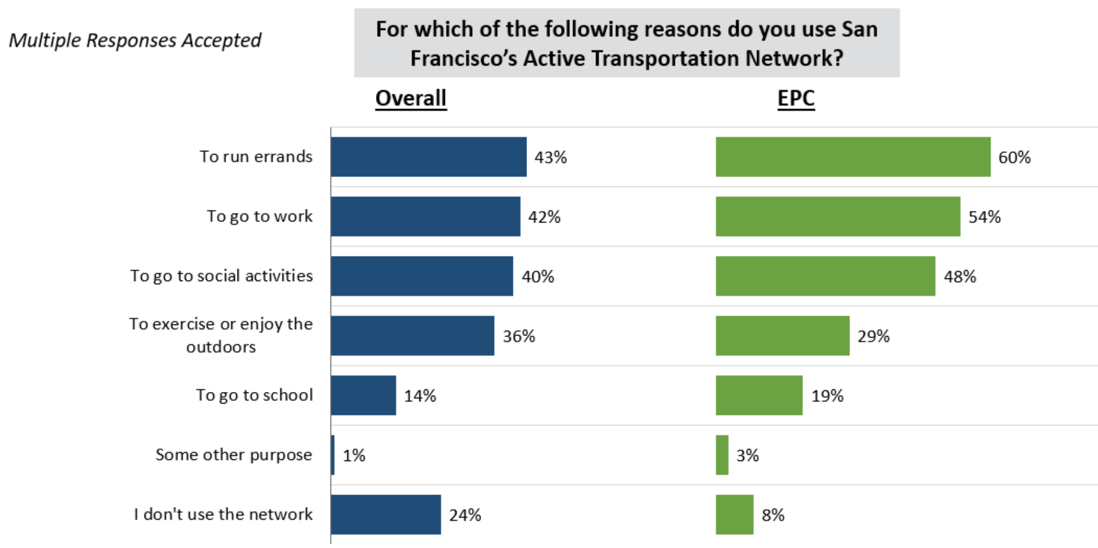
Appendix D

TO: San Francisco Municipal Transportation Agency & Toole Design Group
FROM: EMC Research, Inc.
RE: SFMTA Resident Preference Survey – Summary of Findings **(DRAFT 6/7/23)**
DATE: June 7, 2023

This memo outlines key findings from a recent web panel and intercept survey conducted among San Francisco residents from March 28-May 1, 2023. Four hundred (400) interviews were conducted online with a representative sample of adult San Francisco residents across the City, and an additional 600 interviews were conducted in person across the identified Equity Priority Communities (EPCs), with 100 interviews conducted in each EPC. The survey was made available in English, Spanish, Chinese, and Tagalog. The final distribution of survey respondents were weighted to reflect the actual demographic and geographic distribution of the adult population of San Francisco, according to US Census data.

Use of San Francisco's Active Transportation Network is widespread.

Three-quarters of residents report using San Francisco's Active Transportation Network for at least one purpose, with an even higher rate of usage (92%) among respondents in the Equity Priority Communities. Reasons for using the network are varied, with two-fifths of all respondents saying they use it for commuting, running errands, or attending social activities. EPC respondents used the network in a more utilitarian manner; their usage was more likely to be for work or running errands, and less likely to be used for exercise.



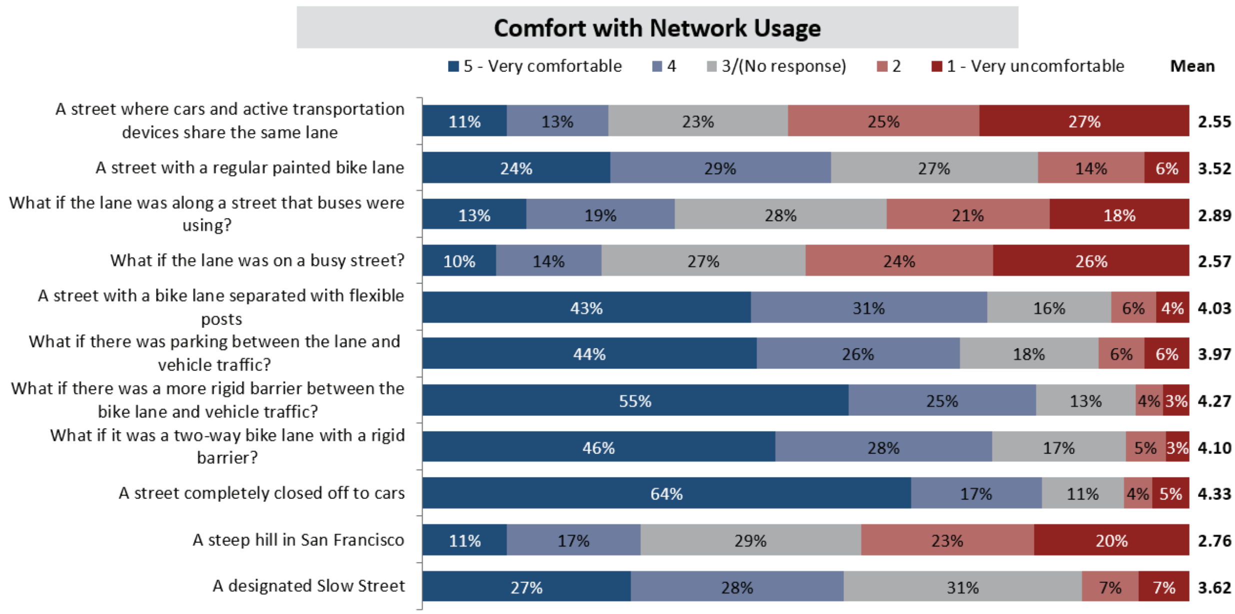
Equity Priority Community respondents report using Slow Streets at a lower rate than city residents overall. Levels of participation in Sunday Streets and Bike to Work Day are more similar.

Which of the following have you done? ***(multiple responses accepted)***	**Overall**	**EPC**
Walked, biked, or rolled on one of San Francisco's designated Slow Streets	51%	32%
Attended a Sunday Streets event in San Francisco	37%	34%
Participated in Bike to Work Day	15%	10%

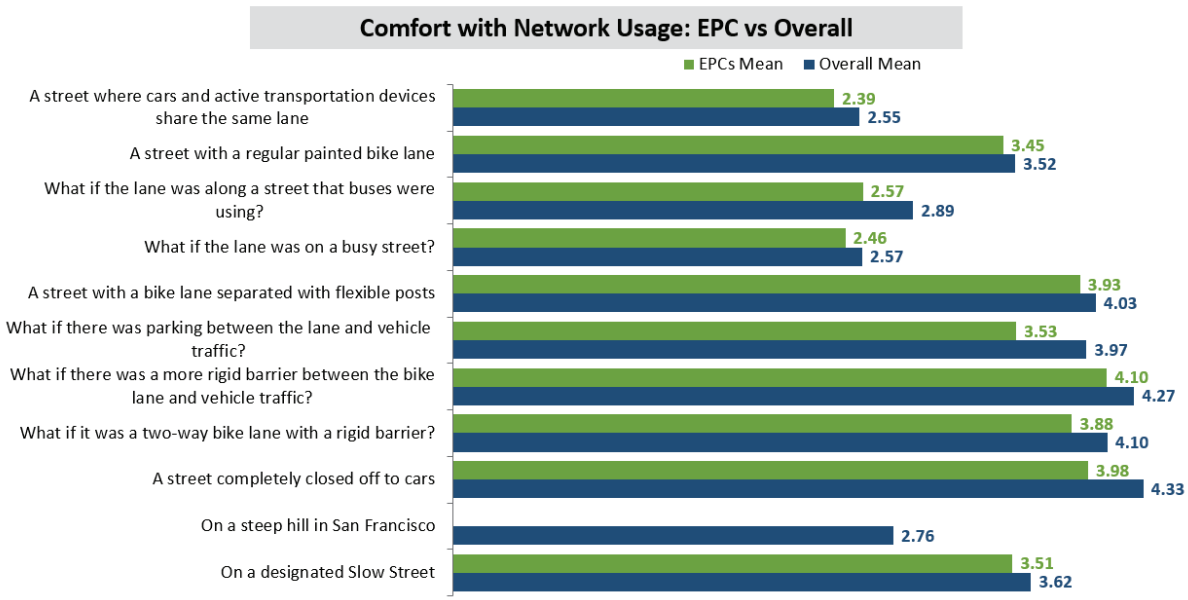
Residents feel most comfortable using Active Transportation Network facilities that are physically separated from cars and other traffic.

Survey respondents were given an ordered set of questions with images that showed different environments they might encounter while using the Active Transportation Network and asked to rate their comfort in each. Photos were shown with some questions for clarity.

The chart below shows the results for that set of questions citywide; questions are shown in the order asked. A majority of residents express discomfort with the idea of using streets where cars and active transportation devices share the same lane. Comfort increases significantly for a painted bike lane environment, but concerns are higher when that lane is near buses or on a busy street. Facilities with physical protection from traffic are the most comfortable environments for a majority of users. As expected, a street completely closed off to cars is the most comfortable environment, with nearly two-thirds (64%) saying they are very comfortable in that environment.



Looking at those same questions among EPC respondents, we see slightly lower comfort level ratings for all facility types than we see with residents citywide. The mean responses for citywide residents and EPC interviews are shown below for comparison.



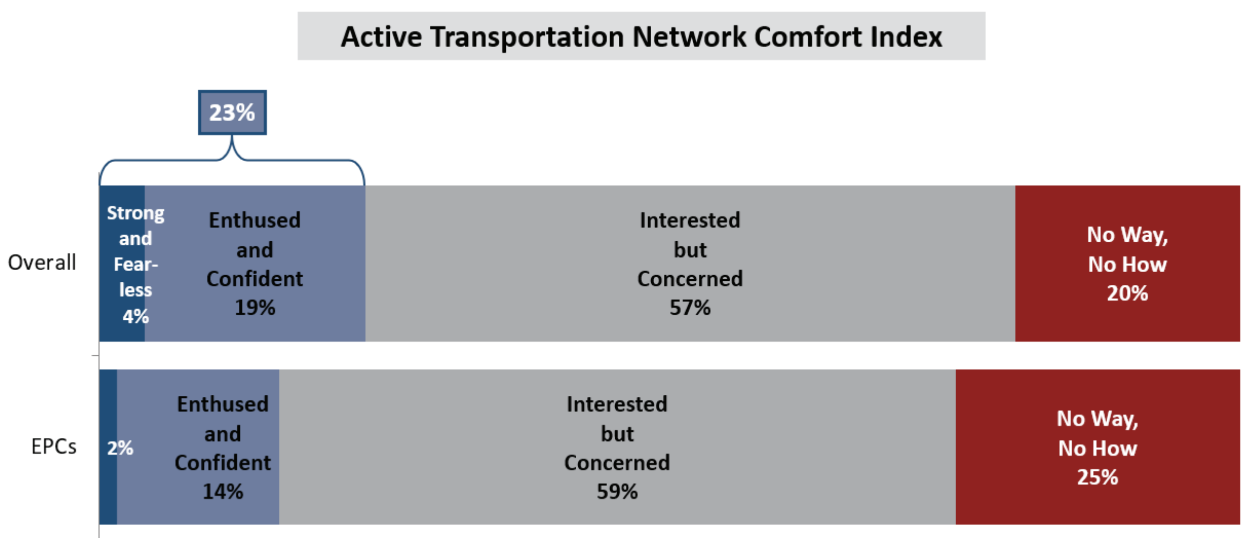
Combined analysis of comfort levels in various facility types in the City's Active Transportation Network reveals that few residents are comfortable across all types of ATN facilities.

The questions from the section above were used to create an **Active Transportation Network Comfort Index,** to understand how residents feel across a range of ATN facility types. The general approach and group names were developed by referencing the work of Roger Geller and Jennifer Dill on cycling comfort level, but adapted for this analysis.

The chart below shows the results of this analysis:

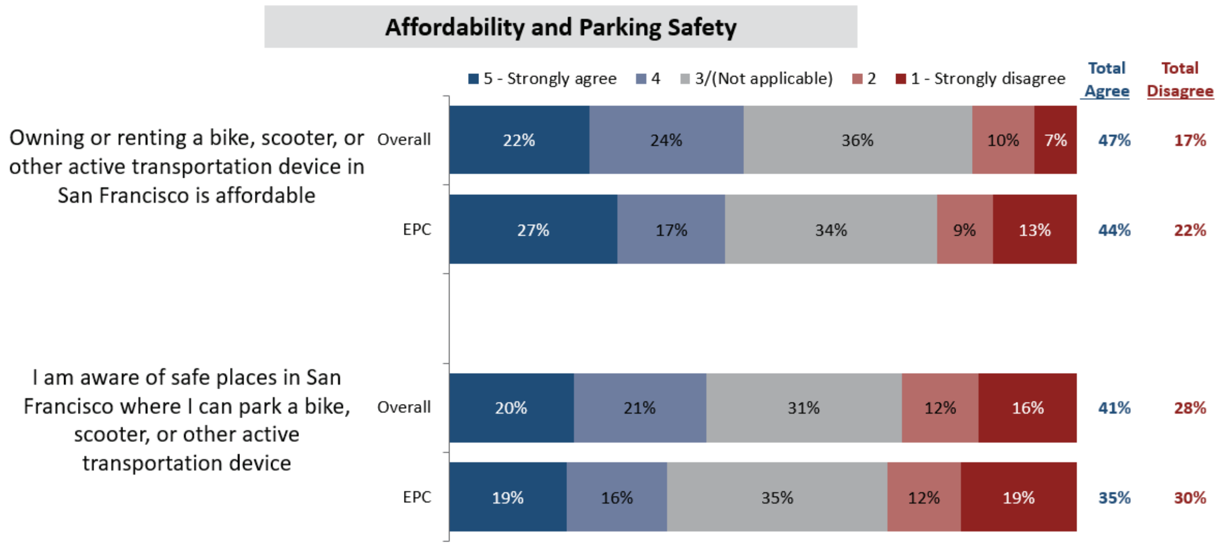
- Four percent (4%) of adult residents of San Francisco can be considered "**Strong and Fearless**" in their use of the ATN, meaning they feel very comfortable using all types of facilities shown in the survey.
- Another 19% are termed as "**Enthused and Confident**," meaning they are not very comfortable with shared facilities, but feel very comfortable on facilities with separate lane designations but no physical barriers.
- The largest share (57%) can be described as "**Interested but Concerned**" – these are people who are comfortable only on facilities that are separated from vehicle traffic by something physical, such as flex posts, parked cars, or a rigid barrier.
- The remaining 20% ("**No Way, No How**") are either very uncomfortable with using any types of facilities, or are unable to use it at all due to their own mobility capabilities.

Although residents of EPCs are more likely to use the ATN, as we saw in the earlier section, they are somewhat less comfortable using the various facilities that are present in the ATN. Just 2% of EPC residents can be described as Strong and Fearless, 14% Enthused and Confident, 59% Interested but Concerned, and 25% No Way, No How.



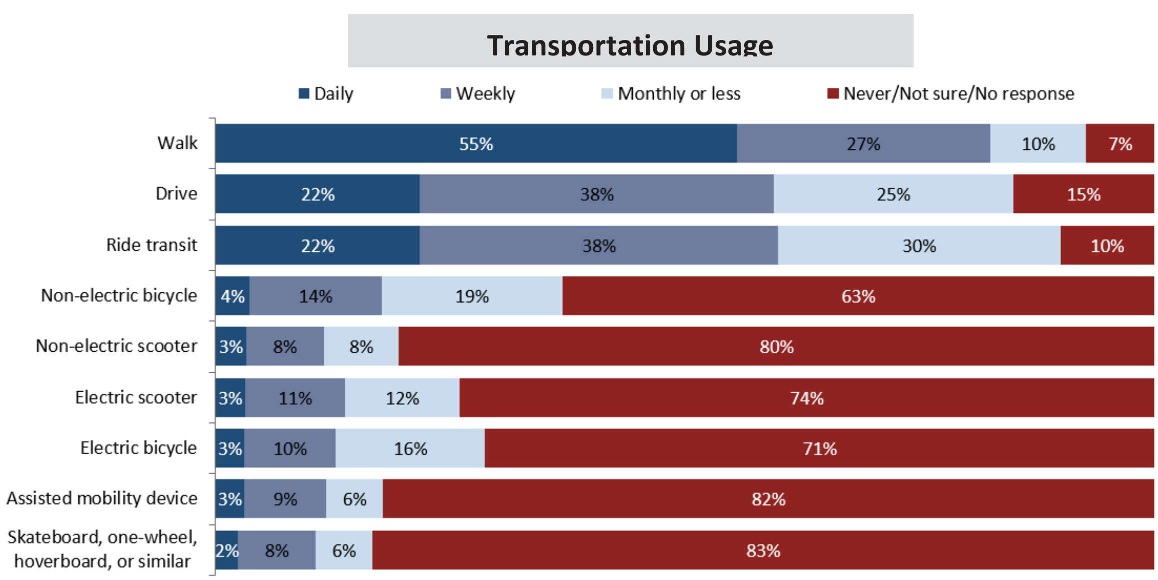
Affordability and safe parking places are potential barriers to using the Active Transportation Network.

A plurality of adult San Francisco residents (47%) agree that owning or renting an active transportation device in San Francisco is affordable, and 41% agree they know of safe places to park devices. However, we do see a sizable minority not in agreement with those statements – 17% disagree that owning or renting is affordable, and 28% disagree that they are aware of safe places to park. Patterns are similar in the EPCs on these questions.

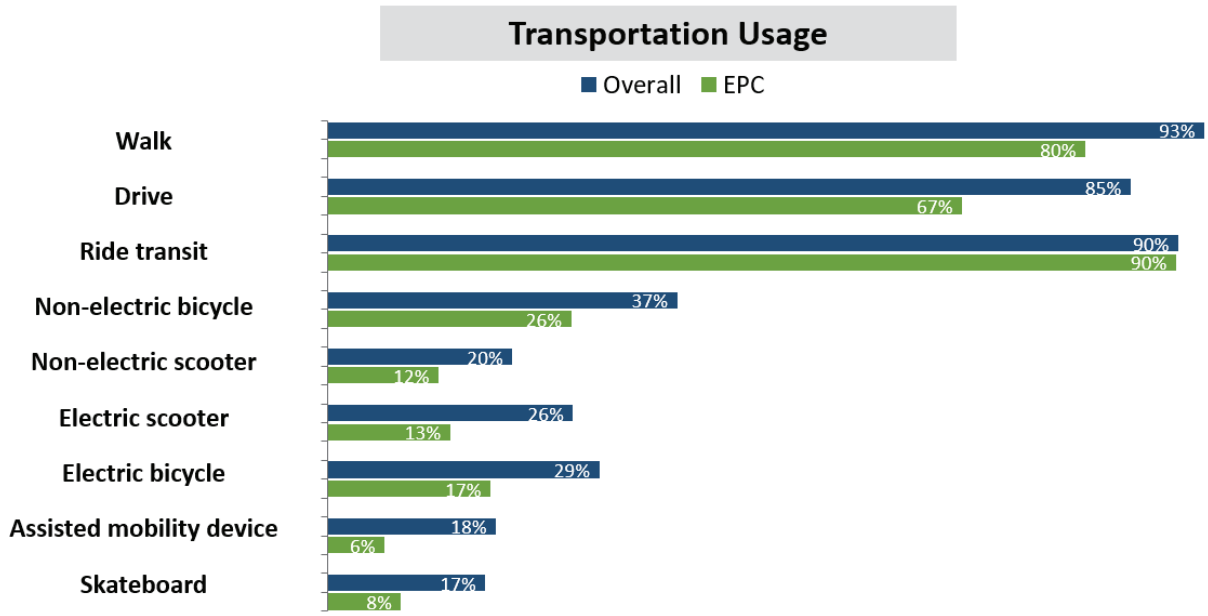


San Francisco residents primarily walk, drive and ride transit to get around

Walking is by far the most commonly used mode of transportation for San Francisco residents. Driving and riding transit command roughly equal usage by City residents, with a little more than one-fifth reporting they drive or use transit daily. Non-electric bicycles are the most common active transportation mode, with almost two-in-five residents reporting some level of usage.



Comparing citywide respondents to those in the Equity Priority Communities, we see somewhat different patterns. The chart below compares those who use each mode citywide against those in the EPC interviews. While the level of transit ridership is essentially identical, fewer in the EPCs use any form of active transportation to get around. EPC respondents are also less likely to be drivers than citywide residents.



Appendix E

Appendix E: Connectivity Analysis

SFMTA Active Communities Plan

Task 2D: Connectivity Analysis

Part 1: Existing Network Connectivity Analysis - Revised Results

February 13, 2024

This memo describes the revised results for Part 1 of the SFMTA ACP Connectivity Analysis which assesses connectivity to key destinations via high-quality facilities on the existing active transportation network. During Part 2 of the analysis, we will apply the same methodology to measure connectivity to key destinations via high-quality facilities on the proposed network. Toole Design will run Part 2 of the analysis once a proposed network is available.

Purpose

The purpose of this analysis is to:

- Show **which parts of the city** have convenient access to key destinations via high-quality facilities, and how this will be improved through the proposed network.
- Identify **what percent of the population** has convenient access to key destinations via high quality facilities, and how this will be improved through the proposed network.
- Identify **what percent of the population lives within a quarter mile of a high-quality facility**, and how this will be improved through the proposed network. This metric will be used to evaluate the SFMTA's progress towards their goal that all residents in San Francisco live within a quarter mile of a high-quality facility.

Definitions

Toole Design worked with SFMTA staff to determine the following definitions to inform the analysis:

- **High-Quality Facilities** include:
  - Class I Paths
  - Class IV Protected Lanes
  - Slow Streets
  - Class II Lanes and Class II Routes that score "high" on the Bicycle Comfort Index[1]
- **Convenient Access** is defined as trip where a user can walk to a high-quality facility within 5 minutes and can then ride on a high-quality facility to their destination within 10 minutes. In other words, a convenient trip is no longer than 15 minutes door-to-door.

[1] The project team defined "high-quality" lanes and routes as those with a Bicycle Comfort Index (BCI) score above 80. BCI scores over 80 indicate that, based on quantitative data such as vehicular speeds, volumes, pavement quality, elevation, the facility is comfortable to ride for most users. For information about BCI inputs, scoring, and interpretation, see the Bicycle Comfort Index Methodology document on the project website.

Destination Types

This analysis uses the three destination types, as shown in the table below. These are Commercial Districts, Major Transit Stops, and Community Resources. Based on literature review and best practice, the project team assumed that most riders tolerate rides up to 10 minutes to access commercial destinations for shopping, grocery stores, and recreation. We assumed that riders tolerate shorter ride times to transit, because these trips are assumed to be the first leg of a longer inter-modal trip. Trips to community resources like parks, schools, and libraries often involve families with children, and literature suggests that young children tolerate shorter bike trips (usually up to mile a or a 5-minute ride).

Destination Type	Data Includes	Travel Shed Distance	Bike Time Equivalent
Commercial Districts	Neighborhood Commercial Districts; grocery stores; location of parking meters	2 Miles	10 minutes
Major Transit Stops	BART stations, MUNI frequent routes, rapid routes, and rail lines	1 Mile	5 minutes
Community Resources	K-12 Schools, Libraries, Parks, and Community/ Rec Centers	1 Mile	5 minutes

Key Findings

- Most San Franciscans (80%) live within a quarter mile of a high-quality facility. Proximity to high-quality facilities is lower in Equity Priority Communities (EPCs) at just 71%.
- Using high-quality facilities, 43% of San Francisco's population live within a 10-minute bike ride of a commercial district or grocery store. People living in Equity Priority Communities (EPCs) have very slightly lower access to commercial destinations (42%).
- Using high-quality facilities, 37% of San Francisco's population live within a 5-minute bike ride of a major transit stop. People living in EPCs have very slightly *higher* access to commercial destinations (38%).
- Using high-quality facilities, 29% of San Francisco's population live within a 5-minute bike ride of a community destination like a park or school. People living in EPCs lower access to community destinations (26%).

Figure 1: People living in Equity Priority Communities have less access to high-quality bike facilities

Access to key destination types and to high-quality bike facilities: general population compared to Equity Priority Communities

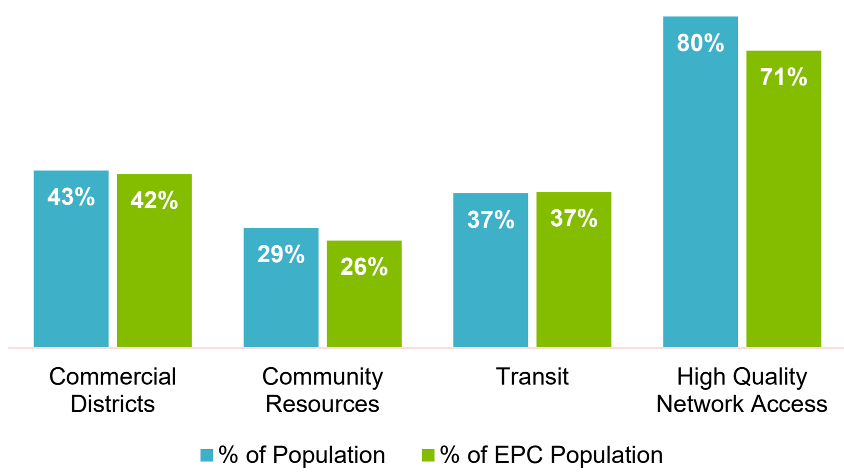
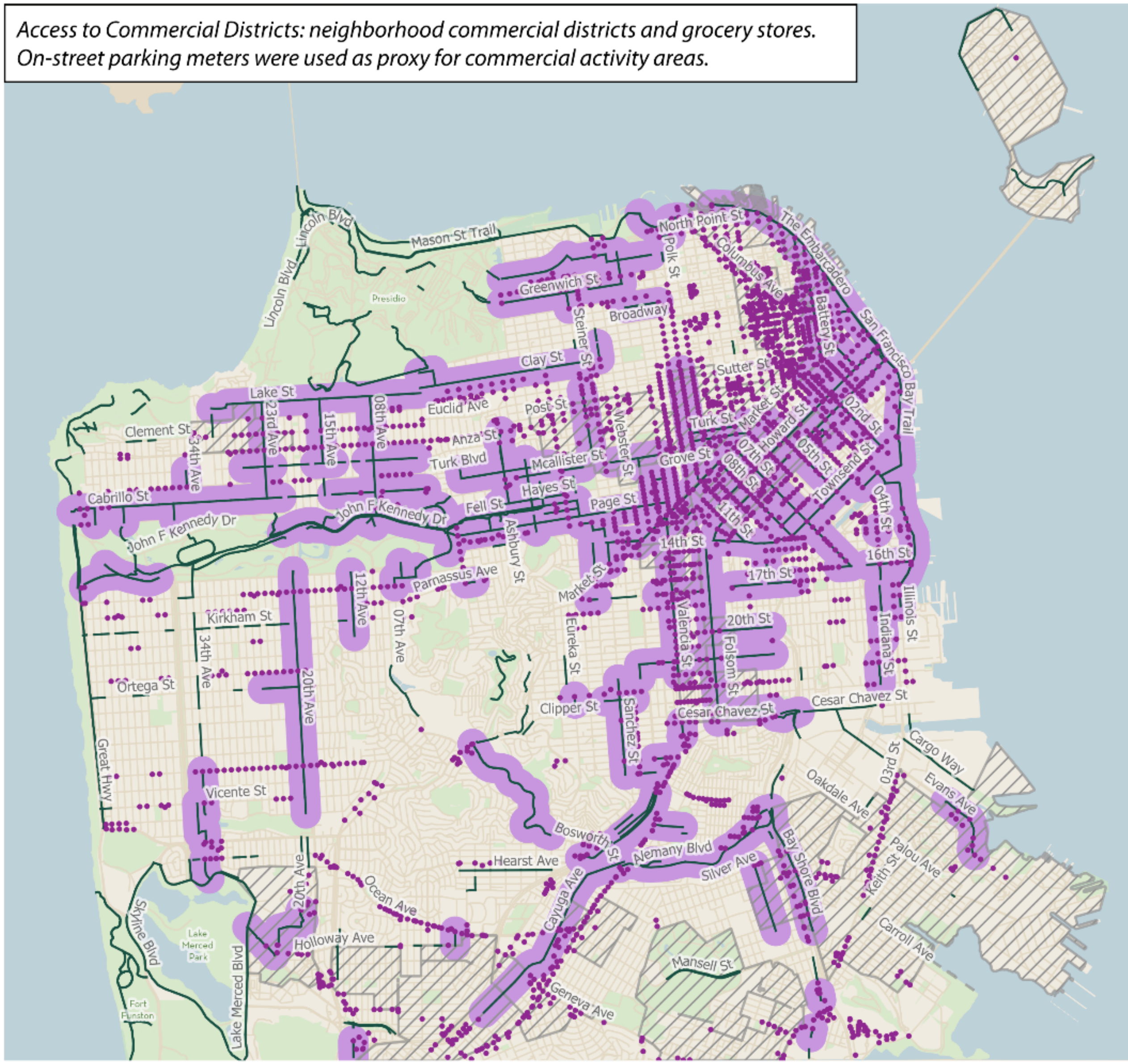


Figure 2



Access to Commercial Districts: neighborhood commercial districts and grocery stores. On-street parking meters were used as proxy for commercial activity areas.

San Francisco Active Communities Plan
Draft Connectivity Analysis
February 2024

- 10-minute Bike Travel Shed
- Existing High Quality Network * (2023)
- Equity Priority Communities
- Commercial Districts

* High quality network includes:
- Paths
- Protected lanes
- Slow Streets
- High Comfort Routes and Lanes, as defined by the 2023 Bicycle Comfort Index

Using the existing high quality network, 43% of the San Francisco population can access commercial districts within a 10-minute bike ride. 42% of populations in Equity Priority Communities can access commercial districts via high quality network facilities within the same amount of time.

N

0 0.75 1.5 mi

Figure 3

San Francisco Active Communities Plan
Draft Connectivity Analysis
February 2024

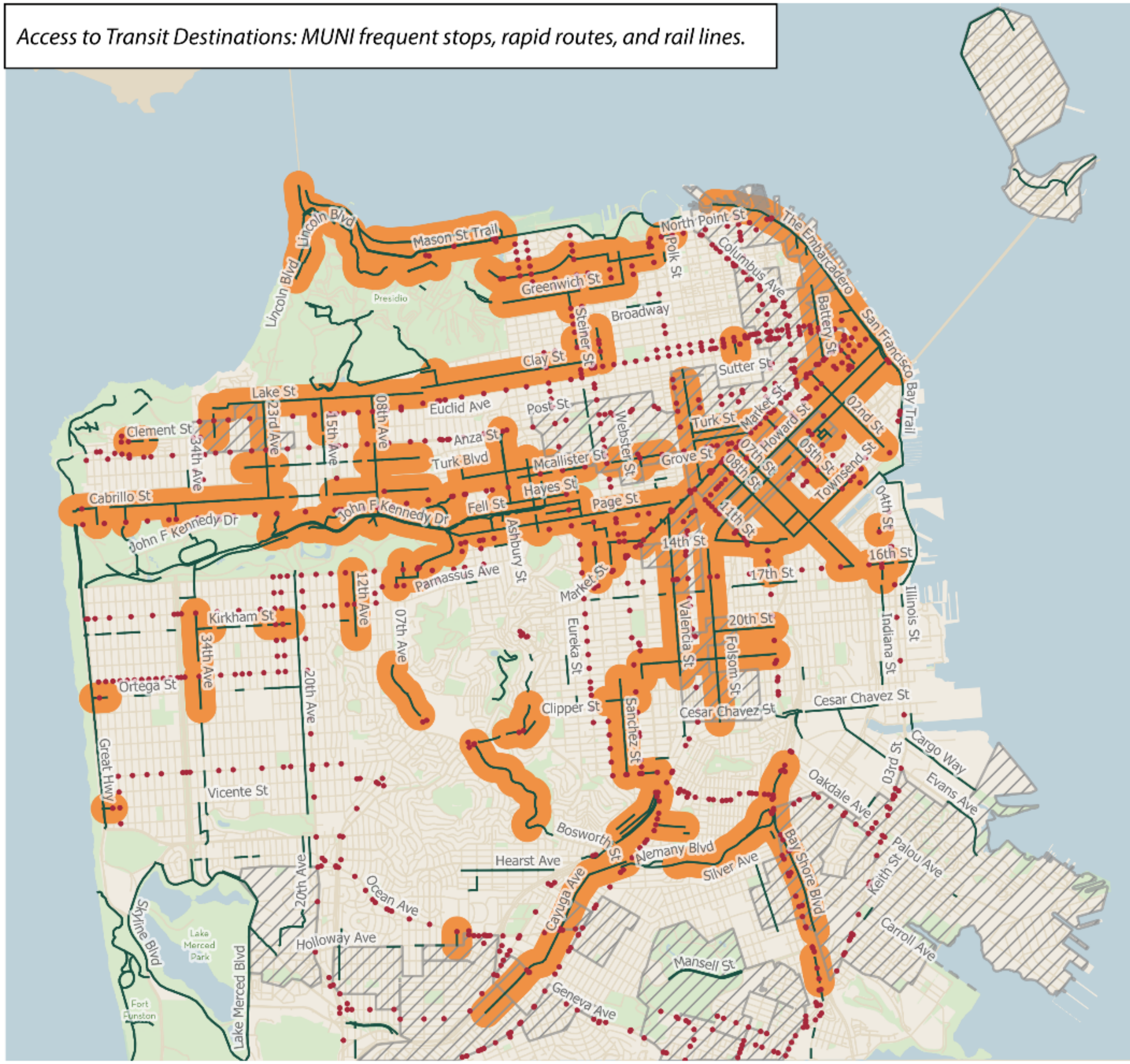
- 5-minute Bike Travel Shed
- Existing High Quality Network * (2023)
- Equity Priority Communities
- Community Resources

* High quality network includes:
- Paths
- Protected lanes
- Slow Streets
- High Comfort Routes and Lanes, as defined by the 2023 Bicycle Comfort Index

Using the existing high quality network, 29% of the San Francisco population can access community resources within a 5-minute bike ride. 26% of populations in Equity Priority Communities have access to community resources via high quality network facilities within the same amount of time.

0 0.75 1.5 mi

Figure 4



San Francisco Active Communities Plan
Draft Connectivity Analysis
February 2024

5-minute Bike Travel Shed
Existing High Quality Network * (2023)
Equity Priority Communities
Transit

* High quality network includes:
- Paths
- Protected lanes
- Slow Streets
- High Comfort Routes and Lanes, as defined by the 2023 Bicycle Comfort Index

Using the existing high quality network, 37% of the San Francisco population can access transit destinations within a 5-minute bike ride. 38% of populations in Equity Priority Communities have access to transit destinations via high quality network facilities within the same amount of time.

N

0 0.75 1.5 mi

Table 1: Access to destination types via high-quality routes.

Destination Type	Metric	Existing Network	Proposed Network*
Neighborhood Commercial District	% of population within 2 miles	43%	
	% of EPC population within 2 miles	42%	
Transit	% of population within 1 mile	37%	
	% of EPC population within 1 mile	38%	
Community Resources	% of population within 1 mile	29%	
	% of EPC population within 1 mile	26%	
High Quality Network Access	% of population within ¼ mile of a high-quality facility	80%	
	% of EPC population within ¼ mile of a high-quality facility	71%	

**To be completed during Part 2 of the analysis*

Appendix F

TOOLE DESIGN

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OAKLAND, CA 94612

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TOOLEDESIGN.COM

MEMORANDUM

November 10, 2023

To: Christopher Kidd
Organization: SFMTA
From: Mia Candy, Ellie Gertler, Ellie Fiore, Toole Design
Project: San Francisco Active Community Plan

Re: San Francisco Active Communities Plan – Final Equity Analysis

Introduction, Background, and Context

As part of the Active Communities Plan, the project team seeks to further understand inequities in San Francisco's Active Transportation Network and identify barriers to walking, biking, and rolling in Equity Priority Communities (EPCs). The project team is collecting quantitative and qualitative data to tell a cohesive story about transportation equity in San Francisco. This memorandum presents the *quantitative* equity data and is designed to be used in coordination with qualitative feedback provided during public outreach and EPC Community Workshops. This memorandum summarizes equity-related findings from the Network and Count Analysis, Collision Analysis, Resident Preference Survey (RPS), and Phase 2 Public Survey. To review the full analysis memoranda, including documentation of all data sources visit the project analysis webpage.

This memorandum focuses on, and is organized into, the following sections:

- Key Findings
- Current Bicycle and Micromobility Activity
- Network Coverage and Quality
- Traffic Safety and Enforcement
- Disability and Access
- Neighborhood Profiles for the Six Equity Priority Communities (EPCs)
- Next Steps

This memorandum is one part of the larger Equity Framework, which was vetted by the SFMTA's Office of Racial Equity and Belonging (OREB), the Active Communities Plan Technical Advisory Committee (TAC), and the project community partners. This document will be used in coordination with community workshops to:

- Identify and quantify barriers to bicycling, micromobility, and accessibility in EPCs;
- Identify community needs related to bicycling, micromobility, and accessibility; and
- Inform recommendations for network improvements, policies, and programs in EPCs.

Note: This memorandum consolidates data and graphics from multiple prior analyses and memoranda. As a result, there is some inconsistency in the formatting of figures, maps, and charts.

Key Findings

This section documents key findings related to inequities in San Francisco's bicycle and micromobility activity and trends. To identify inequities, the project team compared trends within EPCs to citywide trends. Where data was available, we also documented differences between demographic groups.

Current Bicycle and Micromobility Activity

- According to the Resident Preference Survey, people living in the EPCs, as well as Black, Indigenous, and People of Color (BIPOC) residents citywide, are less likely to use active transportation devices (bikes, scooters, one-wheels etc.) than San Franciscans in general, but are *more likely to use active transportation devices daily*. The data show that 12% of Black respondents reported using an e-bike daily, compared to just 3% citywide, but this statistic may have a high margin of error, given the small sample size.
- Among EPC residents, there is a greater perception that owning or renting a bike, scooter, or active transportation device is not affordable (22% of respondents feel this way, compared to 17% citywide).
- In addition, 40% of respondents who live in downtown (including SoMa/Tenderloin) report that they have had a bike or scooter stolen – compared to just 29% citywide.
- BIPOC residents and those living in EPCs report that they use the Active Transportation Network in a more utilitarian manner than San Franciscans in general. More EPC respondents are using the network to run errands and commute than for recreation. This finding is consistent with the fact that EPC residents are making daily active transportation trips.
- According to citywide manual counters, between 2018 and 2022, bike and micromobility volumes fell by about a third. Activity in EPCs was consistent with this trend – volumes fell in all EPCs in which there are counters, with Bayview-Hunters Point seeing the largest decline (96% from 2018 to 2022).
- Bicycle and micromobility volumes in EPCs are closely associated with the land use and density conditions in and around the neighborhood. For this reason, SoMa, the Mission District, Western Addition, and Tenderloin have some of the highest rates of bike commuting and micromobility use in the city. In some cases, these neighborhoods out-perform the city as a whole.
- In contrast, Bayview-Hunters Point and Outer Mission/Excelsior have some of the lowest rates of bike activity. Low bike commuting in the Outer Mission/Excelsior and Bayview-Hunters Point is likely also a result of land use patterns – people live too far from their jobs to make biking an attractive option. In these same neighborhoods, bike commuting is low *even for households without cars*, suggesting that residents likely use transit as their primary commute mode.
- Some of the highest-volume micromobility corridors run through EPCs, including Market Street (Tenderloin and SoMa) with 900 trips per day, Valencia Street (Mission District) with 500 trips per day, and Polk Street (Tenderloin) with 400 trips per day.
- In contrast, micromobility ridership is low in the south and west of the city, despite Bay Wheels policies that specifically incentivize ridership in those service areas. For example, Bayview-Hunters Point has bikeshare stations and is within the designated service area but has a relatively low volume (less than 40 average daily rides).

Network Coverage and Quality[1]

- Slow Street installation is not evenly distributed throughout the city, and there are fewer miles of Slow Streets in EPCs than the city as a whole. The physical distribution of Slow Streets across the city seems to have an impact on resident use and perception. According to the Resident Preference Survey, only a third of EPC residents have used a slow street, compared to more than half of residents citywide. EPC residents also report lower comfort levels on Slow Streets that San Franciscans at large. As part of the Active Communities Plan, SFMTA is working with EPCs to explore opportunities for and concerns about implementing Slow Streets in EPCs.
- Bike parking is concentrated in the city's dense, urban northeast: In the Tenderloin, SoMa, and Mission District EPCs bike parking is densely distributed. In other EPCs, bike parking is concentrated along neighborhood commercial corridors, with little available on residential streets.
- Results from the Resident Preference Survey indicate that EPC residents report being less aware of safe places to store their active transportation devices (35%) than San Franciscans in general (41%).
- The project team measured *network coverage* as the percent of street centerline miles that have bike facilities. Citywide, network coverage is 24%. EPCs that overlap with San Francisco's dense, urban center have high network coverage, including SoMa (36%), the Mission District (30%), and Tenderloin (28%). In contrast, network coverage is relatively low in low-density neighborhoods such as Excelsior (9%). Western Addition/Fillmore has relatively low network coverage (19%), despite being located in the city's dense northeast quadrant.
- The project team measured *high-quality network coverage* as the percent of street centerline miles that have Slow Streets, Class I Paths, or Class IV Bike Lanes. Of the EPCs, SoMa has the highest share (22%) of centerline miles with high-quality facilities. This far exceeds the citywide average of 8%. Bayview-Hunters Point and Outer Mission/Excelsior have lower-than-average quality network coverage. Western Addition/Fillmore has *zero* high-quality facilities – there are no separated bikeways, bike paths, slow streets, or car-free streets within the formal neighborhood boundaries.

Network Comfort[1]

- In the six EPCs studied, existing network facilities tend to have low to moderate Bicycle Comfort Index scores. Exceptions to this rule include Shotwell Slow Street in the Outer Mission ("very high" comfort) and the Class II and Class III facilities on Steiner Street, McAlister Street, and Fulton Street in the Western Addition (which score "high"). In Bayview-Hunters Point, the sections of Hunters Point Boulevard and Bayshore Boulevard that have Class IV Protected Lanes also score "high" on the BCI scale.
- People living in EPCs have very similar preferences about facility type as those living in non-EPC neighborhoods. San Franciscans–whether living in an EPC or not–seem to agree that the most comfortable facilities are those with physical protection from vehicles, including Class IV Bike Lanes and Car-Free Streets.
- There is also agreement that the least comfortable conditions are streets where bikes and cars share the same lane, and on busy commercial or transit streets.

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[1] The data presented in this section is based on the June 2023 Network Analysis. The analysis is based on the January 2023 network, which was the most recent network data available at the time of analysis. Facilities constructed since January 2023 are not included in this analysis.

- Despite this consistency, the data also show that, overall, people living in EPCs have slightly lower levels of comfort on all Active Transportation Network facility types. In EPCs, 25% of respondents reported feeling uncomfortable on, or unable to use, the ATN, compared to 20% citywide.
- Higher rates of discomfort were reported by people with disabilities (26% feel uncomfortable), older adults (25% of men over 50 and 30% of women over 50), and people identifying as Asian or Pacific Islander (AAPI – 23%).

Traffic Safety and Enforcement

- Black bicyclists and drivers are substantially overrepresented in crashes. Census data show that Black residents make up 5% of San Francisco's population but accounted for 9.6% of all bicycle crash victims and 8.6% of fatal and serious injury (KSI) bike victims, pre-pandemic. During the pandemic, these figures rose – Black bicyclists were involved in 11% of all bike crashes and 11.5% of KSI bike crashes.
- Between 2017 and 2021, slightly more than half (55.2%) of the total reported bicyclist and micromobility crashes occurred outside of EPCs. These crashes also tended to be more severe than the crashes within EPCs.
- As expected, bicyclist and micromobility crashes throughout San Francisco are concreted along the High Injury Network (HIN): 67% of all crashes and 62.3% of KSI crashes occur on the HIN. This concentration is more pronounced in EPCs: In EPCs, nearly 81% of all crashes and 80% of KSI crashes occurred along the HIN.
- Consistent with citywide crash violations, the top three reported violations for KSI crashes within EPCs include *unsafe speed for conditions* (26.5%), *disregard red signal* (11.2%), *and unsafe turn or lane change* (10.2%).
- Citations for both bike and scooter-related incidents are concentrated in high-density, high-volume neighborhoods, which overlap with the Tenderloin, SoMa, and Mission District EPCs.
- As part of the Phase 2 Public Survey, almost 74% of respondents (n = 1120) said they would like to see better behavior and safety habits by road users. As part of this response, roughly 80% (n = 882) of participants said that traffic enforcement is a high priority. Notably, among BIPOC respondents, that percent is lower at 74%.

Disability and Access

- Overall, people with disabilities are less comfortable on the Active Transportation Network than San Franciscans overall: 26% of people with disabilities report being uncomfortable on or unable to use the network, compared to just 20% citywide.
- In general, people with disabilities prefer to use facilities that provide some protection from cars – this is consistent with citywide preferences. Compared to citywide preferences, people with disabilities report higher levels of comfort on separated bike lanes and slow streets.
- According to Resident Preference Survey results, people with disabilities report higher rates of theft of their active transportation devices that San Franciscans at large (43% compared to just 25% citywide). Note that this statistic may have a high margin of error, given the small sample size.
- People with disabilities are less likely to be aware of safe places in San Francisco to park a bike, scooter, or other mobility device (just 33% report knowing of safe parking spaces, compared to 43% citywide).
- People with disabilities are also less likely to agree that owning or renting a bike, scooter, or other active transportation device is affordable in San Francisco (44% agree, compared to 48% citywide).

Current Bicycle and Micromobility[2] Activity

Key Question: Are there measurable differences in bike and micromobility activity between EPCs and other San Francisco neighborhoods? Are there differences in activity between different demographic groups?

To analyze bicycle and micromobility activity, the project team used data from the Network and Count Analysis, the Resident Preference Survey (RPS), and the Phase 2 Public Survey. Data sources include the 2021 American Community Survey (ACS) 5-Year Estimates, the city's 22 electronic bike counters, manual counts on 25 Slow Streets and at 13 quick-build locations, micromobility data from the service providers (Bay Wheels [Lyft], Lime, Bird, and Spin), and volume estimates from Replica, an activity-based travel demand model.

What active transportation devices are being used, how frequently, and how are different groups and neighborhoods using them?

As part of the RPS, the project team asked respondents how frequently they use active transportation devices, including bicycles (electric and manual); scooters (electric and manual); assisted mobility devices (such as powerchairs), and skateboards, one-wheels, or hoverboards. Compared to the city at large, residents living in Equity Priority Communities (EPCs) have lower rates of active transportation device usage (34% in EPCs compared to 47% citywide). However, the data on *daily* usage tells a different story: in EPCs, 5% of residents report using a bicycle every day, compared to 4% citywide. Daily usage of scooters, skateboards, e-bikes and other micromobility is very similar in EPCs to the city at large. Similarly, while white respondents report more use of active transportation devices overall, Black respondents report more *daily* use of active transportation devices. Compared to the city as a whole, Black respondents report higher daily usage rates of all modes except walking. The data shows that 12% of Black respondents reported using an e-bike daily, compared to just 3% citywide, but this statistic may have a high margin of error, given the small sample size. The fact that Black respondents use *almost all modes* more on a daily basis, including driving and taking transit, suggests that this demographic group may have commitments that require daily travel outside of the home at a greater rate than other demographic groups.

Table 1: Daily Active Transportation Device Use (Source: Active Communities Plan Resident Preference Survey)

Device/ Mode	Citywide	EPCs	People with a Disability	Race/ Ethnicity				
				AAPI	Black	His./ Lat.	Other	White
Bike (Manual)	4%	5%	6%	2%	6%	6%	5%	4%
Bike (Electric)	3%	3%	5%	-	12%	3%	6%	4%
Scooter (Manual)	3%	2%	5%	1%	8%	1%	1%	5%
Scooter (Electric)	3%	3%	6%	1%	7%	3%	5%	5%
Other Micromobility	2%	1%	7%	-	9%	3%	1%	4%
Transit	22%	38%	27%	20%	31%	26%	14%	21%
Walk	56%	56%	53%	48%	49%	65%	56%	60%
Drive	22%	21%	18%	20%	31%	26%	14%	21%

Highlighted figures are 3%+ greater or lower than citywide average.

[2] The Bay Area's Metropolitan Transportation Commission (MTC) defines micromobility as "ways of getting around that are fully or partially human-powered — such as bikes, e-bikes and e-scooters and mobility-assistance devices/wheelchairs. Most commonly, micromobility vehicles do not exceed 15mph." Other micromobility devices that are common in San Francisco are skateboards, electric skateboards, and one-wheels.

What trip types is the Active Transportation Network used for, and how do trip types differ between demographic groups and neighborhoods?

Bicycle Commuting

Bike commuting in San Francisco is concentrated in the city's dense urban center, near Downtown and the Financial District, and is likely due to the density and proximity between people, housing, and jobs, relatively flat topography, and proximity to bike facilities. The project team found that EPCs in and around the city center (SoMa, Mission, Western Addition, and Tenderloin) had higher rates of bike commuting than the city as a whole (greater than 3.1%). Relatively low bike commuting in the Outer Mission/Excelsior and Bayview-Hunters Point is likely a result of land use patterns – people live too far from their jobs to make biking an attractive option. In these same neighborhoods, bike commuting is low *even for households without cars*, suggesting that residents likely use transit as their primary commute mode[3]. Figures 1 and 2 show that there is no direct correlation between low vehicle ownership and high bike commute rates, except where overall density makes bike commuting easy and attractive.

Compared to the city at large, Hispanic/ Latino/a/x respondents are more likely to say that they would use the Active Transportation Network (ATN) to go to work or school. While 42% of all survey respondents say they use the ATN to go to work – this figure is 56% amongst Hispanic/Latino/a/x respondents. While only 14% of survey respondents say they use the ATN to go to school, this figure is 28% amongst Hispanic/ Latino/a/x respondents. More broadly, residents of the six EPCs report using the Active Transportation Network in a more utilitarian manner than San Franciscans in general. More EPC respondents are using the network to go to work, go to school, or to run errands than for exercise or recreation (See Figure 3). This is consistent with the data that shows BIPOC residents are more likely to use active transportation devises *on a daily basis* than San Franciscans at large.

Figure 1: 2021 Bike Commute Mode Share

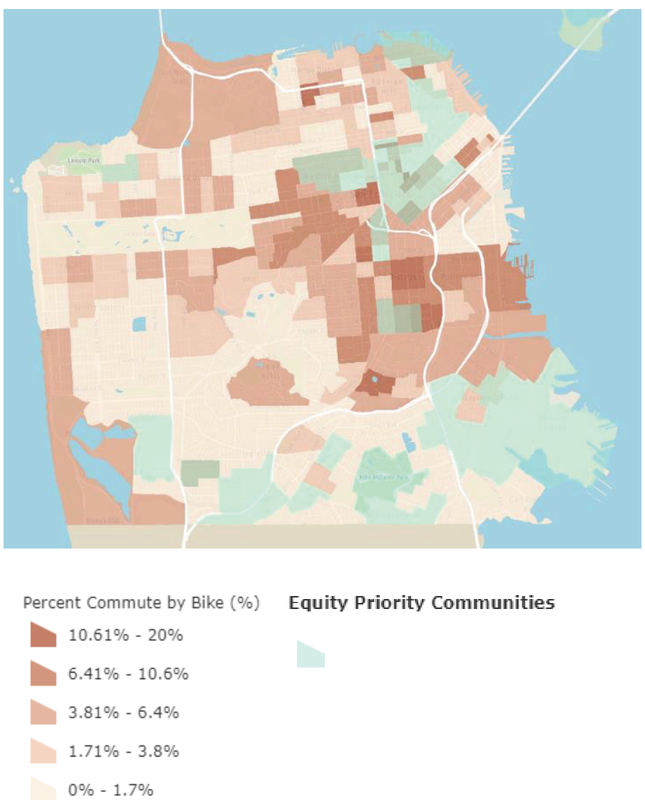
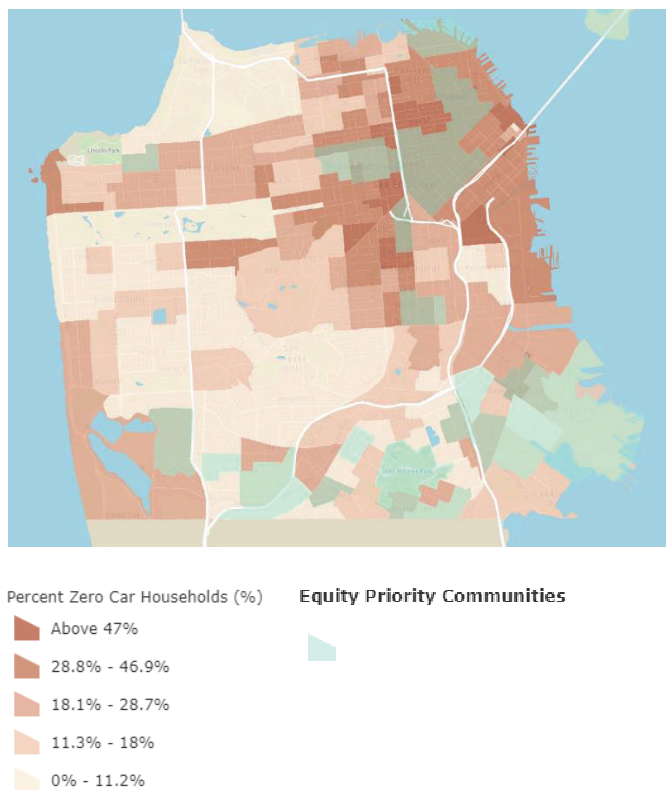
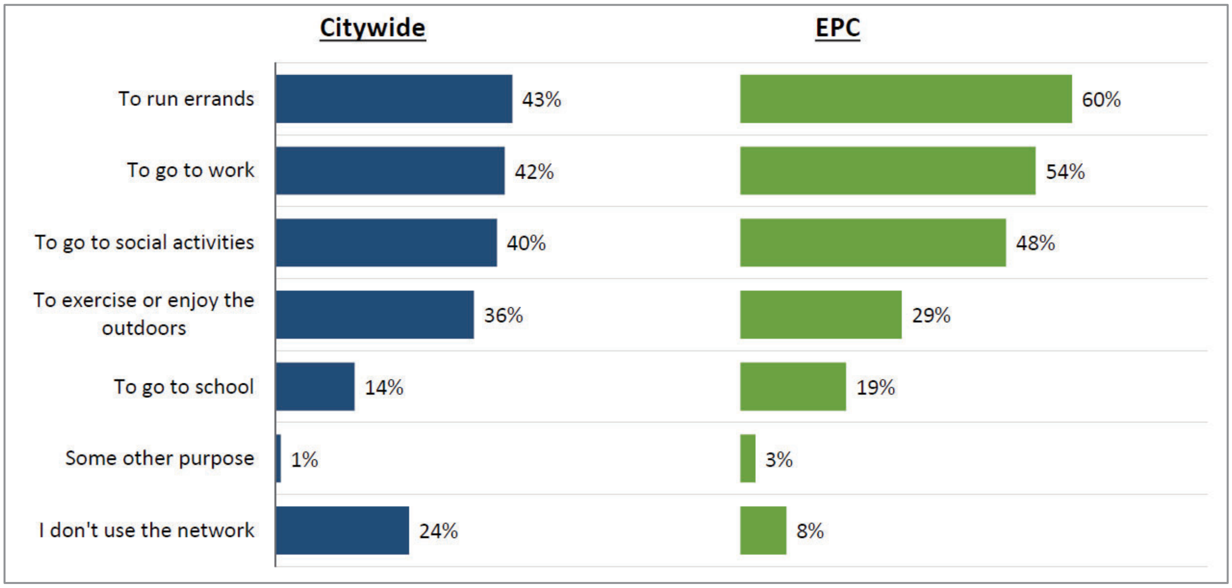


Figure 2: 2021 Zero Vehicle Households



[3] Census data captures only the primary commute mode. Intermodal trips – such as trips by residents who bike and the take bus in one trip – are not reflected in the analysis.

Figure 3: Active Transportation Network Trip Purpose: Citywide vs EPCs (Source: ACP Resident Preference Survey)



Bicycle and Micromobility Activity Combined – All Trip Purposes

To measure overall bicycle and micromobility activity, the project team used data from 22 manual bike counters, bike volume counts for 25 slow streets (collected during 2022), bike volume counts for 13 streets before and after quick-build installations, and estimated volumes from Replica, an activity-based travel demand model.

According to the manual bike counters, between 2018 and 2022, bike and micromobility volumes fell by about a third. Bike activity in EPCs was consistent with this trend – volumes fell in all EPCs in which counters exist, with Bayview-Hunters Point seeing the largest decrease of 96%. This is in stark contrast to non-EPC neighborhoods in the Richmond, Sunset, Potrero Hill, and Russian Hill, where bike activity increased by 120%.

The city also tracks bike activity on Slow Streets, which provides an indication of how Slow Streets are performing in different neighborhoods, including EPCs. Slow Street installation is not evenly distributed throughout the city, and there are fewer miles of Slow Streets in EPCs than the city as a whole. The highest-volume Slow Streets (Clay Street, Lake Street, and Page Street) are outside of EPCs, except for Shotwell Street in the Mission. Slow Streets in the Outer Mission/ Excelsior and Bayview-Hunters Point are amongst the lowest volume Slow Streets, which may be due to land use and overall density in the area.

The physical distribution of Slow Streets across the city seems to have an impact on resident use and perception. According to the Resident Preference Survey, only a third of EPC residents have used a Slow Street (32%), compared to more than half of residents citywide (51%). EPC residents also report slightly lower comfort levels on Slow Streets that San Franciscans overall (EPCs have a mean comfort score of 3.51 out of 5 on Slow Streets compared to a citywide mean comfort score of 3.62 out 5).

Table 2: Self-Reported Slow Street Use and Comfort (Source: ACP Resident Preference Survey)

Slow Street Performance Metric	Citywide	EPCs
Percent of residents who report having walked, biked, or rolled on one of San Francisco's designated Slow Streets	51%	32%
Self-reported level of comfort using San Francisco's Slow Streets. Comfort is scored on a scale from 1 (low comfort) to 5 (high comfort)	3.62	3.51

Micromobility Activity

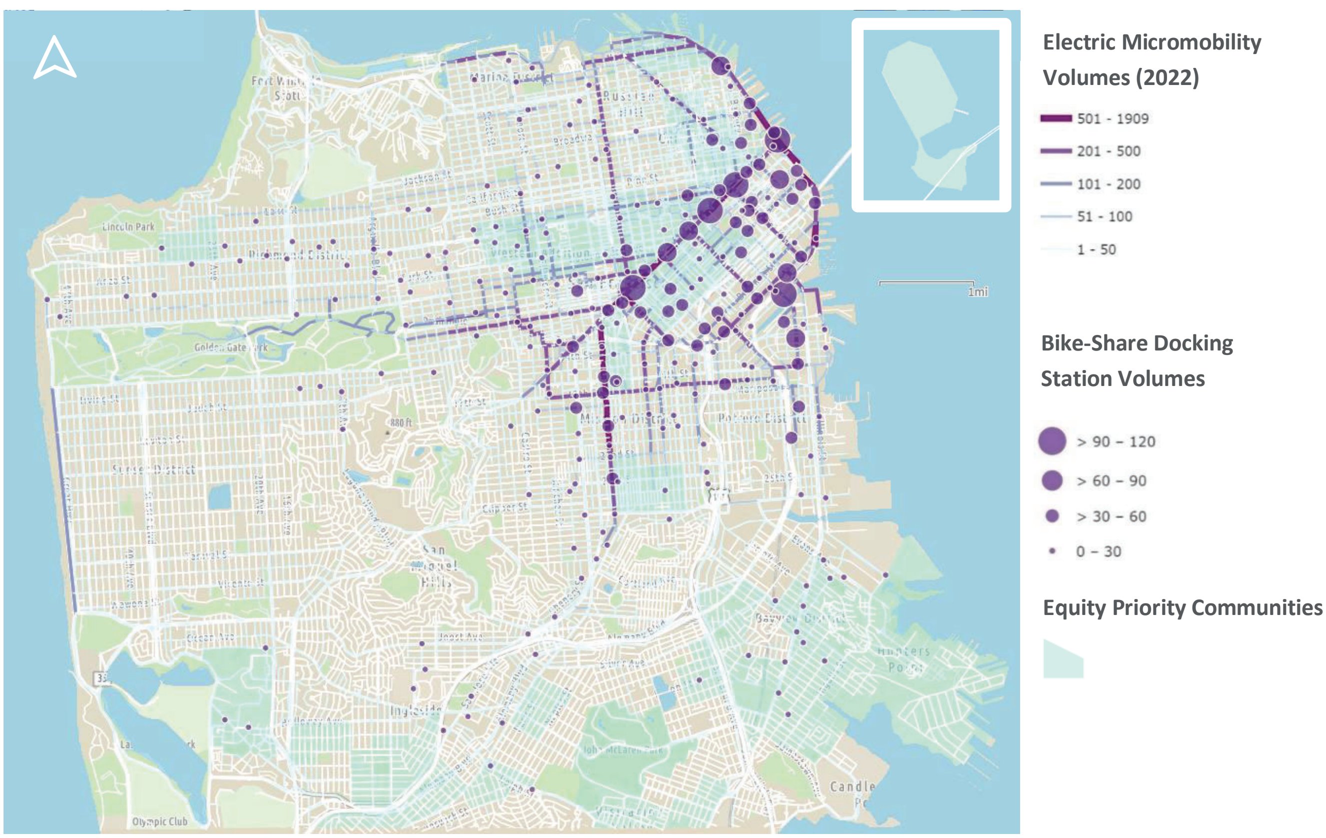
The project team measured micromobility using data provided by service providers including Lyft (Bay Wheels), Lime, Bird, and Spin. Figure 4 illustrates volumes in relation to EPC Boundaries. Micromobility activity is concentrated in the northeast area of the city, especially in Downtown and the Financial District, and is particularly high along key commercial corridors and in dense urban areas. Micromobility activity is low in the southern portion of the city. Specific streets with high micromobility ridership include:

- Market Street (Tenderloin and SoMa EPCs) - approximately 900 trips per day
- Valencia Street (Mission EPC) - approximately 500 trips per day
- Polk Street (Tenderloin EPC) - approximately 400 trips per day
- Embarcadero – approximately 1,800 trips per day

These specific areas likely see higher rates of micromobility use due to the density of people, jobs, and destinations, and because they offer direct and convenient links between destinations. Micromobility ridership is low in the south and west of the city, despite Bay Wheels policies that specifically incentivize ridership in those service areas[4]. For example, Bayview-Hunters Point has bikeshare stations and is within the designated service area but has a relatively low volume of less than 40 average daily rides. Low ridership is likely due, in part, to relatively low network coverage in these neighborhoods, as well as land use patterns – destinations are further away and require longer trips, making micromobility a less attractive option to residents.

Micromobility use is also associated with quality of network facilities. Facilities with protection from cars – protected bike lanes – have the highest ridership per centerline mile than any other facility type. Ridership per centerline mile increases as protection from cars increases. This suggests that upgrading and improving network coverage and facilities could lead to higher rates of micromobility use.

Figure 4: Micromobility Activity and Equity Priority Communities



[4] Bay Wheels policy incentivizes ridership in the south and east of San Francisco via two incentive structures: 1) In south and west services areas, there is no penalty for parking the bike outside of a docking station. 2) In Outer Richmond, Hunters Point and other select neighborhoods, the per-minute price is capped at $2 for members. Maps of the incentive pricing are available in the Network Analysis Memorandum.

Network Coverage and Quality

Key Question: Are there measurable differences in network coverage and quality between EPCs and other San Francisco neighborhoods?

How does network coverage differ between EPCs and the city at large?

The project team measured *network coverage* as the percent of street centerline miles[5] that have bike facilities. Citywide, network coverage is 24%. EPCs that overlap with San Francisco's dense, urban center have high network coverage, including SoMa (36%), the Mission (30%), and Tenderloin (28%). In contrast, network coverage is relatively low in low-density neighborhoods such as Excelsior (9%). Western Addition/Fillmore has relatively low network coverage (19%), despite being located in the city's dense northeast quadrant.

Table 1: Network Coverage and Network Quality Citywide vs. Equity Priority Communities

	Network Coverage	Network Quality	
Neighborhood*	Percent of Centerline Miles with Bike Facilities	Percent of Centerline Miles with High-Quality Facilities	Percent of Network that is High-quality
Citywide Average	24%	8%	28%
Bayview-Hunters Point	23%	5%	21%
Outer Mission/	32%	7%	21%
Excelsior	9%	2%	16%
Mission District	30%	8%	28%
SoMa	36%	22%	61%
Tenderloin	28%	10%	38%
Western Addition/ Fillmore	19%	0%	0%

How does network quality differ between EPCs and the city at large?

The project team measured *high-quality network coverage* as the percent of street centerline miles that have slow streets, Class I Paths, or Class IV Bike Lanes. High-quality facilities generally provide a more comfortable experience for users than pavement markings. Of the EPCs, SoMa has the highest share (22%) of centerline miles with high-quality facilities. This far exceeds the citywide average of 8%. Bayview-Hunters Point and Outer Mission/Excelsior have lower than average quality network coverage. Western Addition/Fillmore has *zero* high-quality facilities – there are no separated bikeways, bike paths, slow streets, or car-free streets within the formal neighborhood boundaries. Quality network coverage in each EPC is visualized in Figure 4.

[5] Centerline miles measure the length of a street, in miles, regardless of the number of lanes or the direction of travel. A one-mile street with one lane of traffic in each direction is one centerline mile. In contrast, "lane miles' measures the total mileage of all lanes on a street. A one-mile street with one lane of traffic in each direction (ie two total lanes) is two lane miles.

Figure 4: High-Quality Facilities and Project Equity Priority Community Boundaries*

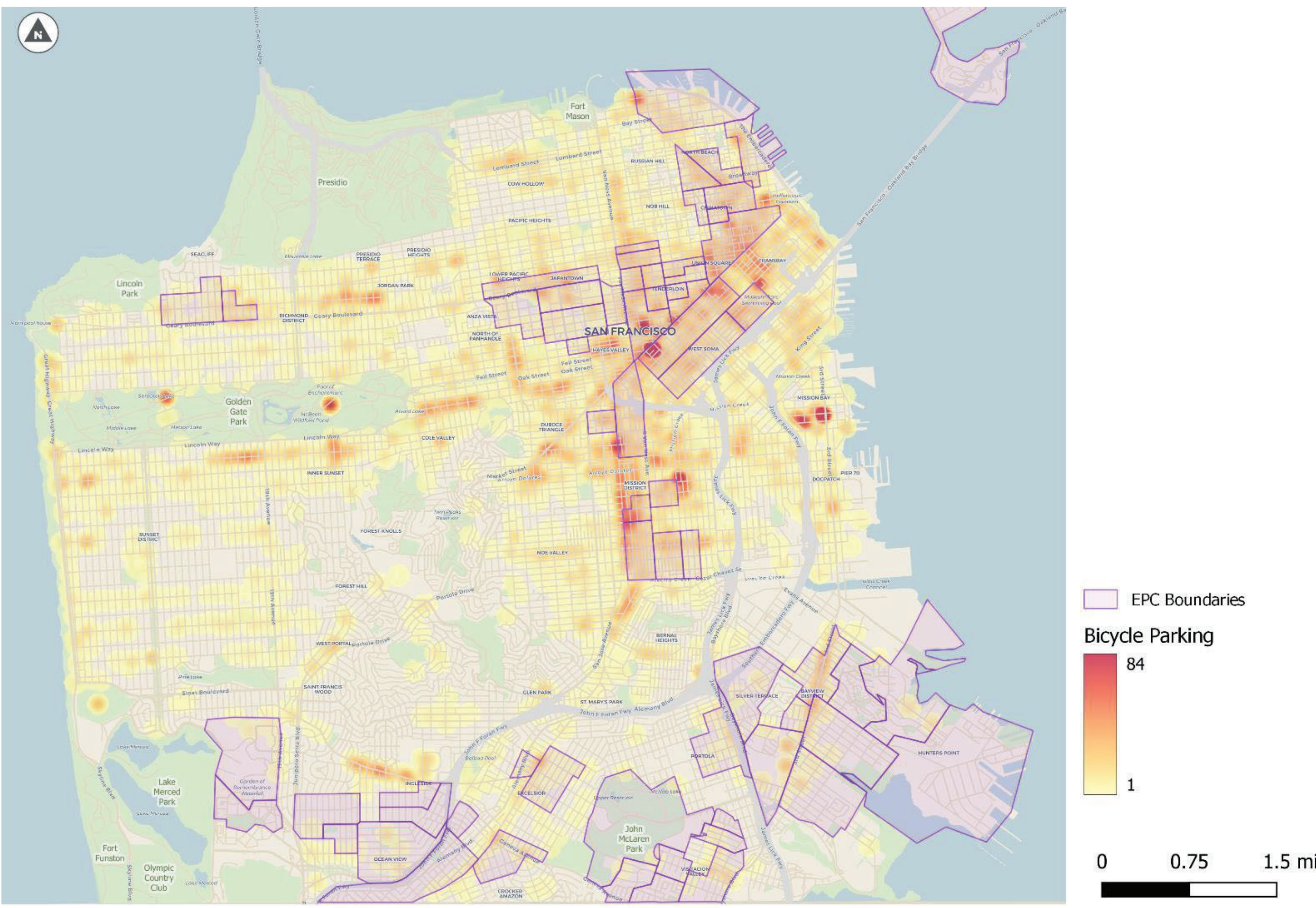
**Note: This map shows the six Equity Priority Communities (EPCs) selected for analysis as part of the San Francisco Active Communities Plan (SF ACP). These neighborhoods are part of a longer list of Equity Priority Communities identified by the Metropolitan Transportation Commission. Figure 5 shows all EPCs in San Francisco.*

How does bike parking coverage differ between EPCs and the city at large?

The project team also evaluated the distribution of bike parking across the city. Availability and quality of bike parking can be an indicator of overall network quality – plentiful bike parking may encourage ridership, while lack of bike parking at key destinations may discourage active transportation mode choice. Figure 5 shows the distribution of bike parking locations throughout the city, overlaid on the EPC boundaries.

Bike parking is concentrated in the city's dense, urban northeast: In the Tenderloin, SoMa, and Mission EPCs bike parking is dense and distributed. In other EPCs, bike parking is concentrated along neighborhood commercial corridors, with little available on residential streets. Specifically, in the Outer Mission/Excelsior and Bayview-Hunters Point, bike parking is sparse, and located primarily along major streets and where commercial activity is present. In addition to this physical distribution, results from the Resident Preference Survey indicate that EPC residents report being less aware of safe places to store their active transportation devices (35%) than San Franciscans in general (41%).

Figure 5: Bicycle Parking Locations (Heat Map) and Equity Priority Communities



How does bicycle comfort differ between EPCs and the city at large?

One metric of network quality is how comfortable facilities are for users. The project team measured network comfort in two ways:

1. The Bicycle Comfort Index (BCI) is a quantitative measure of comfort on every street in San Francisco, based on the January 2023 network*. Comfort is composed of three subscores:
    a. Context, including land use, pavement quality, reported behavioral violations, and slope
    b. Traffic, including Level of Traffic Stress (LTS), heavy vehicle traffic, and curbside turnover
    c. Bike Infrastructure, including the type of facility, intersection, or signalization
2. The Resident Preference Survey (RPS) and Phase 2 Public Survey measured qualitative comfort on different facilities by asking residents to rank facilities on a scale from 1 (low comfort) to 5 (high comfort)

How do Bicycle Comfort Index scores differ between EPCs and the city at large?

Figure 6 depicts the January 2023 BCI scores for all city streets. Medium-to-high-comfort streets tend to be concentrated in flat, low-density, residential neighborhoods. Slow Streets also score very high on the BCI scale. Low-comfort streets are concentrated in dense urban areas, specifically in downtown, along major arterials, and in areas with significant elevation. BCI scores in the EPCs are determined largely by their surrounding contexts: comfort is high on quiet, residential streets, and comfort is low on busy commercial corridors. The following is a summary of the January 2023 BCI scores for the bike network facilities in each EPC (See Figure 7):

- **Bayview-Hunters Point:** Most network facilities, including those on 3rd Street and Oakdale Avenue are rated low-comfort.
- **SoMa:** Most network facilities are rated medium-comfort, but Market Street is rated as low-comfort.
- **Mission District:** Network facilities score relatively high, especially on Shotwell Slow Street which has very high comfort scores.
- **Outer Mission/ Excelsior:** Most network facilities are rated low-to-medium, with the exception of Cayuga Slow Street which has a “very high” BCI score
- **Tenderloin:** Most network facilities are rated as low or very low comfort.
- **Western Addition/ Fillmore:** BCI scores are mixed with moderate-to-high-comfort facilities on Steiner Street, McAlister Street, and Fulton Street, and less-comfortable facilities in the north of the neighborhood on Post Street and Sutter Street.

Figure 6: Citywide Bicycle Comfort Index (January 2023*)

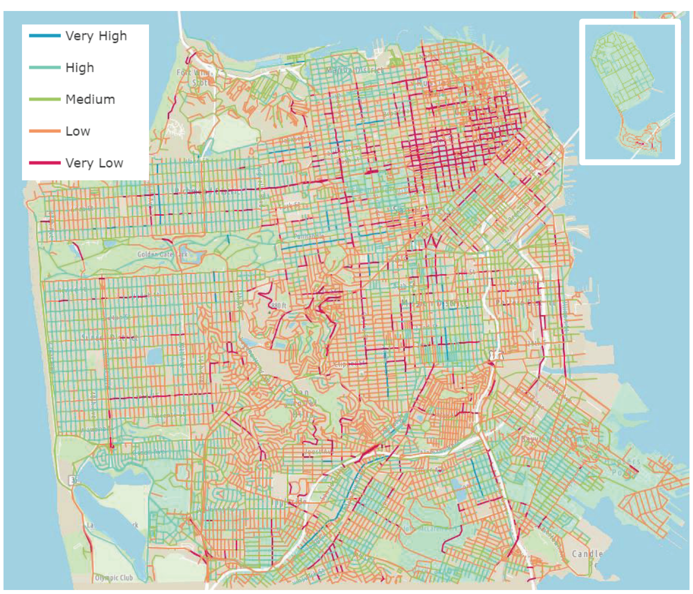
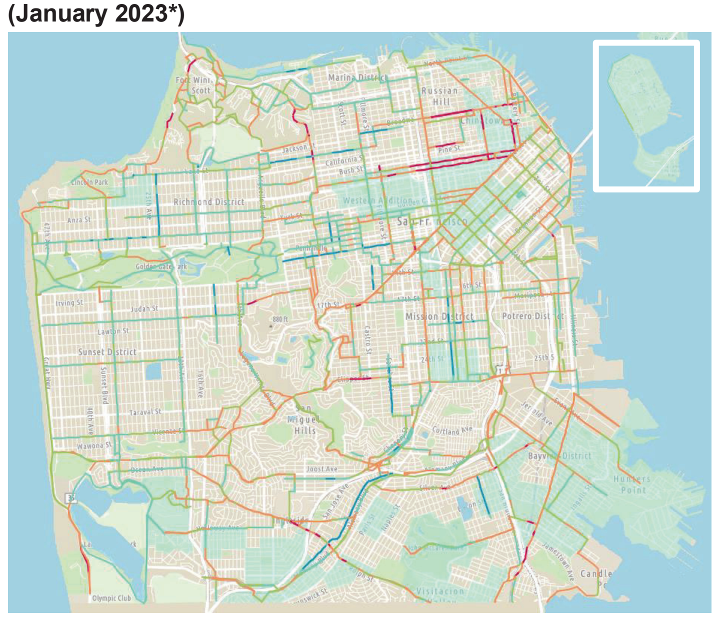


Figure 7: Bicycle Comfort Index on Existing Facilities (January 2023*)



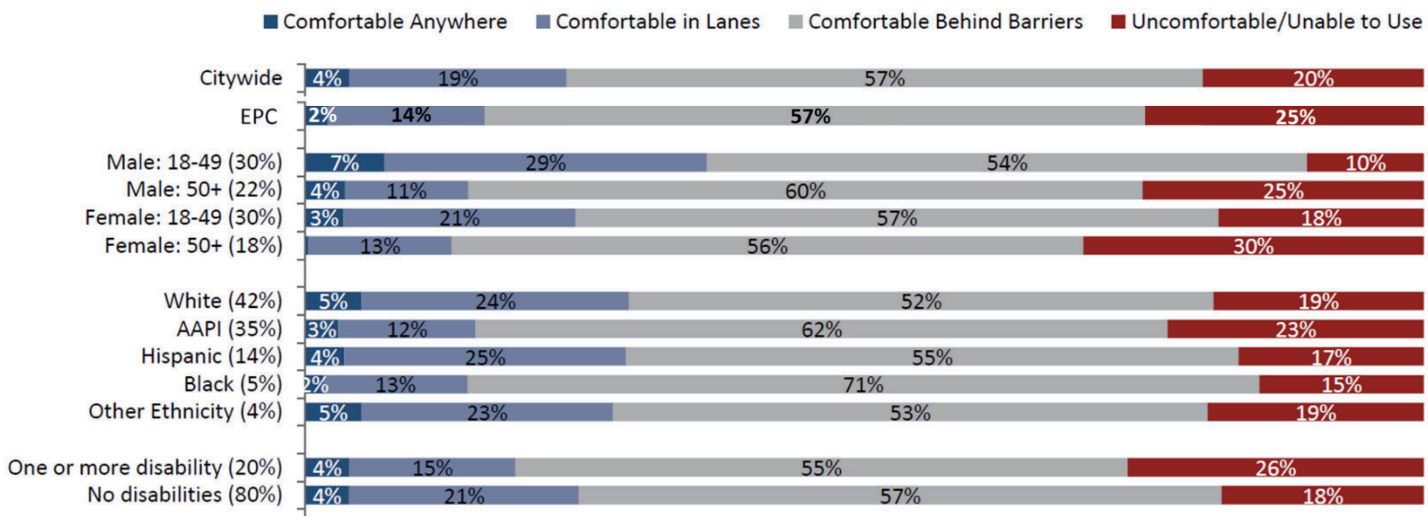
Equity Priority Communities

*The project team calibrated the Bicycle Comfort Index scores based on community input in August 2023. Updated results will be available in the project Storymap and Draft Plan.

How does perceived level of comfort differ between EPCs and the city at large?

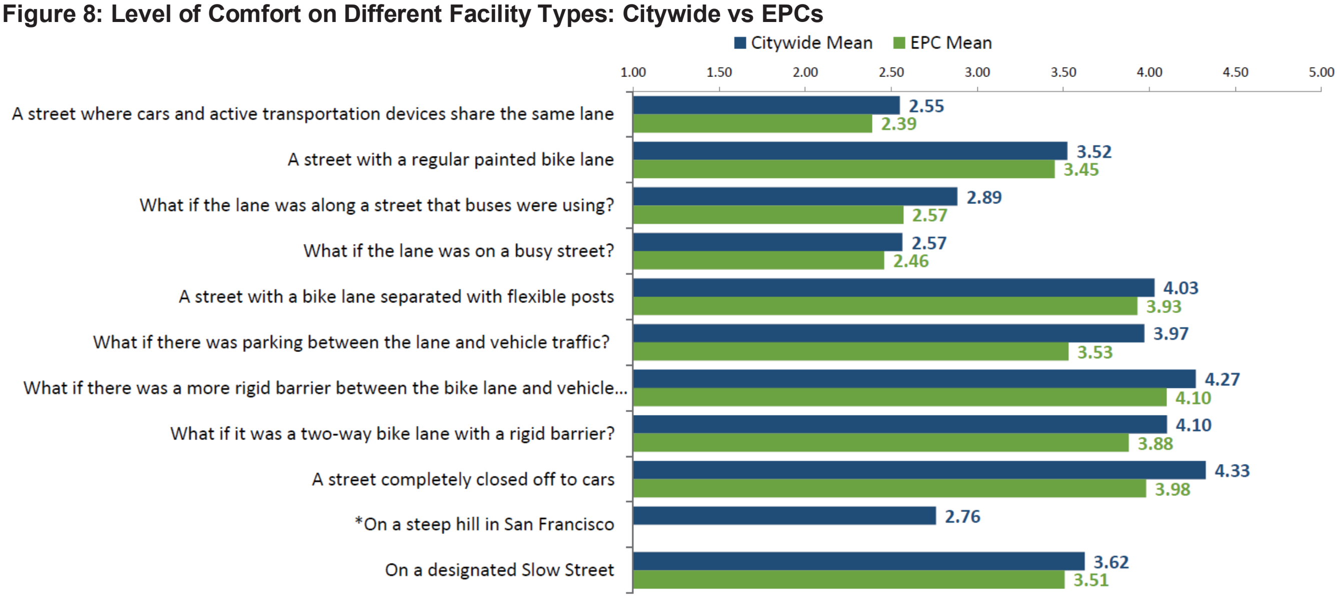
As part of the RPS, the project team evaluated how comfortable different groups of people are when using the active transportation network. Figure 8 documents different comfort levels in EPCs and among demographic groups, compared to the city at large. Overall, people living in EPCs feel less comfortable using the active transportation network than the residents citywide. In EPCs, 25% of respondents reported feeling uncomfortable on, or unable to use, the ATN, compared to only 20% citywide (Figure 8). We also found higher rates of discomfort amongst people with disabilities (26% feel uncomfortable), older adults (25% of men over 50, and 30% of women over 50), and people identifying as Asian or Pacific Islander (23%).

Figure 8: Overall Level of Comfort on the Active Transportation Network: Citywide vs EPCs and Demographic Groups



Responses show that people living in EPCs have very similar preferences about facility type as those living in non-EPC neighborhoods. San Franciscans--whether living in an EPC or not--seem to agree that the most comfortable facilities are those with physical protection from vehicles, including Class IV Bike Lanes and Car-Free Streets. There is also agreement that the least-comfortable conditions are streets where bikes and cars share the same lane, and busy commercial or transit streets. Despite this consistency, the data also shows that overall, people living in EPCs have slightly lower levels of comfort on all facility types. Figure 10 shows mean level of comfort in each condition, on a scale from 1 (low comfort) to 5 (high comfort) for both EPCs and the city at large.

Figure 8: Level of Comfort on Different Facility Types: Citywide vs EPCs



Traffic Safety and Enforcement

Key Question: How do crashes involving people biking or riding scooters impact EPCs and BIPOC in San Francisco?

To analyze traffic safety conditions in EPCs compared to the city overall, the project team used data from the Collision Analysis, the Resident Preference Survey (RPS), and the Phase 2 Public Survey. Collision data was analyzed for the five-year period from 2017 to 2021, and was also disaggregated into the pre-pandemic period (2017-2019) and the pandemic period (2020-2021). Collision, party, and victim data were pulled from DataSF open data portal, which queries the crash data from TransBASE.sfgov.org.

Are there any inequities in the distribution of crashes across demographic groups?

Both before and during the pandemic, Black bicyclists and drivers are substantially overrepresented in crashes. Census data show that Black residents make up 5% of San Francisco's population but accounted for 9.6% of all bicycle crash victims and 8.6% of KSI bike victims, pre-pandemic. During the pandemic, these figures rose – Black bicyclists were involved in 11% of all bike crashes and 11.5% of KSI bike crashes. Additional research is needed to better understand travel behaviors and mode preferences or usage for each race.

Disclaimer: Party race is based on law enforcement officers' assumptions or visual impressions, which can be problematic and inaccurate. Additionally, there are only five racial categories (excludes "Not Stated") within the crash data, in contrast to the US Census, which has nearly twice as many race and ethnicity categories. The victim representation and comparison made to the San Francisco population should be interpreted with caution given these reporting shortcomings.

How do crashes differ between EPCs and the city at large?

Both the High Injury Network (HIN) (Figure 9) and collisions (Figure 10) are concentrated in dense urban areas in the northeast of the city, which overlaps with the neighborhood boundaries of Tenderloin, Western Addition, SoMa, and Mission District. This trend is largely due to higher levels of exposure (locations with higher bicycle volumes have higher bicycle crashes). Slightly more than half of the total reported crashes (2,432 or 55.2%) occurred *outside of EPCs* and *tended to be more severe than the crashes within EPCs* (Table 2).

As expected, bicyclist and micromobility crashes throughout San Francisco are concentrated along the HIN: 67% of all crashes and 62.3% of fatal and serious injury (KSI) crashes occur on the HIN. This concentration is more pronounced in EPCs: In EPCs, nearly 81% of all crashes and 80% of KSI crashes occurred along the HIN. There are several potential factors that may influence this concentration of crashes. One factor might be related to bicyclists riding along a smaller number of streets, increasing the volume along those streets, resulting in a higher crash frequency. Another potential factor might be related to systemic safety issues within these communities that increase bicyclist risk along the HIN or expose bicyclists to greater risk due to a higher ratio of HIN streets to non-HIN streets. Acquiring comprehensive bike counts within EPCs can help better understand bicyclist exposure and estimate crash risk within these communities.

Table 2: Bicyclist crashes by Equity Priority Community, 2017-2021

EPC	# Crashes	% Crashes	# KSI	% KSI	% Crashes resulting in KSI	Avg. EPDO*
Not within EPC	1,342	55.2%	138	58.5%	10.3% (of crashes outside EPCs)	23.2
Within EPC	1,090	44.8%	98	41.5%	9.0% (of crashes within EPCs)	19.8
Total	***2,432***	***100.0%***	***236***	***100.0%***	***9.7% (of all crashes)***	***21.7***

**Severity is measured by an Equivalent Property Damage Only (EPDO) score that indicates the estimate cost of the crash. For details on how EPDO is calculated, see the Collision Analysis Memorandum or USDOT Federal Highway Administration Safety Toolkit*

Figure 9: 2022 High Injury Network

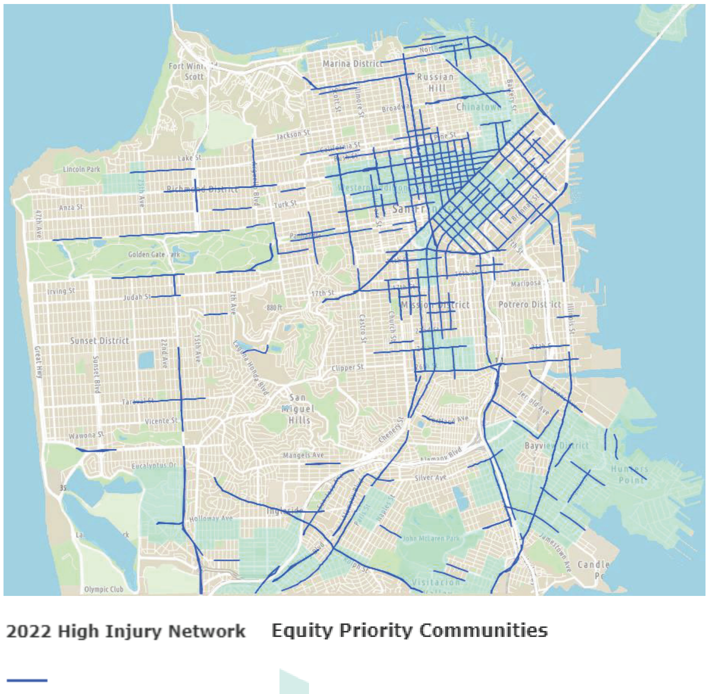


Figure 10: 2017-2021 Crashes by Mode

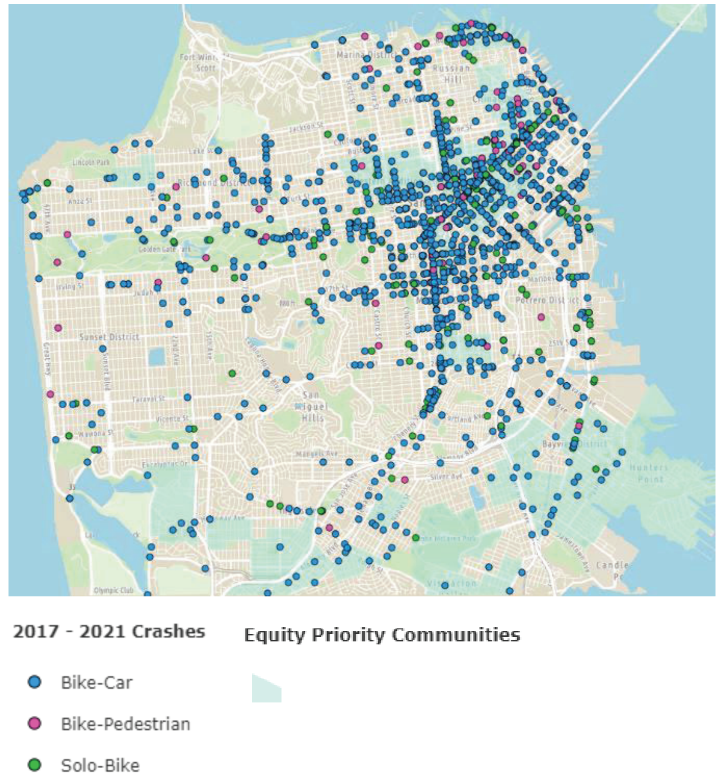
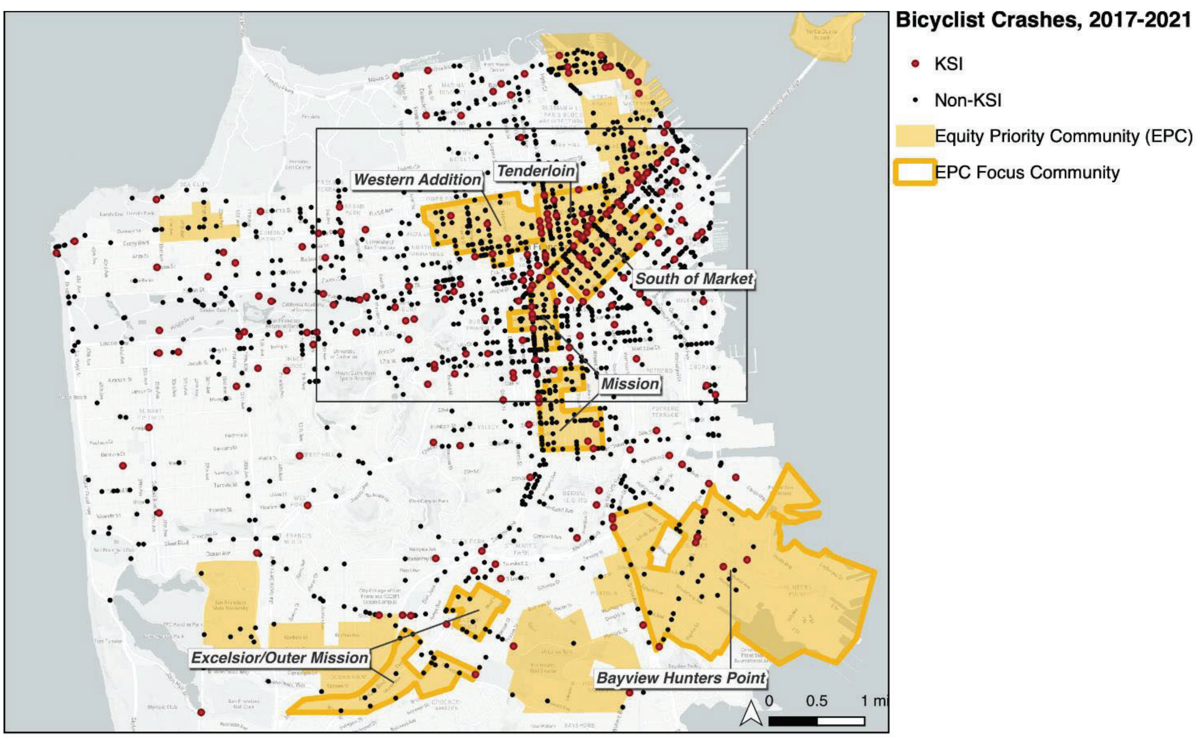


Figure 11: Fatal and Serious Injury (KSI) Crashes (2017-2021) and Equity Priority Community Boundaries*



**This map shows all of the MTC-defined Equity Priority Communities (yellow fill), as well as the six Active Community Plan focus EPCs (yellow outline).*

Do reported traffic violations differ between EPCs and the city at large?

The project team found that reported traffic violations are similar between EPCs and the city at large. The top three reported violations for KSI crashes within EPCs include unsafe speed for conditions (26.5%), disregard red signal (11.2%), and unsafe turn or lane change (10.2%). Excluding “unknown” violation types, these are also the top three reported violations for crashes that occurred outside of EPCs.

How do citations differ between EPCs and the city at large?

The project team looked at citywide citation data from 2017 to present. Citations for both bike and scooter-related incidents are concentrated in high-density, high-volume neighborhoods, which overlap with the Tenderloin, SoMa, and Mission District EPCs. Although adjacent to high-density and high-volume neighborhoods, bike and scooter-related citations in the Western Addition are relatively low compared to neighboring EPCs. Citations are also relatively low in Bayview Hunters-Point, and the Outer Mission/ Excelsior, where overall density and volumes are lower. Parking citations far outweighed riding and permit citations, which could indicate that the city lacks adequate parking facilities for bikes and scooters, especially for shared devices.

Additionally, the RPS asked respondents about their perceptions of traffic law adherence amongst bike and scooter users. Citywide, 41% of respondents feel that people using bikes and scooters do not follow traffic laws. This perception is lower in EPCs – a third of EPC respondents (31%) said that they feel that people using bikes and scooters do not follow traffic laws. During Phase 3 engagement, the project team asked community members what they need to bike, scoot, or roll more in San Francisco. Almost 1,000 people said they would like to see better behavior and safety habits by road users. As part of this response, roughly 80% of all participants said that traffic enforcement is a high priority, while only 74% of BIPOC respondents indicate this as a high priority. **Disclaimer:** Because of the deep, complex history of policing and enforcement in BIPOC communities, it is important to consider this input with a critical lens. As part of the next round of community workshops, the project team will work with CBO partners to ensure residents have the space to express their needs, concerns, or priorities related to enforcement and policing in their neighborhoods.

Disability and Access

Key Question: How do people with disabilities use and experience the active transportation network, and how does their experience differ from people without disabilities?

The project team explored the relationship between the Active Transportation Network and disability access via the Resident Preference Survey (RPS) and Phase 2 public survey. Twenty percent of RSP respondents identified as having one or more disability (n=80). Fifteen percent of all public survey respondents (n=252) are people with disabilities (15%).

What types of active transportation activity is most common among people with disabilities?

Of the people that completed the RPS, 18% of respondents reported using an assisted mobility device, including a manual wheelchair, powerchair or electric wheelchair, or mobility scooter. People with disabilities report using their devices on a daily basis at higher rates than those without disabilities (20% compared to 7% - See Table 3). Compared to people without disabilities, people with disabilities report:

- Slightly lower rates of driving (82% of people with disabilities drive at least once a month compared to 86% of people without disabilities);
- Similar rates of using transit, walking, and biking;
- Slightly higher rates of using e-bikes and scooters; and
- Substantially higher rates of using other devices (25% compared to 15%)

The reasons that people with disabilities use the active transportation network mirror citywide results – much like the city at large, San Franciscans with disabilities use the network to travel to school, to run errands, and to go to social activities. There are some differences in how the network is used including:

- People with disabilities report lower rates of commuting to work via the ATN (35% compared to 43% of people without disabilities)
- People with disabilities report lower rates of using the ATN for exercise or to enjoy the outdoors (30% compared to 38%)
- People with disabilities report slightly higher levels of participation in encouragement events such as Bike to Work Day and Sunday Streets

Table 3: Resident Preference Survey Responses - People with Disabilities vs People without Disabilities

Resident Preference Survey Outputs/ Key Metrics	People with Disabilities	People without
Active Transportation Device Usage (Frequency)		
Daily	20%	7%
Weekly	16%	20%
Monthly	11%	20%
Never/Not Sure/No Response	53%	53%
Overall Comfort on the Active Transportation Network		
Comfortable Anywhere	4%	4%
Comfortable in Lanes	15%	21%
Comfortable Behind Barriers	55%	57%
Uncomfortable/Unable to Use	26%	18%

Resident Preference Survey Outputs/ Key Metrics	People with Disabilities	People without
Participation in Encouragement Events: Percent of people that…		
Have participated in Bike to Work Day	18%	14%
Have attended a Sunday Streets event in San Francisco	39%	36%
Have walked, biked, or rolled on one of San Francisco's designated Slow Streets	49%	52%
Safety and Affordability: Percent of people that…		
Have had a bike or scooter (or part thereof) stolen in San Francisco	43%	25%
Are aware of safe places in San Francisco where they can park a bike, scooter, or other active transportation device.	33%	43%
Believe that owning or renting a bike, scooter, or other active transportation device in San Francisco is affordable	44%	48%
Believe that people using active mobility devices such as bikes and scooters usually follow traffic laws	28%	32%

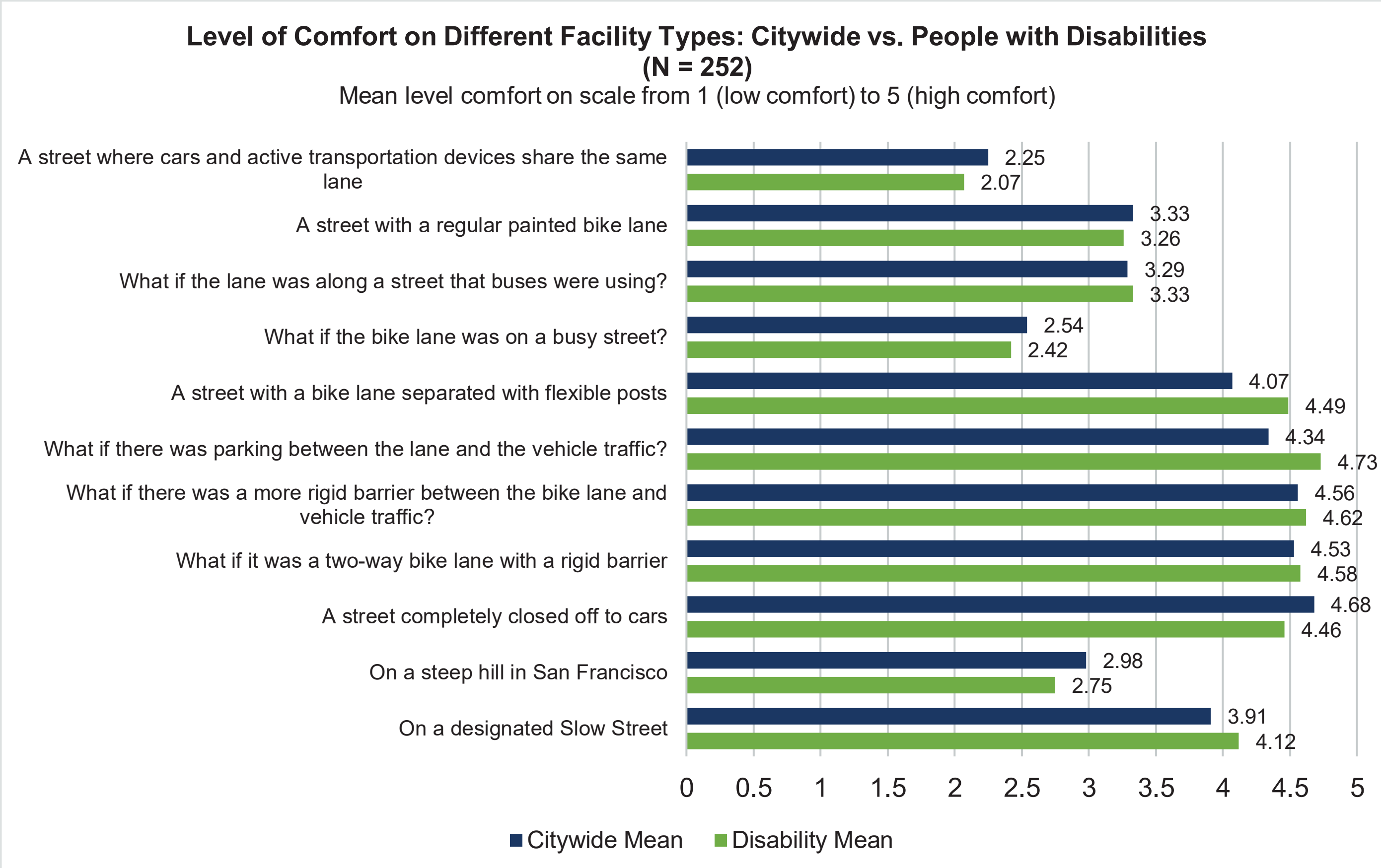
How do people with disabilities experience the active transportation network?

According to resident preference survey results, people with disabilities report higher rates of theft of their active transportation devices than people without disabilities (43% compared to just 25%). Moreover, people with disabilities are less likely to be aware of safe places in San Francisco to park a bike, scooter, or other mobility device (just 33% report knowing of safe parking spaces, compared to 43% of people without disabilities). People with disabilities are also less likely to agree that owning or renting a bike, scooter, or other active transportation device is affordable in San Francisco (44% agree, compared to 48%). Note that these statistics may have a high margin of error, given the small sample size.

Overall, people with disabilities are less comfortable on the active transportation network than San Franciscans without disabilities. Twenty-six percent of people with disabilities report being uncomfortable on or unable to use the network, compared to just 18% of people without a disability (see Figure 8). In general, people with disabilities prefer to use facilities that provide some protection from cars – this is consistent with citywide preferences.

Figure 12 shows that, compared to citywide results, people with disabilities report lower levels of comfort on streets with sharrows or painted bike lanes, as well as on busy commercial streets, steep slopes, and on bike paths or car-free streets. People with disabilities report higher levels of comfort on bike lanes with some kind of barrier, and on Slow Streets.

Figure 12: Citywide Comfort vs. Disability Comfort



What interventions do people with disabilities want to see?

Questions in the Phase 2 Public Survey asked San Franciscans what they need in order to bike, scoot, or roll more. People with disabilities indicated that the most important intervention is "more comfortable and welcoming lanes and facilities" (38% of respondents), followed by "better behavior and safety habits" (35%).

Table 4: Public Survey Results - Policy and Program Preferences of People with Disabilities

What's most important to get you to bike, scoot, and roll more in San Francisco?	*Percent of Respondents*
More comfortable and welcoming lanes and facilities	38%
Better behavior and safety habits by road users	35%
More options for owning and renting bikes or scooters	17%
Information on how to bike, scoot, and roll	10%
Supporting facilities like device parking or charging for e-devices	0%
Events that get people together to ride safely	0%

Within each category, the project team asked respondents to indicate "low", "medium", and "high" priority for specific interventions. The interventions that were most often ranked as "high" priority by people with disabilities were:

- Traffic Enforcement* (80% of respondents who selected "better behavior and safety habits by road users" indicated that this is a "high" priority)

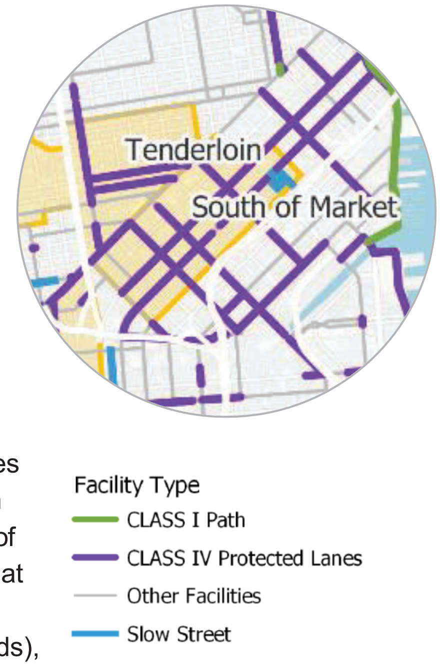
- More pavement maintenance, replacement of broken flex posts, and street sweeping to clear debris or broken glass (77%)
- More signage and wayfinding to navigate the city and find destinations (73%)
- Better connections between bike facilities (71%)
- Driver education on safe behaviors and how to share the road (70%)

***Disclaimer:** Because of the deep, complex history of policing and enforcement in BIPOC communities, it is important to consider this input with a critical lens. As part of the next round of community workshops, the project team will work with CBO partners to ensure residents have the space to express their needs, concerns, or priorities related to enforcement and policing in their neighborhoods. Note that RPS data shows lower levels of priority for enforcement among respondents of color.

Equity Priority Community Neighborhood Profiles

The following section provides an overview of each EPC neighborhood and highlights key findings from the Resident Preference Survey, Network and County Analysis, and Collision Analyses. EPC findings are compared to citywide findings to understand differences between each EPC and the city at large.

SoMa

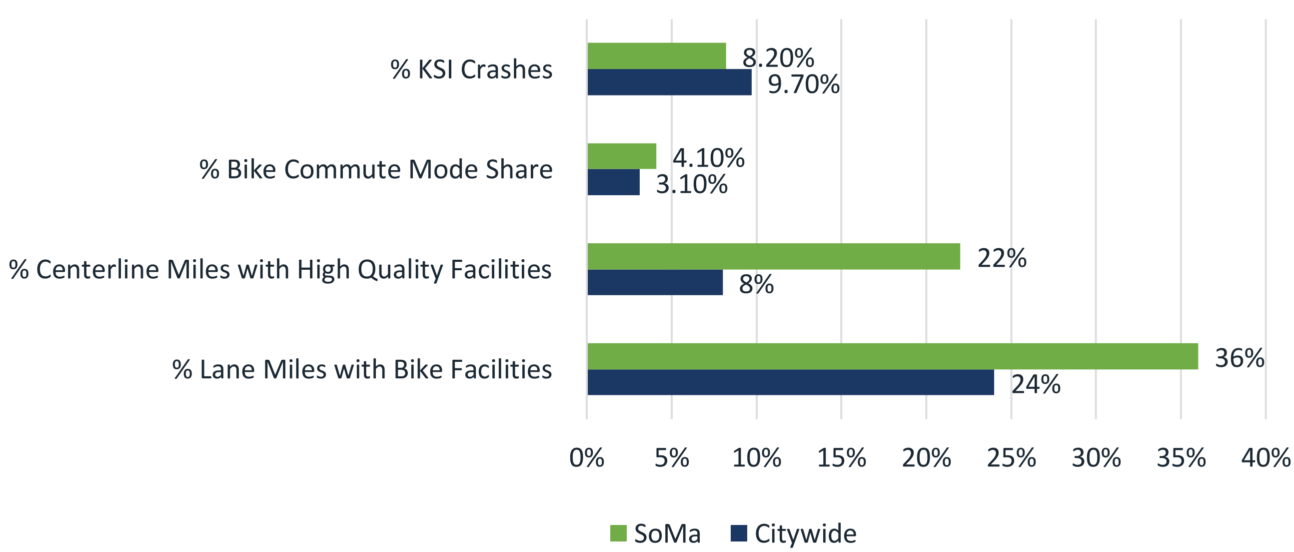


SoMa is located in the northeastern quadrant of the city, in the dense urban center, and is bordered by the Tenderloin EPC in the north and the Mission District EPC in the south. SoMa residents are more likely to be rent burdened, have limited English proficiency, be people of color, low income, disabled, and are older than 75 years old. The share of residents that are in single-parent family households and that are younger than 18 years old is greater than citywide.

Likely as a result of being located in the city's dense urban center, SoMa has some of the best network coverage in the city; 36% of lane miles have bike facilities and 22% of lane miles with bike facilities are high-quality. Class IV bike facilities in SoMa also have some of the highest volumes in the city, likely due to the density of land uses, people, housing, jobs, and destinations. The project team also found that when using the Active Transportation Network, SoMa residents tend to use the network in a more utilitarian manner (commuting to work, school, or running errands), than citywide residents (who use the network more for social events and exercise). This may be related to the fact that SoMa residents are much less likely to own cars (34% compared to 79%), and therefore use the network in place of car trips. Additionally, SoMa bikeshare and scootershare trips are more than double the average daily rate citywide.

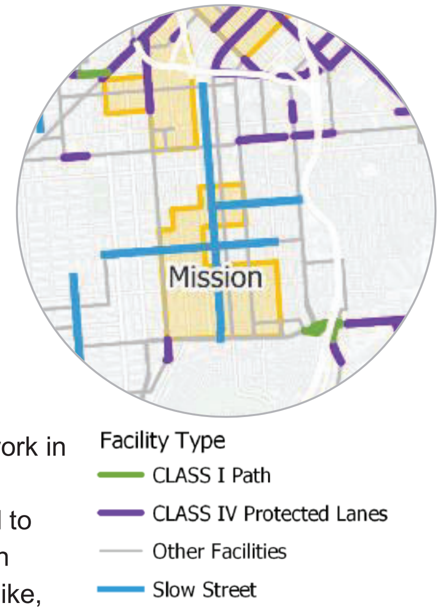
In terms of safety, more than 10% of bike and scooter crashes citywide occurred in SoMa. Of these, 89% of the all crashes, and 100% of KSI crashes occurred along the HIN. KSI crashes occurred in SoMa at a slightly lower rate than citywide KSI crashes, at 8.2% and 9.7%, respectively. While almost half of all crashes (and over half of all KSI crashes) occurred on, or along, streets with four vehicle lanes, and 89% of all crashes occurred along streets with 25 mph speed limits, the most common crash type in SoMa involved both the driver and bicyclist proceeding straight.

SoMa Active Transportation Key Characteristics



The Mission District

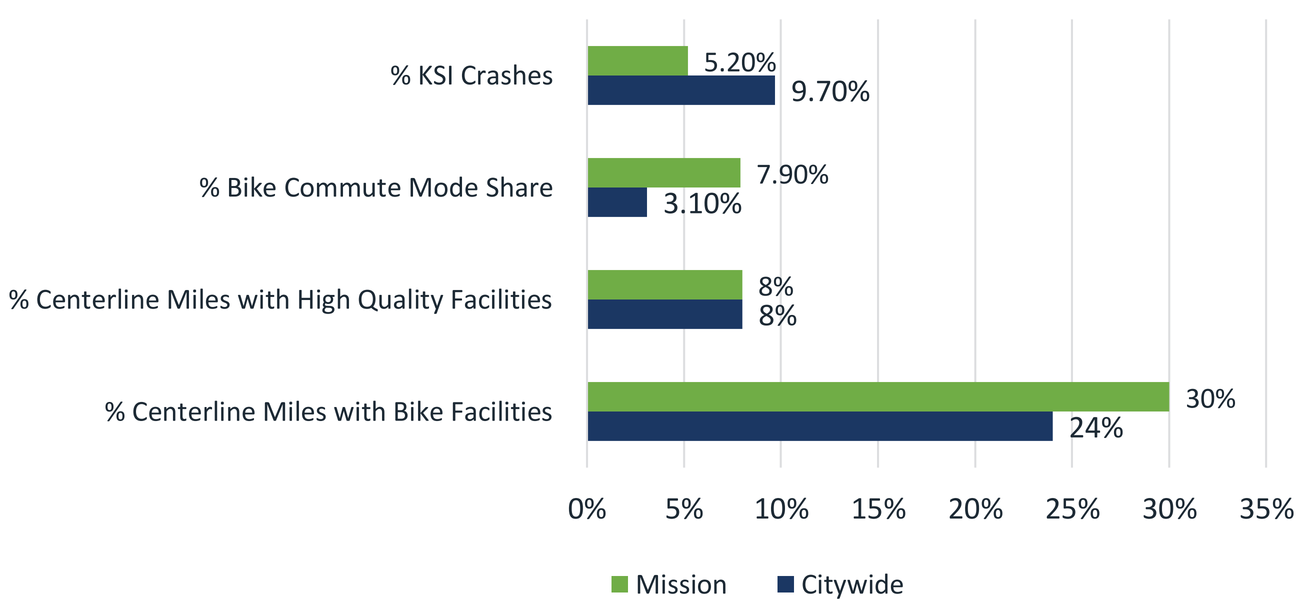
he Mission is located in the north-central area of the city, just south of the city's dense urban center, and is bordered by the SoMa and Tenderloin EPCs to the north and the Bernal Heights neighborhood to the south. Mission District residents are more likely to have limited English proficiency, be people of color, be low income, and have disabilities than all San Francisco residents.



Although the Mission has some of the highest network coverage in the city (30% of lane miles have bike facilities compared to 24% citywide), only 8% of lane miles with bike facilities are high-quality. In terms of network coverage and volumes, the Mission seems to be over-performing, indicating high-volumes relative to network coverage. The project team also found that when using the Active Transportation Network, Mission residents tend to use the network in a more utilitarian manner (commuting to work, school, or running errands), than citywide residents (who use the network more for exercise). This may be related to the fact that in the Mission, the project team found that there is some association between households that do not own cars and those who commute to work by bike, likely due to the proximity between housing and jobs. Both the bike commute mode share and the percent of households that do not own cars in the Mission are more than double that of citywide residents (7.9% of Mission residents commute by bike compared to only 3.1% of citywide residents, and 48% of Mission residents do not own cars compared to only 21% of citywide residents). Additionally, results from the Resident Preference Survey indicate that a larger share of Mission residents, compared to citywide residents, use the Active Transportation Network, and that estimated bike and micromobility volumes in the Mission are about twice as high as the citywide average.

Of the 232 crashes that occurred in the Mission District, 86% of the total crashes, and 83% of KSI crashes occurred along the HIN. KSI crashes in the Mission District occurred at a lower rate than citywide KSI crashes, at 5.2% and 9.7% respectively. While almost half of all crashes (and over half of all KSI crashes) occurred on, or along, streets with four vehicle lanes, and 100% of all crashes occurred along streets with 25 mph speed limits, the most common crash type in the Mission involved perpendicular crashes with both the bicyclist and driver proceeding straight.

Mission Active Transportation Key Characteristics



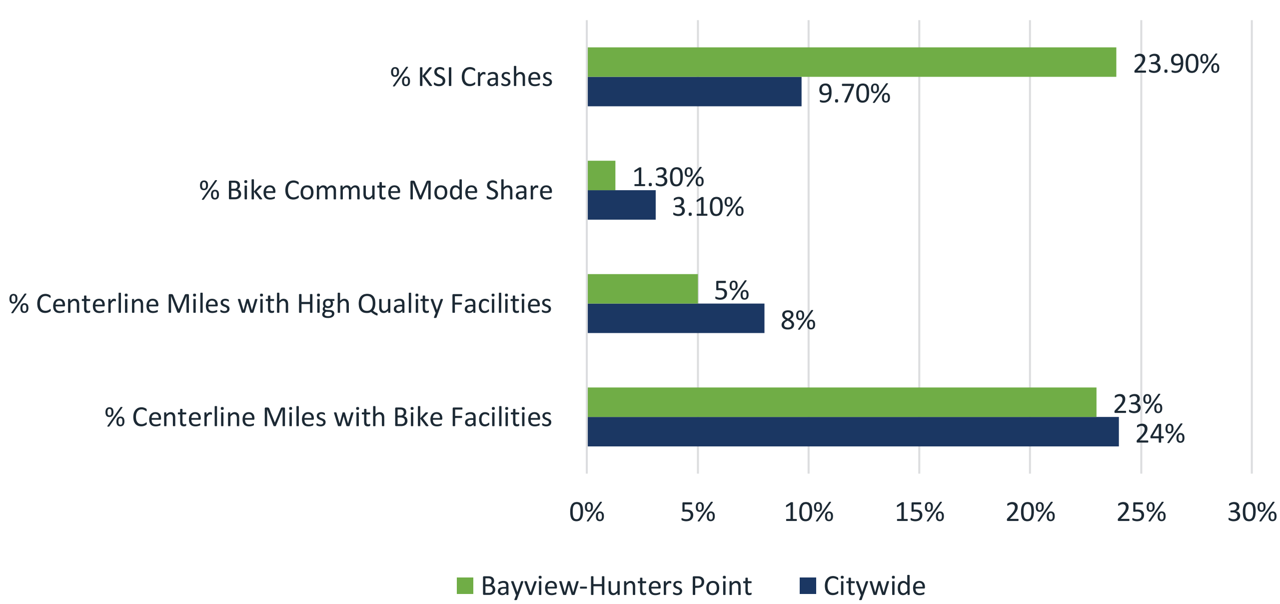
Bayview-Hunters Point

Bayview-Hunters Point is located in the southeast corner of the city and is bordered by the Potrero Hill neighborhood to the north, and Portola and Visitacion Valley neighborhoods to the west. Bayview-Hunters Point demographic characteristics show that residents are more likely than residents citywide to be single-parent households, have limited English proficiency, be people of color, be low income, have disabilities, and be younger than 18 years old. There is lower share of residents that are rent-burdened and that are seniors (older than 75 years old).

The project team found that while although Bayview-Hunters Point has a similar percentage of lane miles that have bike facilities compared to the city as a whole, only 5% of those lane miles are high-quality (lower than the citywide average of 8%). Compared to citywide rates, bikeshare, micromobility, and bike commuting in rates Bayview-Hunters Point are all lower than citywide rates, and while although Class IV separated bikeways in Bayview-Hunters Point have concrete barriers separating riders from vehicular traffic, the project team found low network volume here (volumes on Class II and III facilities were also found to be relatively low). These findings are likely due to the surrounding land use (low density), long distances from destinations, and below average network quality. This may also be why the percentage of households who own cars is similar to the citywide rate (77% in Bayview-Hunters Point and 79% citywide) and may be linked to the relatively low Active Transportation Network usage of this EPC).

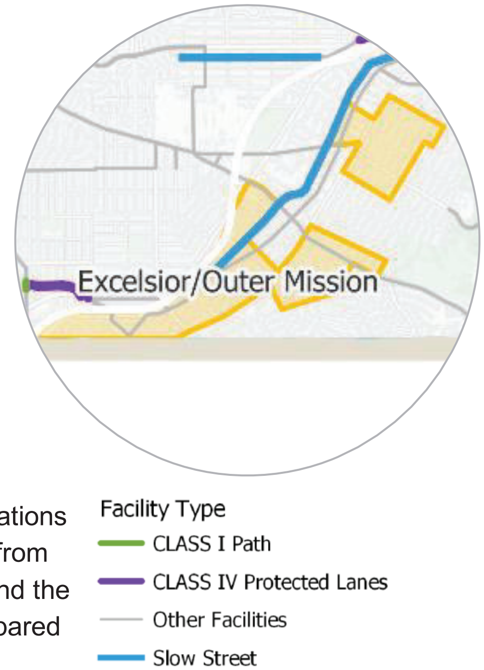
In terms of safety, the project team found that crashes are more severe in Bayview-Hunters Point than citywide. While the total number of crashes is relatively low compared to other EPCs, with only 46 total crashes, 24% were KSI crashes compared to only 9.7% citywide. While almost half of all crashes and KSI crashes occurred on, or along, streets with four vehicle lanes, and 72% of KSI crashes occurred along streets with 30 mph speed limits, the most common crash type in the Bayview-Hunters Point involved crashes with both the bicyclist and driver proceeding straight.

Bayview-Hunters Point Active Transportation Key Characteristics



Outer Mission/ Excelsior

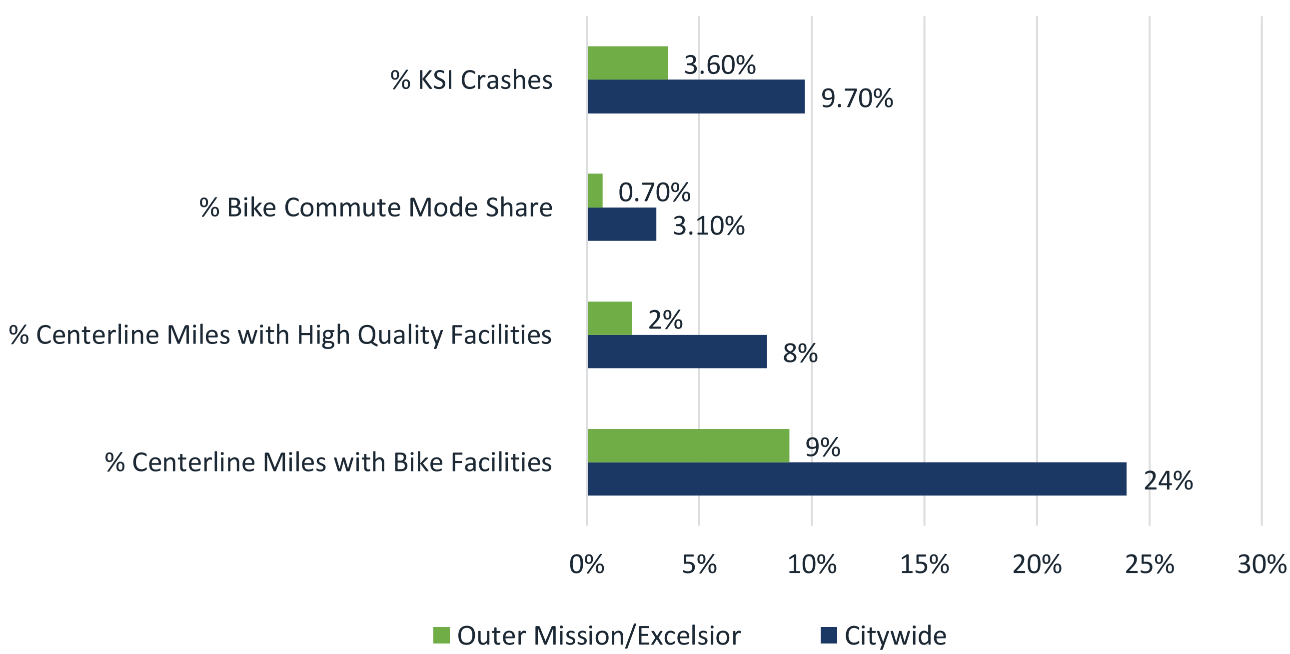
The Outer Mission/Excelsior is located in the southcentral area of the city, west of Bayview-Hunters Point and east of Lake Merced. Residents of the Outer Mission/Excelsior are more likely than San Franciscans overall to have limited English proficiency, be people of color, be low income, and be younger than 18 years old.



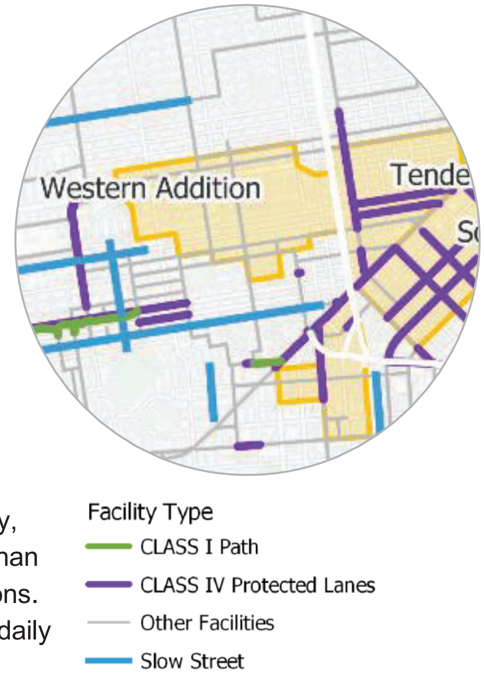
The Outer Mission/Excelsior has both low network coverage, and less high-quality network coverage compared to the citywide network. Relatedly, bike commuting is also low in the EPC, and can likely be attributed to lower density land use patterns and people living too far from their jobs to make bike commuting an attractive option. In terms of network performance, the Outer Mission/Excelsior is underperforming, meaning that volumes are low relative to network coverage, which may be due to factors like land use (long distances between key destinations), connectivity (poor connections to destinations outside of the neighborhood), and network quality (such as lack of protection from cars). Low volumes may also simply be the result of low population density, and the fact that only 11% of Outer Mission/Excelsior residents do not own cars (compared to 21% citywide).

In terms of safety, the Outer Mission/Excelsior had the fewest number of crashes than any other EPC, with 28 total crashes resulting in only one KSI crash. The low number of crashes could be a result of the relatively low Active Transportation Network use in this EPC. While almost half of all crashes and KSI crashes occurred on, or along, streets with four vehicle lanes, the most common crash type in the Outer Mission/Excelsior involved crashes with both the bicyclist and driver proceeding straight.

Outer Mission/Excelsior Active Transportation Key Characteristics



Western Addition/ Fillmore

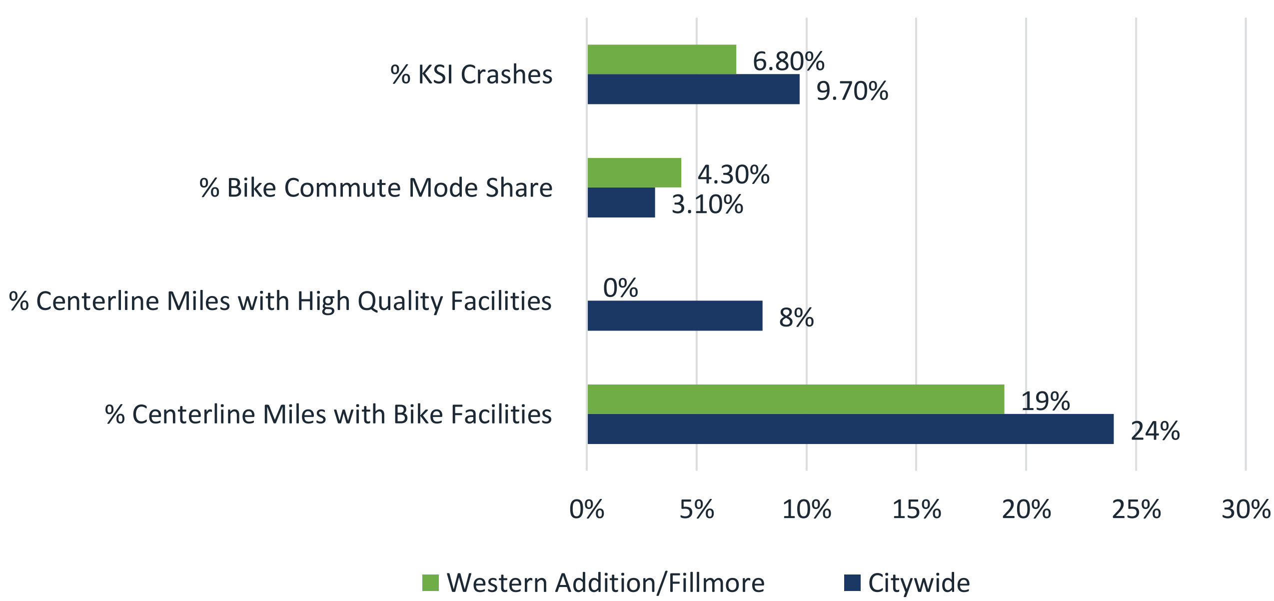


The Western Addition/Fillmore EPC is located in the northeastern quadrant of the city, directly west of the Tenderloin EPC. The Western Addition/Fillmore's residents are more likely than San Franciscans overall to have limited English proficiency, be people of color, be low income, be disabled, and be younger than 18 years or older than 75 years old.

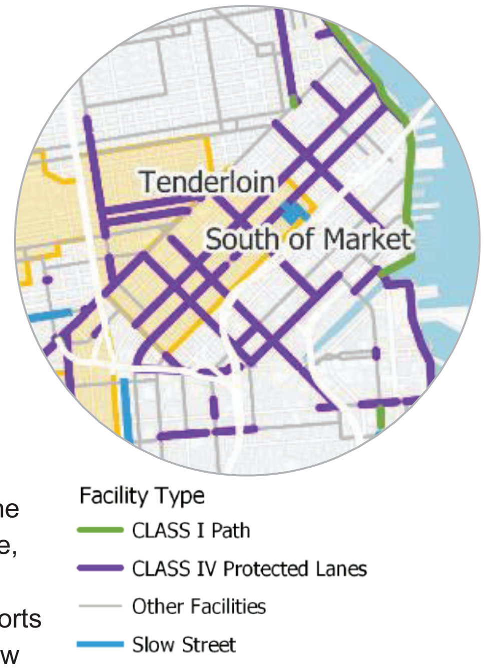
Despite being adjacent to the city's dense urban center, and to EPCs with higher than-average network coverage, the Western Addition/Fillmore EPC has lower-than-average network coverage (19% compared to 24% citywide), and has no high-quality facilities (indicating an absence of protected bike lanes, off-street paths, Slow Streets, and car-free streets within EPC boundaries). Although the EPC has low network coverage, the project team found that certain streets in the EPC see a high volume of off-network use, which may indicate that current infrastructure is working in the area. Additionally, Western Addition/Fillmore residents commute to work by bike at a higher rate than citywide residents and may be using off-network routes to get to their destinations. Bikeshare and scootershare trips in this EPC are also higher than the average daily citywide rate. When using the Active Transportation Network, Western Addition/Fillmore residents use the network in a more utilitarian manner (commuting to work, school, or running errands), than citywide residents (who use the network more for exercise). This may be related to the fact that Western Addition/Fillmore residents are twice as likely to no own cars as citywide residents (47% compared to 21%), and therefore use the network in place of car trips.

In terms of safety, 117 crashes occurred in the Western Addition/Fillmore, with 6.8% of total crashes resulting in KSI crashes (less than the citywide rate of 9.7% KSI crashes). While almost half of all crashes occurred at, or along, streets with two or more vehicle lanes, half of all KSI crashes occurred at, or along, streets with five or more vehicle lanes. and KSI crashes occurred on, or along, streets with four vehicle lanes, the most common crash type in the Western Addition/Fillmore involved crashes with both the bicyclist and driver traveling in the same direction. Posted speed limits also impact crashes, with 73% of all crashes occurring along streets with a posted speed limit of 25 mph, and half of all KSI crashes occurring along streets with a posted speed limit of 35 mph.

Western Addition/Fillmore Active Transportation Key Characteristics



Tenderloin

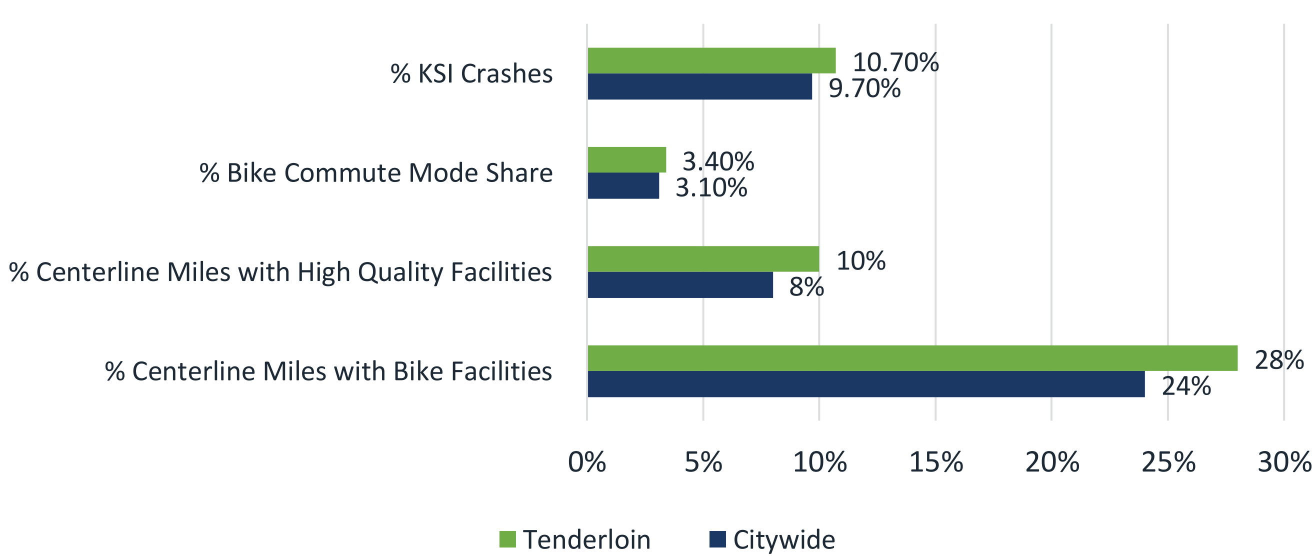


The Tenderloin is located in the northeastern quadrant of the city, in the dense urban center, and is bordered by the Western Addition/Fillmore EPC in the west, and the Mission and SoMa EPCs in the south. The Tenderloin's residents are more likely to be rent burdened, have limited English proficiency, be people of color, ve low income, and have disabilities). The Tenderloin EPC has higher-than-citywide percent of residents that are single family households, are youth (younger than 18 years old), and that are seniors (older than 75 years old).

The Tenderloin has some of the highest network coverage in the city, with 28% of lane miles having bike facilities, compared to only 24% citywide . The Tenderloin also has a higher percentage of high-quality facilities, with 10% of lane miles being high-quality. High network coverage in the Tenderloin can be explained by its dense, urban, and central location. While network coverage in the EPC is high, there are some streets that are under-performing in terms of volume, and may be linked to barrier types not being appropriate for surrounding activity, frequency of vehicles parked in bicycle facilities, high curbside turnover, and reports of frequent debris in bicycle facilities. The project team also found that despite low car ownership in the Tenderloin (81% of households do not own cars compared to only 21% citywide), of those surveyed, less than half of respondents use the Active Transportation Network at all, and less than 20% use it daily. The project team also found that when using the Active Transportation Network, Tenderloin residents use the network in a more utilitarian manner (commuting to work, school, running errands, or going to social activities), than residents citywide (who use the network more for exercise).

Every street in the Tenderloin is on the HIN (meaning that all crashes occurred on the HIN), and that most streets in the Tenderloin have Muni bus routes, which can compromise bicycle facility safety. Crashes in the Tenderloin account for more than 10% of bike or scooter crashes citywide. Of the 243 total crashes that occurred in the EPC, 10.7% resulted in KSI crashes (higher than the citywide average of 9.7%).. While almost half of all crashes and KSI crashes occurred on, or along, streets with three vehicle lanes, and over 90% of both total and KSI crashes occurred along streets with 25 mph speed limits, the most common crash type in the Tenderloin involved perpendicular crashes with both the bicyclist and driver proceeding straight.

Tenderloin Active Transportation Key Characteristics



Next Steps

This memorandum focuses on quantitative data, and next steps include integrating qualitative findings from public outreach, community workshops, and coordination with disability advocates. This next phase of work will provide a deeper understanding and analysis of Active Transportation Network issues and concerns amongst people with disability. The next phase will also include a connectivity/access analysis that will include findings from EPCs, specifically looking at which neighborhoods have access to key destinations (e.g., transit, parks, schools, jobs, hospitals) via comfortable and high-quality routes. The project team will also look to understand what barriers currently exist for people accessing the Active Transportation Network, and what may alleviate those barriers.

Appendix G

MEMO

TO: Christopher Kidd
FROM: Brian Almdale, MUPP and Rebecca Sanders, PhD RSP$_{2B}$
DATE: 03-10-2023
RE: Final Draft Crash Analysis – Step I
PROJECT: SFMTA Bike Plan

Table of Contents

Introduction

This memo summarizes the methodology and key findings for the first of two crash analyses being conducted as part of the San Francisco Active Communities Plan. The two primary questions these analyses aim to answer include:

- **Step I Analysis:** Who, where, when, and why of crashes involving bicyclists and other human-scale wheeled road users?
- **Step II Analysis:** What are the modifiable risk factors associated with (fatal and severe) bicyclist crashes?

The purpose of this Step I analysis will help us understand and communicate the who, where, when, and why of crashes involving bicyclists and other human-scale wheeled road users. The initial findings from this analysis will be shared with the public during Community Engagement Phase 2. The San Francisco Municipal Transportation Agency (SFMTA) staff will review the draft findings and determine, in collaboration with Safe Streets Research & Consulting (Safe Streets) and Toole Design which findings are appropriate for inclusion in a ESRI Story Map for public consumption.

The analysis looked at crashes that occurred during the pre-pandemic period (2017-2019) and during the pandemic (2020-2021) to control for changes in travel behaviors due to the COVID-19 pandemic.

Key findings

Reported crash data that involved a bicyclist was used as the primary dataset in this crash analysis. Reported crash data is critical to understanding crash patterns. While reported crash data is known to have problems with underreporting[1,2], it is often the most complete data source, in terms of the number and consistency of crash attributes available and the breadth and number of crashes included. As such, this data can provide the necessary detail for informing engineering treatments and help us understand who was involved in a crash. This report acknowledges the crash data used in this analysis provides us with an incomplete picture of crashes but allows us to use the most complete and readily available data that represents crash events and the people involved in crashes.

The below bulleted items are the key findings from this crash analysis.

Crashes

- ***Number of bicycle crashes***:
    - Pre-Pandemic (2017 – 2019): 1,668 (556.0 per year)
    - Pandemic (2020 – 2021): 775 (382.0 per year)
    - 5-Year Study Period (2017 – 2021): 2,443 (486.4 per year)
- ***Number of fatal and severe injury (KSI) bicycle crashes:***

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[1] Stutts, J., & Hunter, W. (1998). Police reporting of pedestrians and bicyclists treated in hospital emergency rooms. Transportation Research Record: Journal of the Transportation Research Board, (1635), 88-92.

[2] San Francisco Department of Public Health-Program on Health, Equity and Sustainability. 2017. Vision Zero High Injury Network: 2017 Update – A Methodology for San Francisco, California. San Francisco, CA. Available at: https://www.sfdph.org/dph/files/EHSdocs/PHES/VisionZero/2017_Vision_Zero_Network_Update_Methodology_Final_20170725.pdf

- Pre-Pandemic 152 (52.7 per year)
    - Pandemic: 78 (39.0 per year)
    - 5-Year Study Period: 230 (47.2 per year)
- ***Number of fatal bicycle crashes:***
    - Pre-Pandemic: 7 (2.3 per year)
    - Pandemic: 2 (1.0 per year)
    - 5-Year Study Period: 9 (1.8 per year)
- ***Crashes by Year:***
    - Crashes and KSI crashes per year were highest during the pre-pandemic period.
    - There was a sharp reduction in crashes at the start of the pandemic. This reduction is likely related to changes in travel behaviors due to the COVID-19 pandemic safety precautions and Stay Home order that was in effect within San Francisco.
    - Crashes were slightly more likely to result in a KSI outcome in 2021 compared to previous years.
- ***Injury Severity***:
    - Injury severity distribution was similar between the two study periods. Most bicyclists suffer from complaints of pain or some other visible injury type.
- ***Pre-Crash Movement***:
    - Crash patterns between the pre-pandemic and pandemic period were similar.
    - Crashes that involved both the bicyclist and motorist proceeding straight accounted for the largest share of crashes and KSI crashes.
    - Crashes that involved a motorist making a left turn were on average more severe than crashes with motorists making a right turn.
    - Solo-bicyclist crashes were the most severe on average, but this is likely related to the nature in which solo-bicyclist crashes are reported. Less severe solo-bicycle crashes are generally not reported, therefore skewing the results.
    - Crashes that involved a stopped or parked motorist tend to result in a high rate of KSI outcomes. Many of these were dooring-related crashes and suggest the need for increased physical separation between bicyclists and vehicles.
- ***Relative Direction***:
    - ***Pre-Pandemic:*** Same direction crashes accounted for the largest share of crashes and KSI crashes, followed by perpendicular (i.e., broadside) crashes. Perpendicular crashes tend to be slightly more severe on average.
    - ***Pandemic:*** perpendicular crashes comprised the largest share of all crashes and KSI crashes, followed by same direction crashes.
- ***Crashes by Reported Violations:***
    - ***Pre-Pandemic:*** improper and unsafe turns accounted for the largest share of crashes and KSI crashes, followed by failure to yield while making a left turn and traveling too fast for conditions. Motorists were cited as the party at fault for 53% of all reported crashes and 46% of KSI crashes. Bicyclists were cited for 33% of all crashes and 36% of KSI crashes. Motorists were cited for most crashes related to improper or unsafe turns and failure to yield making a left turn. Bicyclists were cited for most crashes related to traveling too fast for conditions.
    - ***Pandemic:*** Improper or unsafe turn, disregarding a traffic signal, and too fast for conditions were the most common violation types. The party at fault for KSI crashes was substantially different during the pandemic period compared to the pre-pandemic

period. During the pre-pandemic, motorists were cited as the party at fault 47.4% of all crashes. Bicyclists were cited as the party at fault for 40.9% of those crashes. For KSI crashes, motorists were cited at fault in 29.1% of incidents, compared to 56.4% of KSI crashes where a bicyclist was cited at fault. Additionally, bicyclist at fault crashes were disproportionately severe relative to motorist at fault crashes.
    - ***2017-2021:*** Bicyclists were cited at the party at fault for 56% of fatal crashes during the 5-year study period. This should be interpreted with caution as the fatally injured bicyclist was unable to provide their testimony.
- ***Time of Day:***
    - Crash patterns by time of day were similar between the two study periods. Crashes were generally concentrated during the daytime, particularly around typical peak commute periods (6-9 AM and 3-6 PM).
    - When considering time of day by weekday vs. weekend, the pre-pandemic distributions followed common bicycle volumes distributions (weekend: highest crash frequencies during AM/PM commute periods; weekend: highest crash frequencies during midday). During the pandemic study period, the distribution of crashes for weekend and weekday crash patterns were nearly the same and were generally concentrated in the afternoon and evening.
- ***Day of Week***:
    - Crashes were concentrated during the week (compared to the weekend) for both study periods. KSI crashes were highest on Fridays and lowest during the weekend for the pre-pandemic study period. During the pandemic, KSI crashes were slightly more concentrated on the weekends compared to pre-pandemic crashes.
- ***Lighting Conditions:***
    - Daylight conditions accounted for most crashes as expected. Most trips occur during daylight conditions which contributes to higher crash frequencies.
    - Crashes that occurred during non-daylight conditions were more likely to result in a KSI outcome. The severity of nighttime crashes is likely related to reduced visibility and slower perception and reaction times, resulting in the motorist traveling at a higher speed (and having more kinetic energy) at the time of the crash.
- ***Alcohol:***
    - There were ten crashes that involved a party (bicyclist or motorist) who was under the influence of alcohol during the 5-year study period.
- ***Crash type - Mode:***
    - Most crashes included a bicyclist and motorist (83.1%), followed by solo-bicyclist (11.6%) and bicyclist-pedestrian (5.3%).
    - Just over one-fourth of bicycle KSI crashes involved only a bicyclist and no other parties (solo-bicycle crash). Solo-bicycle crashes were disproportionately severe compared to other crash types, which is likely associated with underreporting of less severe solo-bicycle crashes, therefore skewing the results.
- ***Weather Condition:***
    - Most crashes occurred during clear weather conditions for both the pre-pandemic period (86%) and pandemic period (90%).

Parties

- ***Race[3]:***
    - In both study periods, Black bicyclists and drivers are substantially overrepresented in crashes on a per capita (using San Francisco demographics) basis citywide. Census data show that Black residents make up 5% of San Francisco's population but accounted for 9.6% of all bicycle crash victims and 8.6% of KSI bike victims, pre-pandemic. During the pandemic, these figures rose – Black bicyclists were involved in 11% of all bike crashes and 11.5% of KSI bike crashes. Additional research is needed to better understand travel behaviors and mode preferences or usage for each race.
- ***Age:***
    - Bicyclists aged 25-39 accounted for the largest share of bicyclists involved in crashes, and particularly bicyclists aged between 30-34 years. Bicyclists aged between 20-34 were the most overrepresented parties involved in a crash for all three study periods.
    - Drivers aged 30-34 accounted for the largest share of drivers involved in crashes with a bicyclist for all three study periods while also being underrepresented in crashes on a citywide per capita basis. Drivers aged 20-24 and 35-59 were overrepresented in crashes on a citywide per capita basis.
- ***Gender[4]:***
    - Male bicyclists accounted for the majority of bicyclists involved in crashes and KSI crashes during both study periods. This may be a reflection of gender-specific comfort related to riding a bicycle in traffic, related to personal safety, or other factors. Additional research is recommended to better understand the underlying factors for this finding.

Next Steps

- Safe Streets will begin the Step II analysis, which focuses on crash risk and location-specific findings through a systemic safety analysis.
- SFMTA and DPH will coordinate with Safe Streets to better understanding DUI reporting.
    - DPH may consider comparing the DUI crash rates per year with 2014-2016 crash data to get a sense of DUI/BUI prevalence during those years.
- Safe Streets will deliver the following files to Toole Design:
    - Excel workbook with source data, cross tabs (Pivot Tables), and plots
    - CSV file of crash data with geospatial attributes (using PostGIS geometries)
    - Final Step I Crash analysis Word Document

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[3] **Disclaimer:** Party race is based on officer's assumption or visual impression, which can be problematic and inaccurate. Additionally, there are only five racial categories (excludes "Not Stated") within the crash data, in contrast to the US Census, which has nearly twice as many race and ethnicity categories. The victim representation and comparison made to the San Francisco population should be interpreted with caution given these reporting shortcomings.

[4] **Disclaimer:** Party gender is based on officer's assumption or visual impression, which can be problematic and inaccurate. The only categorical values for gender in the crash report form include "male", "female", and "Not Stated" and do not include other personal gender identities. The victim representation and comparison made to the San Francisco population should be interpreted with caution given these reporting shortcomings.

- List of possible key findings and ides for how those finding can be illustrated with graphics

Methodology

This analysis examines who was involved in bicycle crashes, when the bicycle crashes occurred, and contributing factors and circumstances using the reported information within the crash data. This crash analysis looked at the data stratified by two time periods: 2017-2019 (pre-pandemic) and 2020-2021 (pandemic). Stratifying the study period into these timeframes allows the research team to objectively analyze the crash data while controlling for the significant effect that the COVID-19 pandemic had on travel and behavioral patterns[5].

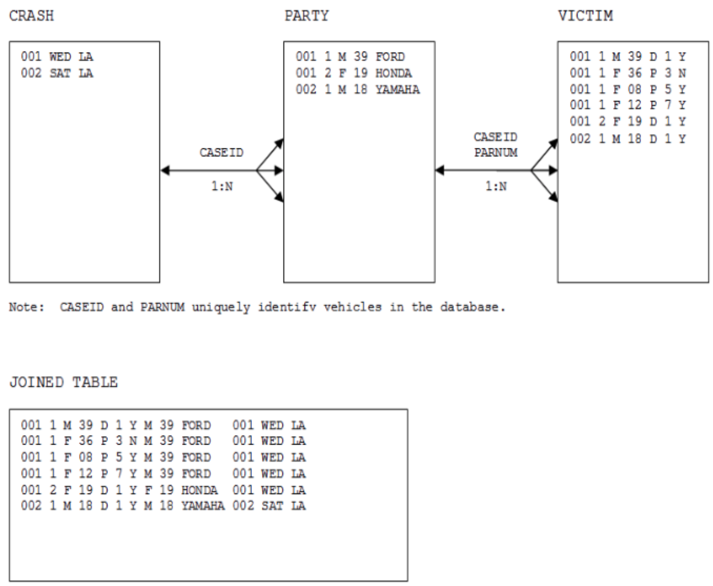
Crash Data Overview

Collision, party, and victim data were pulled from DataSF open data portal, which queries the crash data from TransBASE.sfgov.org. The crash data were downloaded on 11/22/2022, processed by Safe Streets, and loaded into a Postgres database for additional analysis. For detailed information regarding the sources of the collision records, please see detailed data summary hosted on DataSF's webpage (here).

The collision, party, and victim tables closely resemble the Statewide Integrated Transportation Record System (SWITRS) available via the Transportation Injury Mapping System (TIMS) hosted by UC Berkeley's Safe Transportation Research and Education Center (SafeTREC). Detailed information for the collision, party, and victim tables can be viewed here. The collision, party, and victim tables have a relational structure, which is common for storing collision data. For every reported collision, there is one collision record. The party table contains information for all the primary "actors" involved in the collision and has a many-to-one relationship – i.e., all relevant party records are matched via a case identification number to the one collision record. The party table contains information for each primary person such as age, sex, race, direction of travel, and vehicle characteristics. Lastly, the victim table contains attributes for all victims associated with each party, such as the driver and all the passengers of the vehicle. The victims table has a many-to-one relationship with both the parties and collision tables. This relationship is displayed in a graphic displayed Figure 1 below:

[5] Bureau of Transportation Statistics 2022. Daily Travel During the Covid-19 Public Health Emergency. Accessed February 15, 2022: https://www.bts.gov/daily-travel.

Figure 1: Relational Structure of Collision Data. Image Source: TIMS



The crash data used in this analysis was processed by Safe Streets to restructure the data, calculate and assign new variables, and assess the quality of the data though a robust quality control (QC) process. All reported crashes were processed (not just bicyclist crashes), but only crashes that involved at least one bicyclist are included in this analysis. These bicyclist crashes include any crash involving a bicyclist and motorist or pedestrian, as well as crashes in which there were no parties other than a single bicyclist (solo-bicyclist crashes).

Injury Severity Assignment

The officer-reported injury severity levels used in this analysis are specific to the most severely injured (MSI) bicyclist involved in the crash. This injury severity is different than the reported MSI assigned to each crash record (see Table 1, blue cells indicate the matched crash MSI and bicyclist MSI). In most cases, bicyclists are the most severely injured victim involved in the crash. Using the victim-level severity helps improve accuracy of summarizing injury severities. It should be noted that the San Francisco Department of Public Health (DPH) has documented reporting errors related to mis-coded injury severities, particularly for severe injuries[6], suggesting a need for some fluidity when discussing minor and serious injuries. This analysis does not have access to DPH's crash-level data to use the hospital reported or verified injury severities, so the results in this document reflect the best available data at the time.

For reference, the injury severities recorded in the crash data and summarized in this analysis are defined in the California Highway Patrol Collision Investigation Manual 555:

- **Fatal:** A fatal injury is any injury that results in death within 30 days after the motor vehicle collision in which the injury occurred. If the person did not die at the scene but died within 30 days of the motor vehicle collision in which the injury occurred, the injury classification should be changed from the injury previously assigned to "Fatal Injury

[6] https://www.visionzerosf.org/wp-content/uploads/2021/11/Severe-Injury-Trends 2011-2020 final report.pdf

- **Injury (Severe):** A suspected serious injury is any injury other than fatal which results in one or more of the following:
  - Severe laceration resulting in exposure of underlying tissues/muscles/organs or resulting in significant loss of blood.
  - Broken or distorted extremity (arm or leg).
  - Crush injuries.
  - Suspected skull, chest or abdominal injury other than bruises or minor lacerations.
  - Significant burns (second and third degree burns over 10% or more of the body).
  - Unconsciousness when taken from the collision scene.
  - Paralysis.
- **Injury (Minor):** A minor injury is any injury that is evident at the scene of the collision, other than fatal or serious injuries. Examples include lump on the head, abrasions, bruises, and minor lacerations (cuts on the skin surface with minimal bleeding and no exposure of deeper tissue/muscle).
- **Injury (Possible)**: A possible injury is any injury reported or claimed which is not a fatal, suspected serious, or suspected minor injury. Examples include momentary loss of consciousness, claim of injury, limping, or complaint of pain or nausea. Possible injuries are those which are reported by the person or are indicated by their behavior, but no wounds or injuries are readily evident.

Table 1: Crash-level MSI and Bicycle MSI Comparison

Crash-Level MSI	Bike MSI	Total
Fatal	**Fatal**	**8**
Injury (Severe)	**Injury (Severe)**	**220**
	Injury (Other Visible)	*2*
	Injury (Complaint of Pain)	*1*
	unknown	*12*
Injury (Other Visible)	**Injury (Other Visible)**	**994**
	Injury (Complaint of Pain)	8
	unknown	*51*
Injury (Complaint of Pain)	Injury (Severe)	1
	Injury (Other Visible)	*2*
	Injury (Complaint of Pain)	**1,092**
	unknown	*51*
Medical[7]	*Fatal*	*1*
Total		***2,443***

As part of the crash data QC process, 114 crashes were found to be missing bicyclist victim records (see Table 2). The absence of bicyclist victim records prohibits assigning bicyclist MSI to each record with 100% certainty for all crashes. However, it's safe to assume the crash-level injury severity for solo-bicyclist crashes accurately reflects the bicyclist's injury. For crashes that involved a bicyclist and a motorist, it is generally safe to assume the bicyclist experience the most severe injury. While this may not be universally true, it is the likely outcome given that bicyclists are less protected than a motorist in a vehicle. For crashes that involved a pedestrian and bicyclist, however, assigning the crash-level injury severity to the bicyclist may be inaccurate as the MSI may apply to the pedestrian involved in the crash, not the bicyclist. The research team worked with the SFMTA to determine how to proceed with these crash records, presenting the SFMTA team with the following three options:

- **Option 1:** Drop bicyclist-pedestrian crashes without bicyclist victim records
- **Option 2:** Proportionally apply the injury levels from bicyclist-pedestrian crashes with known bicyclist MSI
- **Option 3:** Assign crashes a 50/50 split between Injury B (n=40) and Injury C (n=40), assuming all unknown MSI Injury A crashes (n=11) likely apply to the pedestrian

Ultimately, option two was selected as it applies the bicycle MSI informed by historic crash patterns. Crashes that were not assigned a bicycle MSI (injury C crashes; n=11) during this process were removed from the analysis.

[7] This value is likely an error in the source data, which has been recoded to 'fatal' for this analysis.

Table 2:Crashes without Bicycle Victim Records

Crash Type	Crash-level MSI	Total
Bike-Vehicle	Injury (Severe)	1
	Injury (Other Visible)	10
	Injury (Complaint of Pain)	11
Bike-Pedestrian	Injury (Severe)	11
	Injury (Other Visible)	40
	Injury (Complaint of Pain)	40
Solo-Bike	Injury (Other Visible)	1
Total		***114***

Descriptive Analysis[8]

Crashes by Year

Reported bicycle crashes by year are summarized in Table 3. There is a clear difference in crash frequencies between the two study periods, with each year of pre-pandemic crashes frequencies accounting for between 22% and 24% of crashes during the 5-year period. In contrast, the annual share of crashes dramatically dropped to roughly 16% of crashes per year during the pandemic. The same pattern can be observed when looking at KSI crashes. The percentage of crashes resulting in a KSI was highest in 2021 (8.1%).

Table 3: Reported Bicycle Crashes by Year, 2017-2021

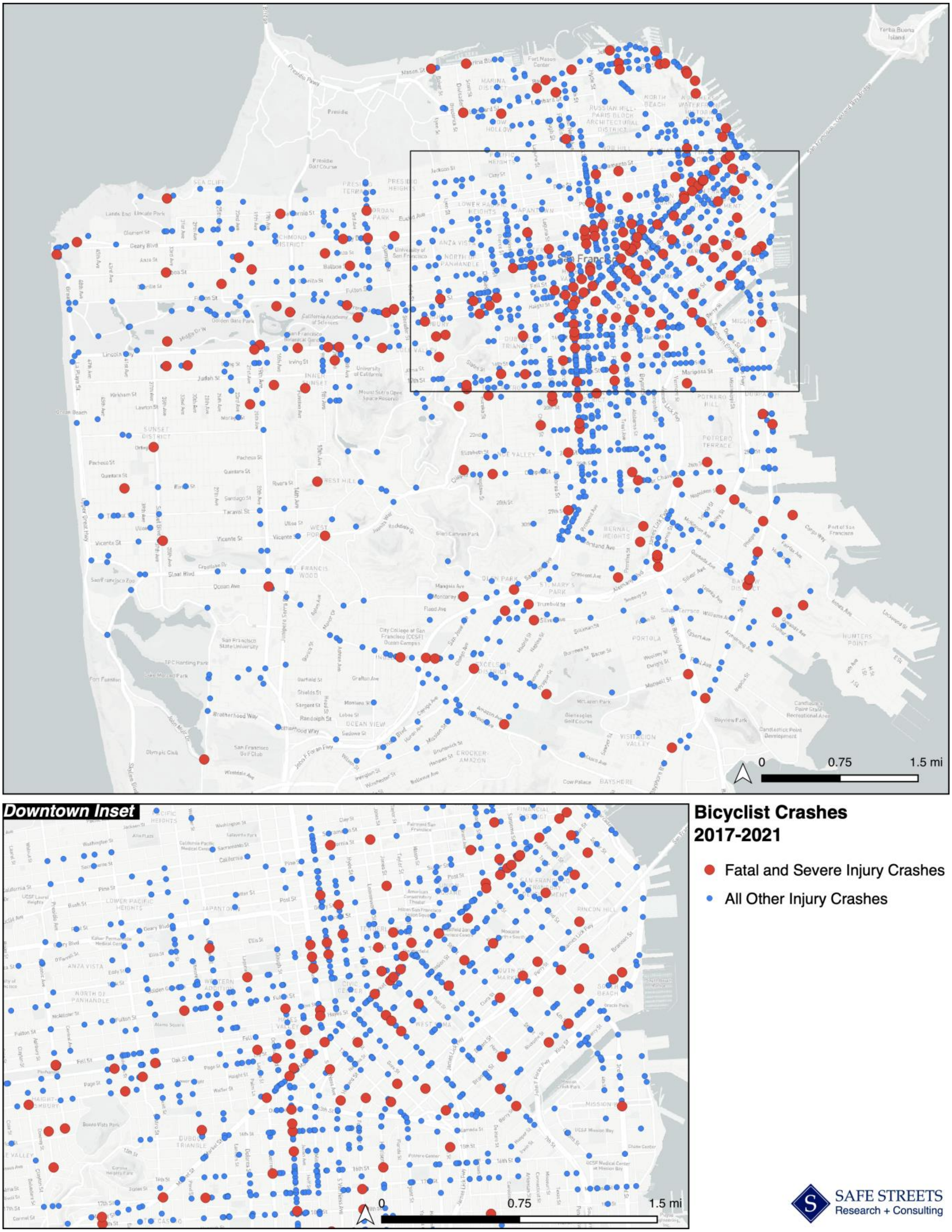
year	# Crashes	% Crashes	# KSI Crashes	% KSI	% Crashes that Resulted in KSI
2017	545	22.4%	35	21.2%	6.4%
2018	578	23.8%	40	24.2%	6.9%
2019	545	22.4%	35	21.2%	6.4%
2020	379	15.6%	24	14.5%	6.3%
2021	385	15.8%	31	18.8%	8.1%
Total	***2,432***	***100.0%***	***165***	***100.0%***	***6.8%***

Map 1 through Map 3 display the location of bicyclist crashes by study period. During the 5-year study period (Map 1), crashes were concentrated near the Downtown area and along corridors that connect nearby neighborhoods to Downtown. During the pre-pandemic (Map 2), crashes followed a similar pattern and were concentrated near Downtown or along corridors connecting to Downtown. Crashes that occurred during the pandemic (Map 3) were more geographically dispersed and less concentrated near Downtown than during the pre-pandemic period. Streets with noticeably lower crash densities during the pandemic study period include Valencia St, Market St, The Embarcadero, Polk St, and many other streets within or near Downtown. This likely reflects changes in commuting to Downtown and may also reflect other changes in bicyclist and motorist travel behaviors and route preferences during

[8] ***Magenta*** text in the summary tables denote values of interest or data points related to key findings.

this time period. Step II of the San Francisco Active Communities Plan will include a deeper dive analysis of location-specific crash patterns and will focus on identifying crash risk factors, analyzing crashes along the High Injury Network, and investigating spatial patterns between the two time-periods.

Map 1: Bicyclist Crashes, 2017-2021



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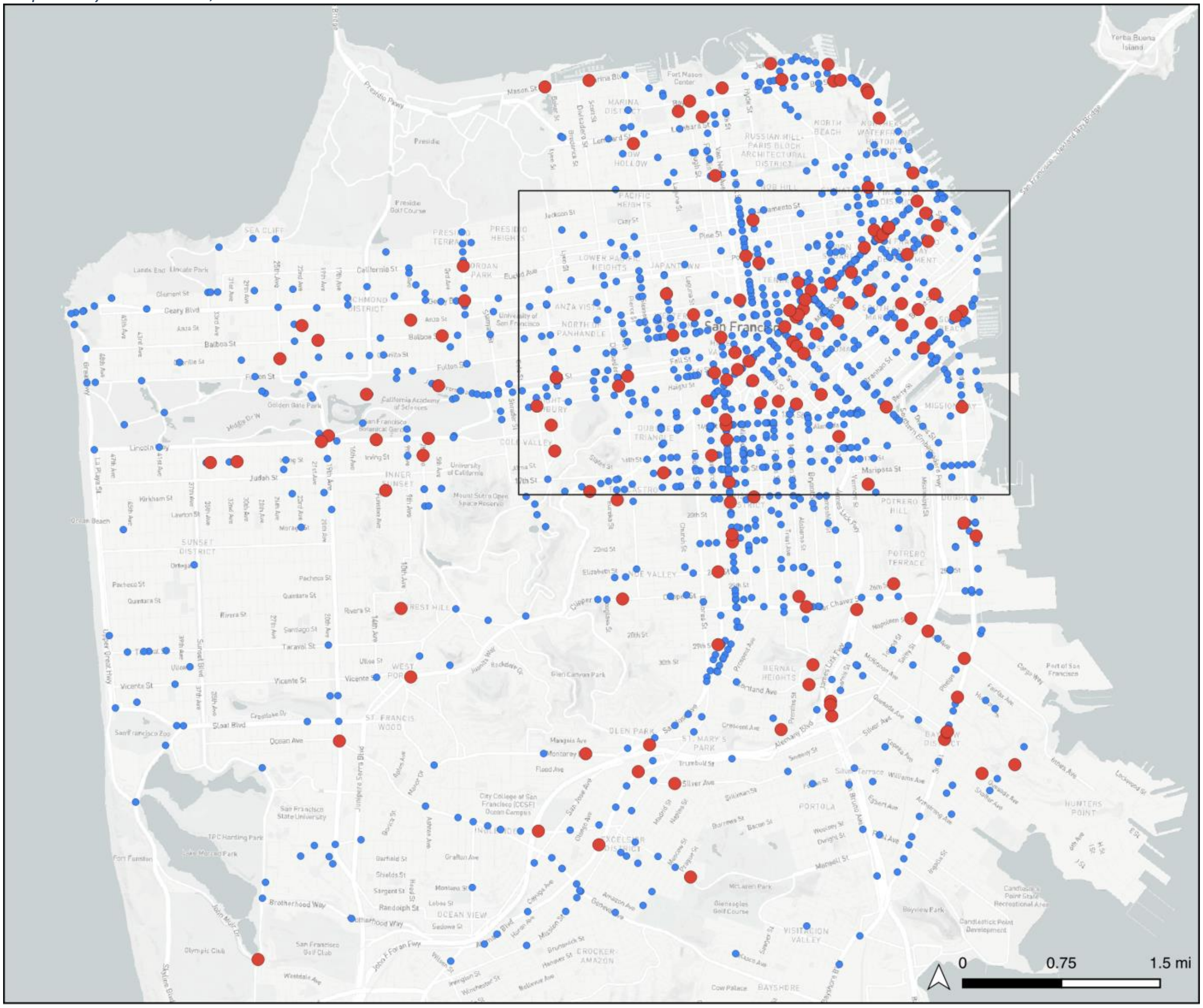
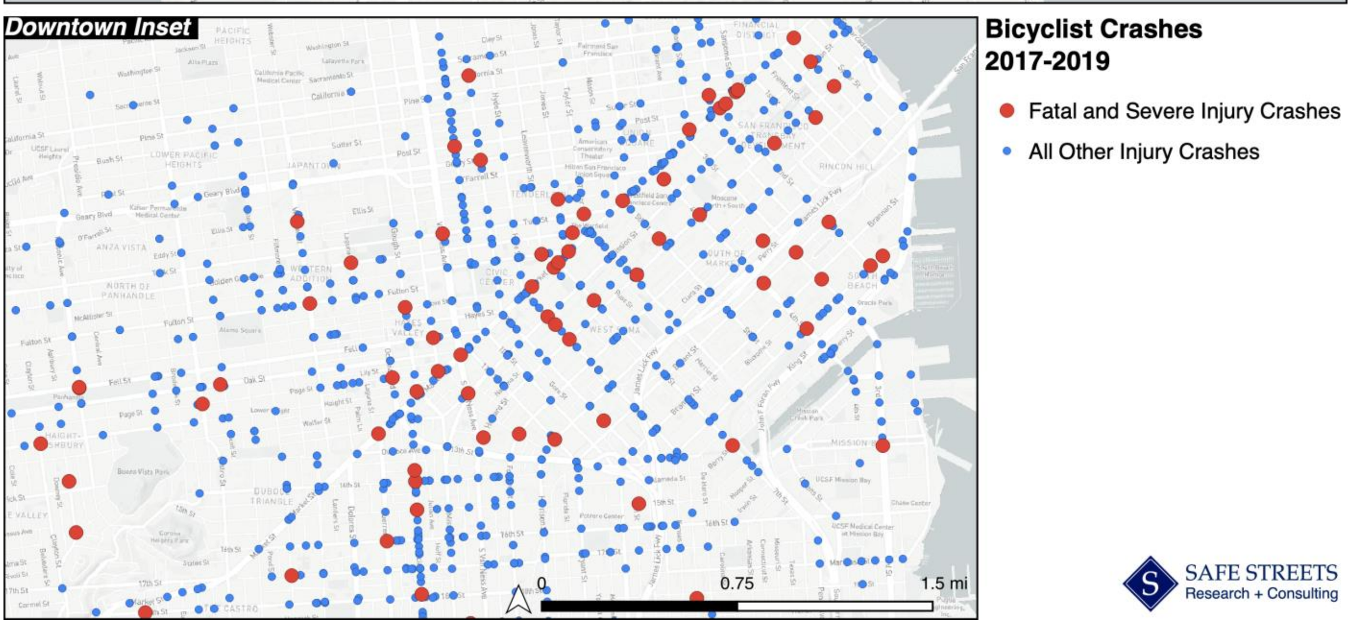
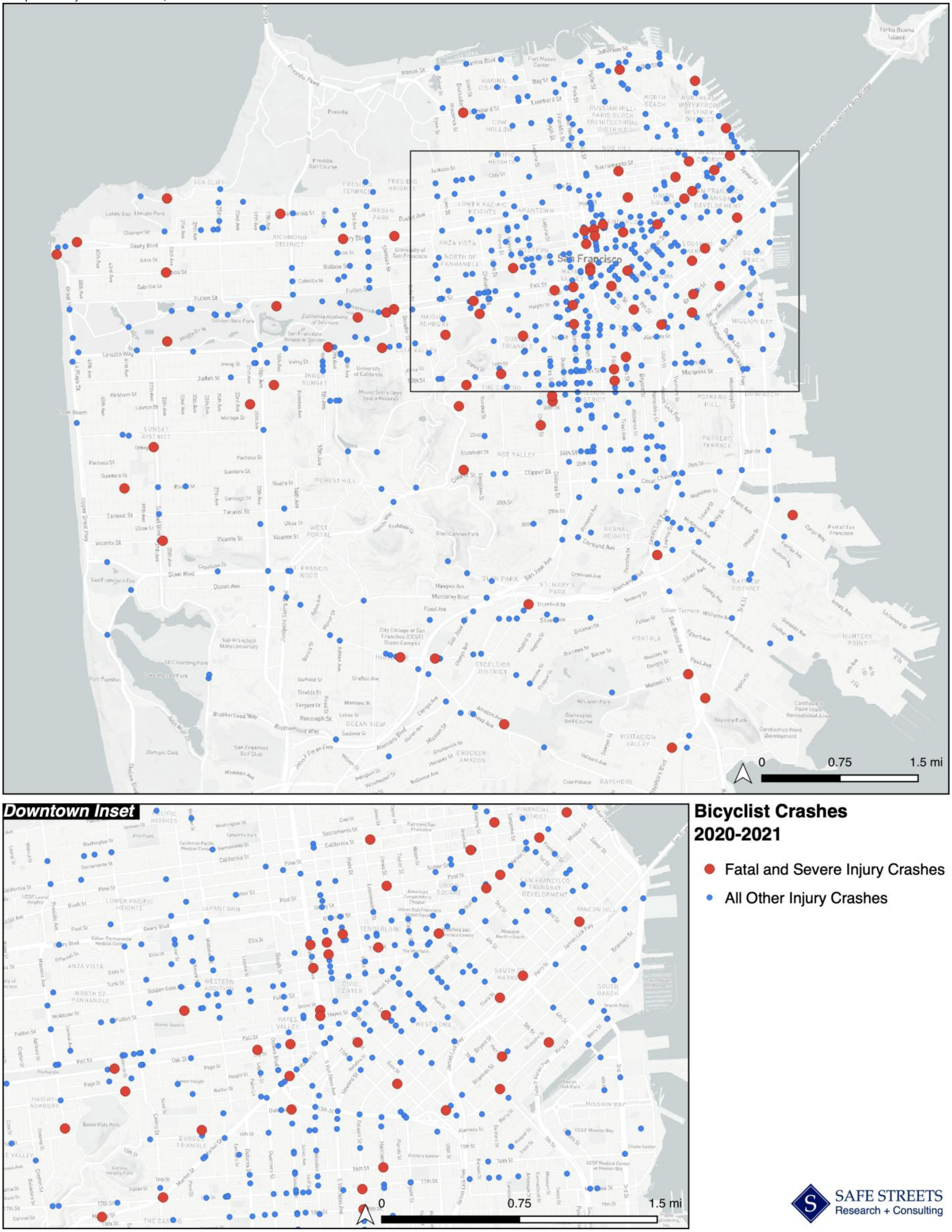
Map 2: Bicyclist Crashes, 2017-2019





Map 3: Bicyclist crashes, 2020-2021



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Crashes by Injury Type

Crashes are summarized by bicyclist MSI in Table 4. Most crashes that involved a bicyclist during the 5-year time frame resulted in less-severe injuries, reported as either complaint of pain (47.1%) or other visible injury (43.1%). Crash rates for all injury severities were higher during the pre-pandemic study period (556 crashes per year) than in the pandemic study period (382 crashes per year). This difference between crash rates is likely related to activity levels during the pre-pandemic relative to those during the COVID-19 pandemic. A *Stay Home order* throughout San Francisco was in effect March 19, 2020, and a corresponding drop in all travel, but particularly motor vehicle travel, could offset any naturally expected increase in crashes from higher bicycle travel in some areas. Regardless of crash rates, the distributions of injury types between the two study periods are similar.

Table 4: Bicycle Crashes by Injury Severity, 2017-2021

	2017-2019			2020-2021			2017-2021		
Injury Type	**# Crashes**	**% Crashes**	**Crash Rate/ Year**	**# Crashes**	**% Crashes**	**Crash Rate/ Year**	**# Crashes**	**% Crashes**	**Crash Rate/ Year**
Fatal	7	0.4%	2.3	2	0.3%	1.0	9	0.4%	1.8
Severe	151	9.1%	50.3	77	10.1%	38.5	228	9.4%	45.6
Other Visible	705	42.3%	235.0	344	45.0%	172.0	1,049	43.1%	209.8
Complaint of	805	48.3%	268.3	341	44.6%	170.5	1,146	47.1%	229.2
Total	***1,668***	***100.0%***	***556.0***	***764***	***100.0%***	***382.0***	***2,432***	***100.0%***	***486.4***

Crashes by Movement-Based Crash Types

Pre-crash movement crash types were developed by combining the bicyclist's pre-crash movement with the other primary party's pre-crash movement[9]. Solo-bicycle crashes are noted in the crash type and bicycle-pedestrian crashes use the pedestrian "action" (no bicycle-pedestrian crash types are in the top 10). See Appendix B for crashes summarizes for every crash type, not just the top 10.

Table 5 summarizes bicycle crashes that occurred during the pre-pandemic study period by injury severity and crash type for the ten crash types that had the highest frequency of reported crashes. Crashes that did not involve any type of turning movement (i.e., proceeded straight) accounted for the largest share of crashes, particularly crashes with both parties proceeding straight (18.6% crashes and 17.7% KSI crashes). Most of these crashes involved both parties traveling perpendicularly (57% of crashes; 68% KSI crashes), followed by same direction (33% of crashes; 21% KSI crashes).

Solo-bicyclist crashes had the largest share of KSI crashes (19.6%). This finding makes sense as most instances when someone riding a bicycle falls or strikes an object is involved in a crash, the victim generally will not report the crash unless they are severely injured and require medical help. Many of

[9] Note: this crash type process will be updated in the Step II analysis, which will incorporate crash location (intersection vs. mid-block) and intersection control. Crash location will be spatially defined by proximity to the nearest intersection centroid. This revised crash type will help the team better understand the crash dynamics unique to specific location types, roadway characteristics, and land use and inform possible countermeasures to systemically improve safety throughout San Francisco.

these crashes were cited as the bicyclist traveling too fast for conditions (42%) and few crashes had a reported roadway condition that contributed to the crash (12%).

Crashes that involved a motorist making a left turn and striking a bicyclist proceeding straight accounted for the second largest share of overall crashes (12.9%) and third largest share of KSI crashes (10.8%). Crashes that involved a motorist making a right turn and striking a bicyclist proceeding straight had the third largest share of crashes (12.1%), fifth largest share of KSI crashes (7.6%), and a moderate-low share of crashes that resulted in a KSI outcome (5.9%). This finding is expected as a motorist's speed making a right turn is often slower than a motorist's speed making a left turn or proceeding straight, resulting in comparatively less kinetic energy transfer at the moment of impact.

Crashes that involved a bicyclist proceeding straight and a stopped motorist had the highest share of crashes that resulted in a KSI outcome (11.5%) and accounted for roughly 8% of KSI crashes (fourth highest), despite comprising only 6.8% of all crashes. These KSI crashes involved a motorist opening the vehicle door into the path of the bicyclist (i.e., dooring), either the motorist or the bicyclist traveling too slow or too fast for conditions, and a vehicle parked in bike lane. Dooring crashes were the predominant violation type and may suggest the need for additional physical separation between bicyclists and motor vehicles as well as educational outreach.

Table 5: Top 10 Bicycle Crashes by Pre-Crash Movements, 2017-2019

Rank	Bike + Motorist Movements	# Crashes	% Crashes	Crash Rate/ Year	# KSI	% KSI	KSI Crash Rate/ Year	% Crashes Resulting in KSI
--	*Not top 10*	*491*	*29.4%*	*163.7*	*42*	*26.6%*	*14.0*	*8.6%*
1	Proceeding Straight, Proceeding Straight	310	**18.6%**	103.3	28	**17.7%**	9.3	9.0%
2	Proceeding Straight, Making Left	215	12.9%	71.7	17	**10.8%**	5.7	7.9%
3	Proceeding Straight, Making Right	202	12.1%	67.3	12	7.6%	4.0	5.9%
4	Solo Bike Proceeding Straight	139	8.3%	46.3	31	**19.6%**	10.3	**22.3%**
5	Proceeding Straight, Stopped	113	6.8%	37.7	13	**8.2%**	4.3	**11.5%**
6	Proceeding Straight, Parked	48	2.9%	16.0	5	3.2%	1.7	**10.4%**
7	Making Left Turn, Proceeding Straight	46	2.8%	15.3	4	2.5%	1.3	8.7%
8	Proceeding Straight, Making U Turn	40	2.4%	13.3	1	0.6%	0.3	2.5%
9	Proceeding Straight, Entering Traffic	33	2.0%	11.0	3	1.9%	1.0	9.1%
10	Proceeding Straight, Changing Lanes	31	1.9%	10.3	2	1.3%	0.7	6.5%
	Total	***1,668***	***100.0%***	***556.0***	***158***	***100.0***	***52.7***	***9.5%***

Table 6 summarizes bicycle crashes that occurred during the pandemic study period by injury severity and crash type for the top ten crash types. The top crash types were similar during the pandemic study period as the pre-pandemic study period, but there were different concentrations of crashes by crash type. In particular, the pandemic study period had a higher percentage of KSI crashes that resulted from a bicyclist proceeding straight – motorist proceeding straight crash (26.9%). Most of these crashes had the same reported contributing factors as the pre-pandemic study period: disregarded traffic signal, failure to stop at stop sign, and traveling at unsafe speeds. Like the pre-pandemic study period, most of these crashes involved both parties traveling perpendicularly (70% of crashes; 86% KSI crashes), followed by same direction (23% of crashes; 5% KSI crashes). Crashes that involved a bicyclist proceeding straight and a motorist making a left turn had a similar crash distribution as the pre-pandemic period, accounting for 13.7% of crashes and 9.0% of KSI crashes. Bicyclist proceeding straight and a motorist making a right turn accounted for a similar share of overall crashes (10.6%) but roughly half the share of KSI crashes (3.8%) compared to the pre-pandemic study period. Additionally, there were fewer crashes that involved a stopped or parked motor vehicle. Dooring crashes for these two crash types accounted for 63% (n=102) of crashes and 50% (n=9) of KSI crashes during the pre-pandemic period, in contrast to 46% of crashes (n=22) and 50% of KSI crashes (n=2) during the pandemic.

Table 6: Top 10 Bicycle Crashes by Pre-Crash Movements, 2020-2021

Rank	Bike + Motorist Movements	# Crashes	% Crashes	Crash Rate/ Year	# KSI	% KSI	KSI Crash Rate/ Year	% Crashes Resulting in KSI
--	*Not top 10*	*202*	*26.4%*	*101.0*	*23*	*29.5%*	*11.5*	*11.4%*
1	Proceeding Straight, Proceeding Straight	185	**24.2%**	92.5	21	**26.9%**	10.5	**11.4%**
2	Proceeding Straight, Making Left	105	13.7%	52.5	7	9.0%	3.5	6.7%
3	Proceeding Straight, Making Right	81	10.6%	40.5	3	3.8%	1.5	3.7%
4	Solo Bike Proceeding Straight	78	10.2%	39.0	16	**20.5%**	8.0	**20.5%**
5	Proceeding Straight, Stopped	34	4.5%	17.0	3	3.8%	1.5	8.8%
6	Making Left Turn, Proceeding Straight	24	3.1%	12.0	2	2.6%	1.0	8.3%
7	Proceeding Straight, Making U Turn	18	2.4%	9.0	1	1.3%	0.5	5.6%
8	Proceeding Straight, Parked	14	1.8%	7.0	1	1.3%	0.5	7.1%
9	Proceeding Straight, Entering	12	1.6%	6.0	1	1.3%	0.5	8.3%
10	Proceeding Straight, Changing	11	1.4%	5.5	0	0.0%	0.0	0.0%
	Total	***764***	***100.0%***	***382.0***	***78***	***100.0%***	***39.0***	***10.2%***

Crashes by Relative Direction (Bicycle-Motorist Crashes Only)

The relative direction of the bicyclist and motorist are summarized in Table 7 (pre-pandemic). Same direction crashes accounted for the largest share of crashes (46.5%) and KSI crashes (40.9%) but had a low percentage of crashes resulting in a KSI outcome (7.0%). Many of these crashes had a reported contributing factor cited as an improper or unsafe turn (29.1% crashes; 8.9% KSI crashes), dooring (15.8% crashes; 24.4% KSI crashes), and traveling too fast for conditions (12.5% crashes; 22.2% of KSI crashes). Perpendicular crashes accounted for the second largest share of crashes (34.0%) and KSI crashes (37.3%). Excluding unknown relative directions, perpendicular had the highest share of crashes that resulted in a KSI outcome (8.7%). Many of the perpendicular crashes involved a road user disregarding a traffic signal, improper or unsafe turn, failure to yield while making a turn, or disregarding a stop sign. Opposite direction crashes had the lowest share of crashes (13.0%) and KSI for crashes (10.9%) with known party direction of travel. Nearly half of the opposite direction crashes involved a party failing to yield while making a left turn or U-turn (34.8%), making an improper turn

(11.0%), or the bicyclist traveling in the wrong direction travel (9.9%). Crashes that involved a bicyclist traveling in the wrong direction of travel may be an indication of a bicycle network gap or lack of safe or comfortable crossing opportunities.

Table 7: Relative Direction of Travel between Bicyclist and Motorists, 2017-2019

Relative Direction	# Crashes	% Crashes	Crash Rate/Year	# KSI	% KSI	KSI Crash Rate/Year	% Crashes Resulting in KSI
Same	647	46.5%	215.7	45	40.9%	15.0	7.0%
Perpendicular	472	34.0%	157.3	41	37.3%	13.7	8.7%
Opposite	181	13.0%	60.3	12	10.9%	4.0	6.6%
Unknown	87	6.3%	29.0	12	10.9%	4.0	13.8%
Missing one party	3	0.2%	1.0	0	0.0%	-	0.0%
Total	***1,390***	***100.0%***	***463.3***	***110***	***100.0***	***36.7***	***7.9%***

Table 8 summarizes bicycle crashes by relative direction for crashes that occurred during the pandemic. Unlike pre-pandemic crashes, perpendicular crashes accounted for the largest share of crashes (47.1%) and KSI crashes (52.7%). Perpendicular crashes had a much larger share of KSI crashes and had a higher chance of a crash resulting in a KSI outcome (9.8%) compared to the pre-pandemic study period. Opposite direction crashes also accounted for a larger share of crashes. Many of these crashes are cited as the bicyclist traveling the wrong direction and the outcome had a higher chance of resulting in a KSI outcome compared to the pre-pandemic period. Aside from that difference, the contributing factors reported by the responding officer had similar distributions between study periods.

Table 8: Relative Direction of Travel between Bicyclist and Motorists, 2020-2021

Relative Direction	# Crashes	% Crashes	Crash Rate/Year	# KSI	% KSI	KSI Crash Rate/Year	% Crashes Resulting in KSI
Perpendicular	297	47.1%	148.5	29	52.7%	14.5	9.8%
Same	221	35.0%	110.5	16	29.1%	8.0	7.2%
Opposite	85	13.5%	42.5	8	14.5%	4.0	9.4%
Unknown	28	4.4%	14.0	2	3.6%	1.0	7.1%
Total	***631***	***100.0%***	***315.5***	***55***	***100.0%***	***27.5***	***8.7%***

Crashes by Reported Violations (Bicycle-Motor Vehicle Crashes Only)

The following section summarizes crashes by generalized reported violation types (see Appendix for the list of violation codes, definitions, and the generalized violation types summarized in the tables below). Similar violations have been grouped to simplify the analysis and to yield potentially more useful insights. It's important to note that some reporting bias or errors in reporting the primary collision violation may be present in some of these crashes. Responding officers attempt to assign each crash a primary collision violation based on the crash investigation and information provided from the parties (and/or witnesses) involved, but that does not always lead to the correct violation assignment.

Analyzing crash types, crash dynamics, and contextual characteristics can help provide a more objective picture of what contributed to the crash. It is recommended to interpret the following findings with caution.

Table 9 summarizes bicycle-motor vehicle crashes by reported violation types for crashes that occurred during the pre-pandemic period. The most frequent violation types include improper or unsafe turn (21.3% crashes; 15.5% KSI crashes), failure to yield while making a left turn (9.8% crashes, 7.3% KSI crashes), and traveling too fast for conditions (8.9% crashes; 15.5% KSI crashes). Improper turns and traveling too fast for conditions had the highest share of KSI crashes followed by disregarding the signal (11.8%) and dooring (10.0%). The majority of improper or unsafe turn crashes involved a motorist making a right turn (42.6%) followed by a motorist making a left turn (15.9%). A larger share of left turn crashes resulted in a KSI outcome (12.8%) than for right turn crashes (4.2%), which is likely due to left turning motorists traveling at a higher speed at the time of the crash.

The crash data includes a "party at fault" attribute *which should be interpreted with caution due to potential reporting biases or errors but may provide high-level insights into contributing factors*. *Additionally, bicyclists who were fatally injured were most likely unable to provide their testimony, which could lead to an inaccurate citation.* For overall bicycle-motor vehicle crashes, motorists were cited as the party at fault for 52.8% of crashes and 46.4% of KSI crashes, whereas bicyclists were cited as the party at fault for 33.4% of crashes and 35.5% of KSI crashes. Bicyclist at fault crashes were disproportionately severe compared to motorist at fault crashes. Looking at the party at fault for the highest frequency violation types may help us understand some behavioral patterns related to crashes.

Motorists were most frequently the party at fault for improper or unsafe turns (motorists cited in 72.3% of crashes and 88.2% of KSI crashes). There were roughly the same number of KSI crashes for at fault motorists making a right turn as there were making a left turn. The most common pre-crash movement for at fault bicyclists involved the bicyclist making a left turn while the motorists was proceeding straight (15 crashes; 1 KSI crash).

Failure to yield while making a left turn was cited as the motorist being at fault for 82.4% of crashes and 87.5% of KSI crashes. Most motorist at fault crashes involved both parties traveling in opposite directions (42.6% of crashes; 25.0% of KSI crashes) at the time of the crash, followed by perpendicular (30.9% of crashes; 37.5% of KSI crashes). Roughly half of these motorists at fault crashes occurred at a location with a functioning traffic control device[10].

Bicyclists were most frequently cited as the party at fault for traveling too fast for conditions[11] (57.3% of crashes; 58.8% of KSI crashes). Most crashes involved a bicyclist proceeding straight and traveling in the same direction as the motorist. For both bicyclist at fault and motorist at fault crashes, roughly 14% of crashes resulted in a KSI outcome.

[10] A more robust analysis into traffic control devices will be conducted using SFMTA traffic control data.

[11] Many cities throughout the US have observed an increased in motor vehicle speeds during the pandemic. Data related to bicyclist speed is not readily available and there is not known research that would suggest changes in bicyclist travel speeds before or during the pandemic. Additionally, the "traveling too fast for conditions" violation code may be used as a "catch-all" code for citing a bicyclist at fault, thereby artificially inflating the frequency of this violation type.

Table 9: Top 10 General Violation Types, 2017-2019

General Violation Type	# Crashes	% Crashes	Crash Rate/Year	# KSI	% KSI	KSI Crash Rate/Year	% Crashes Resulting in KSI
Improper or unsafe turn	296	21.3%	98.7	17	15.5%	5.7	5.7%
Failure to yield (left	136	9.8%	45.3	8	7.3%	2.7	5.9%
Too fast for conditions	124	8.9%	41.3	17	15.5%	5.7	13.7%
Dooring	124	8.9%	41.3	11	10.0%	3.7	8.9%
Disregard traffic signal	121	8.7%	40.3	13	11.8%	4.3	10.7%
Unknown	72	5.2%	24.0	7	6.4%	2.3	9.7%
Failure to yield	65	4.7%	21.7	3	2.7%	1.0	4.6%
Improper stop	64	4.6%	21.3	9	8.2%	3.0	14.1%
Overtaking	59	4.2%	19.7	1	0.9%	0.3	1.7%
Keep right	41	2.9%	13.7	2	1.8%	0.7	4.9%
Not Top 10 [12]	288	20.7%	96.0	22	20.0%	7.3	7.6%
Total	***1,390***	***100.0%***	***463.3***	***110***	***100.0%***	***36.7***	***7.9%***

Table 10 summarizes bicycle-motor vehicle crashes by reported violation type for crashes that occurred during the pandemic period. The most frequent violation types include improper or unsafe turn (20.0% of crashes; 12.7% of KSI crashes), disregarding a traffic signal (13.0% of crashes, 20.0% of KSI crashes), and traveling too fast for conditions (10.5% of crashes; 10.9% of KSI crashes).

For overall bicycle-motor vehicle crashes, during the pre-pandemic motorists were cited as the party at fault for 47.4% of crashes and 29.1% of KSI crashes, whereas bicyclists were cited as the party at fault for 40.9% of crashes and 56.4% of KSI crashes during the pandemic. The party at fault for KSI crashes was substantially different during the pandemic period compared to the pre-pandemic period. Similarly, bicyclist at fault crashes were disproportionately severe during the pandemic relative to motorist at fault crashes.

Improper or unsafe turns were associated with the largest share of overall crashes (20%) and the second largest share of KSI crashes (12.7%). These crashes generally involved an at fault motorist making a right turn (30.2%), making a left turn (12.7%), and changing lanes (7.9%). When the bicyclist was at fault, the bicyclist was most frequently making a left turn (7.9%), followed by changing lanes (5.6%). This violation type did not generally result in a high share of crashes resulting in a KSI outcome: 5.6% of these crashes resulted in a KSI compared to the pandemic average for all crash types of 8.7%.

Disregarding traffic signals had the largest share of KSI crashes and had a relatively high share of crashes that resulted in a KSI outcome (13.4%), indicating a potentially greater tendency toward severity than other violation types. Two-thirds of these crashes assigned fault to the bicyclist. Most crashes involved the bicyclist and motorist traveling in perpendicular travel directions.

[12] There were 26 violation types not in the top 10. The violation type with the largest share of crashes accounted for 2.4% of crashes.

Table 10: Top 10 General Violation Types, 2020-2021

General Violation Type	# Crashes	% Crashes	Crash Rate/Year	# KSI	% KSI	KSI Crash Rate/Year	% Crashes Resulting in KSI
Improper or unsafe turn	126	20.0%	42.0	7	12.7%	2.3	5.6%
Disregard traffic signal	82	13.0%	27.3	11	20.0%	3.7	13.4%
Too fast for conditions	66	10.5%	22.0	6	10.9%	2.0	9.1%
Failure to yield (left turn)	54	8.6%	18.0	3	5.5%	1.0	5.6%
Failure to yield	42	6.7%	14.0	3	5.5%	1.0	7.1%
Improper stop	42	6.7%	14.0	2	3.6%	0.7	4.8%
Unknown	37	5.9%	12.3	3	5.5%	1.0	8.1%
Keep right	32	5.1%	10.7	4	7.3%	1.3	12.5%
Dooring	27	4.3%	9.0	3	5.5%	1.0	11.1%
Overtaking	23	3.6%	7.7	5	9.1%	1.7	21.7%
Not Top 10[13]	100	15.8%	33.3	8	14.5%	2.7	8.0%
Total	***631***	***100.0%***	***210.3***	***55***	***100.0***	***18.3***	***8.7%***

Crashes by Time of Day

Crashes by time of day are summarized in Table 11 for the pre-pandemic time period. Bicycle crashes overall and KSI crashes specifically occurred most frequently near typical commute periods (6am-9am) and (3pm-6pm), with a moderate share of crashes that occurred midday and fewer crashes during the late-night/early morning hours. While crashes were less frequent during the late-night and early morning hours, those crashes tended to be more severe, with 13-29% of those crashes resulting in a KSI outcome compared to 7% during the day. The midnight-3am period only accounted for 2.3% of crashes but accounted for 7% of KSI crashes. This higher share of crashes resulting in a KSI outcome is consistent with the findings noted in the lighting conditions portion of this memo – dark lighting conditions are associated with higher injury severity when a crash occurs.

[13] There were 23 violation types not in the top 10. The violation type with the largest share of crashes accounted for 1.9% of crashes.

Table 11: Bicycle Crashes by Severity and Time of Day, 2017-2019

Time of Day	# Crashes	% Crashes	Crash Rate/Year	# KSI	% KSI	KSI Crash Rate/Year	% Crashes Resulting in KSI
12:00-2:59am	38	2.3%	12.7	11	7.0%	3.7	29%
3:00-5:59am	11	0.7%	3.7	3	1.9%	1.0	27%
6:00-8:59am	241	14.4%	80.3	29	18.4%	9.7	12%
9:00-11:59am	310	18.6%	103.3	23	14.6%	7.7	7%
12:00-2:59pm	257	15.4%	85.7	19	12.0%	6.3	7%
3:00-5:59pm	365	21.9%	121.7	33	20.9%	11.0	9%
6:00-8:59pm	330	19.8%	110.0	25	15.8%	8.3	8%
9:00-11:59pm	112	6.7%	37.3	14	8.9%	4.7	13%
Unknown	4	0.2%	1.3	1	0.6%	0.3	25%
Total	***1,668***	***100.0%***	***556.0***	***158***	***100.0%***	***52.7***	***9%***

Table 12 summarizes crashes by time of day for crashes that occurred during the pandemic period. Like pre-pandemic crash patterns, crashes are generally concentrated around the peak commute period. Two noticeable differences between the two study periods include the larger share of midday and early evening crashes and a lower share of morning crashes during the pandemic study periods. Additionally, the crashes that did occur in the early morning hours were less likely to result in a KSI compared to those in pre-pandemic years. Conversely, the pandemic-era evening crashes were more likely to result in a KSI compared to pre-pandemic years.

Table 12: Bicycle Crashes by Severity and Time of Day, 2020-2021

Time of Day	# Crashes	% Crashes	Crash Rate/Year	# KSI	% KSI	KSI Crash Rate/Year	% Crashes Resulting in KSI
12:00-2:59am	15	2.0%	7.5	3	3.8%	1.5	20%
3:00-5:59am	10	1.3%	5.0	2	2.6%	1.0	20%
6:00-8:59am	74	9.7%	37.0	8	10.3%	4.0	11%
9:00-11:59am	103	13.5%	51.5	9	11.5%	4.5	9%
12:00-2:59pm	159	20.8%	79.5	16	20.5%	8.0	10%
3:00-5:59pm	202	26.4%	101.0	15	19.2%	7.5	7%
6:00-8:59pm	144	18.8%	72.0	18	23.1%	9.0	13%
9:00-11:5pm	57	7.5%	28.5	7	9.0%	3.5	12%
Total	***764***	***100.0%***	***382.0***	***78***	***100.0%***	***39.0***	***10%***

Figure 2 and Figure 3 display crashes by hour of day stratified by weekend vs. weekday for the pre-pandemic and pandemic time periods, respectively. Weekday bicyclist volumes are typically concentrated during peak commute periods whereas weekend bicycle volumes are often highest midday, and it's common to observe higher frequencies of bicycle crashes during these time periods due to higher levels of exposure. This typicality is observable in Figure 2 (pre-pandemic), but not in Figure 3 (pandemic). This difference is likely associated with the Stay Home order and a higher rate of working from home, as well as increased recreational trips. A comparison between this finding and the Bike Count analysis being conducted as part of this planning effort may help nuance these findings.

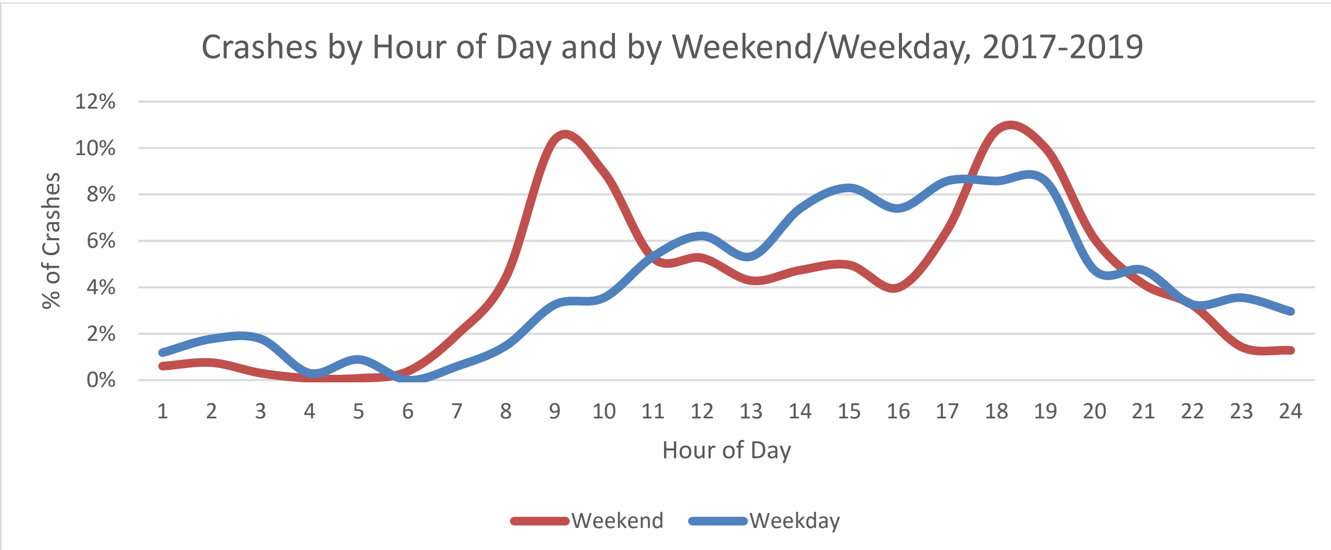


Figure 2: Crashes by Hour of Day Stratified by Weekend vs. Weekday, 2017-2019

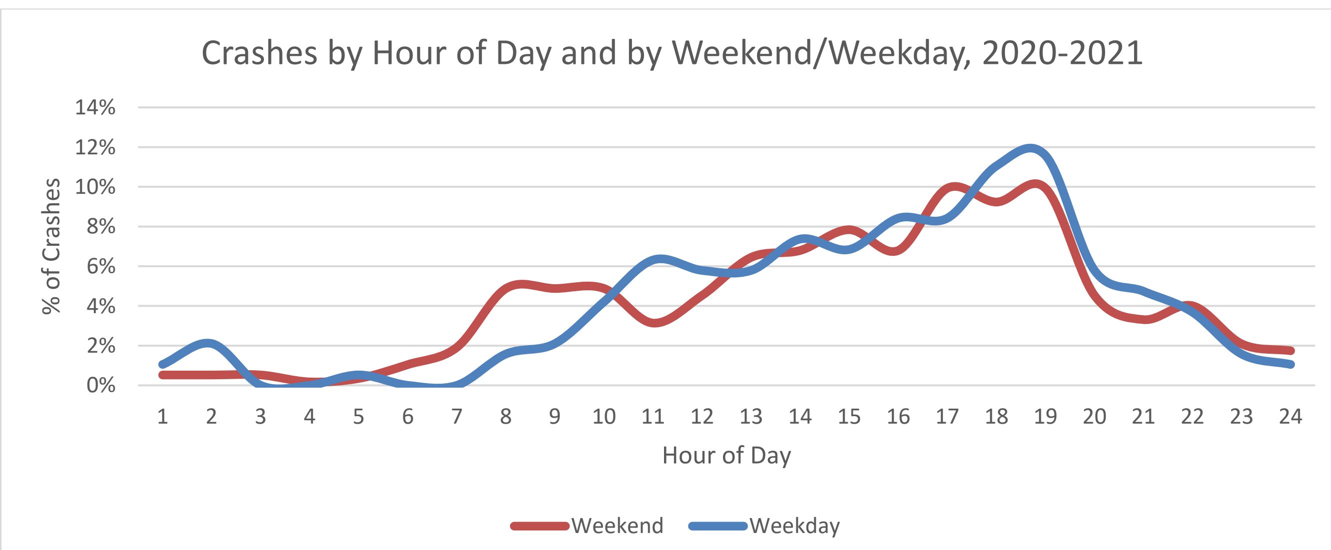


Figure 3: Crashes by Hour of Day Stratified by Weekend vs. Weekday, 2020-2021

Crashes by Day of Week

Crash rates by day of week, injury severity, and by study period are summarized in Table 13. Crash rates were generally higher for each day during the pre-pandemic study period. Overall crashes and KSI crashes were generally concentrated during the weekday for both study periods. During the pre-pandemic study period, crash rates were lowest during the weekend and on Monday. However, KSI crash rates were slightly more concentrated between Saturday through Monday during the pandemic study period compared to the pre-pandemic and 5-year study periods.

Table 13: Bicycle Crash Rates by Day of Week

Day of Week	Crash Rate/Year 2017-2019	Crash Rate/Year 2020-2021	Crash Rate/Year *2017-2021*	KSI Crash Rate/Year 2017-2019	KSI Crash Rate/Year 2020-2021	KSI Crash Rate/Year *2017-2021*
Sunday	52.00	44.50	***49.00***	3.67	4.50	***4.00***
Monday	70.67	41.00	***58.80***	5.33	6.00	***5.60***
Tuesday	87.33	61.50	***77.00***	8.67	4.00	***6.80***
Wednesday	95.67	59.00	***81.00***	10.00	6.00	***8.40***
Thursday	100.00	62.50	***85.00***	10.33	5.50	***8.40***
Friday	89.67	67.50	***80.80***	8.00	8.00	***8.00***
Saturday	60.67	51.00	***56.80***	4.67	5.00	***4.80***
Unknown	0.00	0.50	***0.20***	0.00	0.00	***0.00***
Total	***417.00***	***387.50***	***488.60***	***38.00***	***39.00***	***46.00***

The distribution of crashes by day of week is summarized in Table 14 (pre-pandemic) and Table 15 (pandemic). For both pre-pandemic and pandemic study periods, crashes occurred least often during the weekend and early weekdays (specifically Monday). Comparing the distribution of KSI crashes, pre-pandemic crashes were generally concentrated during weekdays (39.9% of KSI crashes; highest on Wednesday and Thursday), whereas KSI crashes during the pandemic period were highest on Fridays (20.5%) and otherwise relatively high on Monday, Wednesday, and Thursday (44.9% cumulatively).

The percentage of overall crashes and KSI crashes that occurred during the weekend was slightly higher during the pandemic study period compared to the pre-pandemic study period. This is likely associated with changes in travel behaviors, increases in recreational bicycling (typically occurring during the weekend), and higher rates of people working from home.

Table 14: Bicycle Crashes by Severity and Day of Week, 2017-2019

Day of week	# Crashes	% Crashes	Crash Rate/Year	# KSI	% KSI	KSI Crash Rate/Year	% Crashes Resulting in KSI
Sunday	156	9.4%	52.0	11	7.0%	3.7	7.1%
Monday	212	12.7%	70.7	17	10.8%	5.7	8.0%
Tuesday	262	15.7%	87.3	27	17.1%	9.0	10.3%
Wednesday	287	17.2%	95.7	32	20.3%	10.7	11.1%
Thursday	300	18.0%	100.0	31	19.6%	10.3	10.3%
Friday	269	16.1%	89.7	26	16.5%	8.7	9.7%
Saturday	182	10.9%	60.7	14	8.9%	4.7	7.7%
2017-2019 Total	***1,668***	***100.0%***	***556.0***	***158***	***100.0%***	***52.7***	***9.5%***

Table 15: Bicycle Crashes by Severity and Day of Week, 2020-2022

Day of week	# Crashes	% Crashes	Crash Rate/Year	# KSI	% KSI	KSI Crash Rate/Year	% Crashes Resulting in KSI
Sunday	88	11.5%	44.0	9	11.5%	4.5	10.2%
Monday	82	10.7%	41.0	12	15.4%	6.0	14.6%
Tuesday	119	15.6%	59.5	8	10.3%	4.0	6.7%
Wednesday	117	15.3%	58.5	12	15.4%	6.0	10.3%
Thursday	123	16.1%	61.5	11	14.1%	5.5	8.9%
Friday	132	17.3%	66.0	16	20.5%	8.0	12.1%
Saturday	102	13.4%	51.0	10	12.8%	5.0	9.8%
Unknown	1	0.1%	0.5	0	0.0%	0.0	0.0%
2020-2021 Total	***764***	***100.0%***	***382.0***	***78***	***100.0%***	***39.0***	***10.2%***

Crashes by Lighting Condition

Crashes by reported lighting condition are summarized in Table 16 (pre-pandemic) and Table 17 (pandemic). Both study periods have similar overall crash and KSI crash distributions – most crashes occurred during daylight conditions. This is expected as most trips are made during this period with daylight conditions. However, lighting condition clearly affects safety: crashes that occurred in darkness or low-light (i.e., dusk or dawn) conditions were much more likely to result in a KSI outcome compared to those that occurred during daylight. Lack of visibility and slower perception and reaction times are likely contributing factors for these nighttime crashes. Slower perception and reaction times can result in the motorist traveling at a higher speed (and transferring more kinetic energy) at the time of the crash, leading to a more severe outcome.

Table 16: Bicycle Crashes by Severity and Lighting Condition, 2017-2019

lighting	# Crashes	% Crashes	Crash Rate/Year	# KSI	% KSI	KSI Crash Rate/Year	% Crashes Resulting in KSI
Daylight	1,223	73.3%	407.7	95	62.5%	31.7	7.8%
Dark - Street Lights	320	19.2%	106.7	41	27.0%	13.7	**12.8%**
Dusk - Dawn	72	4.3%	24.0	9	5.9%	3.0	**12.5%**
Not Stated	34	2.0%	11.3	4	2.6%	1.3	11.8%
Dark - No Street Lights	16	1.0%	5.3	2	1.3%	0.7	12.5%
Dark - Street Lights Not	3	0.2%	1.0	1	0.7%	0.3	33.3%
2017-2019 Total	***1,668***	***100.0%***	***556.0***	***152***	***100.0%***	***50.7***	***9.1%***

Table 17: Bicycle Crashes by Severity and Lighting Condition, 2020-2022

lighting	# Crashes	% Crashes	Crash Rate/Year	# KSI	% KSI	KSI Crash Rate/Year	% Crashes Resulting in KSI
Daylight	563	73.7%	281.5	53	67.9%	26.5	9.4%
Dark - Street Lights	162	21.2%	81.0	19	24.4%	9.5	11.7%
Dusk - Dawn	23	3.0%	11.5	3	3.8%	1.5	13.0%
Not Stated	9	1.2%	4.5	0	0.0%	0.0	0.0%
Dark - No Street Lights	5	0.7%	2.5	2	2.6%	1.0	40.0%
Dark - Street Lights Not Functioning	2	0.3%	1.0	1	1.3%	0.5	50.0%
2020-2022 Total	***764***	***100.0%***	***382.0***	***78***	***100.0%***	***39.0***	***10.2%***

Crashes by Under the Influence of Alcohol

Between 2017-2021, only ten crashes that involved a motorist or a bicyclist who was under the influence and impaired. This is substantially fewer crashes than anticipated. Further research and coordination may help us understand this very low number of alcohol-related crashes.

Table 18: Bicycle Crashes that Involve a Party Who Was Under the Influence of Alcohol, 2017-2021

Party Type	2017-2019	2020-2022	Total
Bicyclist	1	3	***4***
Driver	3	2	***5***
Pedestrian	1	0	***1***
Total	***5***	***5***	***10***

Crashes by Weather Condition

Crashes are summarized by reported weather conditions for pre-pandemic crashes (Table 19) and pandemic crashes (Table 20). The vast majority of crashes occurred in clear weather conditions for both the pre-pandemic (86%) and pandemic (90%) study periods. Crashes that occurred during the pandemic when the weather condition was cloudy were slightly more severe compared to clear conditions, though the number of KSI crashes is relatively small and may be a contributing factor in the higher share of crashes resulting in a KSI outcome.

Table 19: Bicycle Crashes by Weather Condition, 20217-2019

Weather	# Crashes	% Crashes	Crash Rate/ Year	# KSI	% KSI	KSI Crash Rate/ Year	% Crashes Resulting in KSI
Clear	1,431	85.8%	477.0	136	86.1%	45.3	9.5%
Cloudy	125	7.5%	41.7	12	7.6%	4.0	9.6%
Raining	53	3.2%	17.7	3	1.9%	1.0	5.7%
Not Stated	39	2.3%	13.0	3	1.9%	1.0	7.7%
Other	14	0.8%	4.7	2	1.3%	0.7	14.3%
Wind	5	0.3%	1.7	1	0.6%	0.3	20.0%
Fog	1	0.1%	0.3	1	0.6%	0.3	100.0%
Total	***1,668***	***100.0%***	***556.0***	***158***	***100.0%***	***52.7***	***9.5%***

Table 20: Bicycle Crashes by Weather Condition, 2020-2021

Weather	# Crashes	% Crashes	Crash Rate/ Year	# KSI	% KSI	KSI Crash Rate/ Year	% Crashes Resulting in KSI
Clear	684	89.5%	342.0	69	88.5%	34.5	10.1%
Cloudy	57	7.5%	28.5	8	10.3%	4.0	14.0%
Raining	11	1.4%	5.5	0	0.0%	0.0	0.0%
Not Stated	9	1.2%	4.5	1	1.3%	0.5	11.1%
Other	3	0.4%	1.5	0	0.0%	0.0	0.0%
Total	***764***	***100.0%***	***382.0***	***78***	***100.0%***	***39.0***	***10.2%***

Parties Involved

This section reports on the number of parties involved in bicycle crashes – the main road users/vehicles involved in the crash, such as drivers, pedestrians, bicyclists, and parked vehicles. There will be more than one party for every crash record summarized in this memo except for solo-bicyclist crashes.

Analyzing the parties involved in crashes with at least one bicyclist provides additional insight into these crashes and potential crash dynamics. This analysis compared the distribution of parties involved in crashes to the population distribution of San Francisco. Values greater than one suggest that a certain segment of the population is overrepresented on a per capita basis, while values less than one suggest that that segment of the population is underrepresented on the same basis. It's important to note that this comparison is imperfect in two ways. First, if more or fewer people from a segment of the population bicycle, we would expect that to be reflected in crash rates, all else equal – and this proportion of people who bicycle may not reflect their per capita proportion. We likely see this, for example, in trends related to age and sex, and potentially related to race. In the absence of more nuanced exposure data, however, a per capita understanding is still valuable to help us understand how crashes are distributed among various segments of the population. Second, the home zip code is not readily available for all parties involved in the crash, so we cannot rule out that some people riding a bicycle or driving a motor vehicle live outside of San Francisco and their inclusion will therefore marginally affect the accuracy of the victim-to-population ratio. This affect is more likely to apply to drivers than to bicyclists in San Francisco.

Bicyclist Age

Table 21 summarizes the number of bicyclists involved in a crash by age for the three study periods, Figure 4 displays bicyclist representation by age, Figure 5 and displays KSI bicyclist representation by age. Bicyclists aged 25-39 – and particularly those aged 25-34 – accounted for the largest share of bicyclists involved in crashes in both time periods. Bicyclists aged 20-34 were the most overrepresented parties involved in a crash for all three study periods. Bicyclists aged 40-44 and 50-54 were overrepresented to a greater degree during the pandemic periods than in the pre-pandemic study period. Younger bicyclists were underrepresented in all years, but comprised a higher percentage of the parties during the pandemic compared to pre-pandemic crashes.

The distribution of KSI crashes by bicyclist age closely resembles the distribution for overall crashes. Similar to overall crashes, bicyclists aged between 20-25 and 30-39 were the most overrepresented in KSI crashes. There are some noticeable differences between the pre-pandemic and pandemic KSI bicyclist representation for bicyclists aged between 40-44 and 50-54, which is largely due to small sample sizes for both study periods.

Table 21: Number of Bicyclists Involved in a crash, by age and study period, 2017-2022

Bicyclist Age	% Parties			Population		Representation		
	2017-2019	2020-2022	All Years	#	%	2017-2019	2020-2022	All Years
0 – 4	0.0%	0.3%	0.1%	38,219	4.4%	0.00	0.06	0.02
5 – 9	0.2%	0.9%	0.4%	30,641	3.5%	0.05	0.25	0.12
10 – 14	0.7%	1.0%	0.8%	31,831	3.7%	0.18	0.28	0.21
15 – 19	2.6%	2.6%	2.6%	31,520	3.6%	0.70	0.70	0.70
20 – 24	9.1%	7.4%	8.6%	44,753	5.2%	1.77	1.44	1.66
25 – 29	18.5%	16.4%	17.8%	94,090	10.9%	1.70	1.51	1.64
30 – 34	18.8%	18.1%	18.6%	101,572	11.7%	1.60	1.54	1.58
35 – 39	12.3%	11.3%	12.0%	79,269	9.2%	1.34	1.23	1.31
40 – 44	8.6%	9.7%	9.0%	60,203	7.0%	1.24	1.40	1.29
45 – 49	7.3%	6.4%	7.0%	58,302	6.7%	1.08	0.95	1.04
50 – 54	6.6%	9.0%	7.4%	55,772	6.4%	1.03	1.39	1.14
55 – 59	6.1%	6.0%	6.1%	52,366	6.0%	1.01	1.00	1.00
60 – 64	3.0%	3.3%	3.1%	49,442	5.7%	0.53	0.58	0.55
65 – 69	2.3%	2.3%	2.3%	43,329	5.0%	0.47	0.46	0.46
70 – 74	1.0%	1.4%	1.1%	35,260	4.1%	0.25	0.35	0.28
75 – 79	0.4%	0.8%	0.5%	21,605	2.5%	0.17	0.31	0.21
80 – 84	0.2%	0.3%	0.2%	15,965	1.8%	0.13	0.14	0.13
85+	0.0%	0.0%	0.0%	21,794	2.5%	0.00	0.00	0.00
Unknown	2.3%	2.9%	2.5%	-	-	-	-	-
Total	**100.0%**	**100.0**	**100.0%**	**-**	**100.0%**	-	-	-
	1,676	**781**	**2,457**	**865,933**	**-**	**-**	**-**	-

Representation values greater than 1 indicates that age cohort is overrepresented in crashes. Values less than 1 indicate underrepresentation.

Figure 4: Bicyclist Representation by Age, 2017-2021

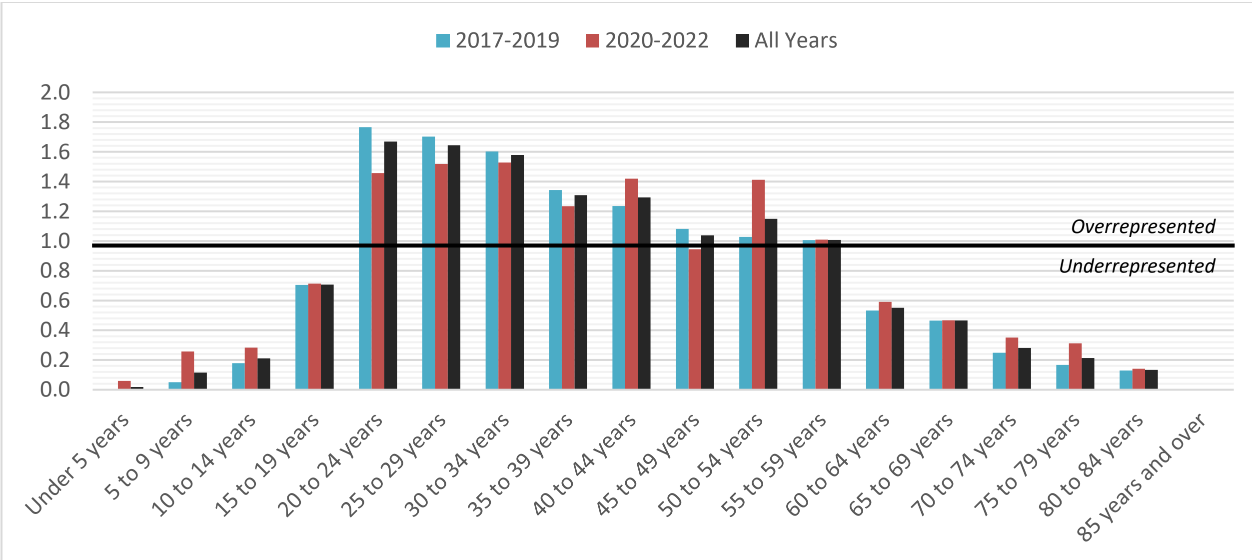
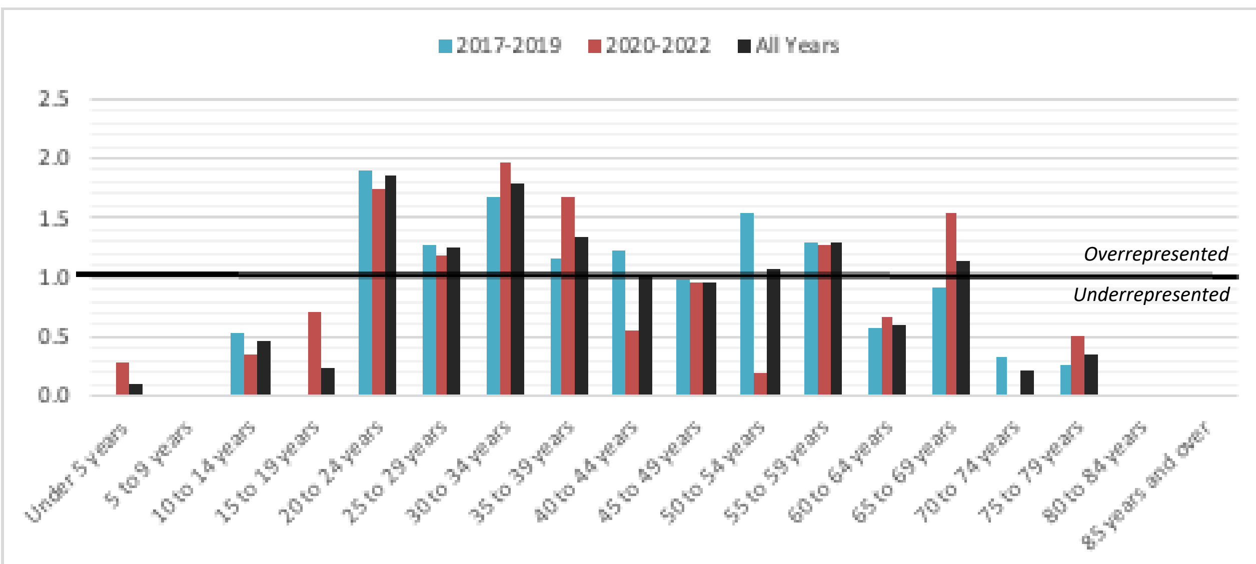


Figure 5: KSI Bicyclist Representation by Age, 2017-2021



Driver Age

Table 22 summarizes drivers involved in bicycle crashes by age and study period, Figure 6 displays the representation of drivers by age, Figure 7 and displays the representation of drivers by age involved in KSI crashes. The distributions of drivers between study periods are similar, with only minor differences no larger than two percentage points. Drivers aged 30-34 accounted for the largest share of drivers involved in crashes with a bicyclist for all three study periods. Like bicyclists, drivers were overrepresented on a per capita basis across a broad range of age cohorts in one or both time periods (20-24 and 35-59). Drivers aged 25-39 were generally underrepresented in these same time periods.

Driver representation in KSI crashes was slightly different than for overall crashes. Drivers aged 25-29 and 40-49 were the most overrepresented in the pre-pandemic period, whereas drivers aged 30-39 and 45-59 were the most overrepresented during the pandemic study period. Representation for both study periods should be interpreted with caution due to the smaller sample sizes for KSI crashes (116 drivers for pre-pandemic study period, 56 drivers for the pandemic study period).

Table 22: Number of Drivers Involved in a crash by age and study period, 2017-2022

Driver Age	% Parties			Population		Representation		
	2017-2019	2020-2022	All Years	# Population	% Population	2017-2019	2020-2022	All Years
0 – 4[14]	0.1%	0.5%	0.2%	38,219	4.4%	0.02	0.11	0.04
5 – 9	0.0%	0.0%	0.0%	30,641	3.5%	0.00	0.00	0.00
10 – 14	0.0%	0.0%	0.0%	31,831	3.7%	0.00	0.00	0.00
15 – 19	2.1%	1.3%	1.8%	31,520	3.6%	0.58	0.34	0.51
20 – 24	6.4%	5.9%	6.3%	44,753	5.2%	1.24	1.15	1.21
25 – 29	8.6%	6.9%	8.1%	94,090	10.9%	0.80	0.63	0.75
30 – 34	10.3%	10.2%	10.3%	101,572	11.7%	0.88	0.87	0.88
35 – 39	8.3%	10.2%	8.9%	79,269	9.2%	0.91	1.11	0.97
40 – 44	8.2%	8.3%	8.2%	60,203	7.0%	1.17	1.19	1.18
45 – 49	8.4%	8.3%	8.3%	58,302	6.7%	1.24	1.23	1.24
50 – 54	8.2%	7.8%	8.1%	55,772	6.4%	1.28	1.21	1.26
55 – 59	6.7%	8.3%	7.2%	52,366	6.0%	1.10	1.37	1.19
60 – 64	5.6%	4.9%	5.4%	49,442	5.7%	0.98	0.85	0.94
65 – 69	4.1%	2.8%	3.7%	43,329	5.0%	0.81	0.56	0.74
70 – 74	3.1%	2.2%	2.8%	35,260	4.1%	0.76	0.54	0.69
75 – 79	1.1%	1.9%	1.3%	21,605	2.5%	0.42	0.75	0.52
80 – 84	0.6%	0.9%	0.7%	15,965	1.8%	0.34	0.51	0.39
85+	0.0%	0.0%	0.0%	21,794	2.5%	0.00	0.00	0.00
Unknown	*18.3%*	*19.7%*	*18.7%*	-	-	-	-	-
Total	**100.0%**	**100.0%**	**100.0%**	-	**100.0%**	-	-	-
	1,423	**639**	**2,062**	**865,933**	-	**-**	**-**	-
Representation values greater than 1 indicates that age cohort is overrepresented in crashes. Values less than 1 indicate underrepresentation.								

[14] Values greater than 0% for cohorts younger than 16 years of age are likely reporting errors in the crash data.

Figure 6: Driver Representation by Age, 2017-2021

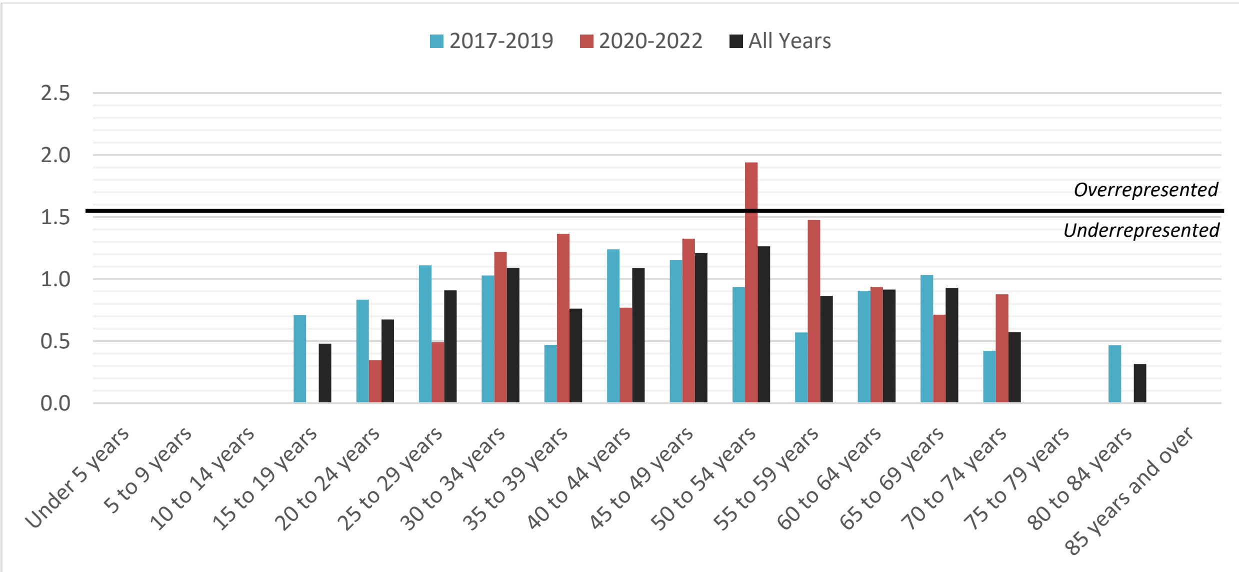
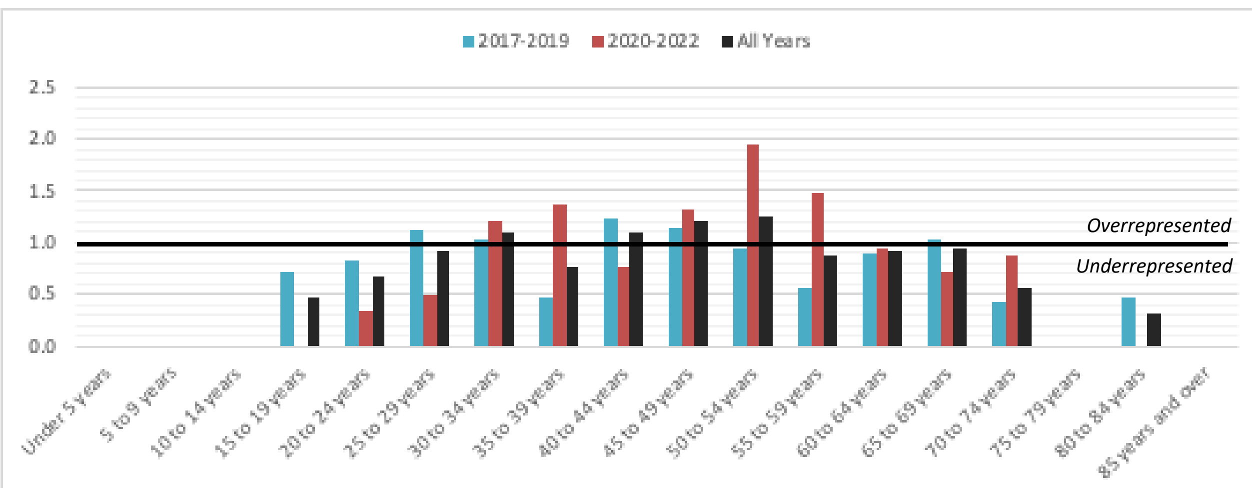


Figure 7: Driver Representation in KSI crashes by Age, 2017-2021



Bicyclist Race

Disclaimer: Party race is based on officer's assumption or visual impression, which can be problematic and inaccurate. Additionally, there are only five racial categories (excludes "Not Stated") within the crash data, in contrast to the US Census, which has nearly twice as many race and ethnicity categories. The victim representation and comparison made to the San Francisco population should be interpreted with caution given these reporting shortcomings.

Table 23 summarizes bicyclist race for the pre-pandemic study period. White bicyclists accounted for the largest share of bicyclists involved in a crash (57%), followed by Hispanic bicyclists (13%). When comparing the share of parties to the share of population by race, Black bicyclists were the most overrepresented (1.91) party involved in a crash, followed by white bicyclists (1.54). The Black population in San Francisco was 5%, but 9.6% of crashes involved a Black bicyclist. While these ratios do not account for the percentage of the population that rides a bike, they indicate a need to explore equity-related issues in order to understand the potential factors contributing to this disproportion. Additional research is needed to better understand the travel behaviors and mode use for each race.

Table 23: Bicyclist by Race, 2017-2019

Bicyclist Race	# Bicyclists	% of Bicyclists	# Population	% Population	Bicyclist Representation
Asian	182	10.9%	286,518	35.1%	0.31
Black	161	9.6%	40,955	5.0%	1.91
Hispanic	211	12.6%	128,030	15.7%	0.80
White	959	57.2%	302,182	37.1%	1.54
Other	131	7.8%	57,516	7.1%	1.11
Not Stated	32	1.9%	-	-	-
Total	***1,676***	***100%***	***815,201***	***100%***	-

Table 24 summarizes bicyclist race for the pre-pandemic study period for KSI crashes. The distribution and representation of KSI bicyclist by race was similar to overall crashes. Black bicyclists were the most overrepresented (1.70) followed by white bicyclists (1.62).

Table 24: KSI Bicyclist by Race, 2017-2019

Bicyclist Race	# KSI Bicyclists	% of KSI Bicyclists	# Population	% Population	KSI Bicyclist Representation
Asian	17	11.2%	286,518	35.1%	0.32
Black	13	8.6%	40,955	5.0%	1.70
Hispanic	18	11.8%	128,030	15.7%	0.75
White	91	59.9%	302,182	37.1%	1.62
Other	10	6.6%	57,516	7.1%	0.93
Not Stated	3	2.0%	-	0.0%	-
Total	***152***	***100.0%***	***815,201***	***100.0%***	**-**

Table 25 summarizes bicyclist race for the pandemic study period. The distribution of victims was somewhat like the pre-pandemic periods, but with some key differences. Black bicyclist representation in crashes was even higher in the pandemic period (2.19). Hispanic bicyclists were slightly overrepresented in crashes (1.19), compared to being underrepresented during the pre-pandemic period. Lastly, white bicyclists are still overrepresented in crashes but to a lesser degree than during the pre-pandemic period.

Table 25: Bicyclist by Race, 2020-2021

Bicyclist Race	# Bicyclists	% of Bicyclists	# Population	% Population	Bicyclist Representation
Asian	102	13.1%	286,518	35.1%	0.37
Black	86	11.0%	40,955	5.0%	2.19
Hispanic	146	18.7%	128,030	15.7%	1.19
White	394	50.4%	302,182	37.1%	1.36
Other	49	6.3%	57,516	7.1%	0.89
Not Stated	4	0.5%	-	-	-
Total	***781***	***100%***	***815,201***	***100%***	**-**

Table 26 summarizes bicyclist race for the pandemic study period for KSI crashes. The distribution and representation of KSI bicyclist by race was similar to overall crashes during the pandemic, with the exception that Hispanic bicyclists were underrepresented. Once again, Black bicyclists were the most overrepresented (2.30), followed by white bicyclists (1.49).

Table 26: KSI Bicyclist by Race, 2020-2021

Bicyclist Race	# KSI Bicyclists	% of KSI Bicyclists	# Population	% Population	KSI Bicyclist Representation
Asian	14	17.9%	286,518	35.1%	0.51
Black	9	11.5%	40,955	5.0%	2.30
Hispanic	9	11.5%	128,030	15.7%	0.73
White	43	55.1%	302,182	37.1%	1.49
Other	3	3.8%	57,516	7.1%	0.55
Total	***78***	***100.0%***	***815,201***	***100.0%***	**-**

Driver Race

The home zip code is not readily available for all parties involved in the crash, therefore we cannot rule out that some people driving a motor vehicle live outside of San Francisco and their inclusion will therefore marginally affect the accuracy of the victim-to-population ratio. This affect is more likely to apply to drivers than to bicyclists in San Francisco.

Table 27 summarizes driver race for the pre-pandemic study period. White drivers accounted for the largest share of drivers involved in a crash with a bicyclist (32%), followed by Asian (15.7%) and Black (15.5%) drivers. Like bicyclist representation, Black drivers were the most overrepresented driver group by a large margin, followed by “Other” (1.78).

Table 27: Driver by Race, 2017-2019

Driver Race	# Drivers	% of Drivers	# Population	% Population	Driver Representation
Asian	223	15.7%	286,518	35.1%	0.45
Black	191	13.4%	40,955	5.0%	2.67
Hispanic	217	15.2%	128,030	15.7%	0.97
White	453	31.8%	302,182	37.1%	0.86
Other	179	12.6%	57,516	7.1%	1.78
Not Stated	160	11.2%	-	-	-
Total	***1,423***	***100%***	***815,201***	***100%***	**-**

Table 28 summarizes driver race for the pre-pandemic study period for KSI crashes. The distribution of drivers by race involved in a KSI crashes is similar to the distribution for overall crashes except for the larger share of drivers that did not have an assigned racial category (22%). These crashes may be related to hit-and-run crashes, which are not identified in the study crash data. Similar to overall crashes, Black drivers were disproportionately involved in KSI crashes (2.23).

Table 28: Driver by Race Involved in KSI Crashes, 2017-2019

Driver Race	# Drivers	% of Drivers	# Population	% Population	Driver Representation
Asian	20	17.2%	286,518	35.1%	0.49
Black	13	11.2%	40,955	5.0%	2.23
Hispanic	18	15.5%	128,030	15.7%	0.99
White	31	26.7%	302,182	37.1%	0.72
Other	9	7.8%	57,516	7.1%	1.10
Not Stated	25	21.6%	-	0.0%	-
Total	***116***	***100.0%***	***815,201***	***100.0%***	**-**

Table 29 summarizes driver race for the pandemic study period. White drivers were again the most frequently involved racial category (26.6%), followed by Hispanic (18.9%) and Asian (18.2%) drivers (in contrast to the pre-pandemic period). Like the pre-pandemic period, Black drivers were the most overrepresented (2.65) group, followed by “Other” (1.66) and Hispanic (1.21). Hispanic drivers were slightly underrepresented during the pre-pandemic study period.

Table 29: Driver by Race, 2020-2021

Driver Race	# Drivers	% of Drivers	# Population	% Population	Driver Representation
Asian	116	18.2%	286,518	35.1%	0.52
Black	85	13.3%	40,955	5.0%	2.65
Hispanic	121	18.9%	128,030	15.7%	1.21
White	170	26.6%	302,182	37.1%	0.72
Other	75	11.7%	57,516	7.1%	1.66
Not Stated	72	11.3%	-	-	-
Total	***639***	***100%***	***815,201***	***100%***	**-**

Table 30 summarizes driver race for the pandemic study period for KSI crashes. The distribution of drivers by race involved in KSI crashes differed from the distribution for overall crashes, in that Asian (29%), Black (18%), and white (35%) drivers accounted for a larger share for KSI crashes compared to overall crashes. This difference may be related to changes to driving behaviors or statistical noise due to KSI crashes having a smaller sample size. Like overall crashes, Black drivers were disproportionately involved in KSI crashes (3.66).

Table 30: Driver by Race Involved in KSI Crashes, 2020-2021

Driver Race	# Drivers	% of Drivers	# Population	% Population	Driver Representation
Asian	14	28.6%	286,518	35.1%	0.81
Black	9	18.4%	40,955	5.0%	3.66
Hispanic	6	12.2%	128,030	15.7%	0.78
White	17	34.7%	302,182	37.1%	0.94
Other	3	6.1%	57,516	7.1%	0.87
Total	***49***	***100.0%***	***815,201***	***100.0%***	

Bicyclist and Driver Race

Table 31 and Table 32 summarize the number of parties involved in each crash for both the bicyclist and driver involved (only includes the first two parties involved – numbers will not match the previous race tables). Values greater than one indicate that particular bicyclist race was disproportionately involved in crashes with drivers of the corresponding driver race. These values are calculated by dividing the bicyclist percentage by the driver race percentage and are not per capita based, therefore these values cannot be compared to the other proportionality measures discussed in this analysis.

White bicyclists were not particularly overrepresented in crashes with a driver of other races during both study periods. Hispanic bicyclists were overrepresented in pre-pandemic crashes with white (1.13) and Asian (1.10) drivers, and were overrepresented in crashes during the pandemic study period with Hispanic (1.23) drivers. Asian bicyclists were slightly to moderately disproportionately involved in crashes during the pre-pandemic crashes with white (1.10), Hispanic (1.08), Asian (1.06), and other (1.12) drivers. Asian bicyclists were particularly overrepresented in pandemic crashes with Asian (1.44) and other (1.24) drivers. Black bicyclists were most disproportionately involved in crashes with

Hispanic (1.24) and Black (1.51) drivers during the pre-pandemic period. These patterns may reflect historic racial segregation and mobility in different neighborhoods throughout San Francisco. Additional research is needed to better understand the travel behaviors and mode preferences for each race.

Table 31: Primary Bicyclist and Primary Driver Race Representation, 2017-2019

Bicyclist Race	White	Hispanic	Asian	Black	Other	Not Stated	# Bicyclists
	Driver Race						
White	1.04	0.97	1.00	0.99	0.93	1.02	***774***
Hispanic	1.13	0.97	1.10	0.77	1.01	0.79	***181***
Asian	1.10	1.08	1.06	0.77	1.12	0.68	***133***
Black	0.76	1.24	1.03	1.51	0.95	0.76	***131***
Other	0.75	0.85	0.90	1.16	1.62	1.18	***107***
Not	0.67	1.13	0.28	0.64	0.00	4.30	***23***
# Drivers	***435***	***207***	***210***	***184***	***163***	***150***	

Table 32: Primary Bicyclist and Primary Driver Race Representation, 2020-2021

Bicyclist Race	White	Hispanic	Asian	Black	Other	Not Stated	# Bicyclists
	Driver Race						
White	1.02	0.96	0.96	1.07	0.84	1.17	***314***
Hispanic	0.92	1.23	0.90	0.90	1.05	1.05	***122***
Asian	0.98	1.06	1.44	0.77	1.24	0.24	***76***
Black	1.02	0.81	0.99	1.00	0.91	1.39	***66***
Other	1.15	0.77	0.91	1.05	1.63	0.44	***42***
Not	0.00	1.79	0.00	2.44	2.84	0.00	***3***
# Drivers	***167***	***116***	***114***	***85***	***73***	***68***	

Bicyclist Gender

Disclaimer: Party gender is based on officer's assumption or visual impression, which can be problematic and inaccurate. The only categorical values for gender in the crash report form include "male", "female", and "Not Stated" and do not include other personal gender identities. The victim representation and comparison made to the San Francisco population should be interpreted with caution given these reporting shortcomings.

Table 33 and Table 34 summarize bicyclists by gender for all crashes and KSI crashes respectively. Male bicyclists accounted for the majority of bicyclists involved in crashes and KSI crashes during both study periods. This may be a reflection of male bicyclists feeling more confident or comfortable riding a bicycle in San Francisco. This may also be a reflection of male bicyclists not experiencing perceived risk (crash or personal safety) that female or non-male-identifying bicyclists experience[15]. Additional

[15] https://safetrec.berkeley.edu/sites/default/files/whydontwomencycle_9.3_v2.pdf

research to better understand travel preferences and bicycling frequency by gender can help contextualize this finding.

Table 33: Number of Bicyclists Involved in a crash, by gender and study period, 2017-2022

Bicyclist Gender	% Parties			Population		Representation		
	2017-2019	2020-2022	All Years	# Population	% Population	2017-2019	2020-2022	All Years
Male	77.9%	78.6%	78.1%	443,653	51.2%	1.52	1.53	1.52
Female	21.4%	21.3%	21.4%	422,280	48.8%	0.44	0.44	0.44
Not Stated	0.7%	0.1%	0.5%	-	-	-	-	-
Total	***100.0%***	***100.0%***	***100.0%***	***865,933***	***100.0%***	**-**	-	-
Representation values greater than 1 indicates that age cohort is overrepresented in crashes. Values less than 1 indicate underrepresentation.								

Table 34: Number of fatally or severely injured Bicyclists Involved in a crash, by gender and study period, 2017-2022

Bicyclist Gender	% Parties			Population		Representation		
	2017-2019	2020-2022	All Years	# Population	% Population	2017-2019	2020-2022	All Years
Male	75.0%	80.8%	77.0%	443,653	51.2%	1.46	1.58	1.50
Female	23.7%	19.2%	22.2%	422,280	48.8%	0.49	0.39	0.45
Not Stated	1.3%	0.0%	0.9%	-	-	-	-	-
Total	***100.0%***	***100.0%***	***100.0%***	***865,933***	***100.0%***	**-**	**-**	**-**
Representation values greater than 1 indicates that age cohort is overrepresented in crashes. Values less than 1 indicate underrepresentation.								

Conclusion and Next Steps

This document summarized the who, when, and why questions related to bicycle crashes within San Francisco between 2017-2021 The findings of this analysis will be shared with the public during Community Engagement Phase 2 (April – June 2023). This is the final draft of the Step I analysis. The follow-up analysis (Step II) will begin and will use systemic safety principles to analyze where crashes occurred and what factors contributed to those crashes.

Appendix A

Generalized Violation Types

The table below represents the how violation types summarized in Table 9 and Table 10 have been grouped into similar violation types.

Table 35: California Vehicle Code Violation Types

Violation Code	Definition	Generalized Category
21657	The authorities in charge of any highway may designate any highway, roadway, part of a roadway, or specific lanes upon which vehicular traffic shall proceed in one direction at all or such times as shall be indicated by official traffic control devices. When a roadway has been so designated, a vehicle shall be driven only in the direction designated at all or such times as shall be indicated by traffic control devices.	Wrong way travel
21651	Bicyclists riding in the roadway or on a shoulder must ride in the same direction of traffic	Wrong way riding
21663	Must not operate a vehicle on a sidewalk except to enter or exit an adjacent properly	Vehicle on sidewalk
24002	Vehicles, loads, or other roadway equipment must not present a safety hazard and be lawfully equipped	Vehicle load ill-equipped
21209	Must not drive a vehicle in the bicycle lane	Vehicle in bike lane
22106	Must not stop, park, or reverse on a highway unless conditions are safe to do so	Unsafe stop
21712	Must not ride in a portion of a vehicle that is not intended for passengers (e.g., trunk)	Unsafe passenger position
21703	Must allow adequate space between vehicles traveling the same direction on a roadway	Unsafe pass
23336	It is unlawful to violate any rules or regulations adopted under Section 23334, notice of which has been given either by a sign on a vehicular crossing or by publication as provided in Section 23335.	Unknown
22515	Must set the brakes before leaving a vehicle unattended	Unattended vehicle
21960	The Department of Transportation and local authorities, by order, ordinance, or resolution, with respect to freeways, expressways, or designated portions thereof under their respective jurisdictions, to which vehicle access is completely or partially controlled, may prohibit or restrict the use of the freeways, expressways, or any portion thereof by pedestrians, bicycles or other nonmotorized traffic or by any person operating a motor-driven cycle, motorized bicycle, motorized scooter, or electrically motorized board.	Travel prohibited
21208	Bicyclists traveling at less than the normal speed of the roadway must travel in the bicycle lane if one is present, except when it is necessary to leave the lane to turn, overtake, or avoid a hazardous condition	Too slow condition
22400	Must not drive slower than a normal speed except when dangerous conditions are present, or stop unexpectedly on a roadway	Too slow condition
22350	Must drive at a reasonable speed	Too fast condition
21760	Must allow three feet of space between the vehicle and bicyclist when overtaking a bicyclist	Three feet safety
21461	Must obey all regulatory signals and signs (applies to pedestrians and drivers)	Disregard signal or sign
21457	Must abide by rules for flashing yellow and red signals	Disregard signal or sign
21229	If a class II bikeway is present, operators of motorized scooters shall ride in the bicycle lane, except when turning, overtaking, or avoiding a hazardous condition	Scooter needs to travel in bike lane
23103	Reckless driving occurs when a driver operates a vehicle with willful disregard for the safety of people or property	Reckless driving
21750	Must pass on the left if overtaking another vehicle	Overtaking

Violation Code	Definition	Generalized Category
21755	Must only pass another vehicle on the right if able to do so safely	Overtaking
21951	Must not overtake another vehicle that has stopped to yield to a pedestrian	Overtaking
21756	The driver of a vehicle overtaking any interurban electric or streetcar stopped or about to stop for the purpose of receiving or discharging any passenger shall stop the vehicle to the rear of the nearest running board or door of such car and thereupon remain standing until all passengers have boarded the car or upon alighting have reached a place of safety	Overtaking
12500	A person may not drive a motor vehicle upon a highway, unless the person then holds a valid driver license issued under this code, except those persons who are expressly exempted under this code.	No valid license
21235	Motorize scooter violation	Motorized Scooter Violation
21955	Pedestrians must cross in the middle of the block only where there is a crosswalk	Illegal mid-block crossing
21211	Must not loiter in a class I bikeway	Loiter in bike lane
21650	Must drive on right half of the highway except when passing another vehicle, making a legal left turn, or when the right half of the roadway is closed	Keep right
22110	The signals required by this chapter shall be given by signal lamp, unless a vehicle is not required to be and is not equipped with turn signals. Drivers of vehicles not required to be and not equipped with turn signals shall give a hand and arm signal when required by this chapter.	Improper signal
22105	Must not make a U-turn in areas where the driver does not have an unobstructed view for 200 feet in both directions	Improper U-turn
22102	Must not make a U-turn in a business district except at intersections or locations where U-Turns are permitted	Improper U-turn
22103	Must not make a U-turn in a residential district when any other vehicle is approaching in either direction within 200 feet, except at an intersection when the approaching vehicle is controlled by a traffic device	Improper U-turn
22107	Must turn in a safe place and use a turn signal	Improper turn
22100	Must make right- and left-hand turns as close as practicable to the right- and left-hand edge of roadway, respectively	Improper turn
22101	Must obey signals and signs indicating turning restrictions, such as no-turn-on-red signs or signals	Improper turn
21717	Whenever it is necessary for the driver of a motor vehicle to cross a bicycle lane that is adjacent to his lane of travel to make a turn, the driver shall drive the motor vehicle into the bicycle lane prior to making the turn and shall make the turn pursuant to Section 22100.	Improper turn
22450	Must stop at stop sign before intersection, or stop line, or crosswalk	Improper stop
22109	No person shall stop or suddenly decrease the speed of a vehicle on a highway without first giving an appropriate signal in the manner provided in this chapter to the driver of any vehicle immediately to the rear when there is opportunity to give the signal.	Improper stop
22500	A person shall not stop, park, or leave standing any vehicle whether attended or unattended, except when necessary to avoid conflict with other traffic or in compliance with the directions of a peace officer or official traffic control device	Improper parking
21658	Must drive within a single lane if roadway has been divided into two or more lanes, unless directed otherwise	Improper lane
23152	Must not drive while under the influence of alcohol	Impairment
23153	Must not drive while under the influence of alcohol and concurrently break the law	Impairment
21206	This chapter does not prevent local authorities, by ordinance, from regulating the registration of bicycles and the parking and operation of bicycles on pedestrian or bicycle facilities, provided such regulation is not in conflict with the provisions of this code	Illegal bicycle operation

Violation Code	Definition	Generalized Category
20001	Must stop if vehicle is involved in an accident resulting in an injury to a person, other than oneself	Hit and run
20002	The driver of any vehicle involved in an accident resulting only in damage to any property, including vehicles, shall immediately stop the vehicle at the nearest location that will not impede traffic or otherwise jeopardize the safety of other motorists.	Hit and run
21950	Must yield to pedestrian crossing the roadway at an intersection	Failure to yield to pedestrian
21952	Must yield to pedestrian before driving over or on any sidewalk	Failure to yield to pedestrian
21801	Must yield to oncoming traffic before turning left or making a U-Turn	Failure to yield – driver left turn
21804	Must yield to traffic when entering or crossing a highway	Failure to yield
21954	Pedestrians must yield right-of-way to vehicles except when at a marked crosswalk or an unmarked crosswalk at an intersection	Failure to yield
21800	Must yield to drivers already in an intersection when approaching an intersection	Failure to yield
21456	Pedestrians must obey pedestrian signal heads but must yield to vehicles legally in the intersection at the time that the signal is first shown	Failure to yield
21803	Drivers must obey yield signs at intersections controlled by a yield right-of-way sign	Failure to yield intersection
21451	A driver facing a circular green signal shall proceed straight through or turn right or left or make a U-turn unless a sign prohibits a U-turn. Any driver, including one turning, shall yield the right-of-way to other traffic and to pedestrians lawfully within the intersection or an adjacent crosswalk.	Failure to yield intersection
21707	No motor vehicle, except an authorized emergency vehicle or a vehicle of a duly authorized member of a fire or police department, shall be operated within the block wherein an emergency situation responded to by any fire department vehicle exists, except that in the event the nearest intersection to the emergency is more than 300 feet therefrom, this section shall prohibit operation of vehicles only within 300 feet of the emergency, unless directed to do so by a member of the fire department or police department, sheriff, deputy sheriff, or member of the California Highway Patrol.	Failure to yield emergency
22108	Any signal of intention to turn right or left shall be given continuously during the last 100 feet traveled by the vehicle before turning.	Failure to signal turn
21802	Must stop at stop sign and yield to drivers that do not have a stop sign	Fail to stop
21807	Drivers of emergency vehicles must drive with regard for the safety of all people and property	Emergency vehicle unsafe
21752	Must not drive on the left side of a roadway when approaching a grade or curve, or when the drivers vision is obstructed within 100 feet of a railroad crossing, intersection, bridge, or tunnel	Driving left of centerline
21203	Must not attach oneself to a streetcar or vehicle on the roadway if traveling by bicycle, motorcycle, skates, sled, or motorized bicycle	Drag tow
22517	Must not open vehicle door on the same side as moving traffic unless it will not interfere with moving traffic	Dooring
21460	Must not cross double parallel solid yellow or white lines	Do not cross solid line
23123	A person shall not drive a motor vehicle while using a wireless telephone unless that telephone is specifically designed and configured to allow hands-free listening and talking, and is used in that manner while driving.	Distracted phone
27400	A person operating a motor vehicle or bicycle may not wear a headset covering, earplugs in, or earphones covering, resting on, or inserted in, both ears.	Distracted headphones
21453	Must stop at red light	Disregard signal

Violation Code	Definition	Generalized Category
21202	Bicyclists must ride as close as practicable to the right-hand edge of the road, except when passing, preparing for a left-turn, avoiding roadway hazards, or preparing to turn right	Close practicable
21662	Must maintain control of vehicles on all roads and drive on the right side of the roadway if no center line is present	Close practicable
21751	Must not drive left of center on a two-lane roadway, except to pass	Close practicable
21956	Pedestrians must walk close to the right- or left-hand edge of the roadway	Close practicable
21200	Bicyclists must abide by the same rules as vehicle drivers	Bike-Vehicle violation
21201	Must not ride a bicycle on a roadway unless it is equipped with brakes, lights, and reflectors	Bike illegal equipment

Appendix B

Pre-Crash Movement (Full Tables)

The tables below expand upon Table 5 and Table 6 and display all crash types, not just the top 10 crash types.

Table 36: Bicycle Crashes by Pre-Crash Movements, 2017-2019

Bike + Motorist or Pedestrian Movements	# Crashes	% crashes	Crash Rate/ Year	# KSI	% KSI	KSI Crash Rate/ Year	% Crashes Resulting in KSI
Proceeding Straight, Proceeding Straight	310	18.6%	103.3	28	17.7%	9.3	9.0%
Proceeding Straight, Making Left Turn	215	12.9%	71.7	17	10.8%	5.7	7.9%
Proceeding Straight, Making Right Turn	202	12.1%	67.3	12	7.6%	4.0	5.9%
solo bike Proceeding Straight	139	8.3%	46.3	31	19.6%	10.3	22.3%
Proceeding Straight, Stopped	113	6.8%	37.7	13	8.2%	4.3	11.5%
Proceeding Straight, Parked	48	2.9%	16.0	5	3.2%	1.7	10.4%
Making Left Turn, Proceeding Straight	46	2.8%	15.3	4	2.5%	1.3	8.7%
Proceeding Straight, Making U Turn	40	2.4%	13.3	1	0.6%	0.3	2.5%
Proceeding Straight, Entering Traffic	33	2.0%	11.0	3	1.9%	1.0	9.1%
Proceeding Straight, Changing Lanes	33	2.0%	11.0	2	1.3%	0.7	6.1%
Proceeding Straight, Parking Maneuver	31	1.9%	10.3	3	1.9%	1.0	9.7%
Proceeding Straight, Crossing in Crosswalk at Intersection	31	1.9%	10.3	2	1.3%	0.7	6.5%
Making Right Turn, Proceeding Straight	23	1.4%	7.7	1	0.6%	0.3	4.3%
Proceeding Straight, Crossing Not in Crosswalk	23	1.4%	7.7	2	1.3%	0.7	8.7%
Stopped, Proceeding Straight	22	1.3%	7.3	0	0.0%	0.0	0.0%
Not Stated, Not Stated	17	1.0%	5.7	1	0.6%	0.3	5.9%
Proceeding Straight, Slowing/Stopping	16	1.0%	5.3	2	1.3%	0.7	12.5%
Proceeding Straight, Passing Other Vehicle	14	0.8%	4.7	0	0.0%	0.0	0.0%
Changing Lanes, Proceeding Straight	13	0.8%	4.3	0	0.0%	0.0	0.0%
Proceeding Straight, Backing	12	0.7%	4.0	0	0.0%	0.0	0.0%
Proceeding Straight, Other Unsafe Turning	12	0.7%	4.0	1	0.6%	0.3	8.3%
Proceeding Straight, Not Stated	12	0.7%	4.0	4	2.5%	1.3	33.3%
Proceeding Straight, nan	12	0.7%	4.0	0	0.0%	0.0	0.0%
solo bike Changing Lanes	11	0.7%	3.7	3	1.9%	1.0	27.3%
solo bike Making Left Turn	10	0.6%	3.3	1	0.6%	0.3	10.0%
Proceeding Straight, Not in Road	10	0.6%	3.3	0	0.0%	0.0	0.0%
Entering Traffic, Proceeding Straight	10	0.6%	3.3	2	1.3%	0.7	20.0%
Stopped, Stopped	9	0.5%	3.0	0	0.0%	0.0	0.0%
Proceeding Straight, In Road, Including Shoulder	9	0.5%	3.0	2	1.3%	0.7	22.2%
Passing Other Vehicle, Proceeding Straight	8	0.5%	2.7	0	0.0%	0.0	0.0%
Passing Other Vehicle, Stopped	7	0.4%	2.3	0	0.0%	0.0	0.0%
Proceeding Straight, Other	6	0.4%	2.0	2	1.3%	0.7	33.3%
solo bike Making Right Turn	6	0.4%	2.0	1	0.6%	0.3	16.7%
Traveling Wrong Way, Proceeding Straight	6	0.4%	2.0	0	0.0%	0.0	0.0%
Making Right Turn, Stopped	6	0.4%	2.0	0	0.0%	0.0	0.0%
Other, Proceeding Straight	5	0.3%	1.7	0	0.0%	0.0	0.0%
Making Left Turn, Making Left Turn	5	0.3%	1.7	2	1.3%	0.7	40.0%
Stopped, Making Right Turn	5	0.3%	1.7	0	0.0%	0.0	0.0%
Proceeding Straight, Merging	5	0.3%	1.7	0	0.0%	0.0	0.0%
Making Right Turn, Making Left Turn	5	0.3%	1.7	0	0.0%	0.0	0.0%
solo bike Other	4	0.2%	1.3	1	0.6%	0.3	25.0%
Traveling Wrong Way, Making Left Turn	4	0.2%	1.3	0	0.0%	0.0	0.0%
solo bike Passing Other Vehicle	4	0.2%	1.3	1	0.6%	0.3	25.0%
Traveling Wrong Way, Making Right Turn	4	0.2%	1.3	0	0.0%	0.0	0.0%
Other Unsafe Turning, Proceeding Straight	4	0.2%	1.3	0	0.0%	0.0	0.0%
solo bike Stopped	3	0.2%	1.0	0	0.0%	0.0	0.0%
Proceeding Straight, Ran Off Road	3	0.2%	1.0	0	0.0%	0.0	0.0%

Bike + Motorist or Pedestrian Movements	# Crashes	% crashes	Crash Rate/ Year	# KSI	% KSI	KSI Crash Rate/ Year	% Crashes Resulting in KSI
Changing Lanes, Stopped	3	0.2%	1.0	0	0.0%	0.0	0.0%
Passing Other Vehicle, Making Right Turn	3	0.2%	1.0	1	0.6%	0.3	33.3%
solo bike Slowing/Stopping	3	0.2%	1.0	1	0.6%	0.3	33.3%
Proceeding Straight, No Pedestrian Involved	3	0.2%	1.0	1	0.6%	0.3	33.3%
Making Left Turn, Parked	3	0.2%	1.0	0	0.0%	0.0	0.0%
Not Stated, Proceeding Straight	3	0.2%	1.0	1	0.6%	0.3	33.3%
Proceeding Straight, Crossing in Crosswalk Not at Intersection	3	0.2%	1.0	0	0.0%	0.0	0.0%
Making U Turn, Proceeding Straight	3	0.2%	1.0	0	0.0%	0.0	0.0%
Making Right Turn, Making Right Turn	3	0.2%	1.0	0	0.0%	0.0	0.0%
Not Stated, Making Left Turn	3	0.2%	1.0	0	0.0%	0.0	0.0%
Merging, Proceeding Straight	2	0.1%	0.7	0	0.0%	0.0	0.0%
Making Right Turn, Crossing in Crosswalk at Intersection	2	0.1%	0.7	0	0.0%	0.0	0.0%
Other, Other	2	0.1%	0.7	0	0.0%	0.0	0.0%
Entering Traffic, Making Right Turn	2	0.1%	0.7	0	0.0%	0.0	0.0%
Stopped, Making Left Turn	2	0.1%	0.7	0	0.0%	0.0	0.0%
Entering Traffic, nan	2	0.1%	0.7	0	0.0%	0.0	0.0%
Changing Lanes, Changing Lanes	2	0.1%	0.7	0	0.0%	0.0	0.0%
Not Stated, Stopped	2	0.1%	0.7	0	0.0%	0.0	0.0%
Making Left Turn, Stopped	2	0.1%	0.7	1	0.6%	0.3	50.0%
Making Left Turn, Crossing in Crosswalk at Intersection	2	0.1%	0.7	0	0.0%	0.0	0.0%
solo bike Ran Off Road	2	0.1%	0.7	1	0.6%	0.3	50.0%
Making Left Turn, nan	2	0.1%	0.7	0	0.0%	0.0	0.0%
Stopped, Passing Other Vehicle	2	0.1%	0.7	0	0.0%	0.0	0.0%
Not Stated, nan	2	0.1%	0.7	0	0.0%	0.0	0.0%
Other, Making Right Turn	2	0.1%	0.7	1	0.6%	0.3	50.0%
Proceeding Straight, Traveling Wrong Way	2	0.1%	0.7	0	0.0%	0.0	0.0%
Making Left Turn, Making Right Turn	1	0.1%	0.3	0	0.0%	0.0	0.0%
Passing Other Vehicle, Not Stated	1	0.1%	0.3	0	0.0%	0.0	0.0%
Passing Other Vehicle, Making Left Turn	1	0.1%	0.3	0	0.0%	0.0	0.0%
Making Left Turn, Other Unsafe Turning	1	0.1%	0.3	0	0.0%	0.0	0.0%
Stopped, In Road, Including Shoulder	1	0.1%	0.3	0	0.0%	0.0	0.0%
Proceeding Straight, Crossed Into Opposing Lane	1	0.1%	0.3	0	0.0%	0.0	0.0%
Traveling Wrong Way, Crossing Not in Crosswalk	1	0.1%	0.3	0	0.0%	0.0	0.0%
Other, Passing Other Vehicle	1	0.1%	0.3	0	0.0%	0.0	0.0%
Merging, Merging	1	0.1%	0.3	0	0.0%	0.0	0.0%
Entering Traffic, Backing	1	0.1%	0.3	0	0.0%	0.0	0.0%
solo bike Traveling Wrong Way	1	0.1%	0.3	0	0.0%	0.0	0.0%
Making Right Turn, nan	1	0.1%	0.3	0	0.0%	0.0	0.0%
Passing Other Vehicle, Parking Maneuver	1	0.1%	0.3	0	0.0%	0.0	0.0%
Other, Stopped	1	0.1%	0.3	0	0.0%	0.0	0.0%
Stopped, Slowing/Stopping	1	0.1%	0.3	0	0.0%	0.0	0.0%
Making Right Turn, Parked	1	0.1%	0.3	1	0.6%	0.3	100.0%
Passing Other Vehicle, Entering Traffic	1	0.1%	0.3	0	0.0%	0.0	0.0%
Parked, Proceeding Straight	1	0.1%	0.3	0	0.0%	0.0	0.0%
Not Stated, Making U Turn	1	0.1%	0.3	0	0.0%	0.0	0.0%
Entering Traffic, Crossing Not in Crosswalk	1	0.1%	0.3	0	0.0%	0.0	0.0%
Other Unsafe Turning, Making Right Turn	1	0.1%	0.3	0	0.0%	0.0	0.0%
Passing Other Vehicle, Slowing/Stopping	1	0.1%	0.3	0	0.0%	0.0	0.0%
Passing Other Vehicle, Parked	1	0.1%	0.3	0	0.0%	0.0	0.0%
Entering Traffic, Making Left Turn	1	0.1%	0.3	1	0.6%	0.3	100.0%
Stopped, Crossing in Crosswalk at Intersection	1	0.1%	0.3	0	0.0%	0.0	0.0%
Slowing/Stopping, Backing	1	0.1%	0.3	0	0.0%	0.0	0.0%
Other, Not in Road	1	0.1%	0.3	0	0.0%	0.0	0.0%
Slowing/Stopping, Parking Maneuver	1	0.1%	0.3	0	0.0%	0.0	0.0%
Traveling Wrong Way, Stopped	1	0.1%	0.3	0	0.0%	0.0	0.0%

Bike + Motorist or Pedestrian Movements	# Crashes	% crashes	Crash Rate/ Year	# KSI	% KSI	KSI Crash Rate/ Year	% Crashes Resulting in KSI
Slowing/Stopping, Proceeding Straight	1	0.1%	0.3	0	0.0%	0.0	0.0%
Stopped, Ran Off Road	1	0.1%	0.3	0	0.0%	0.0	0.0%
Slowing/Stopping, Traveling Wrong Way	1	0.1%	0.3	0	0.0%	0.0	0.0%
Not Stated, Crossing in Crosswalk at Intersection	1	0.1%	0.3	1	0.6%	0.3	100.0%
Parking Maneuver, Proceeding Straight	1	0.1%	0.3	0	0.0%	0.0	0.0%
Changing Lanes, Entering Traffic	1	0.1%	0.3	0	0.0%	0.0	0.0%
Passing Other Vehicle, Changing Lanes	1	0.1%	0.3	0	0.0%	0.0	0.0%
Backing, In Road, Including Shoulder	1	0.1%	0.3	0	0.0%	0.0	0.0%
Ran Off Road, Merging	1	0.1%	0.3	0	0.0%	0.0	0.0%
Ran Off Road, Proceeding Straight	1	0.1%	0.3	1	0.6%	0.3	100.0%
Making Left Turn, Passing Other Vehicle	1	0.1%	0.3	0	0.0%	0.0	0.0%
Total	***1668***	***100.0%***	***556.0***	***158***	***100.0%***	***52.7***	***9.5%***

Table 37: Bicycle Crashes by Pre-Crash Movements, 2020-2021

Bike + Motorist or Pedestrian Movements	# Crashes	% crashes	Crash Rate/ Year	# KSI	% KSI	KSI Crash Rate/ Year	% Crashes Resulting in KSI
Proceeding Straight, Proceeding Straight	185	24.2%	92.5	21	26.9%	10.5	11.4%
Proceeding Straight, Making Left Turn	105	13.7%	52.5	7	9.0%	3.5	6.7%
Proceeding Straight, Making Right Turn	81	10.6%	40.5	3	3.8%	1.5	3.7%
solo bike Proceeding Straight	78	10.2%	39.0	16	20.5%	8.0	20.5%
Proceeding Straight, Stopped	34	4.5%	17.0	3	3.8%	1.5	8.8%
Making Left Turn, Proceeding Straight	24	3.1%	12.0	2	2.6%	1.0	8.3%
Proceeding Straight, Making U Turn	18	2.4%	9.0	1	1.3%	0.5	5.6%
Proceeding Straight, Parked	14	1.8%	7.0	1	1.3%	0.5	7.1%
Proceeding Straight, Entering Traffic	12	1.6%	6.0	1	1.3%	0.5	8.3%
Proceeding Straight, Changing Lanes	11	1.4%	5.5	0	0.0%	0.0	0.0%
Changing Lanes, Proceeding Straight	11	1.4%	5.5	2	2.6%	1.0	18.2%
Making Right Turn, Proceeding Straight	10	1.3%	5.0	2	2.6%	1.0	20.0%
Entering Traffic, Proceeding Straight	9	1.2%	4.5	3	3.8%	1.5	33.3%
Not Stated, Not Stated	9	1.2%	4.5	1	1.3%	0.5	11.1%
Traveling Wrong Way, Proceeding Straight	8	1.0%	4.0	1	1.3%	0.5	12.5%
Proceeding Straight, In Road, Including Shoulder	8	1.0%	4.0	2	2.6%	1.0	25.0%
Proceeding Straight, Other	8	1.0%	4.0	1	1.3%	0.5	12.5%
Proceeding Straight, Crossing in Crosswalk at Intersection	7	0.9%	3.5	0	0.0%	0.0	0.0%
Proceeding Straight, Parking Maneuver	7	0.9%	3.5	1	1.3%	0.5	14.3%
Proceeding Straight, Not in Road	7	0.9%	3.5	0	0.0%	0.0	0.0%
Proceeding Straight, Crossing Not in Crosswalk	7	0.9%	3.5	0	0.0%	0.0	0.0%
solo bike Slowing/Stopping	6	0.8%	3.0	2	2.6%	1.0	33.3%
Stopped, Proceeding Straight	6	0.8%	3.0	0	0.0%	0.0	0.0%
Other, Proceeding Straight	6	0.8%	3.0	0	0.0%	0.0	0.0%
Stopped, Stopped	5	0.7%	2.5	0	0.0%	0.0	0.0%
solo bike Other	5	0.7%	2.5	1	1.3%	0.5	20.0%
solo bike Making Left Turn	4	0.5%	2.0	1	1.3%	0.5	25.0%
Proceeding Straight, Slowing/Stopping	4	0.5%	2.0	0	0.0%	0.0	0.0%
Making Left Turn, Making Right Turn	4	0.5%	2.0	0	0.0%	0.0	0.0%
Making Left Turn, Making Left Turn	3	0.4%	1.5	0	0.0%	0.0	0.0%
Traveling Wrong Way, Making Right Turn	3	0.4%	1.5	0	0.0%	0.0	0.0%
Other, Making Left Turn	3	0.4%	1.5	0	0.0%	0.0	0.0%
solo bike Changing Lanes	3	0.4%	1.5	1	1.3%	0.5	33.3%
Not Stated, Proceeding Straight	3	0.4%	1.5	0	0.0%	0.0	0.0%
Stopped, Making Right Turn	3	0.4%	1.5	0	0.0%	0.0	0.0%

Bike + Motorist or Pedestrian Movements	# Crashes	% crashes	Crash Rate/ Year	# KSI	% KSI	KSI Crash Rate/ Year	% Crashes Resulting in KSI
Changing Lanes, Changing Lanes	3	0.4%	1.5	0	0.0%	0.0	0.0%
solo bike Making Right Turn	2	0.3%	1.0	0	0.0%	0.0	0.0%
Changing Lanes, Stopped	2	0.3%	1.0	0	0.0%	0.0	0.0%
Making Right Turn, Making Left Turn	2	0.3%	1.0	0	0.0%	0.0	0.0%
Proceeding Straight, Backing	2	0.3%	1.0	0	0.0%	0.0	0.0%
Proceeding Straight, Traveling Wrong Way	2	0.3%	1.0	0	0.0%	0.0	0.0%
Making Left Turn, Other	2	0.3%	1.0	0	0.0%	0.0	0.0%
Making Left Turn, Stopped	2	0.3%	1.0	0	0.0%	0.0	0.0%
Proceeding Straight, Not Stated	2	0.3%	1.0	0	0.0%	0.0	0.0%
Slowing/Stopping, Other	1	0.1%	0.5	1	1.3%	0.5	100.0%
Crossed Into Opposing Lane, Proceeding Straight	1	0.1%	0.5	0	0.0%	0.0	0.0%
Other, Backing	1	0.1%	0.5	0	0.0%	0.0	0.0%
Making Right Turn, Making U Turn	1	0.1%	0.5	0	0.0%	0.0	0.0%
Making Left Turn, Crossing in Crosswalk at Intersection	1	0.1%	0.5	0	0.0%	0.0	0.0%
Traveling Wrong Way, Stopped	1	0.1%	0.5	0	0.0%	0.0	0.0%
Not Stated, Stopped	1	0.1%	0.5	0	0.0%	0.0	0.0%
Making U Turn, Proceeding Straight	1	0.1%	0.5	0	0.0%	0.0	0.0%
solo bike Not Stated	1	0.1%	0.5	0	0.0%	0.0	0.0%
Proceeding Straight, Merging	1	0.1%	0.5	0	0.0%	0.0	0.0%
Other, Stopped	1	0.1%	0.5	1	1.3%	0.5	100.0%
Proceeding Straight, nan	1	0.1%	0.5	1	1.3%	0.5	100.0%
Entering Traffic, Not Stated	1	0.1%	0.5	0	0.0%	0.0	0.0%
Merging, Other	1	0.1%	0.5	0	0.0%	0.0	0.0%
Slowing/Stopping, Stopped	1	0.1%	0.5	0	0.0%	0.0	0.0%
Other, Making Right Turn	1	0.1%	0.5	0	0.0%	0.0	0.0%
solo bike Entering Traffic	1	0.1%	0.5	0	0.0%	0.0	0.0%
Stopped, Backing	1	0.1%	0.5	0	0.0%	0.0	0.0%
Parked, Proceeding Straight	1	0.1%	0.5	0	0.0%	0.0	0.0%
Other, Not in Road	1	0.1%	0.5	0	0.0%	0.0	0.0%
Other, Entering Traffic	1	0.1%	0.5	0	0.0%	0.0	0.0%
Traveling Wrong Way, Entering Traffic	1	0.1%	0.5	0	0.0%	0.0	0.0%
Making Left Turn, Not in Road	1	0.1%	0.5	0	0.0%	0.0	0.0%
Other, Parking Maneuver	1	0.1%	0.5	0	0.0%	0.0	0.0%
Other, nan	1	0.1%	0.5	1	1.3%	0.5	100.0%
Merging, Proceeding Straight	1	0.1%	0.5	0	0.0%	0.0	0.0%
Other, Other	1	0.1%	0.5	1	1.3%	0.5	100.0%
Not Stated, Changing Lanes	1	0.1%	0.5	0	0.0%	0.0	0.0%
Traveling Wrong Way, Making Left Turn	1	0.1%	0.5	0	0.0%	0.0	0.0%
Not Stated, Making Left Turn	1	0.1%	0.5	0	0.0%	0.0	0.0%
Entering Traffic, Making Right Turn	1	0.1%	0.5	0	0.0%	0.0	0.0%
Not Stated, Making Right Turn	1	0.1%	0.5	0	0.0%	0.0	0.0%
Making Left Turn, Backing	1	0.1%	0.5	0	0.0%	0.0	0.0%
Parked, Stopped	1	0.1%	0.5	0	0.0%	0.0	0.0%
Total	***764***	***100.0%***	***382.0***	***78***	***100.0%***	***39.0***	***10.2%***

Appendix H

Biking and Rolling Plan

Summer 2024 Neighborhood Outreach Report

DRAFT FOR PUBLIC ENGAGEMENT

SFMTA

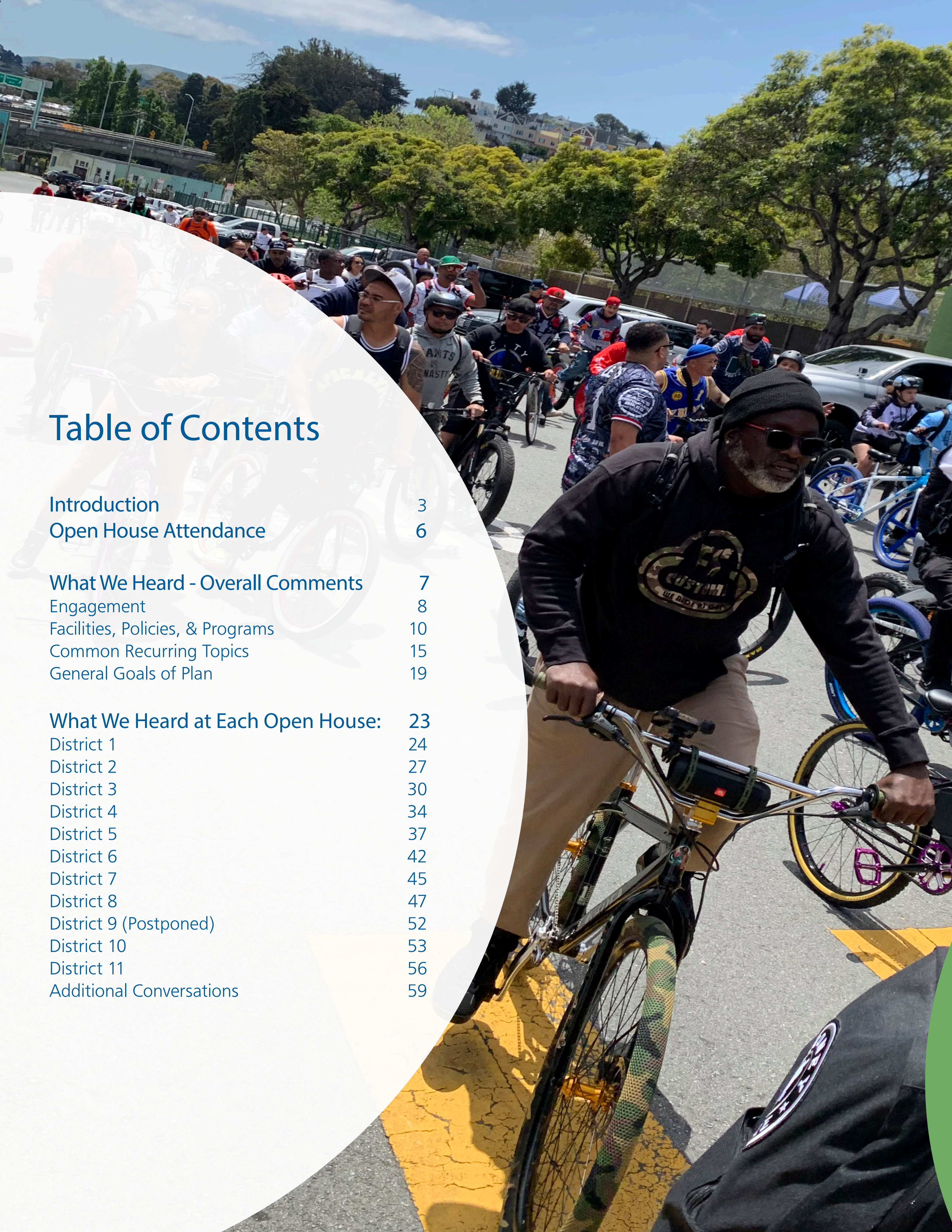


Table of Contents

Introduction

The San Francisco Biking and Rolling Plan has a goal to deliver a safe, connected biking and rolling network within a quarter mile of everyone, involving a two-year process to help the SFMTA meet the needs of those who roll and bike over the next 10-15 years.

For Phase 3 of the Biking and Rolling Plan, the SFMTA hosted 10 open houses over the summer of 2024, meeting with hundreds of stakeholders throughout the city to share draft materials based on the year-long community outreach efforts in Phase 1 and Phase 2. Participants were asked to provide comments on a policy framework, suggested programs, and three bikeway scenario maps, weighing in on the tradeoffs of different policy choices and how they could result in different locations and types of bikeways.

Equity is at the center of the Biking and Rolling Plan.

SFMTA is working with community groups (Bayview Hunters Point Community Advocates, New Community Leadership Foundation, PODER, SOMA Pilipinas, and Tenderloin Community Benefit District) in six Equity Priority Neighborhoods, which have historically experienced displacement and disproportionate negative impact from past transportation initiatives, to develop "community action plans". These plans will include community developed guidance related to engagement, infrastructure, policies, and programs, as well as identifying what systemic harm looks like in each neighborhood.

As part of these equity initiatives, participants at the open houses were asked to provide feedback on the latest iterations of:

- **Goals and policy developed through the Policy Working Group and the Equity Priority Community groups**

- **Programs developed through community outreach and input from the Equity Priority Community Group related to:**
    - o Affordability and access
    - o Education and encouragement
    - o Economic and workforce development

In achieving the broader safety and connectivity goals of the Biking and Rolling Plan, SFMTA staff presented key aspects of an improved biking and rolling network, including:

- **Facility Toolkit, made up of types of infrastructure that people feel the safest on:**
    - o Car-free spaces like streets and paths
    - o Protected with hardened separation
    - o Separated with quick-build materials
    - o Shared roadways with heavy traffic calming and painted treatments

- **Policies that influence possible bikeways in the network:**
    - o Community-led choices in Equity Priority Communities
    - o All ages and abilities in facility types
    - o Prioritizing school access
    - α. How we work in constrained spaces and merchant corridors with other elements that utilize space on the street, including transit routes, fire department response routes, street parking, parklets, and other streetscape elements

- **Network certainty map showing what bikeways are approved, newly proposed or suggested, categorizing them as either:**
  - High certainty / Approved already
  - Medium certainty / Newly proposed by SFMTA staff
  - Low certainty / Newly suggested bikeways by community

In turn, three network scenarios were presented for open house participants to comment and weigh in on, each applying different sets of these policies and facility toolkits, along with the associated tradeoffs:

- **Scenario A: Heavily protected and separated**
  - People feel the safest, significant parking removal, a lot of work needed to design for accessibility needs, high cost and staffing capacity, and four merchant corridors that will require outreach work beyond this plan
- **Scenario B: Painted lanes with heavy traffic calming**
  - People feel less safe, minimal parking removal, a lot of work needed to design for accessibility needs, more historically traditional cost and staffing capacity needed
- **Scenario C: Significantly traffic-calmed zones centered around schools**
  - Centered on shorter trips, people feel less safe, minimal parking removal, a lot of work needed to design for accessibility needs, high cost and high staffing capacity needed

In the following report, we outline an illustrative summary of what we heard overall across the summer open houses and outreach meetings and what we heard about some specific locations at each open house and outreach meetings. SFMTA staff will use the comments to help weigh the trade-offs and refine the draft materials.

Note: SFMTA staff carefully read each comment, used AI via Microsoft Copilot to help organize and summarize comments, and then verified accuracy of the outputs.

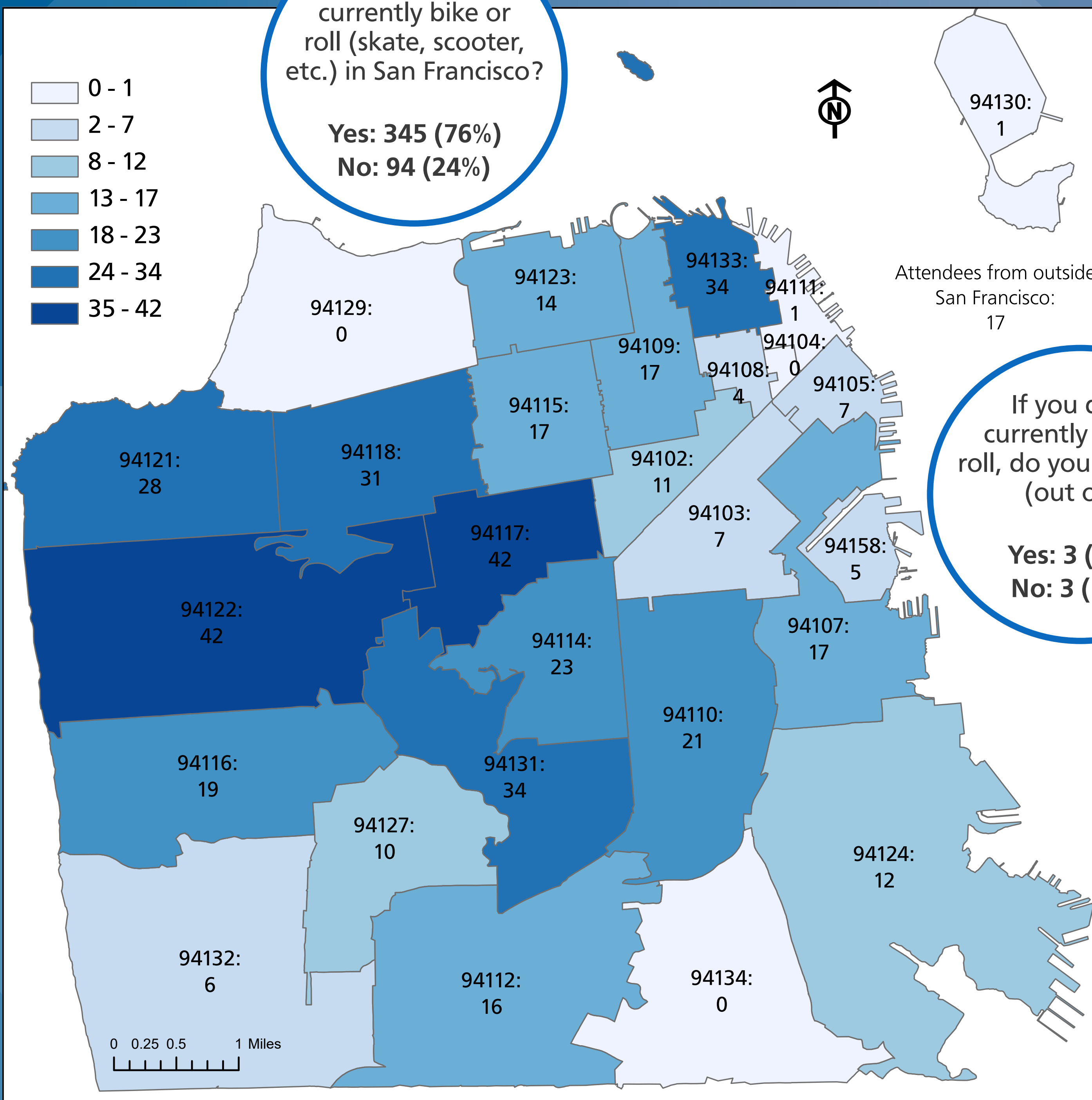
Any suggested bikeways and/or improvements in the Plan will still go through project-specific outreach to refine the plans and designs of proposed bikeways.

Neighborhood Open House Attendance - Summer 2024

Approximately **486 people attended** the 10 neighborhood open houses held across San Francisco this summer. Here is a breakdown of where attendees came from by zip code:

Do you currently bike or roll (skate, scooter, etc.) in San Francisco?

Yes: 345 (76%)
No: 94 (24%)



If you don't currently bike or roll, do you want to? (out of 6)

Yes: 3 (50%)
No: 3 (50%)

*Numbers based on information provided by attendees upon sign in at each open house event

What We Heard - Overall Comments

Below, we outline an illustrative summary of what we heard generally about the Biking and Rolling Plan. SFMTA staff will use the comments to help weigh the trade-offs and refine the draft materials.

"Slow streets are lovely. They help bikers & pedestrians. They help create a sense of community & make urban neighborhoods more neighborhoody, connected, & kind"

"Please keep in mind the needs of seniors and people with disabilities, their accessibility needs are unique."

"Consider cyclist who are uncomfortable now/ not biking - what would it take to get them on the road?"

Comments about Engagement for the Plan

1. **Acknowledge Past Harms First:**
    - Many participants were generally wary of the SFMTA engagement and plan development process, which made them understandably wary of this project.
    - Participants brought up old bus lines and issues with current service and quick-build projects that caused them harm in the past.

2. **Conduct Effective Community Engagement and Outreach:**
    - Develop creative, clear, and inclusive engagement processes to build stronger relationships with communities.
    - Improve communication channels to notify of project updates and timelines.
    - Conduct additional rounds of public input with more time to review proposals prior to events.

3. **Involve Merchants Along with Other Stakeholders:**
    - Merchant input is valuable to help with planning but should be carefully weighed along with other viewpoints to decide on street design.
    - Ensure business/merchant representation in Technical Advisory Committee.

"Need to come back to communities after we have a clearer plan to run it by residents, come back to us, build relationship."

4. **Increase Accountability in Agency Leadership and Decision-Making**:
   - Emphasize strong leadership to communicate safety as a priority.
   - Build trust by increasing transparency in SFMTA process.

5. **Improve Access to Materials:**
   - Design a more user-friendly website with easier navigation.
   - Improve legibility and readability of online maps.
   - Makes physical maps and information more readily available.
   - Update definitions to avoid jargon and confusion.
   - Offer resources in Spanish and other languages.
   - Present design alternatives side by side to compare proposal scenarios.
   - Present examples of great streets in other cities.
   - Include additional data and design standards to support the benefits of bike lanes.

"Community engagement that allows local business owners to talk to cyclists + understand how many cyclists visit their shops or would visit if cycling were safer."

6. **General Appreciation and Support**:
   - Many comments expressed gratitude for the outreach work being done.
   - Positive feedback was given on the presentation of proposed improvements.

"This looks like an amazing improvement over what we have today!"

Comments about Facilities, Policies, and Programs

Bike Facilities

1. **Safe and Protected Bikeways that Encourage People to Bike and Roll**:
   - Increase protected, separated, or car-free bikeways over non-protected, non-separated, and non-car-free bikeways.
   - Increase physical barriers (e.g., concrete, plastic poles) to prevent cars from going into bike lanes.
   - Add protected intersections and continuous protected paths.
   - Support car-free promenades and routes.
   - Create bikeways that enforce the rules of the road including stop signs painted on bike lanes.

"Protected bike lanes help keep communities healthy, happy, connected, and safe! Protect SF bike lanes :)"

2. **Traffic Calming and Diversion to Increase Safety and Comfort**:
   - Increase traffic calming measures in residential and high-traffic areas.
   - Add diverters, planters, and roundabouts to slow down traffic.
   - Implement bulb-outs and raised crosswalks for pedestrian safety.

3. **Ample Bike Parking and Storage**:
   - Increase secure, safe, and convenient bike parking near businesses, schools, and residential areas.
   - Increase for bike lockers, indoor cages, and large-scale bike parking facilities.
   - Incentivize businesses to install bike parking.

4. **Connected Biking and Rolling Network**:
   - Ensure facilities reach all parts of the city for safe cross-town travel.
   - Ensure connected network of bike lanes, especially to key destinations like BART stations and business corridors.
   - Increase uninterrupted car-free paths across the city.
   - Connect bikeways to schools and open spaces.

"More bike storage is super necessary!"

5. **Quality Materials for All Types of Bikeways**:
    - o Use durable materials for quick-build projects.
    - o Paint or add delineators to concrete barriers for visibility.

6. **Biking and Rolling Amenities and Services**:
    - o Install bike maintenance stations along major bike corridors, like tire refill stations.
    - o Create of safe charging stations for e-bikes.
    - o Expand bikeshare stations in underserved areas.

Policies

1. **Bike Facilities to Enhance Connectivity and Encourage New Riders**:
    - o Ensure bike lanes are continuous, prioritizing connecting gaps in the network.
    - o Establish policy to ensure all future bike lanes are protected.
    - o Increase number of uninterrupted car-free paths across the city to encourage new cyclists.
    - o Maintain clean bike lanes and make them wide enough to accommodate cargo bikes.

"Consider cyclist who are uncomfortable now/ not biking - what would it take to get them on the road?"

2. **Safety in Design and Implementation of Bike Facilities**:
    - o Preference for Class I and IV bike lanes over Class II and III.
    - o Standardize concrete barriers for protected bike lanes to separate cyclists from car traffic.
    - o Design streets to prioritize bike safety over car movement.
    - o The slow streets program is wrongly prioritized and should focus on fast streets instead.
    - o Create speed restrictions for e-bikes that are larger, heavier, and faster than normal bikes.
    - o Separate bikeways and transit infrastructure where possible to reduce conflicts and enhance safety.
    - o Assess safety commercial corridors or streets in high-injury network when placing and designing bike facilities.

3. **Traffic Calming to Enhance Effectiveness of Bike Network**:
    - Add traffic calming measures to complement bike facilities, such as four way stops, speed humps, raised crosswalks, and traffic circles.
    - Prioritize additional traffic calming in areas around schools and recreational areas.
    - Address vehicles that frequently double park and block bike facilities, such as app-based rides and deliveries.
    - Update traffic signals to add leading bicycle/pedestrian intervals.
    - Replace blinking yellow right turn lights with clearer red/green signals.

4. **Enhance Connectivity of Biking with Transit**:
    - Improve connectivity of bike facilities to major transit hubs and provide additional bike parking.
    - Use smooth pavement on all streets and improve bike access around and over Muni tracks.
    - Expand bike capacity on Muni vehicles, including more bike racks on buses and permitting bikes on light rail vehicles. It's often the easiest way to get around.

5. **Equitable Access and Future Expansion**
    - Increase investment in bike network for the future, reducing reliance on cars to meet climate and density goals.
    - Implement bike facilities that empower children and vulnerable people to utilize them.
    - Improve experience of slower ADA wheeled devices, such as mobility scooters, in navigating existing infrastructure.
    - Assess opportunity to add safety improvements on streets prior to scheduled street repairs.

"SFMTA should prioritize designs that forefront safety of the user, the potential for iteration and change, and the maximization of co-benefits such as green infrastructure and pedestrian access."

"Yes to heavy traffic calming around schools. Have you seen what Paris did? Car free right in front of school, calm on surrounding streets"

Programs

1. **Provide Incentives and Discounts**
   - Provide discounts for students, high schoolers, and implement universal discount programs.
   - Expand rebates for e-bikes, especially targeting commuters, delivery workers, and seniors.
   - Offer financial support for fixed-income individuals to purchase cargo bikes.
   - Subsidize or provide free helmets, particularly for children, and bike locks.
   - Provide rent subsidies for bike shops along busy routes.
   - Develop programs to get unused bikes in garages tuned up and back on the road.

2. **Increase Access to Bikes**
   - Implement program to provide every kid and teenager access to a bike.
   - Make safety gear more accessible.
   - Simplify the process for businesses to install bike racks.

3. **Improve Outreach and Education**
   - Create a platform for public feedback on bike infrastructure.
   - Conduct outreach on new infrastructure treatments and slow street regulations.
   - Increase emphasis on safety measures in school zones.
   - Increase bike education in schools.
   - Provide information on bike lanes, bike safety, and how to use bike infrastructure.
   - Promote sharing of multi-passenger bikes and cargo bikes.

"Important to have bike facilities connecting to all transit (especially BART)."

"Free or reduced helmets for children (from a doctor)"

“How will mobility scooters be managed? ADA issue. Speed differentials? Bike, e-scooter (travel) 20 mph. Mobility scooter (travel) 5 mph. Sidewalks NOT viable! Sidewalk quality & barrier; parking/ construction obstacles”

4. **Support Community**
   - Continue bike valet services at events and farmers markets.
   - Organize large citywide group rides like bike buses and open streets events to demonstrate demand.
   - Regularly close streets for biking events.
   - Turn commercial corridors into transit plazas with supportive merchants.
   - Implement programs similar to the UK’s Bike to Work scheme.

“Love Sunday Streets!”

5. **Increase Use of Emerging Mobility**
   - Integrate new bike infrastructure with Bay Wheels stations.
   - Ensure public data and maintenance standards for bikeshare programs like Lyft.
   - Encourage UPS, FedEx, and the Postal Service to use e-cargo bikes.
   - Explore the use of golf carts for short-distance travel.

“Consider cyclist who are uncomfortable now/not biking - what would it take to get them on the road?”

Comments about Common Recurring Topics

In addition to comments related to biking and rolling infrastructure, programs, and policy, these three topics commonly recurred during summer outreach: Enforcement of traffic rules, vehicle parking, and user experience of biking and rolling, all three of which overlap with infrastructure, programs, and policy.

Enforcement of Traffic Rules:

1. **Need for Traffic Enforcement for Driving and Bicycling Rules:**
    - Infrastructure alone is not enough without enforcement.
    - Enforce traffic laws, especially speeding.
    - Enforce bike rules.

"Have SFPD enforce dangerous moving violations in an un-biased manner +1"

2. **Examples of Traffic Violations Mentioned:**
    - Parking in bike lanes, especially vehicles for delivery and ride-hailing services
    - Scooters on sidewalks
    - Double-parking
    - High-speed motorbikes in bike lanes
    - Speed limits around schools

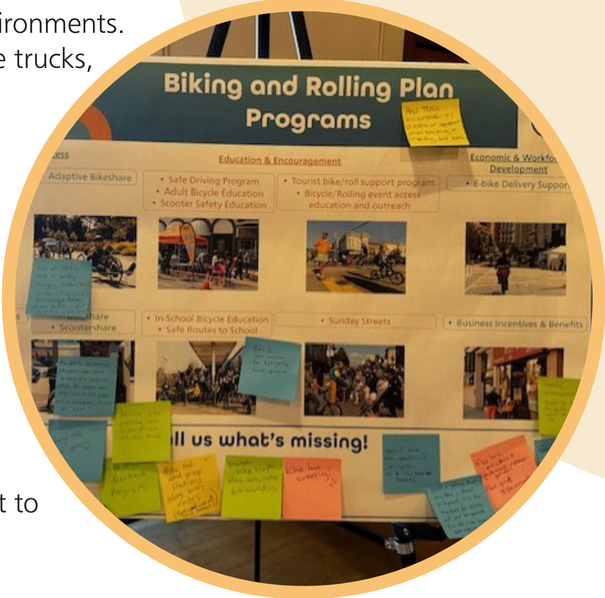
"Enforce existing laws for bicycle and scooters regardless if there are special lanes. I can't safely cross [the street] without mostly young, mostly male electric bike and scooter riders not slowing down, going right through stop signs and not even looking to see if anyone is crossing the street."

3. **Examples of Traffic Enforcement Solutions Mentioned:**
    - Write tickets and towing cars
    - Fine delivery trucks/cars blocking bike lanes
    - More law enforcement on bikes
    - Confiscate of bikes for sidewalk riding
    - Hold Transportation Network Companies (TNCs) accountable

4. **Equitable Enforcement:**
    - Enforcement should be unbiased and consistent. For example, use of speed cameras.
    - Automated traffic enforcement is needed for equitable coverage.

"More advertising and education on where bike lanes are, how to put bike on Muni, where bike rentals are, how to ride safely, etc would go a long way for new/learning city bikers"

5. **Prioritize Resources for Enforcement:**
    - Engage with local businesses to create bike-friendly environments.
    - Prioritize enforcement in busy merchant corridors where trucks, ride-hailing, and delivery drivers block bikeways
    - Study enforcement rules for bikes
    - Enforce of speed limits and volume limits on calmed streets.



Vehicle Parking

1. **Desire to Reallocate Parking to Other Uses:**
    - Remove parking to encourage alternative transportation.
    - Suggestions to reframe parking removal as "curb reprioritization."
    - Parking takes up lots of space and comes at a huge cost to other city goals.

2. **Desire to Preserve Parking Spaces:**
    - Keep existing parking spaces.
    - Avoid removing parking.
    - Parking is essential for residents and businesses.

"The neighborhood is residential with little on-site parking. Bike lanes should not take away street parking."

3. **Impact on Specific Groups**:
    - Consideration for houses without garages.
    - Need for accessible parking for handicapped individuals.
    - Concerns about the impact on merchants and businesses.

4. **Alternative Solutions**:
    - Expand residential parking permits (RPP) and appropriate pricing.
    - Enforce and better manage parking and curbs.
    - Replace lost parking or create one-way streets to minimize parking removal.
    - Consider role of technology (like Waymo) in reducing parking needs

5. **Safety, Accessibility, Environmental, and Social Benefits:**
    - Emphasize safety over parking.
    - Provide better options for people who need to park or load vehicles to prevent parking in bikeways
    - Provide fully accessible parking spots when adding bikeways to prevent accessibility issues.
    - Less parking incentivizes walking, biking, and transit use.
    - Parking removal reduces car dependency and promote mode sharing.

User Experience

1. **Safety and Comfort of Infrastructure:**
    - o Mixing zones aren't safe or comfortable.
    - o Plastic bollards aren't effective.
    - o Upgrade bikeways from sharrows/Class III.
    - o Raise bike lane to curb level like in Vancouver or Amsterdam.
    - o Improve intersection comfort and safety.
    - o Slow traffic down.
    - o Make Slow Streets safer.

"More advertising and education on where bike lanes are, how to put bike on Muni, where bike rentals are, how to ride safely, etc would go a long way for new/learning city bikers"

1. **Efficiency of Infrastructure:**
    - o Facilitate safe biking through and to commercial corridors.
    - o Add bicycle signals to give bicyclists a head start.
    - o Improve and add bike sensors at signaled intersections.
    - o Designate fast vs. slow bike routes, for example, fast lanes for e-bikes.

"Think about designation of fast, efficient bike commute routes in parallel with slower, pleasant joy rides (parks, merchant, schools)."

2. **Ease of Use**:
    - o Improve legibility of bike route signage.
    - o Add more signage and maps to direct people on bicycles.
    - o Coordinate with Google and Apple for better bike navigation, bike directions are not always the best.
    - o Advertise maps of bike lanes.

3. **Placemaking, Community, and Fun:**
    - o Add more planters for quick builds to make streets greener.
    - o Create a sense of community, especially in Slow Streets.
    - o Bicycling is fun and liberating.
    - o There should be a focus on sidewalks and pedestrian safety, experience, and accessibility, including more benches and buses.
    - o There is an opportunity for people to exercise and improve their health. Addressing the common excuse of not having time for exercise is important.
    - o Support Bike Coalition and WalkSF.

"From a SF born and raised young adult woman of color, I started biking a years ago. It has been one of the most liberating of accessible things I have ever done. I am able to get to all parts of the city in bike, I want this for all SF's residence. We can't have this without biking and pedestrian safety centered infrastructure!"

Comments about General Goals of the Plan

General Equity, Accessibility, and Environment

1. **Equity:**
   - There should be an emphasis on equitable access to biking infrastructure.
   - There are concerns about marginalized communities not benefiting from current initiatives.
   - It is important to highlight the cost-effectiveness of bikes compared to cars.
   - There is opposition to subsidies that benefit the wealthy.
   - There are issues with slow streets creating elitist areas.
   - There should be a proof of concept for safe commuter routes based on community needs.

"Please keep in mind the needs of seniors and people with disabilities, their accessibility needs are unique."

2. **Disabled Access:**
   - There are needs for seniors and people with disabilities, such as wider sidewalks, easier curbs, low height, and smooth sidewalks.
   - Scenario A is too expensive and doesn't consider the needs of the elderly.
   - There is a need for better engagement with physically challenged individuals.
   - It is important to have safe, car-free paths for all, including those using recumbent bikes.

3. **Environment:**
   - There are concerns about plastic bollards contributing to microplastics.
   - Protected facilities encourage more cycling and help shift the mobility culture away from cars.

"Slow streets are lovely. They help bikers & pedestrians. They help create a sense of community & make urban neighborhoods more neighborhoody, connected, & kind"

General Economic Impact

1. **Impact to Merchants and Local Businesses:**
    - Promote foot traffic and business, connect communities, and foster prosperity.
    - Encourage visits to businesses in slow street areas, creating a welcoming environment.
    - Merchants' influence may compromise residents' safety.
    - Increased visits to waterfront businesses due to better accessibility.
    - Support for local bike shops, which are crucial despite e-commerce challenges.
    - Consider loading needs in industrial areas.

"I visit businesses along the waterfront more because I can just roll up and check them out. Even if the merchant corridor is just a street away. I'm less likely to visit because I can't see them."

2. **Budget and Financial Cost of Plan:**
    - Do not frame Scenario A as expensive, it is cheap cheaper than the cost of car-centricness. It costs thousands a year to own a car, families will have more money to spend on other things.
    - Measure the cost of not doing anything, in addition to the cost of implementing.
    - SFMTA is in a budget crisis. Focus on public transportation instead until we know the impact of commutes, businesses, and driverless vehicles.

General Safety

1. **Safety Concerns:**
    - o Traffic circles are not safer than typical intersections.
    - o Buffered or separated bike lanes lack sufficient physical protection and are within door radius.
    - o Speed bumps with gaps do not effectively reduce driver speed.
    - o Narrow bike lanes are unsafe due to limited space for avoiding obstacles.
    - o Low barriers offer minimal protection as inattentive drivers often encroach into bike lanes.
    - o Right-side bike lanes are perceived as more dangerous than no bike lanes.
    - o Roads designed for car safety are not necessarily safe for bicycles.

- Potholes pose significant hazards, especially in areas like Golden Gate Park and the tunnel from Koret Playground to Haight Street.
- The current rate of frequent cycling is considered dangerous.
- Some believe that slow streets may compromise safety for residents.
- Concerns exist about the influence of merchants on residents' safety.

"I'm afraid to leave my house because the roads around me are so crazy with cars. I only do it because I have no other choice. Maximize safety & connection, please!"

2. **Driver Behavior:**
    - Motorists frequently drive towards cyclists to align their wheels with gaps.
    - SFMTA's speed bumps are ineffective, and more drivers are ignoring stop signs, especially for pedestrians.
    - Traffic calming measures must address both driver attitudes and engineering solutions.
    - Use Infrastructure to slow cars and enforce stop signs to prevent dangerous intersections.
    - Implement measures to encourage drivers to slow down around cyclists and pedestrians.

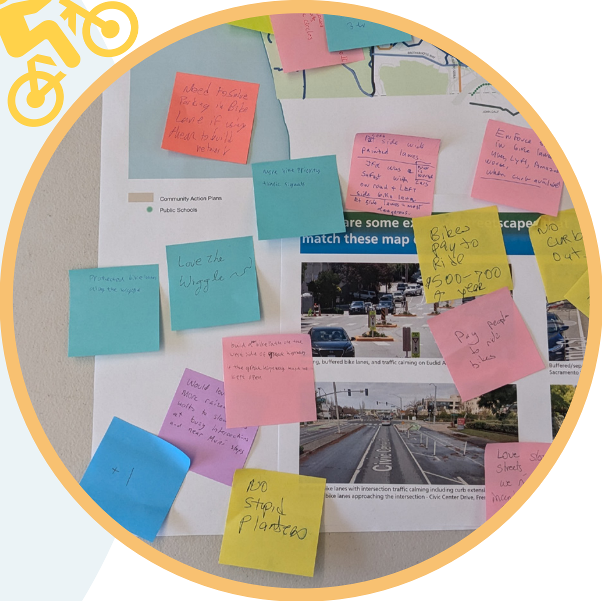
"Traffic calming requires changing driver attitudes as well as engineering changes."

3. **Infrastructure and Design:**
    - Scenario C is the least safe option.
    - Scenario C should have separated lanes and funding for safer school zones.
    - MTA staff should try bike facilities to understand safety issues.
    - MTA should have a team to check hazards during peak times.
    - Better management of bikes and scooters on sidewalks is needed.
    - Increase the number of bulb-outs as they are effective.

- Address visibility and cost issues of islands at night.
- The "laned, calmed" option might seem safe but needs careful consideration.

4. **Vision Zero and Traffic Calming:**
    - Scenario A supports Vision Zero goals.
    - Prioritize maximum safety and convenience.
    - Traffic calming around schools needs a safe, connected network for city-wide impact.
    - Vision Zero is achievable with proper implementation.
    - Consider a self-reported "near miss" system to enhance current reporting.

"I'd like to see a greater focus at intersections to improve bike and pedestrian safety. I want solutions to keep cars, trucks and dumpsters from blocking bike facilities."



5. **Personal Impact and Preferences:**
    - Make bike commuting safe to influence job choices.
    - Safer biking will boost business for merchants.
    - Address fears of chaotic road conditions.
    - Make bike commuting safe for children.
    - Prioritize young cyclists' safety over parking spaces.
    - Improving safety will increase the number of cyclists.

6. **General Observations and Suggestions:**
    - Make biking around the city safe.
    - Address safety issues with front-mounted bike carriers.
    - Protect children from car-related dangers.
    - Deal with frequent assaults on cyclists in certain areas.
    - Revise the current unsafe map.

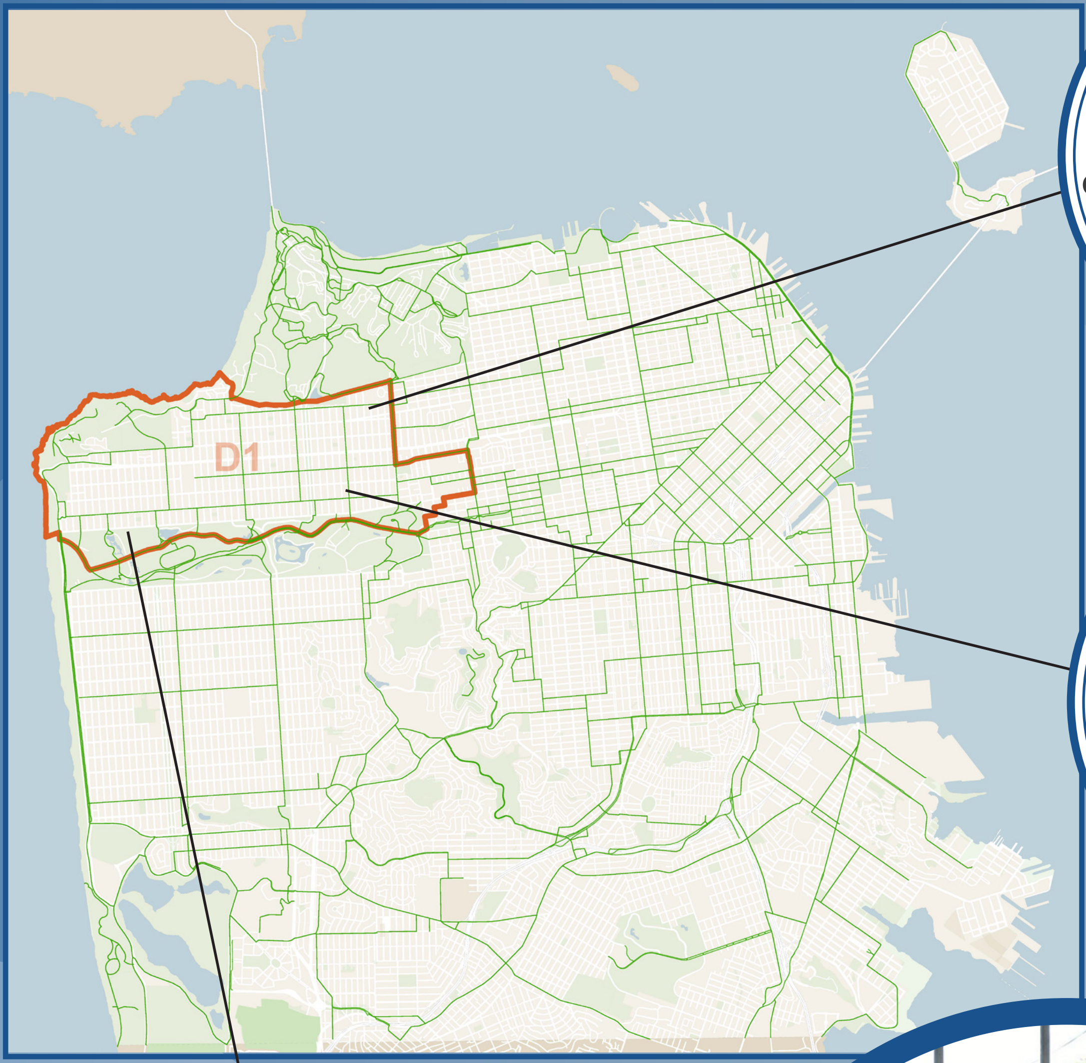
What We Heard at Each Open House

Below, we outline an illustrative summary of what we heard about some specific locations at the open house in District 1. SFMTA staff will use the comments to help weigh the trade-offs and refine the draft materials.

Note: SFMTA staff carefully read each comment, used AI via Microsoft Copilot to help organize and summarize comments, and then verified accuracy and edited the outputs. No decisions have been made, and any proposals in the Plan will still go through project-specific outreach to refine the plans and designs of proposed bikeways.

District 1 Open House

July 24, 2024 - Richmond Rec Center



Do you currently bike or roll (skate, scooter, etc.) in San Francisco?

Yes: 30 (81%)
No: 7 (19%)

If you don't currently bike or roll, do you want to?

Yes: 5 (71%)
No: 2 (29%)

Total attendees: **approx. 58**

Sample of What We Heard - District 1 Open House

Below, we outline an illustrative summary of what we heard about some specific locations at the open house in District 1. SFMTA staff will use the comments to help weigh the trade-offs and refine the draft materials. Note: SFMTA staff carefully read each comment, used AI via Microsoft Copilot to help organize and summarize comments, and then verified accuracy and edited the outputs. No decisions have been made, and any proposals in the Plan will still go through project-specific outreach to refine the plans and designs of proposed bikeways.

Richmond

- **Fulton St:**
  - Add bus red carpet and more stop lights to improve accessibility and safety for the Richmond district.
  - Need protected bike paths; crossing Fulton N-S is unsafe due to speeding cars.
  - Extend Cabrillo slow street past Argonne Elementary.
  - Improve safety at intersections like 8th Avenue and Park Presidio.
  - Need a protected option to cross Fulton into GGP.
- **Geary Blvd**: Needs bike lanes to improve safety and encourage shopping.
- **Arguello Blvd**:
  - Needs protection for bikers due to fast traffic and risks of derailment and bucking.
  - Essential for connecting slow streets like Clay Street and Pacific Heights bike infrastructure to Richmond.
  - Recognition of Arguello as a key bike corridor needing protection.
- **Anza St:**
  - Needs protection, especially after Arguello, due to fast traffic and unsafe driving behaviors.
  - More important for safer connections compared to Cabrillo.
  - Calls for protected bike lanes due to issues with parked cars and stop sign violations.
- **Cabrillo St:**
  - Needs protected bike lanes; viewed as a connector to major locations like Presidio, Golden Gate Bridge, and Golden Gate Park.
  - Extend slow street past Argonne Elementary.
  - Needs protected bike lanes to benefit many people.
- **Clement St:** Needs a bike lane or calming lane.
- **8th Ave:**
  - Needs repaving and robust traffic calming.
  - Should have 4-way stops at intersections like Irving and Judah.

Inner Sunset

- **11th Ave:**
  - Needs more 4-way stops or traffic calming measures.
  - Stop signs at intersections like Judah and Lawton are not visible.

Mission

- **17th St:** Needs a protected bike lane as it is a critical link to the bike network and provides access to estuaries on the east.
- **Caesar Chavez St:** Needs a fully separated route free of glass, gravel, and freeway over ramp crossing. More protection is needed due to plowed down posts.

Western Addition

- **Divisadero St:** Unsafe left turns into the gas station at Fell Street. Needs diversion when turning into the bike lane.
- **Wiggle/17th:** Support for uninterrupted car-free paths to encourage new cyclists. Concerns about right hooks and the need for more traffic calming. Suggestions for bike maintenance stations along key bike corridors.

Financial District

- **Clay St:** Slow street needs a connection to Downtown or Chinatown.

Parkside

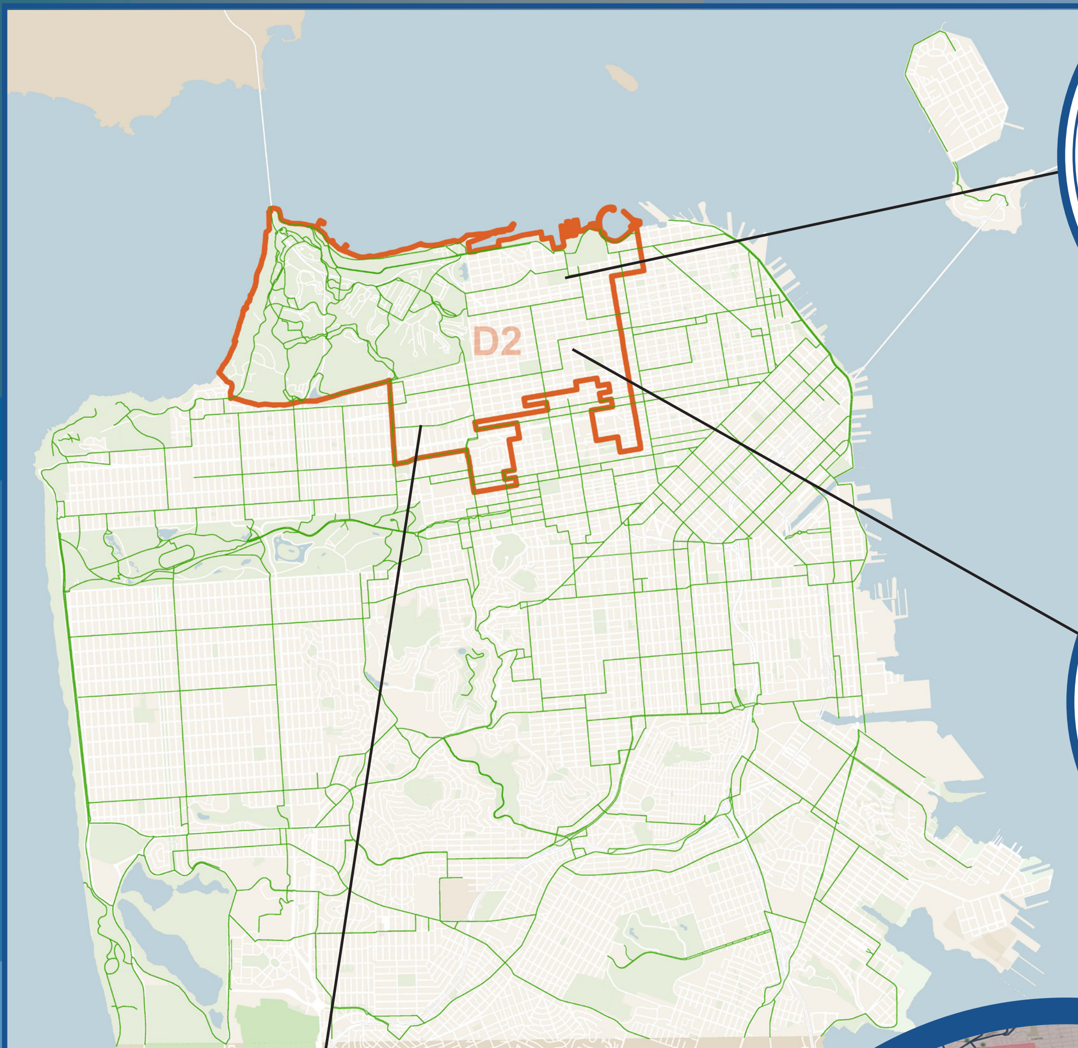
- **Dewey Boulevard & Pacheco St:** Dangerous crossing for cars, bikes, and pedestrians. Consider adding a traffic circle.

Castro/Upper Market

- **14th St:** Needs a protected bike lane or green paint to make crossing Market Street safer. Love the 20-mph bike light timing.

District 2 Open House

July 31, 2024 - NEON



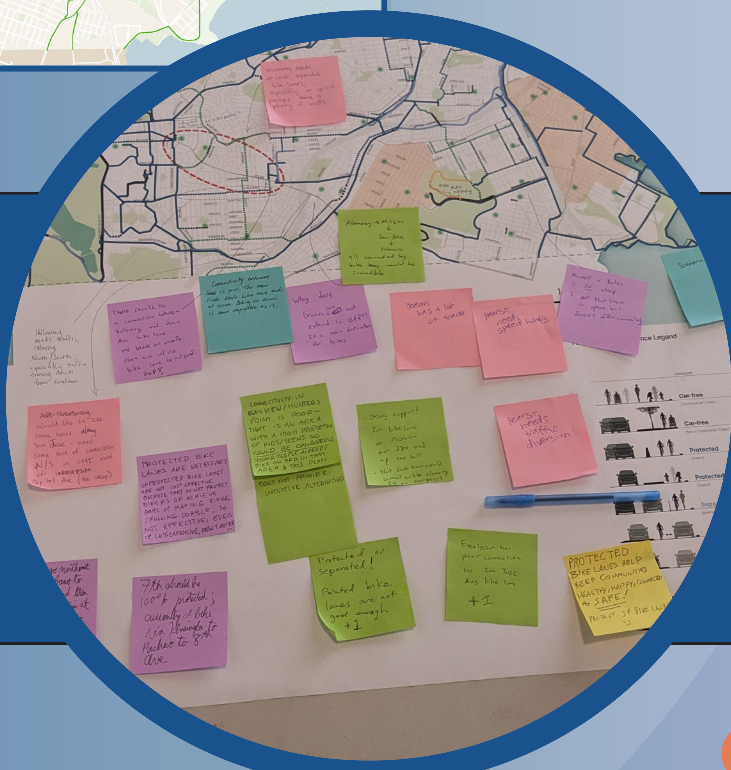
Do you currently bike or roll (skate, scooter, etc.) in San Francisco?

Yes: 30 (81%)
No: 7 (19%)

If you don't currently bike or roll, do you want to?

Yes: 5 (71%)
No: 2 (29%)

Total attendees: **approx. 37**



Sample of What We Heard

Below, we outline an illustrative summary of what we heard about some specific locations at the open house in District 2. SFMTA staff will use the comments to help weigh the trade-offs and refine the draft materials. Note: SFMTA staff carefully read each comment, used AI via Microsoft Copilot to help organize and summarize comments, and then verified accuracy and edited the outputs. No decisions have been made, and any proposals in the Plan will still go through project-specific outreach to refine the plans and designs of proposed bikeways.

Presidio:
- **Arguello/Presidio Blvd**: Better protection plans needed.

Nob Hill/Russian Hill/North Beach:
- **Polk St**: Complete and make safe for biking. Need protected lanes on Polk & Columbus. Prevent cars from turning into nearest traffic lane.
- **Green St**: Shared, calmed/diverted street connecting Polk to Steiner. Consider separated bike lane on Greenwich.
- **Franklin**: Remove one car lane and add a bike lane as an alternative to Polk.
- **Galileo High School at Bay & Van Ness**: Traffic calming needed, especially with students crossing from bus stops.
- **Francisco St**: Painted bike lanes widen the street, causing faster traffic and less safety.
- **Columbus**: Address gaps in the network. Prevent cars from monopolizing the only flat route through North Beach.
- **North Point, Greenwich St, Francisco St**: No changes

Downtown/Civic Center/SoMa/Financial District
- **Car-free Market St**: Pedestrians running across/walking in the street is terrifying for bikers.
- **Embarcadero**: Extend cycle track along the full Embarcadero.

Hayes Valley:
- **Hayes Valley near Octavia**: No cars should be allowed.

Western Addition:
- **Greenwich/Steiner**: Add a bikeshare station at the northwest corner.
- **Steiner**: From Post to Chestnut, multiple upvotes for protected lanes.
- **Steiner**: Extend/connect Steiner. Protect from Fulton to Union St. Scary intersection at Steiner/Fulton.
- **East-West connections**: Suggest bike lane on Golden Gate or Post between Downtown and Steiner
- **North-South connections**: Need more connections between Polk and Sansome, Leavenworth/Hyde, Grant.

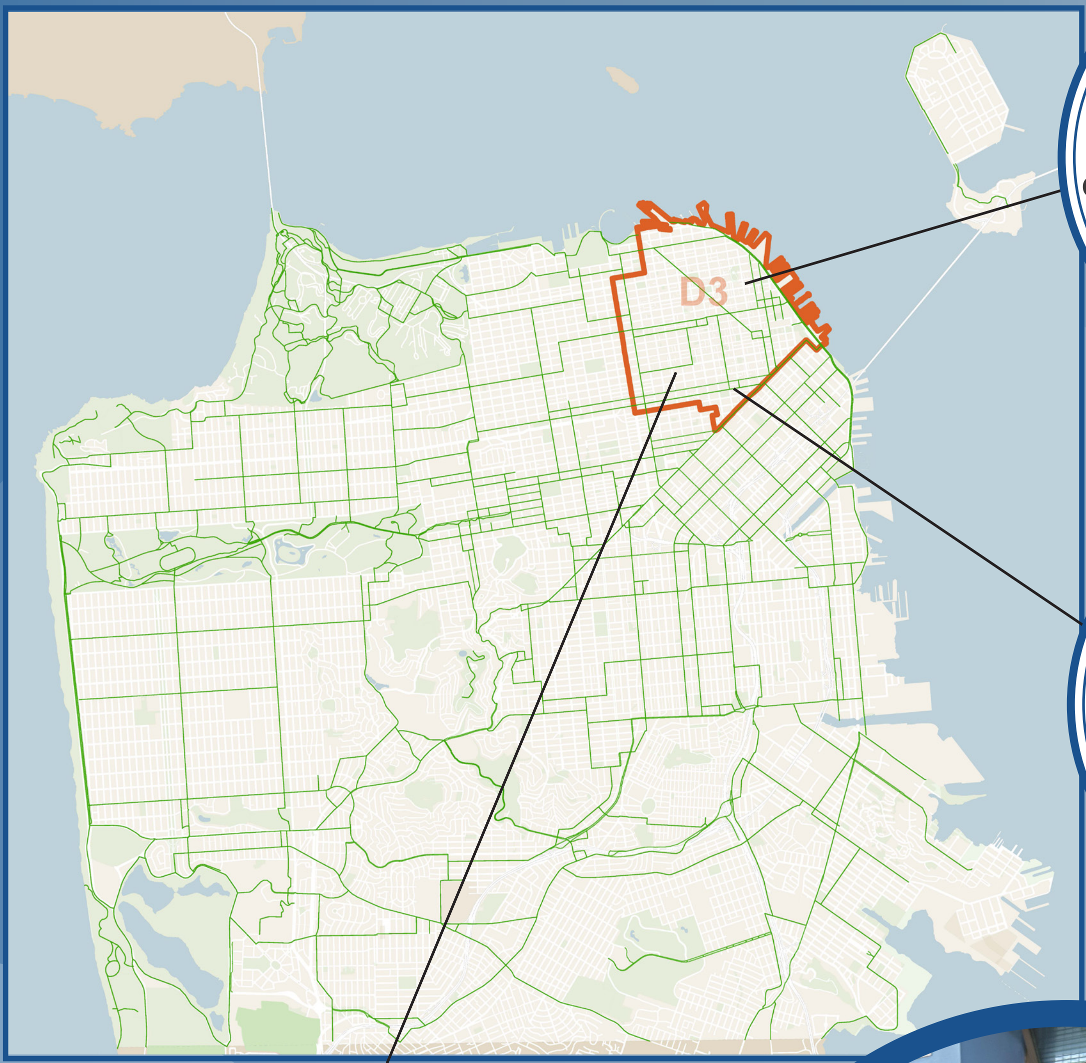
Golden Gate Park:
- **Car-free JFK**: Walkers use the entire street, making it unpredictable for bikers.
- **Golden Gate Park**: Appreciate more car-free roads in Golden Gate Park.

Outer Richmond:
- **15th Ave**: Redirect cars due to lack of left turns from Park Presidio.
- **Lake and Clay Slow Streets**: Clarify expectations for drivers sharing the road with cyclists and pedestrians.

Mission
- **14th St**: From Market to Valencia, marrow lanes and heavy traffic make painted lanes scarier than sharrows.
- **Folsom St**: From Cesar Chavez to 13th St, should be protected.
- **Harrison**: From Cesar Chavez to 17th St, keep as a protected bike lane.

District 3 Open House

July 8, 2024 - Joe DiMaggio Playground



Do you currently bike or roll (skate, scooter, etc.) in San Francisco?

Yes: 29 (52%)
No: 26 (46%)

If you don't currently bike or roll, do you want to?

Yes: 4 (17%)
No: 19 (83%)

Total attendees: **approx. 56**

Sample of What We Heard

Below, we outline an illustrative summary of what we heard about some specific locations at the open house in District 3. SFMTA staff will use the comments to help weigh the trade-offs and refine the draft materials. Note: SFMTA staff carefully read each comment, used AI via Microsoft Copilot to help organize and summarize comments, and then verified accuracy and edited the outputs. No decisions have been made, and any proposals in the Plan will still go through project-specific outreach to refine the plans and designs of proposed bikeways.

Chinatown/North Beach:

- **Columbus Ave**:
  - Needs investment for bikes and pedestrians.
  - Wider sidewalks and protected bike lanes are necessary.
  - Consider replacing car lanes with bus and bike lanes.
  - Speed bumps to slow down traffic.
  - Families bike here; they need protection.
  - Traffic calming is essential.
  - Ignoring Columbus is not an option; everyone uses it.
- **North Beach**:
  - Many stop signs; consider roundabouts.
  - Drivers are insane on weekends; need intensive traffic calming.
- **Stockton St**:
  - The tunnel is dangerous, especially southbound.
  - Needs protected bike and bus lanes.
  - Close Stockton between Union and Columbus.
  - Fill in potholes in the tunnel.
  - Consider adding a protected lane.
- **Grant Ave**:
  - Make it car-free between Market and Filbert.
  - Make it bike and pedestrian-friendly all the way to Filbert by removing parking during daylight hours.
- **Kearny St**:
  - Needs protected bike and bus lanes.
  - Officially proposed for the Biking and Rolling Network.
- **Montgomery St**: Needs protected bike lanes for safe access to downtown.
- **Broadway**:
  - Needs a protected bike lane.
  - Can be reduced to one lane each way to add a bike lane.
  - More traffic calming needed.
  - The tunnel needs a protected bike lane; remove car lanes to slow down traffic.
  - Currently very dangerous; protection is essential.
  - Consider a quieter, less commercial route for bikes.
  - Protected bike lanes on Broadway are crucial.
- **Pacific Ave**:
  - Too steep for safe biking. Going west on Pacific is harder than east.
  - Needs a protected lane on Broadway.

    - Should connect the Pacific slow street to Steiner St.
    - Make Pacific between Van Ness and Webster a safe biking space again (Slow Street).
    - Connect Pacific slow street to D3, e.g., Polk – Pacific and Columbus.
- **Sansome St**: Needs a bike lane; minimal parking removal required.
- **General**: On streets with 2+ lanes in each direction, need traffic diets and bike lanes: (Broadway, Sansome, Columbus, Kearny, Stockton, Sutter, Montgomery).

Nob Hill:

- California St: Needs to be safer, at least from Polk to Taylor.

Russian Hill:

- Bay St: Needs a road diet (2 lanes and a left-turn center lane).
- Lombard St: Speeding downhill; needs traffic calming.
- Jefferson St: Should be car-free.
- Francisco Park: Needs a safe way to bike there.

Financial District/ Embarcadero

- **Battery St**: Existing bike lane but need one on Sansome connecting to Columbus.
- **Washington - Drumm - Jackson - Front - Pacific**:
    - Too complicated to explain to friends.
    - Need a simpler route.
    - Protected bike lanes on Broadway are necessary.
- **Embarcadero**: Extend bike lanes around the Waterfront to Presidio, Crisdy, Atlantic Park, and Fisherman Wharf.
- **Upper Market**: Work is lovely and exciting!

Tenderloin/Civic Center

- **Polk St**:
    - Big gap in bike lanes; needs connection.
    - Flattest route across the neighborhood; should be safe and comfortable.
    - Needs protected bike lanes.
    - Unprotected lanes won't work due to double parking.
- **Larkin St**:
    - Traffic moves too fast; should be local traffic only north of California.
    - Needs protected bike lanes or space.
    - Add protection on Leavenworth and Larkin.
- **Sutter and Post Sts**:
    - Should be two-way connections; dense, hilly neighborhood needs safe routes.
    - Both needs separated or protected bike lanes.
    - Bikeways should connect to transit at Van Ness.
    - Protect Post across the city.
    - Two-way separated lanes on Sutter would be great.
    - Currently, fast cars, buses, and double parking are problems.
    - If not making Broadway tunnel safe, remove misleading 'bike on tunnel' light.
    - Residents use Post frequently; parking is not needed.

Western Addition

- **Western Addition**: Gap in bike infrastructure.
- **Fell and Divisadero**: Dangerous intersection.

- **Divisadero**: **C**onsider more bike bus corridors in these commercial areas.
- **Fillmore**: Consider more bike bus corridors in these commercial areas.
- **The Wiggle**:
  - o Needs more traffic calming; it's an important connector.
  - o Should be clearly signed and protected if possible.
  - o The wiggle in the Haight is wide enough for protected lanes.

Pacific Heights:

- **Pacific Heights**: Gap in bike infrastructure.

Haight Ashbury:

- **Haight**: Consider more bike bus corridors in these commercial areas.

Richmond:

- **Clement**: Consider more bike bus corridors in these commercial areas.
- **Richmond District**: Need a west-east connection like Broadway and Pacific.

Inner Sunset:

- **Irving St**: Consider more bike bus corridors in these commercial areas.

Bernal Heights:

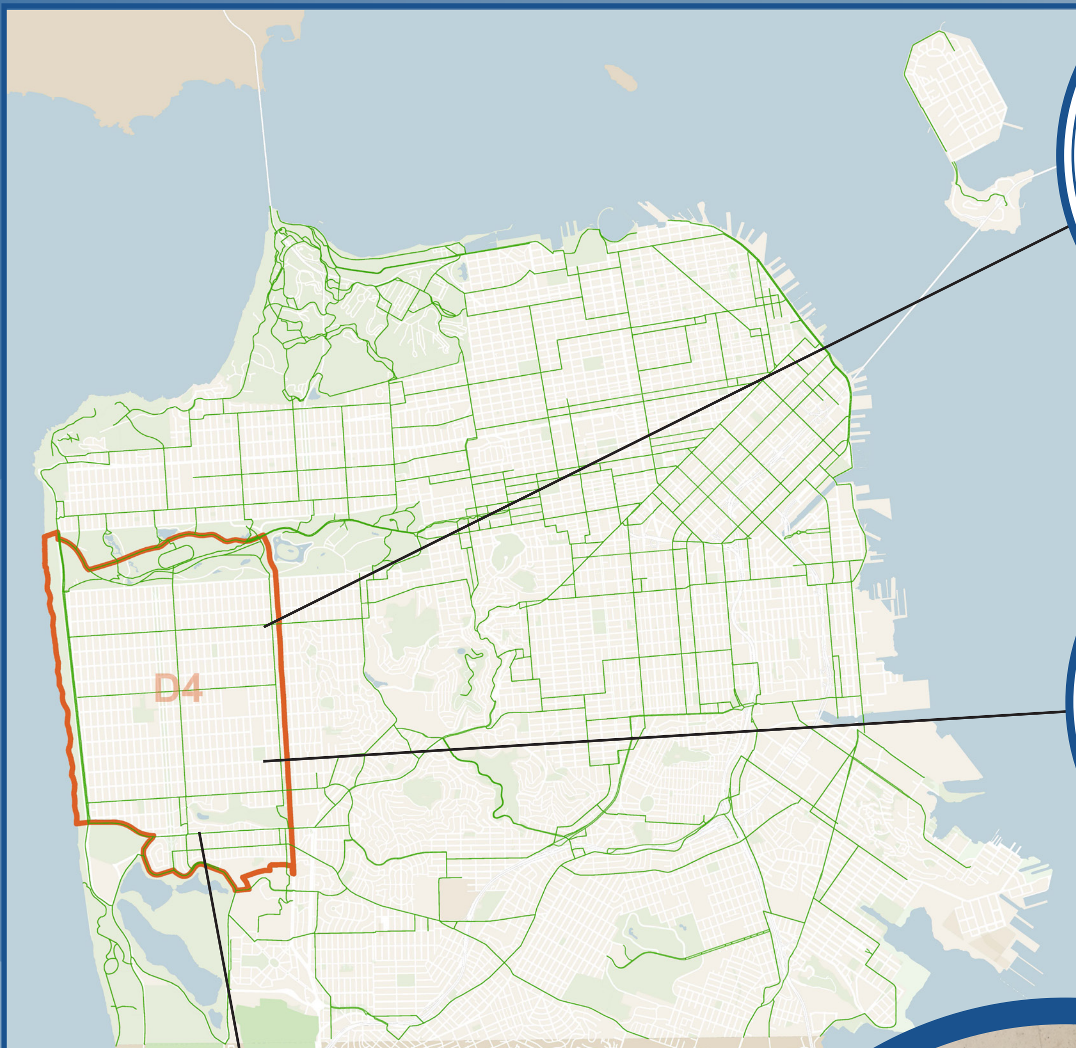
- **Bernal Heights, Excelsior**: Missing bike shops.

Excelsior:

- **Bernal Heights, Excelsior**: Missing bike shops.

District 4 Open House

July 28, 2024 - Sunset Rec Center



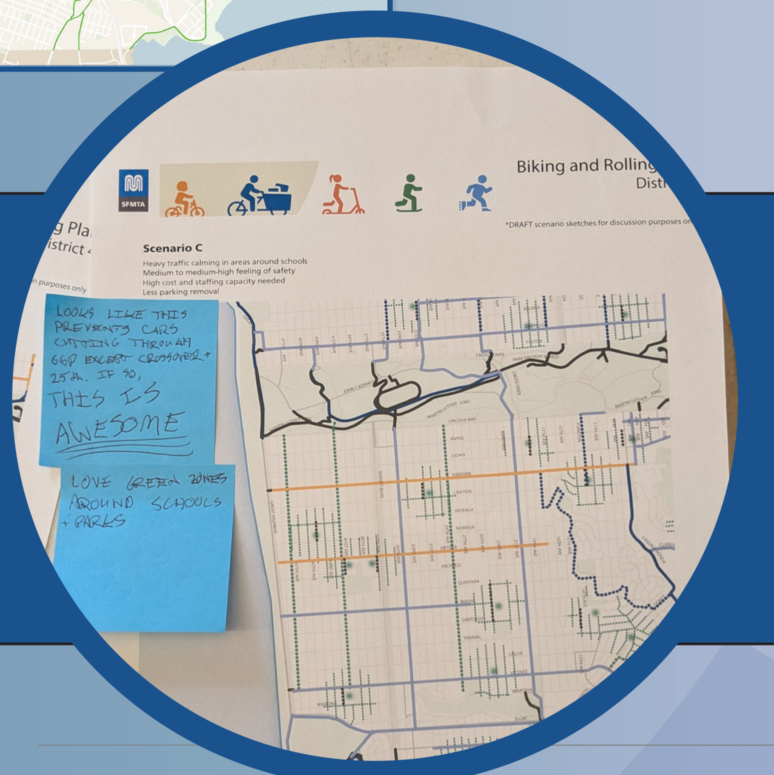
Do you currently bike or roll (skate, scooter, etc.) in San Francisco?

Yes: 45 (90%)
No: 5 (10%)

If you don't currently bike or roll, do you want to?

Yes: 1 (33%)
No: 2 (66%)

Total attendees: **approx. 51**



Sample of What We Heard

Below, we outline an illustrative summary of what we heard about some specific locations at the open house in District 4. SFMTA staff will use the comments to help weigh the trade-offs and refine the draft materials. Note: SFMTA staff carefully read each comment, used AI via Microsoft Copilot to help organize and summarize comments, and then verified accuracy and edited the outputs. No decisions have been made, and any proposals in the Plan will still go through project-specific outreach to refine the plans and designs of proposed bikeways.

Sunset District

- **34th Ave**: Currently a bike route but unsafe; many intersections unprotected and lack stop signs. Needs a 4-way stop at Vicente.
- **41st Ave**: Bikeway; intersection at Noriega needs a 4-way stop. Traffic calming needed on 37th - 41st Ave for students.
- **Taraval St, Vicente St, Noriega St**: Wide, fast corridors; prioritize stop signs on North/South bike routes crossing these streets.
- **22nd Ave**: Suggest new slow street
- **20th Ave**: Needs protected lanes; currently used as a loading zone. Connection to Transverse needs improvement.
- **30th Ave**: Better for biking than 28th Ave; could use a bike lane and/or traffic calming.
- **Irving St**: Room for a bike lane; should have a 4 ft bike lane, perpendicular parking, and widened sidewalk.
- **Noriega St**: Very wide; add trees to the center median. Needs a 4-way stop at 41st Ave.
- **Kirkham and Ortega**: Topographically ideal for bike lanes; need Class II or higher bike lanes where they cross Sunset.
- **Great Highway**: Keep car-free; give to pedestrians and bikes.
- **Transverse Dr**: Needs repaving; prioritize for rolling network, make a dead end for cars.
- **Sunset Blvd**: Shrink width to influence average speed.
- **7th Ave**: Bike lane is hairy but only way to Twin Peaks; needs a protected facility around southside of Twin Peaks.
- **Schools**: More 24/7 loading zones needed for after school, nights, and weekends activities.
- **General**: More traffic calming via roundabouts chicanes, protected bike lanes, bike lockers near the zoo, slow streets, parking meters, parking removal, and consistent stop signs needed. Parking-protected bike lanes to reduce vehicle speeds.

Richmond District

- **23rd Ave**: Great bike route.
- **Geary and Arguello**: Cars speeding; more protected lanes needed.
- **General**: More protected bike lanes

Golden Gate Park

- **MLK and JFK**: Cars not stopping; very unsafe. Needs a safer intersection at MLK and Transverse.
- **Transverse Dr**: Full of potholes; needs repaving badly. Connects 21st Ave to car-free JFK.
- **General**: Appreciate protected routes to get into the park for kids to ride to school.

Lakeshore

- **Lake Merced**: Should have 2-way protected bike lanes along the lake.

Ingleside/Ocean View/West of Twin Peaks

- **Ocean Ave**: Needs protected lanes.
- **Monterey Blvd**: Needs a protected bike lane.

Mission

- **Cesar Chavez**: Unsafe for bikes; needs protection.

Western Addition

- **The Wiggle**: Needs a protected bike lane; love the existing route.

Glen Park

- **Chenery St**: Necessary due to broken glass on San Jose Ave.

Civic Center/Nob Hill/Russian Hill

- **Polk St**: Needs protected bike lanes; existing system north of Pine is unsafe.

Downtown/Financial District/SoMa

- **Market St**: Needs a protected bike lane; delivery trucks often block the bike lane.
- **Howard St**: Love the protected lanes; essential.

District 5 Open House

August 27, 2024 - Park Branch Library

Do you currently bike or roll (skate, scooter, etc.) in San Francisco?

Yes: 66 (92%)
No: 6 (8%)

If you don't currently bike or roll, do you want to?

Yes: 3 (60%)
No: 2 (40%)

Total attendees: **approx. 110**

Sample of What We Heard by Open House

Below, we outline an illustrative summary of what we heard about some specific locations at the open house in District 5. SFMTA staff will use the comments to help weigh the trade-offs and refine the draft materials. Note: SFMTA staff carefully read each comment, used AI via Microsoft Copilot to help organize and summarize comments, and then verified accuracy and edited the outputs. No decisions have been made, and any proposals in the Plan will still go through project-specific outreach to refine the plans and designs of proposed bikeways.

Note: Many people who would have attended the District 9 Open House attended the District 5 Open House, as well as open houses, since the District 9 Open House was postponed.

Downtown/Civic Center:

- **Market St**:
  - Improve unsafe crossings, needs repaving
  - Urgent need for paving between 4th and 8th.
  - Calls for calming measures and protected bike lanes.
  - Car-free streets should be truly car-free.
  - Concrete separation required along the entire Market St.
  - Between 4th St and 8th St, more signage and enforcement to keep cars off.
- **Union Square**: Add traffic calming around Union Square
- **Kearny St**: Needs protected lanes due to safety concerns.
- **Polk St**: Finish the Polk bike lane (fully protected). (+1) (+1)
- **Tenderloin**: Advocacy for 2-way bike lanes on every street.
- **Valencia Street to Polk St**: Appreciation for fast biking options.
- **McAllister St**: Add a protected bike lane connecting McAllister St and Polk St.
- **Post St**: Add east-west connection on Post or other street.

Western Addition/Hayes Valley:

- **North-South Routes**:
  - Need more protected bike routes north-south.
- **McAllister St**:
  - Request for paving despite sewer work.
  - Desire for an improved alternative to avoid the Wiggle.
- **Masonic Ave**:
  - Traffic calming near Raoul Wallenberg HS.
  - Cut-through traffic from the Target mall area.
- **Divisadero St**:
  - Bike lane next to Arco at Fell St is dangerous.
  - Urgent need for signaling and protection.
  - Explore bus and bike-only routes.
- **Oak/Masonic Intersection**:
  - Noted as dangerous.
- **Wiggle**:
  - Needs traffic calming and protected bike lanes, no mixing zones with cars on Fell and Oak. Currently weak point on network to 4th and King
- **Golden Gate Ave**:
  - Add car-free or protected bikeways connecting to Golden Gate.

- Extend bike lane to Scott Street; current abrupt end is problematic.
- Broderick: Misplaced speed hump.
- At Turk St: No one-way designation.

- **Scott St**:
  - Connect Scott St between Fulton and Clay to bridge the north-south gap in bike infrastructure.
- **Geary Blvd**:
  - Explore bus and bike-only routes.
- **Buchanan Mall and Hayes Valley**:
  - Connect Buchanan Mall with Hayes Street and the Hayes Valley Rec Center.
  - Tie Fulton Street bike lanes to Buchanan Mall renovations for a safer north/south arterial.

Japantown:

- **Bush St**:
  - Narrow; two bike lanes may block traffic.
- **Post + Sutter**:
  - Opposition to dedicated lanes; shared lanes acceptable.
- **General comments about Japantown**
  - Need comprehensive community process in Japantown
  - Insufficient space for bicycles in Japantown.
  - Few bikers; mostly commuters.
  - Limited demand for bike routes.
  - Promote cycling culture from preschool.
  - Lack of scooter docks; littering issue.
  - Suggest re-exploring e-bike rentals.
  - Request for better organization for e-bike and scooter parking.
  - Consider impact on community due to past racism.
  - Caution when removing parking.
  - Some seniors don't bike.
  - Commuters and volunteers bike to Japantown.
  - Increase access Japantown (+1) (+1).
  - To address perception that cyclists only pass through Japantown, offer bike riding lessons, safety education, and more bike routes.

Haight Ashbury:

- **Haight St**:
  - Explore bike and bus-only routes.
- **Sanchez + Steiner**:
  - Appreciation for the slow route; well-received.
- **Stanyan Cycle** :
  - Add dedicated cycle paths on Stanyan Street.
- **Oak St**:
  - Importance of Oak Street between Panhandle and Scott Street.
  - Keep the protected bike lane separate at intersections, as the lane on Fell St is not separate.
  - Personal experience with blocked lanes due to neighbors and delivery services.

Castro/Upper Market:

- **Market St**:
    - Calming measures ineffective due to limited turns; propose moving turns to Castro and Church.
    - Connect missing bike lane spots from Page to Market.
    - Address challenges getting onto the Wiggle from Church.
- **17th St**:
    - Major east-west Connection but currently weak point
    - Appreciation for existing lane; vital access to Mission.
    - Extend protected lane between Valencia and Sanchez.
- **Upper Market**:
    - Advocate for protected bike lanes between Castro and 19th St
    - Improve Class 3 on Corbett for Caselli neighborhood access.

Mission:

1. **General**: Current bike infrastructure in Mission is weak point.
2. **Harrison St**:
    - Advocate for north/south protected lane for groceries and activities.
    - Essential connection for Mission Cliffs, Gus's, Jolene's, etc.
3. **17th St**:
    - Prefer fully protected lanes from Harrison to Illinois.
    - Address safety concerns for cargo bikes.
    - Extend quick-build to Valencia
4. **Mission Routes**:
    - Protect east/west routes through the Mission.
    - Explore alternatives if Valencia St can't be protected.
5. **Valencia Street**:
    - Implement 4-way stops at key intersections (McCoppin, 15th, 17th, 19th, 20th, 21st, 22nd, 23rd, 25th, 26th).
    - Explore bus and bike-only routes.
6. **Cesar Chavez St**:
    - Add bike lane
7. **15th St**:
    - Convert to two-way with traffic calming measures.
    - Add traffic calming measures from Church to Harrison.
8. **13th/Division Intersection**:
    - Urgently address issues west of Folsom.

Noe Valley:

- Cycling paths and road diet on Dolores from 19th to Market

Financial District:

- **General**: More protected bike routes in Financial District
- **Market St**: More bike access on Market.
- **Market to Stockton Tunnel**: Improve connections.
- **2nd St, Battery St, and 11th St**: Address infrastructure needs.
- **Pine and Bush Streets**: Evaluate for enhancements.
- **Post St**: Prioritize protection measures.
- **Montgomery St**: More protected bike routes.
- **Bay Bridge**: Establish bike path; Enhance bike accessibility.

Chinatown:

- **General**: Protected bike lanes in Chinatown.

North Beach/Russian Hill:

- **Embarcadero**: Connect Embarcadero to Fort Mason along Jefferson/Waterfront

Marina:

- **General**: More north-south connections to the Marina
- **Steiner St**: Add Steiner Slow Street

Potrero Hill:
- **Mariposa and Indiana**: Currently, there's no left turn allowed from Indiana but bicyclists from Caltrain take illegal left due to convenience. Address this left turn for bicyclists.
- **17th St**: Appreciation for existing lane; vital access to Mission.

Presidio:
- **Baker Beach**:
    - Allow left off El Camino Del Mar onto the parking lot. Bike access to Baker Beach from the south.
    - Add green bike path off El Camino Del Mar to Baker Beach

Richmond:
- **General Outer Richmond**: There's a big gap in the outer Richmond. Need bike facilities there because the roads are wide and cars drive fast.
- **Arguello**:
    - Road diet and cycle paths on Arguello - sidewalk level cycle paths
    - Blended Scenarios A/B for Arguello. Cars and delivery vans double park there all the time.
- **Balboa St**: Add westbound bike route on Balboa and additional east-west routes south of Geary.

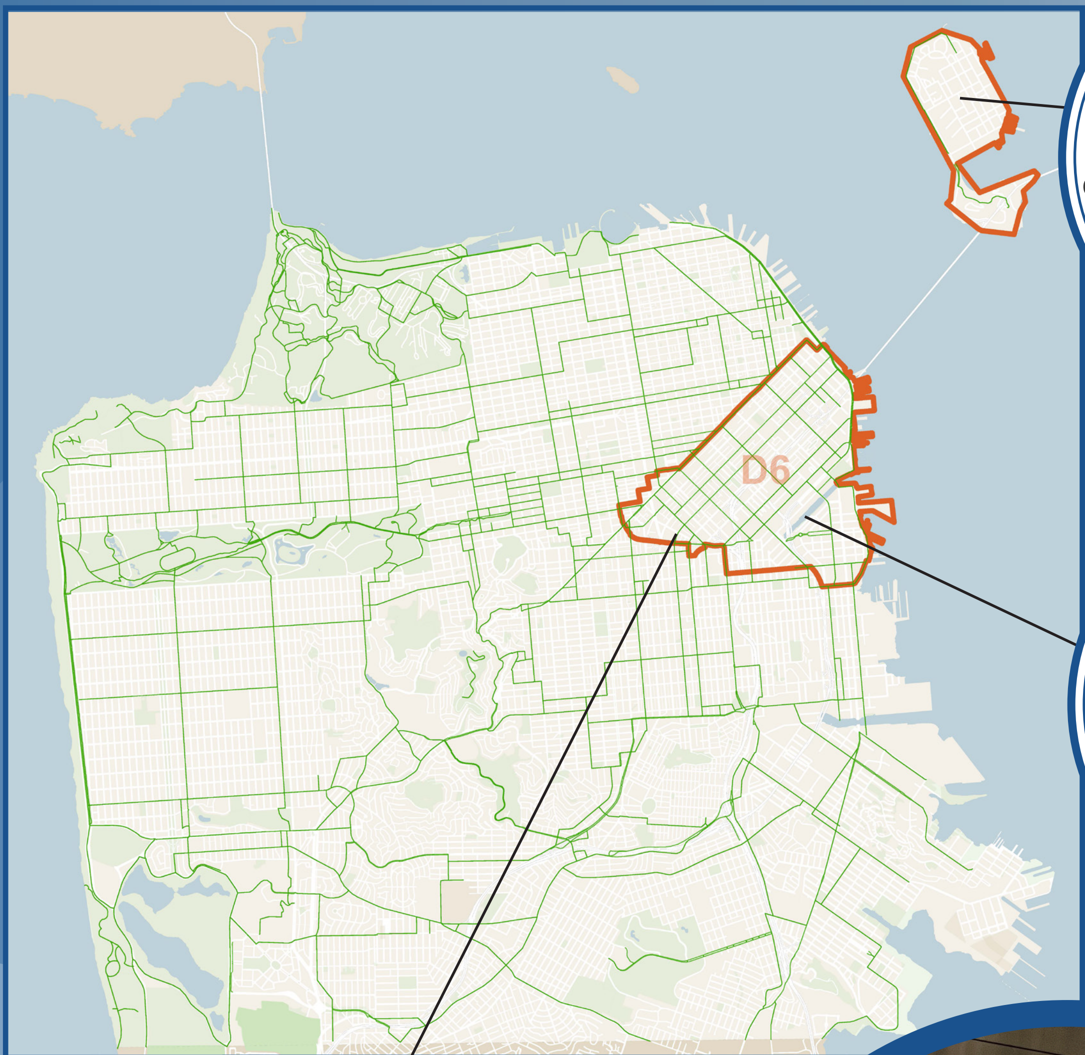
Golden Gate Park:
- **General**: Connect Golden Gate Park with car-free or protected bike lanes
- **Kezar Dr**:
    - Riding with cars feels unsafe, connection to Oak Street is unclear. Consider having it stay on park side and crossing over at Panhandle instead of at Kezar.
    - Make it car-free. +1
- **JFK Promenade**:
    - Add striping for safety.
    - Need something on the western portion of JFK.
- **MLK to Great Highway**: Install bike signaling.
- **Lincoln**:
    - Create a protected, two-way bike lane on the north side.
    - Implement a two-way protected cycle path on the park side from Stanyan to Great Highway

Sunset
- **Irving St**: Please consider improvements on Irving! This is the fastest route and currently very dangerous.
- **Kirkham St**: A friend lives near Kirkham and says people speed through stop signs - and make it dangerous to walk.
- **Parnassus Ave**:
    - Construction at UCSF makes creating a bike lane complex.
    - Fix the blind and confusing conditions at Willard.

Lakeshore:
- **Lake Merced Blvd**: Connections between Brotherhood Way and Ocean Ave.

District 6 Open House

August 14, 2024 Salesforce Transit Center Grand Hall



Do you currently bike or roll (skate, scooter, etc.) in San Francisco?

Yes: 38 (79%)
No: 10 (21%)

If you don't currently bike or roll, do you want to?

Yes: 6 (67%)
No: 3 (33%)

Total attendees: **approx. 49**

Sample of What We Heard

Below, we outline an illustrative summary of what we heard about some specific locations at the open house in District 6. SFMTA staff will use the comments to help weigh the trade-offs and refine the draft materials. Note: SFMTA staff carefully read each comment, used AI via Microsoft Copilot to help organize and summarize comments, and then verified accuracy and edited the outputs. No decisions have been made, and any proposals in the Plan will still go through project-specific outreach to refine the plans and designs of proposed bikeways.

Mission Bay:

- **4th St Bridge**:
  - Address significant gaps and prevent cars from passing and add signage.
  - Bridge can be slippery when wet.
- **3rd St**:
  - Remove a travel lane due to overbuilt traffic capacity.
  - Bridgeview Way and Tony Stone Xing channel have a shared-use path at 3rd and 4th. Needs a signal from the path to connect across 3rd.
  - At Terry Francois near Chase Center, install bike sensor.
- **Mission Bay Blvd**: Improve crossing and prioritize bike facilities.
- **7th St and Mission Bay**: Add bike facilities to cross the tracks. Difficult to merge into traffic at roundabout, too wide.
- **Mississippi to 7th St**: Dangerous slip lane that cars use to go to freeway, blocks visibility
- **Mission and Channel Roundabout**: Add bike protection alongside pedestrians.
- **General**: Talk to Spark Social about the park.

SoMa:

- **Beale St**: Extend bike path to Embarcadero.
- **Townsend St**: Make it fully safe for biking between 4th and Embarcadero.
- **5th St**: Improve bike signals and add more protection.
- **13th/Division**: Need more crosstown connections.
- **5th and Bryant/Harrison**: Simplify cross signals for pedestrians.
- **Berry St**: Address issues with dumpsters in bike lanes.
- **4th and King**: Ensure physical protection from cars.
- **4th St**:
  - Prevent car parking in bike lanes.
- **3rd St**: Redesign for pedestrians, narrow street to reduce speeding, enforce wrong-way drivers.
- **2nd St**: Improve turn onto Howard.
- **General**: Add protected lanes on every one-way street, improve wayfinding, and add mid-block crossings between SoMa and South Beach.

Financial District/Chinatown/North Beach:

- **Embarcadero**: Ensure continuous, protected bike lanes from the ballpark to Fisherman's Wharf.
- **Montgomery St**: Add bike lanes. However, challenging to find good option with businesses.
- **Sutter St**: Make the protected lane two-way.
- **Chinatown**: Improve bike paths.
- **Columbus St**: Add bike facilities on flat streets.
- **General**:
  - Create a dense bike network similar to Treasure Island.

Downtown/Civic Center

- **Mid-Market**: Existing lanes need additional connections to Mission and SoMa. Protected lanes Safer except at driveways.

Western Addition

- Connect Golden Gate and Turk St to complete connection - lots of schools

Mission

- **East/West Routes**: Improve protected lanes.
- **Schools**: Expand calmed zones around schools.
- **15th St**: Link Valencia Gardens and wiggle to BART and Marshall Elementary.
- **Guerrero**: Prefer Valencia as an option due to hills.
- **Valencia**:
    - Improve left from Market to Valencia.
    - Wish Valencia was done differently.
- **17th St**: Improve protected lanes.
- **General**: Implement traffic calming around schools.

Potrero Hill/Dogpatch:

- **Illinois St**: Cars park on sidewalk and in bike lane.
- **Mississippi St**:

Richmond

- **7th Ave**: Avoid further disruptions due to parent drop-off/pick-up.

Sunset:

- **Irving vs Kirkham**: Irving is better for biking due to less steepness and more businesses; needs more infrastructure.
- **Kirkham and Ortega**: Address why they remain class II without improvements.
- **General**: Install parking-protected bike lanes.

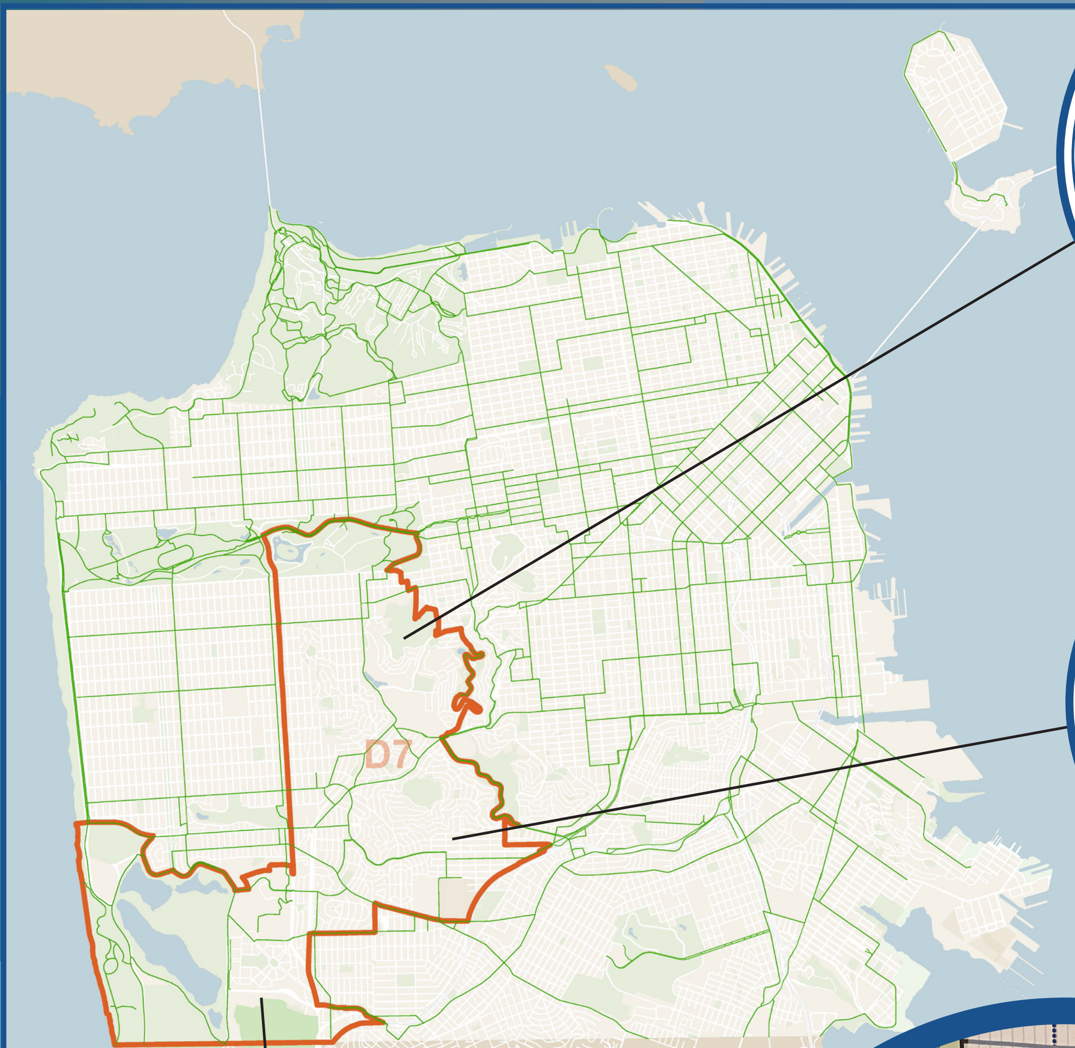
Parkside/Lakeshore

- **West Side**: Focus on protected lanes on streets like Sloat and Portola.

SF State: Add safer connection from SF State north via Stonestown.

District 7 Open House

July 17, 2024 - Cesar Chavez Student Center



Do you currently bike or roll (skate, scooter, etc.) in San Francisco?

Yes: 7 (70%)
No: 3 (30%)

If you don't currently bike or roll, do you want to?

Yes: 2 (67%)
No: 1 (33%)

Total attendees: **approx. 10**

Sample of What We Heard

Below, we outline an illustrative summary of what we heard about some specific locations at the open house in District 7. SFMTA staff will use the comments to help weigh the trade-offs and refine the draft materials. Note: SFMTA staff carefully read each comment, used AI via Microsoft Copilot to help organize and summarize comments, and then verified accuracy and edited the outputs. No decisions have been made, and any proposals in the Plan will still go through project-specific outreach to refine the plans and designs of proposed bikeways.

Parkside/Lakeshore

- **Sloat Blvd**: Should be protected in Scenario A but is shown as separated.

Sunset

- **Great Highway**: Existing bike paths need smoothing.

Inner Sunset

- **Irving St**: No street parking near Pasqually's Pizza.

Ingleside/Ocean View/West of Twin Peaks

- **Monterey Blvd**: High traffic; Yerba Buena Ave could be an alternative if made bike-friendly.
- **Santa Clara St**: Underutilized by cyclists; could divert traffic from Yerba Buena Ave if made more bicycle-friendly.

Height/Ashbury

- **Cole Valley**: Parking issues lead customers to opt for Home Depot instead.
- **17th St**: From Market to Clayton is very steep with heavy car traffic congestion.

Outer Mission

- **San Jose Offramp**: Proposal for a two-way cycle track.

Lakeshore

- Students drive to school due to unsafe biking conditions.

Downtown

- **The Embarcadero**: Speeding cars are a significant problem.
- **Tenderloin**: Service and emergency vehicles often double park, making fully protected bike lanes challenging.

District 8 Open House

July 10, 2024 - Upper Noe Rec Center

Do you currently bike or roll (skate, scooter, etc.) in San Francisco?

Yes: 37 (76%)
No: 12 (24%)

If you don't currently bike or roll, do you want to?

Yes: 1 (9%)
No: 10 (91%)

Total attendees: **approx. 52**

Sample of What We Heard

Below, we outline an illustrative summary of what we heard about some specific locations at the open house in District 8. SFMTA staff will use the comments to help weigh the trade-offs and refine the draft materials. Note: SFMTA staff carefully read each comment, used AI via Microsoft Copilot to help organize and summarize comments, and then verified accuracy and edited the outputs. No decisions have been made, and any proposals in the Plan will still go through project-specific outreach to refine the plans and designs of proposed bikeways.

Mission

- **Cesar Chavez St**:
  - Needs a major overhaul from Sanchez to 3rd St due to dangerous conditions and high bike traffic. Should be protected for bikes; map is incorrect all the way to the bay.
  - Fast, direct, and flat but not safe; requires fully protected lanes to ensure safety and high-quality biking facilities.
- **Valencia St**:
  - Loved the Valencia Center Bike lane; consider trying again on a lower traffic road. Extend separated bike lane between 23rd and Cesar Chavez for safe cycling.
  - Connect Valencia to Tiffany to 29th to Sanchez. Questioning why there are still no plans for Valencia south of 23rd.
- **Folsom St**:
  - Prefer one street with a two-way bike lane for safety and speed.
  - Keep Folsom as the N-S bike route over South Van Ness.
  - Downtown: enforce 'No Right Turn' to ensure bike lane safety.
  - Implement protected lanes from 11th to Cesar Chavez and Harrison from 11th to 20th.
- **Potrero Ave**:
  - Prefer protected bike lanes; need a way across Potrero by Potrero del Sol Park to Cesar Chavez.
- **South Van Ness Ave**:
  - Use Capp St for bikes; it's car-free by neighborhood consensus.
  - 90s City Plan: S. Van Ness for cars, Mission for transit, Valencia for bikes; plan not followed.
- **17th St**:
  - Extend bike lanes to Mission for flat access to Potrero and Caltrain.
  - Protected lanes from Valencia to Harrison; continue them.
  - No change needed; essential for car crossing.
- **19th St**:
  - Slow Street between Dolores and Folsom.
- **22nd St**:
  - Need a protected lane going east from Church to get to Valencia bike lane and BART.
  - More love for 22nd St to Chattanooga to 24th St.
- **26th St**:
  - Parents take 26th St between Valencia and Sanchez; should be safer for bikers.
- **Church St**:
  - Many pedestrians are elderly or children; cars don't stop for them.
  - Discourage cars from crossing at 28th St; right turn only for safety.
  - Allow cars to cross Market at Church St to avoid the wiggle.
  - Modal filter at 28th and Church.
  - Protected lane needed by Mission High School.

- **Dolores St**:
    - Between 30th and San Jose: two lanes wide but cars only use one lane, leaving ample room for a bike lane.
- **San Jose Ave**:
    - Make San Jose Ave safe for cyclists.
    - Extend cycle track protection to beginning and end from Randall to Glen Park/Bosworth.

Noe Valley

- **24th St**:
    - Have secure bike parking at Noe Valley and at Valencia St.
- **Sanchez St**:
    - Add calmed streets in Noe Valley between 24th and 17th; wide and spacious.
    - More ideas needed for Sanchez between 17th and Duboce; important but dangerous connector.
- **Duncan St**:
    - Between Sanchez and Valencia southbound designated as a sharrow for bikes.
    - Best for bikes between Sanchez and Valencia.
- **Diamond St**:
    - Very steep; cars travel downhill running through all the stop signs. Speed bumps are supposed to be put in but will not make it safe.
- **Eureka St**:
    - Bus street; can't be made a slow street.
    - Concerns about losing parking on Eureka.
- **Douglas St**:
    - Great for bicyclists; great route that serves many uses (23rd - 17th).

Glen Park

- **Bosworth St**:
    - Residents need parking; Chilton is a dead end, access via Bosworth.
    - Traffic issues on Bosworth and Diamond; no proposals for Diamond.
    - Clarify bike lane proposals between Elk and Diamond.
    - Existing bike lane is functional; no changes needed.
    - Add a protected lane.
    - Remove unused bus lane at Elk.
- **Chenery St**:
    - Slow street proposal rejected; honored.
    - Support bike path on Arlington, not Chenery.
    - Include cars; allow right turn on red at Bosworth.
    - Too narrow for bike path; bus line (36) uses it.
    - Already safe for all; no changes needed.
    - Replicate traffic calming elsewhere.
    - Against slow Chenery streets; will affect neighboring streets.
    - Marked on "Network Certainty" map; under discussion?
- **Elk St**:
    - Steep terrain from Diamond Heights to Bosworth; high traffic and garage exits.
    - Too steep for bicyclists; no space for bike lanes.
    - Fast and steep with many garages/driveways; difficult for non-ebikers.
- **Miguel St**:
    - Clearly mark as a bike way; ideal route from Chenery/Arlington to Cortland St.

- **O'Shaughnessy Blvd**:
    - Improve protected lanes.
    - Widen side path to 22' for bikes and pedestrians; extend Class I path from O'Shaughnessy to San Jose.
    - Enhance safety at Bosworth/O'Shaughnessy.

Castro/Upper Market

- **Market St**:
    - Direct cars to cross Market St on Church, not Sanchez.
    - Ensure uninterrupted bike space.
    - Create safe bike routes in the Castro on Market St and Castro St to 17th St.
    - Clarify and discuss the Upper Market plan.
- **Church St**:
    - Allow cars to cross Market at Church St.
    - Install modal filter at 28th and Church.
    - Add protected bike lane by Mission High School.
- **17th St**:
    - Essential car route between Market and Stanyan.
- **Clayton St**:
    - Ensure good separation near 17th/Twin Peaks due to high car and bike traffic.
    - Add bulbouts for Oak and Clayton.

Downtown/Civic Center

- **5th St**:
    - Parking garage entrance is hard to find and too small for cargo and other bikes.
- **Van Ness Ave**:
    - Northbound barely used by cars due to proximity to Franklin. Reduce or eliminate N Bound roadway and install protected bike lanes for better connectivity.
    - Less hilly; Larkin is very hilly.
- **Ellis and Eddy St**:
    - Two-way: buses on Ellis and bikes on Eddy.
- **Golden Gate and Turk St**:
    - Two-way: buses on Turk and bikers on Golden Gate.

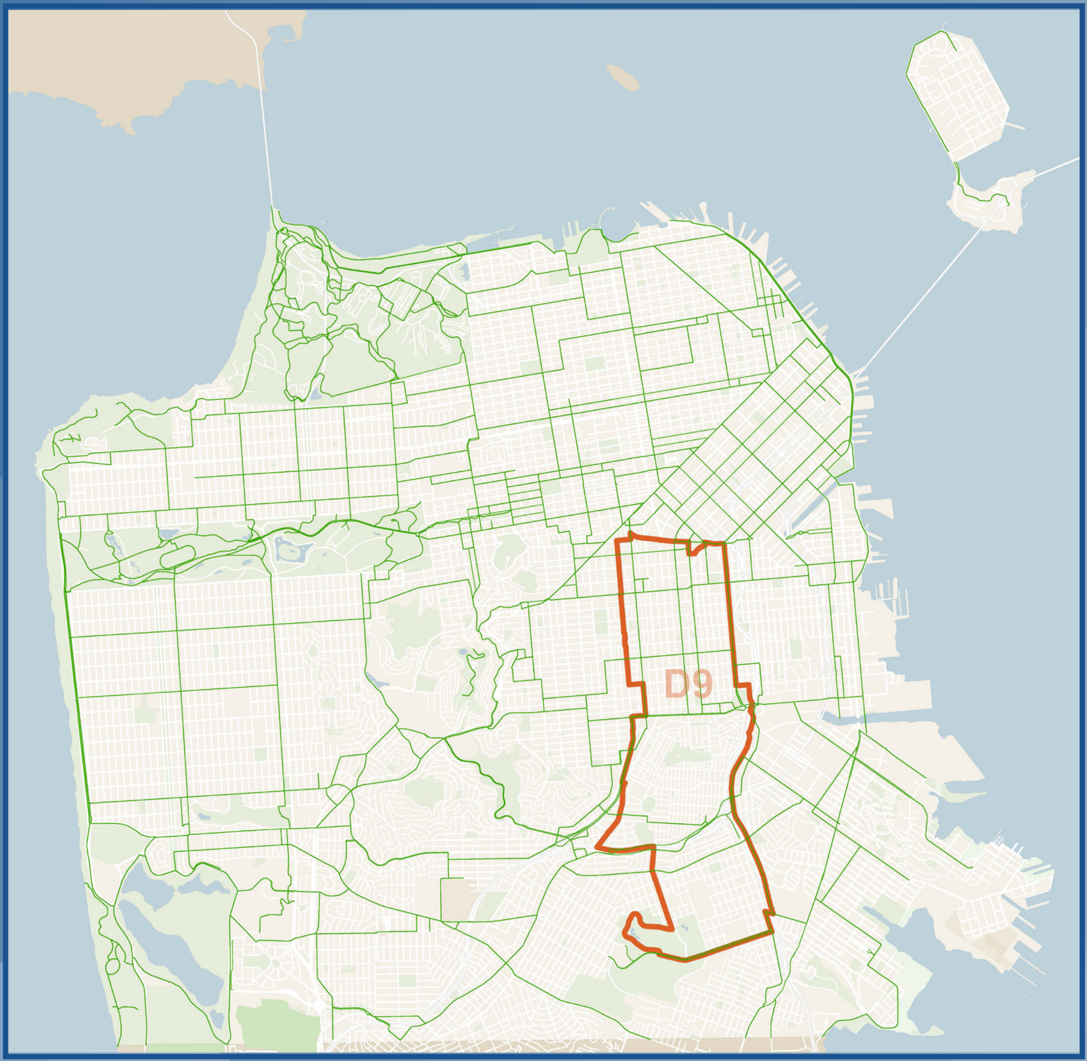
Financial District

- **Ferry Building**:
    - Why does the Farmers Market close the Ferry Building bike lane?
- **Battery St**:
    - Would be great to finish Battery from Embarcadero to Market and Van Ness.

Haight Ashbury/Golden Gate Park

- **Panhandle**
    - Move bikes for pedestrian space; ensure bike routes are shady, pretty, and safe. Panhandle has better pavement than Oak/Fell. Expand car-free spaces in Golden Gate Park.

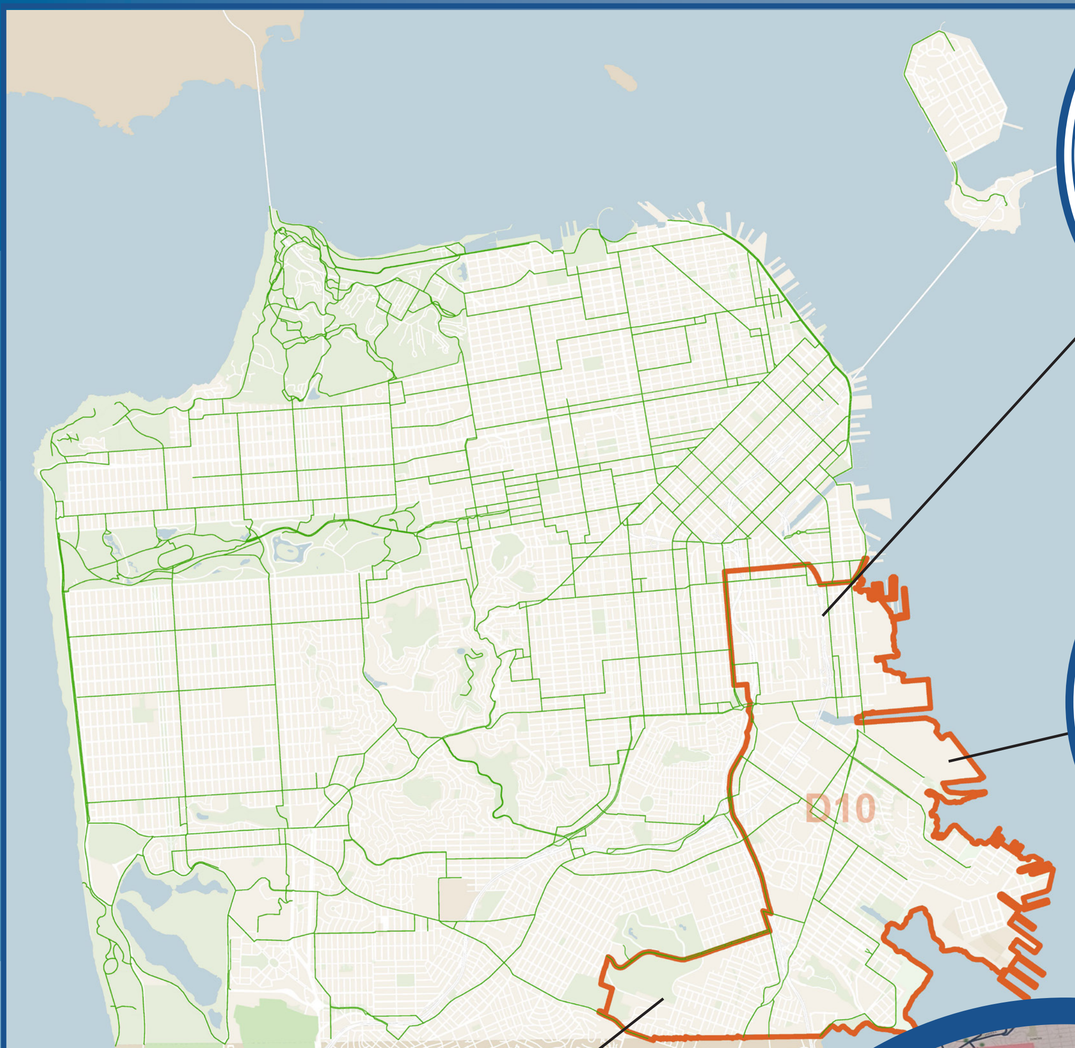
District 9 - Open House Postponed



The SFMTA postponed the open house originally scheduled in District 9 after hearing feedback to allow community to process more pressing issues in neighborhood. Many people who planned to attend the District 9 Open House attended the District 5 Open House, as well as other open houses.

District 10 Open House

July 15, 2024 - Southeast Community Center



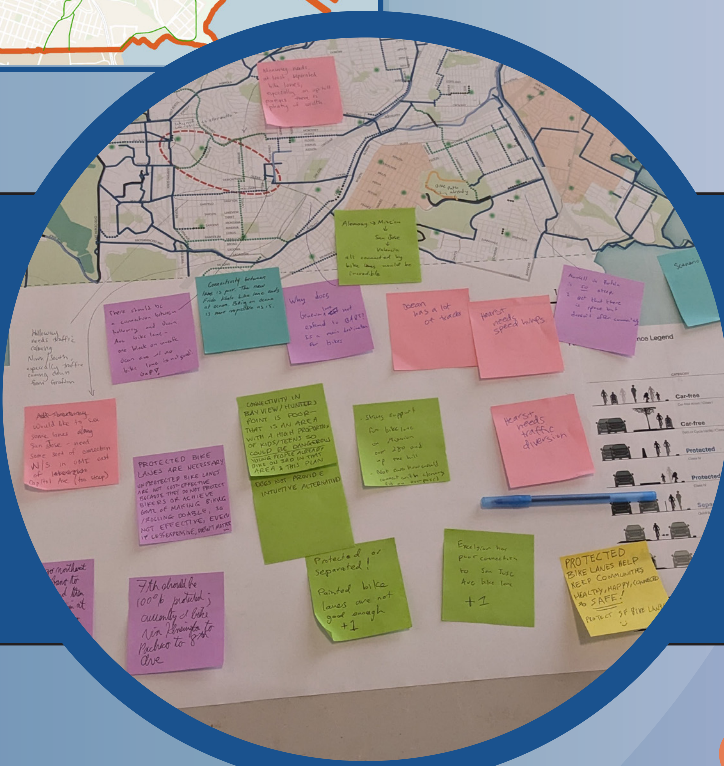
Do you currently bike or roll (skate, scooter, etc.) in San Francisco?

Yes: 25 (61%)
No: 16 (39%)

If you don't currently bike or roll, do you want to?

Yes: 3 (27%)
No: 8 (73%)

Total attendees: **approx. 43**



Sample of What We Heard

Below, we outline an illustrative summary of what we heard about some specific locations at the open house in District 10. SFMTA staff will use the comments to help weigh the trade-offs and refine the draft materials. Note: SFMTA staff carefully read each comment, used AI via Microsoft Copilot to help organize and summarize comments, and then verified accuracy and edited the outputs. No decisions have been made, and any proposals in the Plan will still go through project-specific outreach to refine the plans and designs of proposed bikeways.

Dogpatch/Bayview/Mission/Bernal

- **Cesar Chavez St**: Protect bike lanes and improve pavement. Address safety at highway off-ramps. Add tech bus stops that do not block bike lanes.

Dogpatch

- **22nd St**:
  - Fix light timing at 22nd and 3rd St. to improve pedestrian safety.
  - Make 22nd St a more walkable commercial corridor.
  - Add a bike lane from Indiana to Pennsylvania.
  - Address loading concerns and improve safety for bikes and pedestrians.
- **Mariposa St**:
  - Implement traffic calming west of 280 to reduce cut-through traffic.
  - Improve safety at the blind corner of Mariposa and Indiana.
  - Add new physical infrastructure, no sharrows.
- **Indiana St**: Improve safety between Mariposa and 22nd.
- **Illinois St**:
  - Maximize protected bike lanes and remove defunct Muni tracks.
  - Address loading concerns from 20th to 23rd.
  - Improve safety for bikes and pedestrians, especially on game days.
  - Consider fully protected bi-directional bike lanes.
- **Tennessee St**:
  - Consider as an alternative to Illinois with more infrastructure and safety improvements.
  - Add a 4-way stop at 19th St.
- **Cargo Way**: Improve bike lane maintenance and add mid-block ramps.
- **Minnesota St**: Leave bike lanes as is or reroute through Minnesota St.

- **Connections to Golden Gate Park**:
    - Provide a truly safe route to bike from Dogpatch to Golden Gate Park.
    - Address cut-through traffic due to trucks coming off the highway.
    - Improve bike safety, especially for families biking with toddlers.

Bayview

- **Bay Trail**: Complete the Bay Trail into Shipyard.
- **Connections to Mission District and Bernal Heights**:
    - Provide safe bike routes from Mission and Bernal to Heron's Head Park.
    - Increase Baywheels docks.
    - Implement green wave timed lights for the Bayview route.
    - Address safety concerns with freeway crossings.

Bernal Heights

- **Alabama St**: Add speed bumps between Precita and Ripley. Improve hill climb routes: Alabama > Mullen > Brewster > Franconia > Esmeralda > Bernal Heights Blvd.
- **Mullen Ave**: Add Slow Street between Alabama and Brewster.
- **Precita Ave**: Add Slow Street in front of Leonard Flynn School. Improve bike routes and add sidewalks.
- **Cortland Ave**: Add a bike lane on Cortland in both directions between Mission and Bayshore.
- **Connections to Caltrain, Mission District, Bayshore**: Improve bike routes to Caltrain, 24th/Mission BART, and Alemany Farmers Market. Connect Valencia bike lane to Bernal and Mission going east other than Cesar Chavez. Provide a safer bike route from Bernal to Caltrain. Improve connection between Bernal and Bayshore.
- Add protected bike lanes and improve safety around parks and schools.

Russian Hill

- **Polk St**: Improve bike safety and connectivity to Embarcadero Path.

South of Market

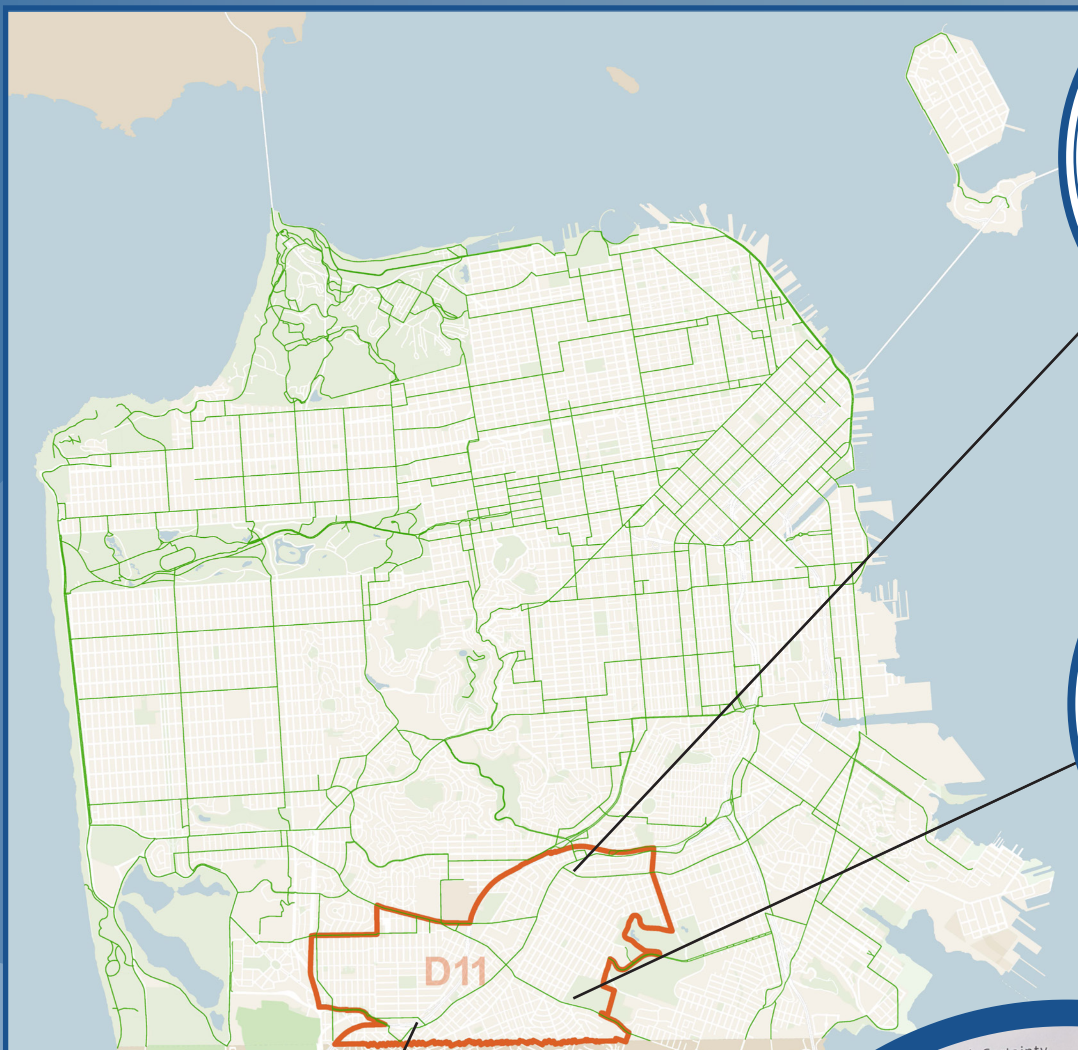
- **Near ballpark and stadium**: Address safety concerns with tech buses, game traffic, and poorly maintained paths.
- **Connections to Mission**: Provide access to 17th, 18th, 7th, and 4th streets.

Sunset

- Improve bike access to restaurants and businesses, especially south of Golden Gate Park.

District 11 Open House

August 4, 2024 - Minnie & Love Ward Rec Center



Do you currently bike or roll (skate, scooter, etc.) in San Francisco?

Yes: 16 (84%)
No: 3 (16%)

If you don't currently bike or roll, do you want to?

Yes: 3 (100%)
No: 0 (0%)

Total attendees: **approx. 20**

Sample of What We Heard

Below, we outline an illustrative summary of what we heard about some specific locations at the open house in District 11. SFMTA staff will use the comments to help weigh the trade-offs and refine the draft materials. Note: SFMTA staff carefully read each comment, used AI via Microsoft Copilot to help organize and summarize comments, and then verified accuracy and edited the outputs. No decisions have been made, and any proposals in the Plan will still go through project-specific outreach to refine the plans and designs of proposed bikeways.

Ocean View

- **Holloway Ave**:
  - Paint the bike lane; street width is an issue.
  - Traffic circles and bulbouts worsen the situation.
  - Intersection with Junipero Serra Blvd is too wide; unsafe to cross.
  - Conflict with 29 bus and cars turning off Junipero Serra.
  - Needs traffic calming from Beverly St to Lee St, especially traffic from Grafton.
  - Minimal changes between Ashton and Junipero Serra; maybe paint the bike lane.
  - Connect Holloway and Ocean Ave bike lanes; one block on unsafe Ocean Ave is not good.
- **Randolph St**:
  - Make bike-friendly at Arch St; sketchy, blind curve at Orizaba St.
  - Conflict with rail tracks at Arch St; need escape ramp on other side of train ADA ramp.
  - Needs protected bike lanes (not sharrows).
  - Traffic calming needed from Orizaba Ave to 19th Ave.
- **Junipero Serra Blvd**:
  - From Ocean Ave to Moncada Way: No connection, heavy traffic, no bike access except sidewalk; school route.
  - From Moncada Way to Ocean Ave: Use Urbano to Moncada, act as pedestrian at Ocean and Junipero Serra; official crossing needed.
  - From Winston Dr to Ocean Ave: Desire for two-way protected bike lane.
  - West frontage road is a better route than Junipero Serra Blvd from Holloway Ave to Ocean Ave.
- **Ocean Ave**:
  - Needs prioritization over Sloat.
  - Gap at Ocean Ave/Lee St to Ocean Ave/Frida Kahlo Way.
  - Sketchy left turn at Frida Kahlo Way; needs protected left turn.
  - Surprised Ocean Ave is “low certainty” given frequent cyclist use.
  - Poor connectivity between lanes.
  - New Frida Kahlo bike lane ends at Ocean.
  - Remove freeway ramps on Ocean; dangerous and redundant with ramps on Geneva.
- **Brotherhood Way**:
  - Must be a physically protected bikeway.
  - Traffic over 40mph; needs protected bike lanes.
  - Direct access to greenspace for Ocean View/Merced Heights/Ingleside.
- **Capitol and Lakeview**: Needs traffic calming.
- **East/West Connections**: Missing in OMI south of Grafton/Sargent/Lakeview.

Outer Mission

- **Bosworth St**:
  - o Important for BART and 280 access; heavy car traffic.
  - o Create a separated bike lane; better than changing Chenery.
- **Geneva Ave**:
  - o Used by recreational cyclists; currently unprotected and unpleasant.
  - o Extend bike lane to BART; main destination for bikes.
- **Alemany Blvd**:
  - o Support for protected bike lanes from OMI to Mission Terrace.
  - o Missing connection to Mission Terrace from OMI.
  - o Confusing intersection at Sagamore St and Orizaba Ave; need protected bike lane to connect to Alemany.
  - o Support for bike lane on Mission over 280 and up the hill.
  - o Unclear connection between Mission St bike lane and Alemany (overpass issue).
- **San Jose Ave**:
  - o Desire for bike lanes along San Jose Ave.
  - o Connecting Alemany Blvd, Mission St, San Jose Ave, and Valencia St with bike lanes would be ideal.
- **Hearst Ave**:
  - o Not functioning as a slow street; needs more infrastructure to slow traffic.
  - o Needs traffic diversion and speed humps.
  - o Traffic calming needed from Ridgewood Ave to Baden St.

Excelsior

- **Persia Ave**: Needs traffic calming; cannot support more car volumes and speeds.
- **Mansell St**: Steep, rarely used by cyclists; lacks connectivity.
- **Slow Streets**: Add slow streets.
- **Connections to San Jose Ave**: Poor connections in Excelsior.

Glen Park

- **Monterey Blvd**:
  - o Narrow lanes; needs traffic calming.
  - o Consider bike facilities as traffic calming measure.
  - o Needs separated bike lanes, especially uphill; plenty of width.
- **Bosworth St**:
  - o Important for BART and 280 access; heavy car traffic.
  - o Create a separated bike lane; better than changing Chenery.

West of Twin Peaks

- **Portola Dr**:
  - o From Junipero Serra Blvd to Del Sur Ave: Needs physical protection; cars speed quickly.
- **7th Ave**: Should be 100% protected.

Parkside/Lakeshore

- **Sloat Blvd**: From 35th Ave to 39th Ave: Dangerous traffic and road conditions. Improve alternate bike route at Sloat and Skyline. Do not prioritize Sloat.
- **Connection to Eucalyptus**: Need connection via Rolph Nicol Park.

Bayview/Hunters Point

- **Phelps St to Oakdale St to Mendell St to Galvez St**:
  - o Area with many families/kids; should be a slow street area. Driving already <15mph; make it official.
- **3rd St**:
  - o High need for a safe bike/roll along 3rd St.
  - o Young people already bike on 3rd; plan lacks intuitive alternatives.
- **Connectivity to other neighborhoods**:
  - o Poor connectivity in Bayview/Hunters Point; high proportion of kids/teens, potentially dangerous.

Additional Conversations

In addition to the open houses, SFMTA staff engaged in conversation with numerous community members, business owners, and community groups about biking and rolling, taking place through 24 email threads and 5 in person meetings. In the following pages, we outline an illustrative summary of what we heard about some specific locations through these in-person and e-mail exchanges.

SFMTA staff will use the comments to help weigh the trade-offs and refine the draft materials. Note: SFMTA staff carefully read each comment, used AI via Microsoft Copilot to help organize and summarize comments, and then verified accuracy and edited the outputs. Any proposals in the Plan will still go through project-specific outreach to refine the plans and designs of proposed bikeways.

On Commercial Corridors

- Car parking is vital to small business success
- Need for improved communication on construction timelines

North Beach

- **Columbus Wiggle**: Better wiggle NB on Columbus is right on Powell, left on Lombard, right on Mason, left on Chestnut and back onto Columbus past the tracks. When going south, take Columbus and don't get pushed into the tracks.

Chinatown

- **Stockton Tunnel**: Improve pedestrian safety at Stockton Tunnel and light at Pacific and Powell.
- **Grant St, Stockton St**: Add signage that says no bicycles.

Inner Richmond

- **Anza St**: Move bikeshare station from 5th Ave. to Anza St.

Sunset

- People living in the Sunset, especially Chinese-speaking multi-generational households, rely on car travel for daily activities.

Western Addition

- **Oak and Fell Sts (between Scott and Baker)**: Improve intersections, add protection, and enhance safety. Vital connection to Panhandle, JFK Promenade, and west side of the city. Already high bike volumes despite current infrastructure limitations.

Downtown/Civic Center/Financial District

- **Market St between Civic Center and Fifth Street Garage**: Improve route

Castro/Upper Market

- **17th St**: Add connections to the Castro via 17th Street. Not currently connected.
- **Market St between Castro St and Noe St**: Add protected bike lane due to all the double parking.

Noe Valley

- **Church St**: Add traffic calming on Church St including on Duncan and 28th St as drivers go fast without stopping for pedestrians.
- **23rd St**: Don't make a bikeway, already has a lot of traffic and speed bumps. Suggest Elizabeth St parallel to 23rd St instead.

Potrero Hill/Dogpatch

- **Illinois St**: From Mariposa St to Cargo St, add a protected, bi-directional bike lane.
- **Mariposa St**:
  - West of 280, implement traffic calming, traffic diverters, and improved pedestrian crossings to calm cut through traffic between 280 and 101.
  - East of 280, implement a road diet and protected bicycle infrastructure to connect to Terry Francois and Illinois St bicycle lanes.
- **23rd St**:
  - Pennsylvania St to Illinois St, implement traffic calming and pedestrian and bicycle infrastructure as it's a key corridor and will connect the Power Station Development.
- **Cesar Chavez St**:
  - East of Potrero Ave between Pennsylvania St and Illinois St and including Illinois & 3rd Intersections, fill protected bicycle lane gap.
- **18th St**:
  - From Illinois St to Connecticut St in the Potrero Hill commercial district, reduce speed to reduce cut through traffic to improve pedestrian safety.
  - From Minnesota St to Pennsylvania St on the southern side of the overpass, add a bi-directional, parking-protected bike lane and shared pedestrian path.

- **Safe School Zones / Route**:
  - Daniel Webster, Starr King, SF International, Mission Bay School
  - Add Live Oak at Jackson Park to the map.
- **17th St**: Quick build changes
  - Missouri St From 16th to 17th St
  - Mississippi St From 16th to 17th
  - 17th St Intersection @ Potrero Ave
  - 17th St From Mississippi to Pennsylvania
- **22nd St**: From Minnesota St to Tennessee St, add permanent Shared Space or Permanent Slow Street / Stop Signs
- **19th St and Tennessee St**: Add stop sign
- **Kansas St**: North of 17th, should be protected prior to neighborway designation; and
- **Utah St**: From 17th St to Potrero St, traffic calming and curb cuts needed at W side of pedestrian bridges over 101 as there are increasing cut-throughs.
- **Vermont St**: From 22nd St to 23rd St, traffic calming and curb cuts needed at west side of pedestrian bridges over 101 as there are increasing cut-throughs .

Lakeshore

- **19th Ave**: At Holloway, improve crossing.
- **Connections to SF State**:
  - Improve connections to Daly City, Balboa Park BART, and Stern Grove
  - Unclear about what's happening with Daly City BART, would bike if better connection.
- **Brotherhood Way**: Improve bike route through underpass

West of Twin Peaks

- **Upland Dr, Northwood Ave, Montecito Ave, Hazelwood Ave, Gennessee St, and Hearst Ave**: Add alternative route to Monterey Blvd.
- **Faxon**: Edit route involving curvature of the hill.

Glen Park

- **Chenery St**: Little community consensus over whether or not to include Chenery Street between Diamond and Elk as part of the network.

Bernal Heights

- **Junipero Serra Elementary School and Early Education School**: Add bike facilities to support lower income Latinx population.
- **Holly Park Circle**: Add Slow Street or traffic calming.

South of Market

7th St and Folsom: Dangerous mixing zone for right-turning traffic

Appendix I

Updated List of Community and Stakeholder Organizations engaged during the Biking and Rolling Plan process

As of November 13, 2024 / Alphabetical Order

1. American Indian Cultural District
2. American Industrial Center
3. Barbary Coast Neighborhood Association
4. Bay Area Outreach and Recreation Program
5. Bayview Hill Neighborhood Association
6. Bayview YMCA
7. Bernal Heights Merchant Association
8. Better Housing Policies
9. BMAGIC
10. Bring Your Own Big Wheel
11. Calle 24
12. Castro Farmer's Market
13. Central City SRO
14. Chinatown Community Development Center
15. Chinatown Merchant's Association
16. Chinatown TRIP
17. City College Student Association
18. Citywide CBD Alliance
19. Common Roots
20. CYC – Bayview
21. CYC – Richmond
22. Discover Polk
23. Dogpatch Neighborhood Association
24. Duboce Triangle Neighborhood Association
25. Earth Day SF
26. East Cut Community Benefit District
27. Excelsior Collaborative
28. Excelsior District Improvement Association
29. Family Connections Center
30. Financial District CBD
31. Flynn Elementary School
32. Fort Mason Farmer's Market
33. Glen Park Merchant Association
34. Glen Park Neighborhood Association
35. Golden Gate Restaurant Association
36. Grattan Elementary School
37. Hayes Valley Neighborhood Association
38. KidSafe SF
39. Lighthouse for the Blind

40. Lower Polk CBD
41. Lower Polk Neighbors
42. Mission Merchants Association
43. Mission YMCA
44. New Mission Terrance Improvement Association
45. NorCal Pedal Gang
46. North Beach Business Association
47. North Beach Neighbors
48. North of Panhandle Neighborhood Association
49. Northern Neighbors
50. OMI Cultural Participation Project
51. Outer Sunset Farmer's Market
52. Outer Sunset Neighbors
53. People of Parkside-Sunset
54. People of Slow Streets
55. Potrero Boosters
56. Richmond Families
57. San Francisco Bicycle Coalition
58. Senior Power
59. SF African American Arts & Cultural District
60. SF Bike Bus
61. SF Council of District Merchants
62. SF Parks Alliance
63. SF State Student Government
64. SF Youth Commission
65. SFMTA Small Business Working Group
66. Skating on Native Land
67. Small Business Commission
68. SOMCAN
69. Southeast Community Facility Commission
70. Telegraph Hill Dwellers
71. Tenderloin Community School
72. Tenderloin Neighborhood Development Corporation
73. Tenderloin YMCA
74. Transgender District
75. Union Street Merchants
76. University of California, San Francisco
77. We are OMI
78. Youth Mojo

Appendix J

to be added next draft