C/CAG
City/County Association of Governments
of San Mateo County

EXISTING CONDITIONS REPORT

C/CAG Comprehensive Bicycle and Pedestrian Plan

July 23, 2020 | Draft

TOOLE DESIGN

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CHAPTER 1: COUNTYWIDE DEMOGRAPHICS AND TRAVEL TRENDS

INTRODUCTION

This Existing Conditions Report is part of the City/County Association of Governments of San Mateo County (C/CAG) Comprehensive Bicycle and Pedestrian Plan (CBPP) update. The updated CBPP will set new goals, assess existing conditions and changes since the last plan, and identify opportunities to improve mobility options for people walking and bicycling. This Existing Conditions Report provides an understanding of who is already walking and bicycling in San Mateo County and how existing infrastructure supports active transportation options across the county for people walking, biking, or using other forms of active transportation. This report will support the next phase of the CBPP development, including the identification of the pedestrian focus areas and creation of the countywide bicycle backbone network.

CONTEXT AND CITIES

Located in the center of the San Francisco Bay Area just south of San Francisco County, San Mateo County is uniquely situated between the Pacific Ocean and San Francisco Bay. The county encompasses a total land area of approximately 455 square miles. Several major interstate routes and state highways run through it, including I-280, U.S. Route 101, CA-1, CA-35, and CA-82 (El Camino Real) which run north-south, and CA-84 and CA-92 (including the San Mateo Bridge) running east-west. Other major highways include I-380, CA-9, CA-109, and CA-114.

The county's growing population and economy, and varying landscapes of redwood forests, rolling hills, farmland, tidal marshes, beaches, along with its mild climate, make it an ideal place for walking and bicycling. There are also numerous regional recreation areas in San Mateo County, including the San Bruno Mountain State & County Park, Crystal Springs Reservoir, the Santa Cruz Mountains, several forest and marine protection areas, the ocean beaches, and many well-used trails.

San Mateo County has a variety of transit options for local and regional travel, including rail options like BART and Caltrain along with an extensive bus and shuttle system operated largely by SamTrans. These transit operations have hubs throughout the county – if coupled with improved walking and bicycling connections, the existing transportation network will provide a solid foundation for increasing the active transportation mode share.

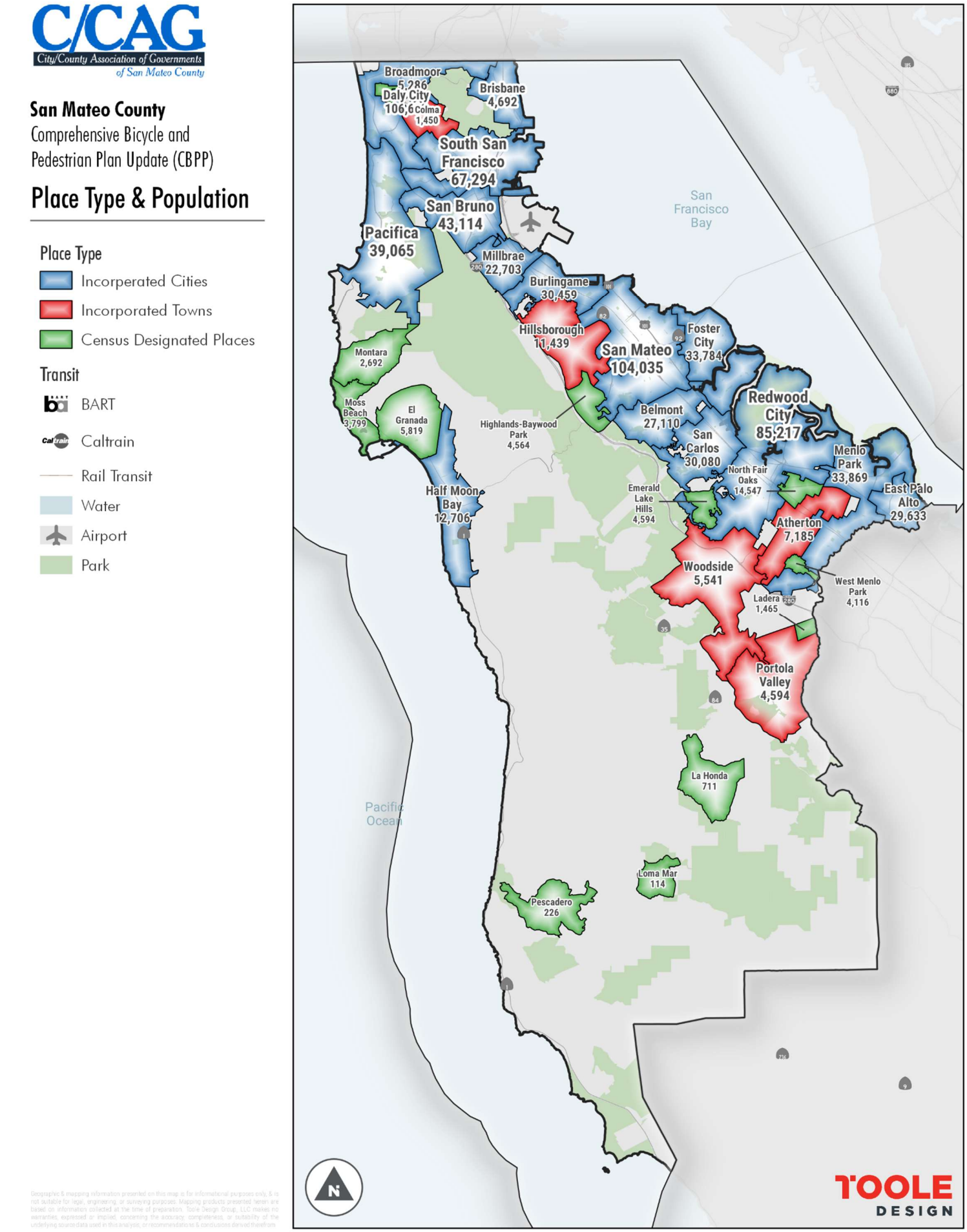
There are 20 incorporated cities and towns within San Mateo County, most of which are located along state highways (see Figure 2). The United States Census American Community Survey (2014-2018, five-year estimates) estimates that San Mateo County has a population of 769,545, an increase of seven percent from 2010. The largest city in the county is Daly City, which has a population of approximately 106,638. Other cities in the county range in population from 1,450 in Colma to 104,035 in San Mateo County.[1] The population of the county is also very racially and ethnically diverse, with 62 percent of the population identifying as a person of color.[1]

Figure 1. San Mateo County Facts

20 **Incorporated cities**	**91** **Recreation trails**	**455** **Square miles of land area**
769,545 **People**	**60** **Miles of coastline**	**3** **Regional transit agencies**

[1] US Census American Community Survey, 2018

Figure 2. San Mateo County Jurisdictions and Populations (2014-2018)



PLANNING CONTEXT

OVERVIEW

There are several state and regional plans that support and provide important context for active transportation planning in San Mateo County. Caltrans' *Toward an Active California (2017)*, is California's first statewide active transportation plan and presents policies and actions to help Caltrans and its partner agencies achieve the goal of doubling walking and bicycling trips by 2020. Caltrans' *District Four Bike Plan (2018)* and the forthcoming Pedestrian Plan provide an assessment of bicycle and pedestrian needs and identifies specific projects along the State Transportation Network in District Four which includes many roadways that serve countywide needs in San Mateo County. Overall, the policy frameworks for California, C/CAG, and local jurisdictions strongly support active transportation. These plans include policies to support the construction of active transportation facilities, integrate Complete Streets principles, Americans with Disabilities Act (ADA) accountability, roadway safety improvements, and in some cases, traffic calming programs.

KEY TAKEAWAYS

Table 1 presents a summary of the bicycle and pedestrian plans in each jurisdiction in San Mateo County. Some jurisdictions do not have bicycle- or pedestrian-specific plans, however, all of the jurisdictions have general plans that provide support for active transportation. Below are examples of local and county bicycle and pedestrian policies.

City of Belmont General Plan (2017)

- Make Complete Streets practices a part of Belmont's planning, design, and operation of its circulation network, acknowledging that a flexible and context-sensitive approach to design will result in each roadway serving most users and the roadway network as a whole serving all users.

City of East Palo Alto General Plan (2017)

- Implement traffic-calming and traffic-slowing measures on roads and at intersections with a high level of existing or planned pedestrian and non-motorized vehicle activity and/or collisions.

During interviews with local jurisdiction staff, Toole Design determined that several jurisdictions have ADA transition plans. ADA transition plans typically include a public involvement process, an evaluation of pedestrian facilities in the public right of way to determine facility compliance with ADA guidelines, and an implementation strategy to inform the public which facilities will be upgraded and when. Belmont, Daly City, Half Moon Bay, Millbrae, Pacifica, and Redwood City have formal ADA transition plans; San Mateo is the process of developing a plan, and Foster City doesn't have a plan but systematically addresses issues near schools and civic centers.

APPLICATION

The goals and policies reviewed as part of this plan will provide the baseline for future program and policy recommendations and the updated policy framework.

Table 1. Jurisdiction Active Transportation Plan Summary

Jurisdiction	General Plan	Bicycle Plan	Pedestrian Plan	Active Transportation Plan	ADA Transition Plan
San Mateo County	X			X	
Atherton	X			X	
Belmont	X			X	X
Brisbane	X			X	
Burlingame	X			X**	
Colma	X				
Daly City	X			X	X
East Palo Alto	X	X			
Foster City	X				
Half Moon Bay	X			X	X
Hillsborough	X				
Menlo Park	X	X			
Millbrae	X				X
Pacifica	X				X
Portola Valley	X				
Redwood City	X			X*	X
San Bruno	X			X	
San Carlos	X			X**	
San Mateo	X	X	X		X**
South San Francisco	X	X	X		
Woodside	X				

*Transportation plan for all modes
** In Progress

ACTIVE TRANSPORTATION DEMOGRAPHICS

OVERVIEW

There are a variety of data sources that can be used to better understand the size and characteristics of the population who use, or are more likely to use, active transportation options in San Mateo County. These datasets can also highlight the share of the population who may be most dependent on active transportation and would derive the greatest benefit from improved access to additional mobility options or network safety improvements.

KEY TAKEAWAYS

According to the most recent data from the U.S. Census' American Community Survey (2014-2018, five-year estimates), a substantial share of the population in San Mateo County may be dependent on, or interested in, active transportation.

- **36 percent** of the population is under 18 or over 65 and may be unable to drive or feel less comfortable driving.
- **7 percent** of the population lives below the federal poverty level and may not be able to afford or regularly maintain access to a vehicle or transit pass.
- **29 percent** of households own only one car and 5 percent of households do not own a car at all.
- **15 percent** of the population ages 16 or older are already walking, bicycling, or riding public transit to work.

Figure 3 presents a demographic summary of the people who are already walking, bicycling, and riding public transit to work in San Mateo County.

Race/Ethnicity: Compared to the distribution of the total commuter population by race/ethnicity, white (alone) populations are overrepresented among bicyclists, Asian populations are overrepresented among transit riders, and people of Hispanic or Latin descent are overrepresented among pedestrians. The term 'alone' indicates that a person only declared one race or ethnicity in the American Community survey. For example, white (alone) indicates that a person is white and not white *and* of Hispanic or Latinx descent.

Gender: Men and women are proportionately represented among pedestrians. Women are slightly overrepresented among transit riders. Men are significantly overrepresented among people who bike. This trend is true in many communities across the nation and may indicate that existing bikeways are uncomfortable for riders due to a lack of physical separation from motor vehicle traffic.

Age: A disproportionately high share of young adults (age 16-24) walk or bike to work. People age 45 and older are slightly underrepresented among active transportation users.

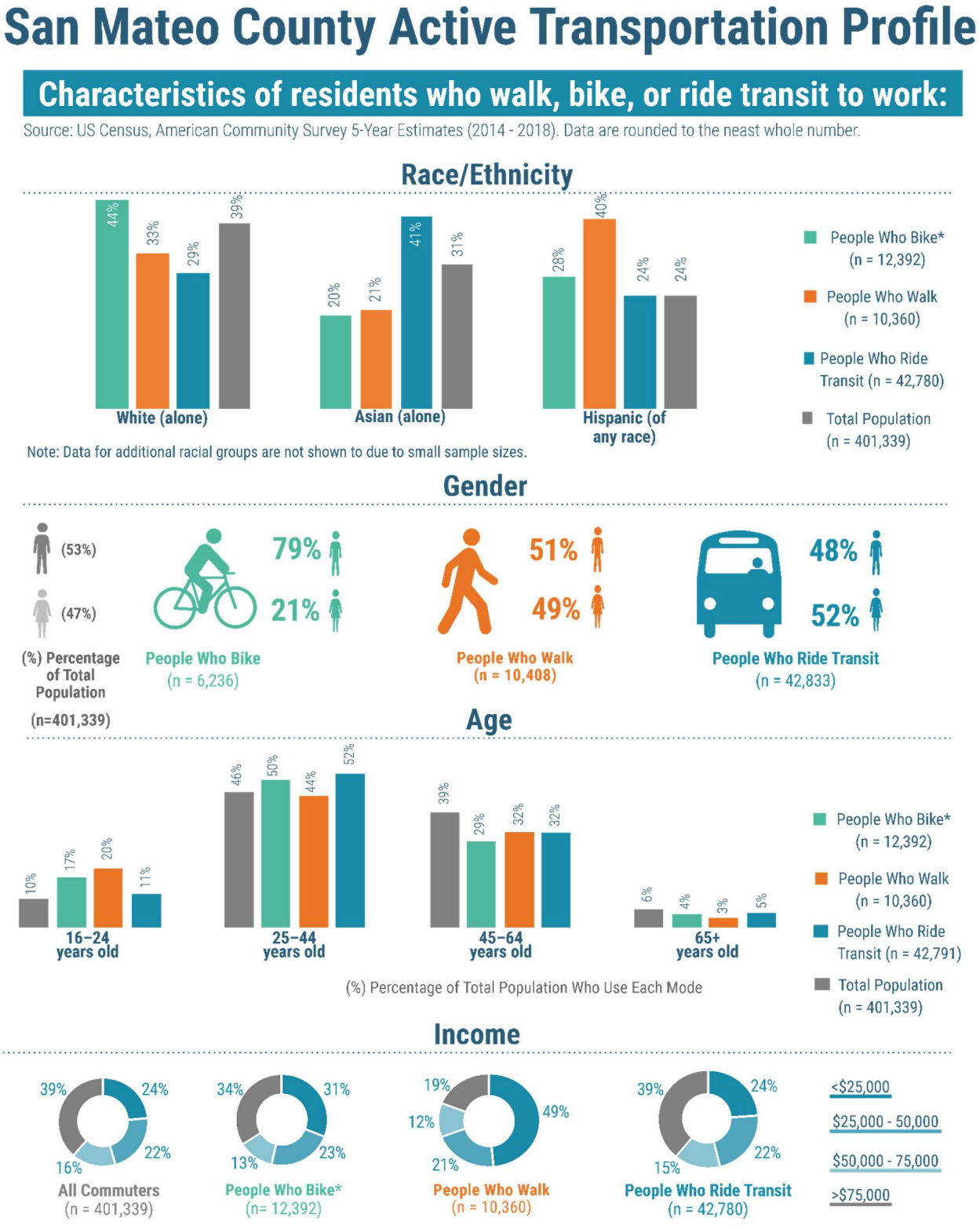
Income: The income distributions are relatively similar among people who bike or ride transit to work, compared to the overall commuting population. Among people who walk, a much smaller share of people has an annual household income over $75,000 and a much larger share earn less than $25,000, compared to the general commuting population.

APPLICATION

The information presented in this section is for informational purposes only. It is presented only to indicate that it is useful to think about the different populations who may use, or want to use, active transportation. This specific data

will not be used again in this planning effort, but it can be used to evaluate future public involvement efforts to determine whether different demographic groups have been engaged in the planning process.

Figure 3. Active Transportation Demographic Profile



DISADVANTAGED COMMUNITIES & COMMUNITIES OF CONCERN

OVERVIEW

This section highlights areas in San Mateo County that have been identified as disadvantaged communities using the California Office of Environmental Health Hazard Assessment's CalEnviroScreen 3.0 tool and the Metropolitan Transportation Commission's (MTC) Communities of Concern. The CalEnviroScreen tool uses socioeconomic and environmental health data to map disadvantaged areas. Specifically, it uses pollution exposure, environmental impact, sensitive population, and socioeconomic indicators to produce an overall score for every census tract in California and compares the results as percentiles across all of California. Communities within the top 25th percentile statewide are considered disadvantaged communities. MTC's approach also uses a set of thresholds and demographic and socioeconomic data from the Census to categorize census tracts into tiers to show varying levels of concentration of different factors. These communities can be viewed in three tiers, highest, higher, and high. MTC's approach was developed as part of *Plan Bay Area 2040*; details about the methodology can be viewed here.

KEY TAKEAWAYS

Only a few locations within San Mateo County fall within the highest 25th percentile statewide for CalEnviroScreen (see Figure 4)**.** This is likely because the CalEnviroScreen methodology compares conditions in San Mateo County to those across the state and does not account for cost of living differences such as increased housing and transportation costs like those experienced by San Mateo County residents. The disadvantaged communities identified by the CalEnviroscreen methodology in San Mateo County are located in South San Francisco, East Palo Alto, northern Menlo Park, and North Fair Oaks. Among the MTC's Communities of Concern, there is one community that falls within the "highest" level and it is in Redwood City. Several locations in the county fall within the "higher" category, these are located in:

- Redwood City,
- North Fair Oaks,
- East Palo Alto,
- Northern Menlo Park,
- Daly City, and
- Downtown San Mateo.

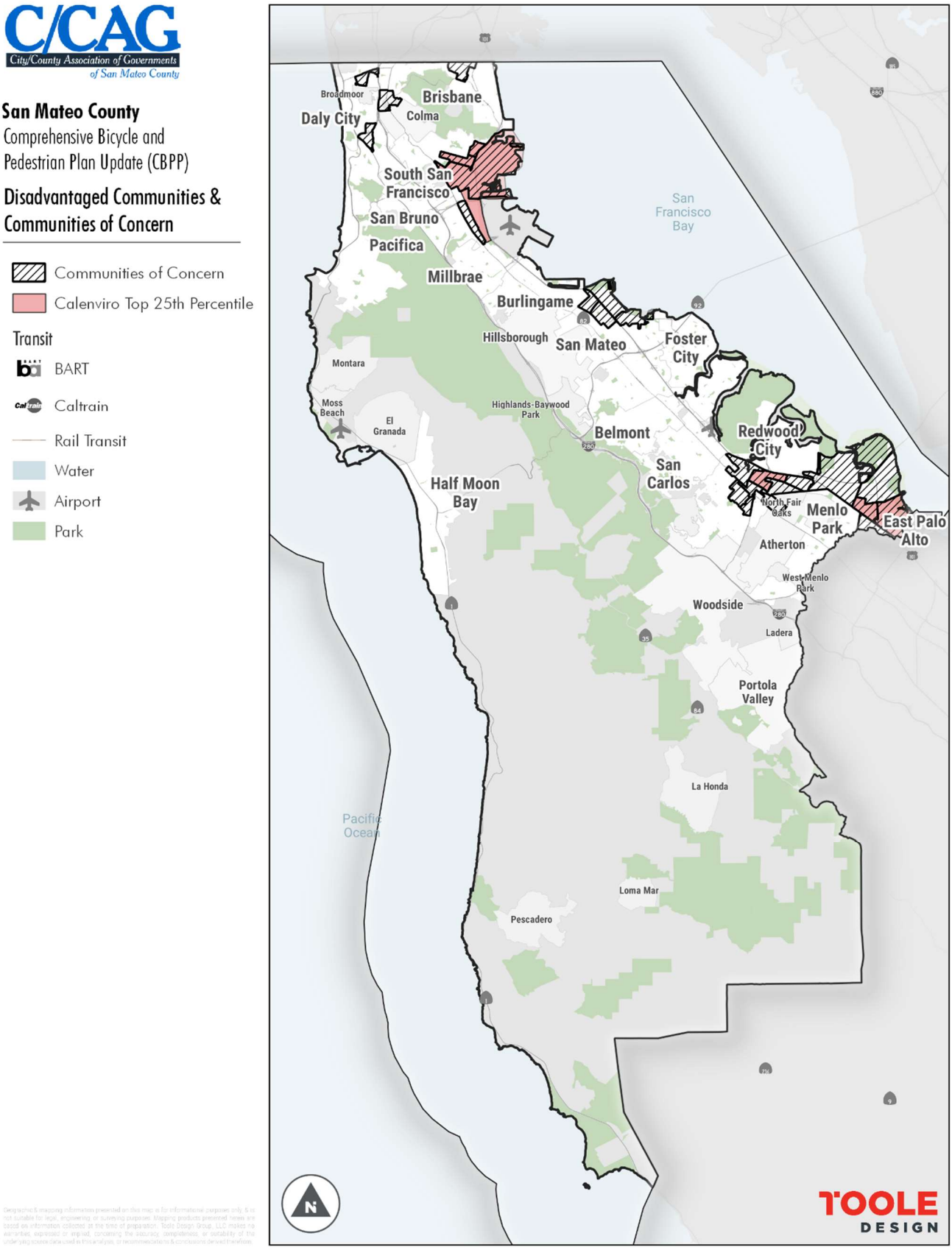
Discussions with local agency staff and members of the Technical Advisory Group highlighted the fact that local agencies do not have a consistent methodology to incorporate equity into their projects because the statewide methodology is not relevant at the local scale. Due to the small number of statewide equity focus areas in San Mateo County, the Plan Development Team developed an additional methodology for identifying equity focus areas that will be more applicable to jurisdictions in San Mateo County.

APPLICATION

The statewide criteria can be used for selecting projects that may be well suited for competitive grant applications based on the criteria from the Caltrans Active Transportation Planning (ATP) Grant Program statewide competition[2]. The MTC Communities of Concern are used to at the regional level to compete for funding from programs like Caltrans ATP Grant Program regional allocations or the MTC One Bay Area Grants.

[2] catc.ca.gov/-/media/ctc-media/documents/programs/atp/workshops/cycle-5/2020325-adopted-2021-atp-guidelines-a11y.pdf

Figure 4. San Mateo County Disadvantaged Communities and Communities of Concern



SAN MATEO COUNTY EQUITY FOCUS AREAS

OVERVIEW

This section presents the San Mateo County equity focus areas methodology and results developed by the Plan Development Team as part of the Comprehensive Bicycle and Pedestrian Plan Update. The San Mateo County equity focus areas were identified using Census Block Group data for the three socio-economic indicators listed below:

- **Median Household Income** (Source: US Census)
- **Race** – Block Groups where the population of people of color is greater than the countywide average[3]. (source: US Census)
- **Housing and Transportation Affordability Index** – (source: https://htaindex.cnt.org/download/)

For each of the above metrics, the data was divided into percentiles (e.g., 20th percentile, 40th percentile) and the values across all three variables were combined into a composite list of percentiles. The Block Groups that fell into the top 20th percentile were selected as equity focus areas. The three metrics received equal weight in the analysis.

KEY TAKEAWAYS

Figure 5 shows the results of the equity focus area analysis developed specifically for this Plan. The equity focus areas are primarily clustered throughout the urban communities in the northern end of the county and along the San Francisco Bay. These clusters are located in:

- South San Francisco,
- Daly City,
- Millbrae,
- San Mateo,
- East Palo Alto, and
- North Fair Oaks.

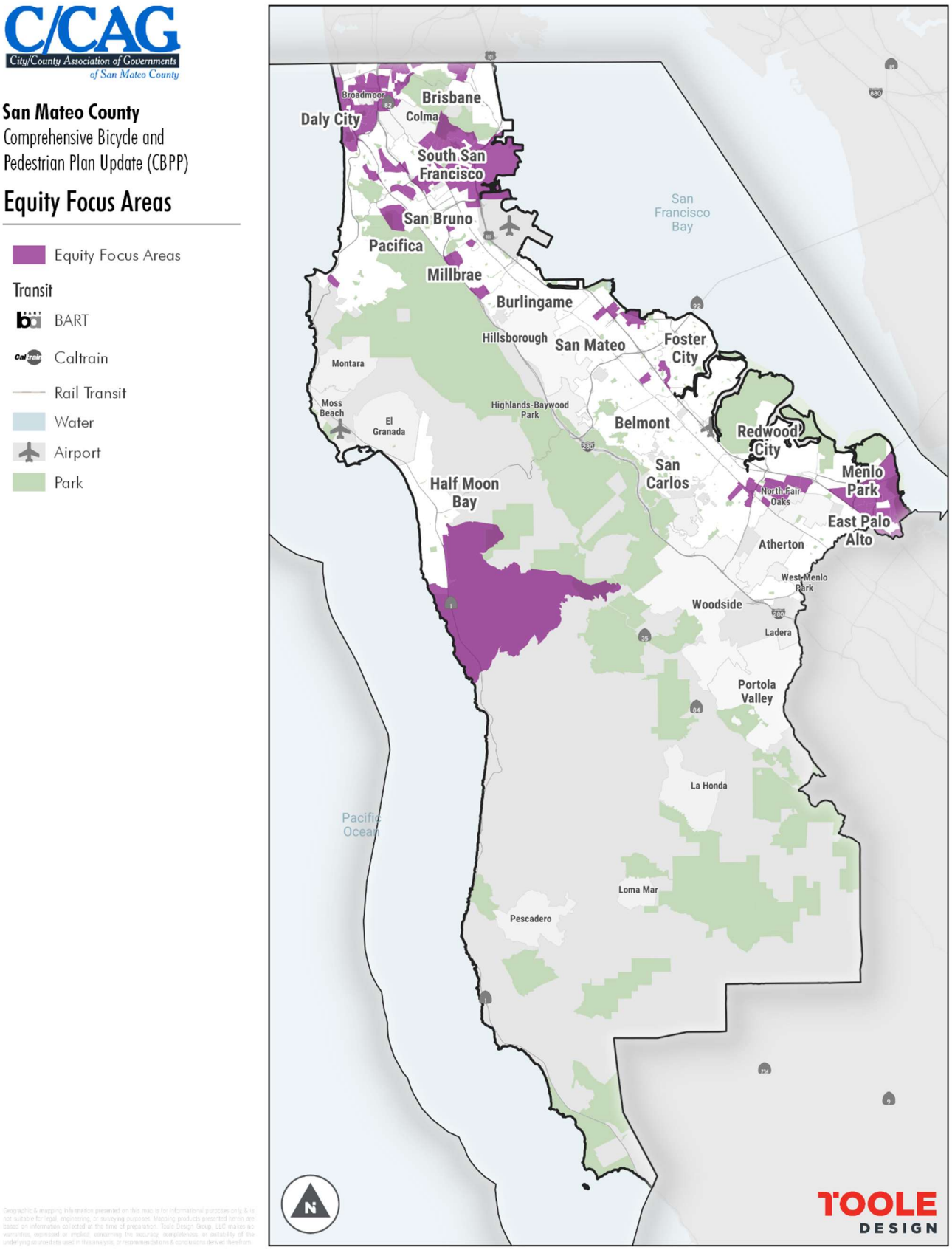
There is also one Block Group which includes the small, rural communities south of Half Moon Bay and a small community southwest of Pacifica.

APPLICATION

The San Mateo County criteria could be used to help identify additional areas within San Mateo County that C/CAG can prioritize for different types of funding sources, including state and regional grant opportunities. This methodology could also be used by local jurisdictions to help local staff prioritize locations for active transportation improvements within their communities. The County Equity Focus Areas are intended to be used to augment the statewide disadvantaged communities and regional communities of concern areas, they are not intended to replace those.

[3] The exact percentage will be adjusted based on how the data is distributed.

Figure 5. San Mateo County Equity Focus Areas



GENERAL COUNTYWIDE TRAVEL TRENDS

OVERVIEW

This section evaluates general and active transportation travel trends using data from the California Household Travel Survey (2017). Data from the California Household Travel Survey (CHTS) was used instead of data from the American Community Survey because CHTS data provides information on all trips, not just commute to work or school trips like the American Community Survey. In an active transportation plan at the countywide scale, it is important to examine different trip purposes and distances for all trips, not just commute trips because it can provide a more realistic way to set and track mode shift goals. Note that the data presented in this section is based on a sample of travelers in the county and should be evaluated further before being use for purposes beyond understanding broad travel trends. Figure 6 presents a summary of travel trends in San Mateo County.

KEY TAKEAWAYS

TRIP PURPOSE

About 11 percent of all trips completed by survey respondents were commute trips to work. Trips for social or recreational purposes make up 12 percent of trips, and 20 percent of trips were for shopping. An additional 57 percent of trips are completed for other purposes, such as non-shopping errands or trips categorized as “other” like traveling to school, entertainment, or friends. Additional information about trips in the “other category” cannot be determined due to data limitations, however, we do know that those trips originated at a person’s home.

TRIP DISTANCES

Almost half (49 percent) of trips taken in San Mateo County by any mode of transportation are less than three miles in length which is generally considered an easy bicycling distance. One-fifth of all trips (21 percent) are less than one mile in length, which is considered a reasonable walking distance for most trip types. This indicates that almost half of all trips made within San Mateo County have the potential to be converted to walking or biking trips under the right conditions.

MODESHARE

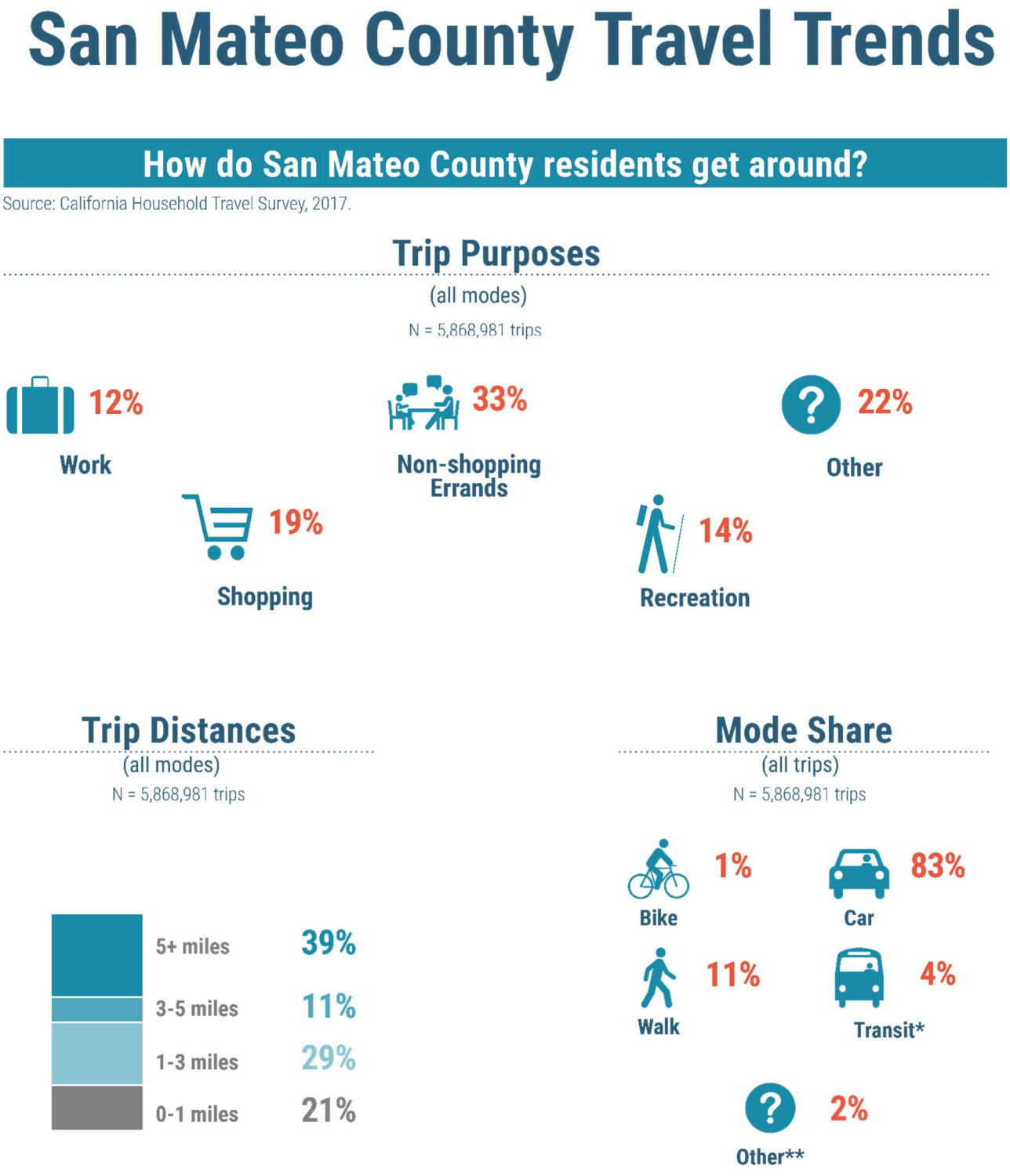
Although a majority of trips in San Mateo County are short distance and non-work-related, the preferred mode of choice for all trip types is the car (87 percent). Transit, paratransit, and school bus trips represent nearly five percent of trips, while walking and bicycling represent six percent and one percent of trips, respectively. Other modes, including motorcycle and private shuttles represent less than one percent of trips. Note that data from the American Community Survey (2018, one-year estimates) indicates that 1.6 percent of San Mateo County’s working population bicycles, 2.3 percent walks, and 10.6 percent rides transit to work.

APPLICATION

The information presented in this section is for informational purposes only. While aggregated to the county level, some of the mode share data is considered unreliable due to small sample sizes. This data is presented to demonstrate that when developing active transportation programs and infrastructure improvements, it is important to consider the types of trips that people take and the distances that they travel depending on their trip purpose or travel mode. Although the specific statistics presented in this section will not be used in this planning process,

future recommendations will consider the residents' unique needs dictated by where and how they are planning to travel.

Figure 6. General Travel Trends



Note: All estimates are rounded to the nearest whole number.

*Includes public or commuter bus, school bus, light rail, commuter rail, street car, and private or shuttle bus
**Includes boat, ferry, airplane, and other.

UPCOMING OR PLANNED BICYCLE AND PEDESTRIAN PROJECTS

OVERVIEW

Local jurisdictions across San Mateo County have recently installed, or are planning to install, a variety of bicycle and pedestrian projects. Some of these projects are the result of previous active transportation plans and others are part of Complete Streets or Safe Routes to School projects. Many of these projects are funded by C/CAG, Caltrans, grants, or local capital improvement programs. Figure 8 shows a map of the recent and planned (funded) bicycle and pedestrian projects throughout San Mateo County. Note that the projects listed in this section may not provide a comprehensive list of all upcoming or planned bicycle and pedestrian projects; additional bicycle and pedestrian projects may be planned throughout the county.

KEY TAKEAWAYS

Jurisdictions are implementing a selection of bicycle and pedestrian projects throughout the county. Projects include crossings and corridor improvements. The majority of projects have been funded by C/CAG through TDA Article 3 or Measure W and Measure A funding, however a significant number of projects have also been funded through One Bay Area Grant.

A few projects include:

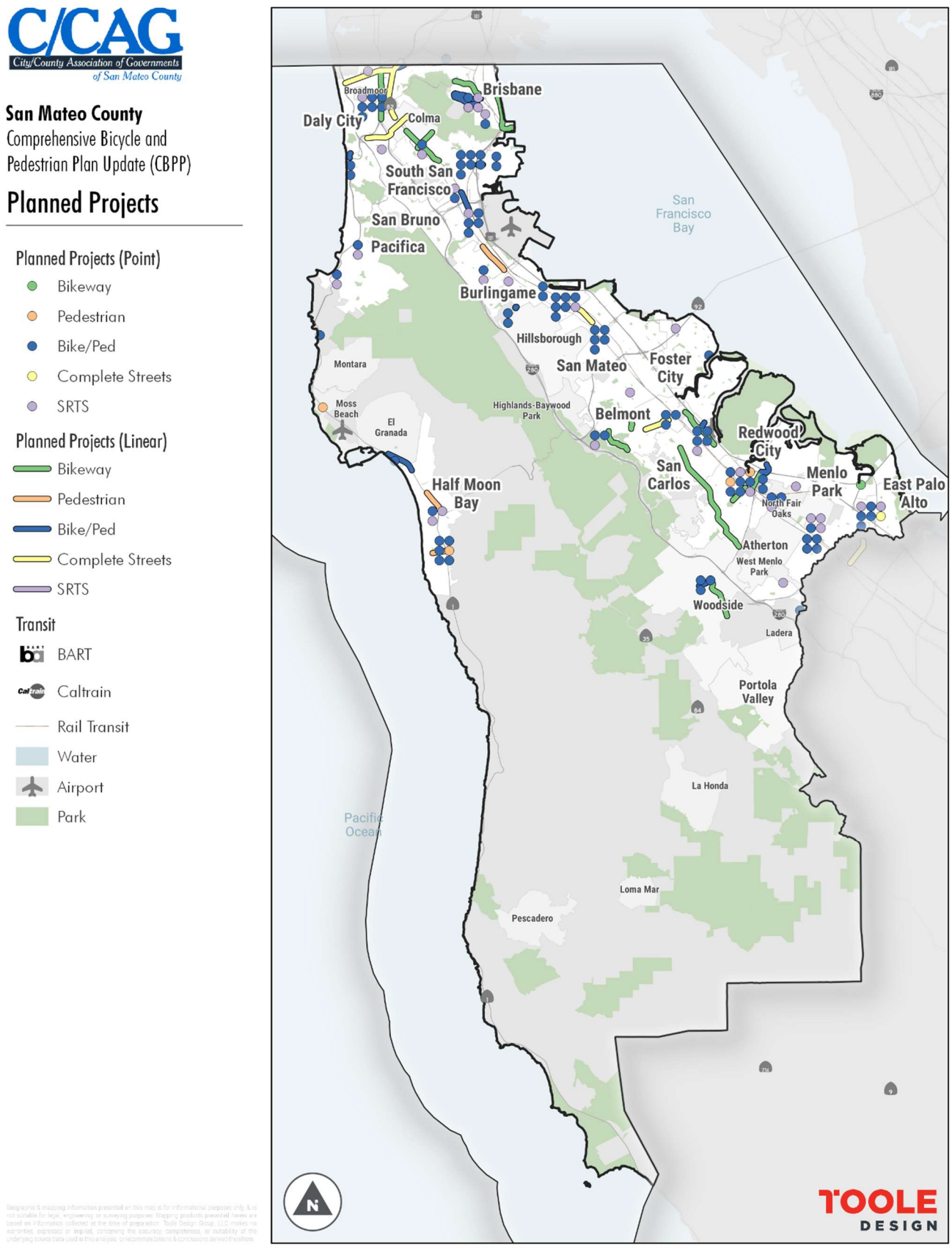
- Ralston Ave in Belmont (bicycle and pedestrian improvements)
- Addison Ave (pedestrian improvements) and Clarke Ave (bicycle and pedestrian improvements) in East Palo Alto
- Main Street Bridge to Highway 1 and the California Coastal Trail in Half Moon Bay (bicycle and pedestrian improvements)
- Broadway Ave repaving in Millbrae (pedestrian improvements)
- Middlefield Rd in Redwood City (bicycle and pedestrian improvements)
- 28th Ave in San Mateo (bicycle improvements)
- Hoover School in Burlingame (bicycle and pedestrian improvements)
- Crocker Trail in Brisbane (Complete Streets)
- El Camino High School in Colma (Complete Streets)
- San Bruno Huntington Transit Corridor (Complete Streets)
- Highway 101 and Holly Street Interchange in San Carlos (bicycle and pedestrian improvements)

Figure 7. Recently Completed Separated Bike Lane and Intersection Improvements in East Palo Alto.

APPLICATION

The recently installed or planned bicycle and pedestrian projects will be included in the existing conditions maps so that project recommendations can take these soon-to-be installed projects into consideration. This will ensure that the ultimately recommended projects identified in the CBPP Update build upon a comprehensive list of planned projects and enhance those that will soon be underway.

Figure 8. Upcoming and Planned Bicycle and Pedestrian Projects



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CHAPTER 2: COUNTYWIDE BICYCLE NETWORK OVERVIEW

TYPES OF BIKEWAY FACILITIES

OVERVIEW

California has four primary bikeway classifications as defined by the California Manual of Uniform Traffic Control Devices (CA MUTCD) Chapter 9 and shown in Figures 9 – 12. In general, facilities with a greater amount of separation between motor vehicles and bicyclists (e.g., Class I and Class IV) are better suited for areas with larger traffic volumes, higher vehicle speeds, and/or where anticipated riders are families or people who may not feel comfortable riding in shared traffic lanes. Examples of these facilities are shown in Figure 13.

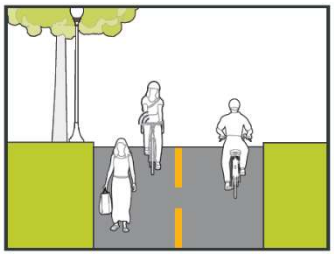


Figure 9. Shared-Use Path

Multi-Use Paths or Shared-Use Paths (Class I)

Multi-use paths and shared-use paths provide robust separation from motor vehicles and are often located within fully separate rights-of-way. They are shared with pedestrians. Interactions between bicyclists and vehicles are limited to roadway crossings. Due to their separation from vehicle traffic, these facilities are typically attractive to most bicyclists and are considered the least stressful type of facility to the average rider.

On-Street Bicycle Lanes (Class II)

On-street bike lanes are striped adjacent to vehicle travel lanes, delineated either by a solid white line or by a larger hatched buffer space. The latter case is known as a buffered bike lane. The relative comfort of bicycle lanes depends on adjacent motor vehicle speeds and volumes, given the lanes' lack of separation from traffic.

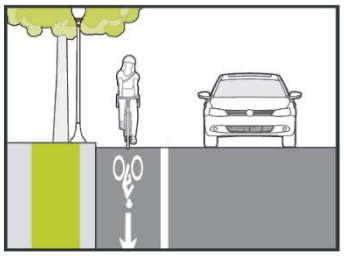


Figure 10. Bicycle Lane

Bicycle Routes and Bicycle Boulevards (Class III)

On-street bike routes designate certain roadways as preferred bicycle roads. They typically include wayfinding signage for bicyclists as well as additional signage to increase driver awareness to the potential presence of bicyclists (e.g., Share the Road signage). Since users often must share travel lanes with motor vehicle traffic, bike routes can vary in comfort depending on traffic volume and vehicle speed.

Bicycle boulevards are a specific type of bike route. They are often found on low-speed, low-volume neighborhood streets with traffic calming enhancements and are often used as parallel options when high-speed and high-volume roadways cannot accommodate a designated space for cyclists. Rural bike routes are another type of bike route, and usually feature wide shoulders, striping, and intermittent rumble strips to provide space for cyclists to ride on rural roads or highways.

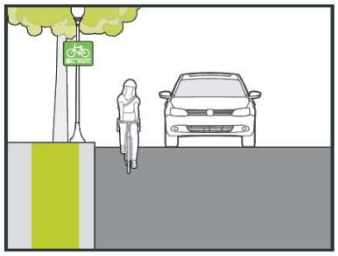


Figure 11. Bicycle Route or Shared Lane

Rural bike routes are often not considered comfortable because cyclists ride alongside vehicle traffic traveling at high speeds with little separation.

Separated Bicycle Lanes (Class IV)

Separated bike lanes (SBLs) are located on the roadway, adjacent to vehicular traffic. However, SBLs provide more robust physical separation between bicyclists and motor vehicles than Class II facilities. Separation always includes both vertical separation (parked vehicles, raised concrete curbs, planters, bollards, etc.) and horizontal separation (striped buffer, landscaped areas, etc.). SBLs are often considered to be a more comfortable facility than traditional bike lanes or bike routes.

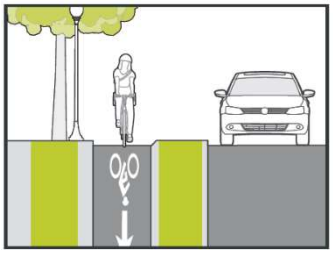


Figure 12. Separated Bicycle Lane

Figure 13. Examples of Different Types of Bikeways in Urban and Rural Areas

MULTI-USE PATH

BICYCLE LANE

BUFFERED BICYCLE LANE

BICYCLE ROUTE

RURAL BICYCLE ROUTE

BICYCLE BOULEVARD

SEPARATED BICYCLE LANE

TWO-WAY SEPARATED BICYCLE LANE

EXISTING BICYCLE NETWORK

OVERVIEW

San Mateo County is home to many types of bikeways, ranging from on-street signed bike routes to off-street shared-use paths. The variety of bikeway types reflects the many needs present in San Mateo County's diverse communities, which range from small municipalities like Colma and Pacifica to larger, more urban areas like Daly City and San Mateo. For the Active Transportation Plan, the comfort level of existing bicycle facilities for the "interested but concerned" cyclist will be analyzed to identify opportunities for network improvements.

KEY TAKEAWAYS

San Mateo County has a variety of bikeways already built. Of the existing bikeways, there are nearly 113 miles of multi-use paths, 161 miles of bike lanes, 181 miles of bike routes, and nearly two miles of separated bikeways (Table 2). The largest share of bikeways is Class III Bicycle Routes. These routes are often used to create neighborhood or local street bikeways and do not provide separation between road users. San Mateo County has a notable share of Class 1 Multi-use Paths – these are also great recreational riding facilities and, if well-maintained and providing well-designed roadway crossings, are comfortable for people of all ages and abilities. The majority of roadways in the county do not have any designated bikeways but cyclists are often still permitted to ride on them. Many of the roads with bikeways are found in the larger urban areas where there are dense street networks (Figure 14). Refer to Appendix A for bikeway facility maps for each city in San Mateo County.

In general, the existing bicycle network within each incorporated jurisdiction serves some destinations and residential areas, but not all. The city of San Mateo and Redwood City have the most designated bikeways, but the networks are missing several key connections. There is very limited bicycle network connectivity between incorporated areas. Where there is connectivity, it is primarily on bike routes and bike lanes on roadways that are unlikely to be comfortable for people of all ages and abilities. There are no complete cross-county bikeways but many agencies are working together to complete gaps in the San Francisco Bay Trail and Peninsula Bikeway.

APPLICATION

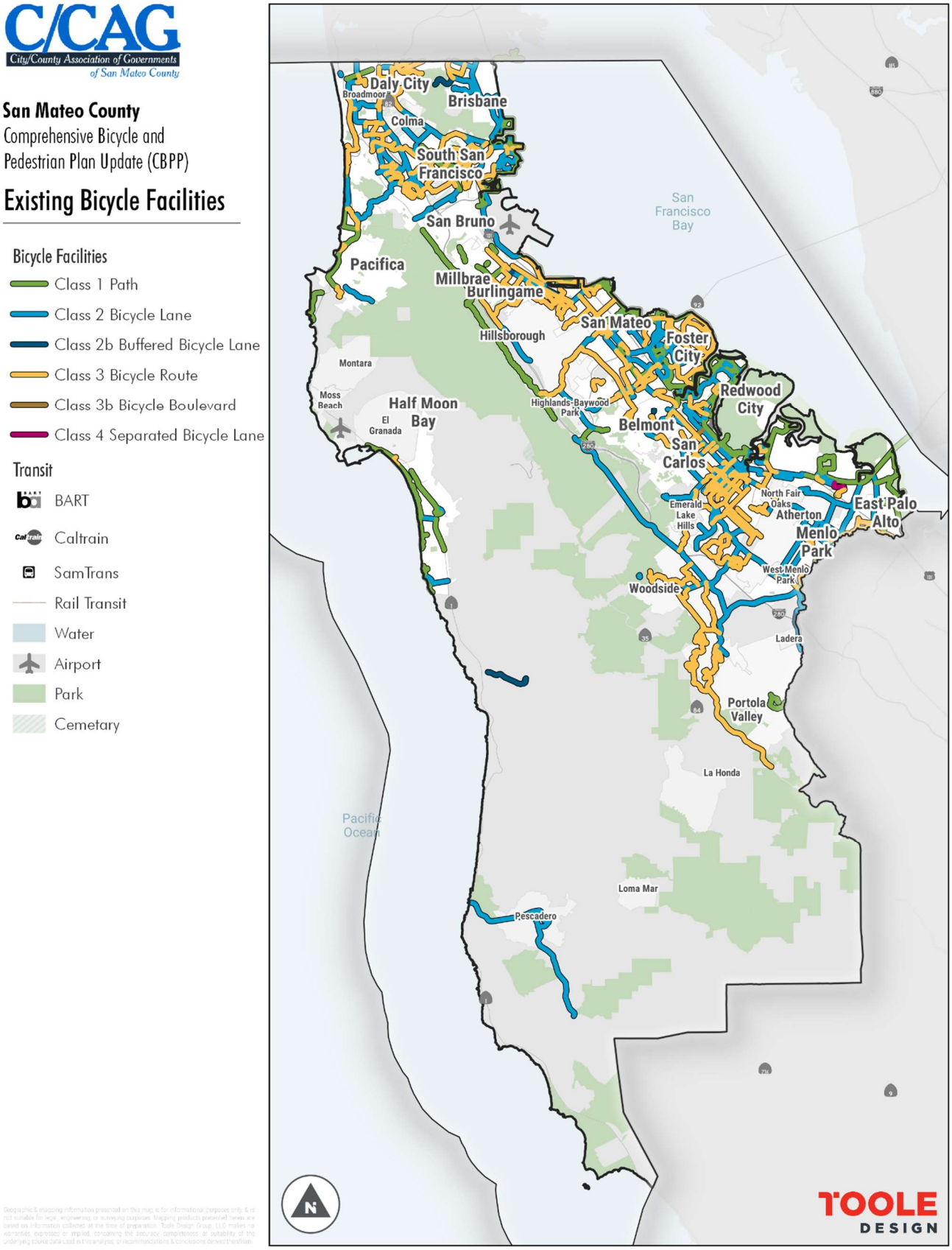
The existing bikeway data will be used throughout this report and the plan development process. Existing bikeways will be evaluated based on land-use context and appropriateness for use by people of all ages and abilities using roadway speed and traffic volume data or other proxy analyses such as level of traffic stress. The existing bicycle network will also be examined to identify strategic locations for new bikeway recommendations that provide access to key destinations, such as transit stops, employment centers, recreational areas, and schools.

Table 2. Bikeway Mileage by Classification

Bikeway Class	Mileage*	Share of Mileage*
Class I Multi-use Path	113	25%
Class II Bicycle Lane	157	34%
Class IIb Buffered Bicycle Lane	4	1%
Class III Bicycle Route	181	40%
Class IV Separated Bicycle Lane	2	<1%
Total	457	100%

*Mileages are rounded to the nearest whole number.

Figure 14. Existing Bikeways by Classification



EXISTING BICYCLE NETWORK COMFORT

TYPES OF BICYCLISTS

OVERVIEW

When planning and designing bikeways, it is important to recognize that not all bicyclists feel comfortable on every type of bikeway. An all-ages-and-abilities bicycle network is comprised of low-stress bikeways that are connected, comfortable, and appealing to both new and experienced riders. The countywide bikeway network should include bikeways suitable for all types of bicyclists.

FOUR TYPES OF BICYCLISTS

No two bicyclists are alike. National research indicates that bicyclists are better understood along a spectrum (see Figure 15).[4] On one end of the spectrum are people who are comfortable riding with traffic in almost any condition. These types of riders are considered "highly confident" bicyclists (e.g., adults who regularly commute by bicycle) and are willing to ride on roads with little to no dedicated bicycle infrastructure. The largest segment of the population is generally willing to ride a bicycle but does not feel comfortable sharing the lane with motor vehicles or riding adjacent to high-speed and high-volume traffic (e.g., children, the elderly, and non-regular adult bicyclists). These types of riders are known as the "interested but concerned," and they prefer off-street bicycle facilities or bicycling on low-speed, low-volume streets. This group has the largest potential to increase bicycle mode share if facilities are designed to address their comfort, safety, and security but they may not bike at all if bicycle facilities do not design facilities for their comfort needs.

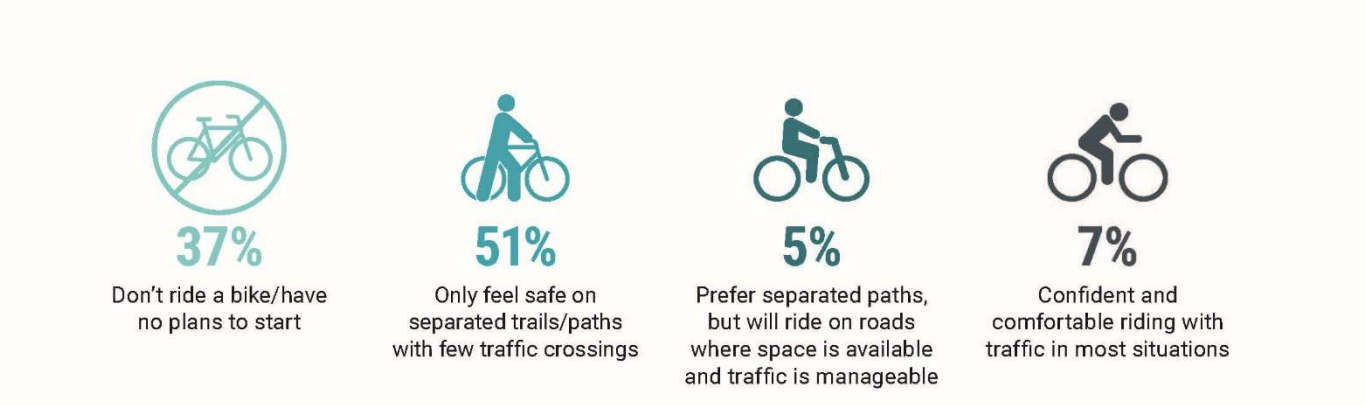


Figure 15. Share of Population by Bicyclist Category for Typical U.S. Community[4]

Figure 16 shows the level of traffic stress (LTS) experienced by the "interested but concerned" rider on different types of bicycle facilities from most comfortable (LTS 1) to least (LTS 4). LTS 1 scores indicate little or no traffic stress, and facilities with this score are generally suitable for most of the population. LTS 2 scores mean the user experiences some minimal traffic stress, but facilities are suitable for many less-confident bicyclists. LTS 3 scores describe facilities with moderate traffic stress that are generally uncomfortable or unappealing for a large portion of bicyclists but may be suitable for somewhat experienced or confident bicyclists. LTS 4 scores include facilities with high traffic stress that are primarily only suitable for very confident bicyclists.

[4] Dill, Jennifer and Nathan McNeil. Revisiting the Four Types of Cyclists: Findings from a National Survey. In Transportation Research Record: Journal of the Transportation Research Board, Issue 2587, Washington, DC, 2016.

Figure 16. Level of Traffic Stress of Different Types of Bikeways

Source: Toole Design

*Dutch-style intersections provide physical separation between bicyclists and motor vehicles to protect bicyclists from motor vehicles going straight or turning. The separation is typically provided using concrete islands, with one island placed at each corner of the intersection between the bike lane and the motor vehicle travel lane.

LEVEL OF TRAFFIC STRESS ANALYSIS

OVERVIEW

It is important to analyze the existing bicycle network's level of comfort, as it can indicate how many people may choose to ride a bike for commuting, errands, and recreational trips. Comfort is typically determined by the speed and volume characteristics of vehicular traffic on segments within the network as well as the level of separation provided by a bike facility between the bicyclist and adjacent vehicular traffic. A level of traffic stress (LTS) analysis provides a rating for on- and off-street bikeways, roadways that do not have a designated bicycle facility, and crossings to indicate the vehicular traffic stress experienced by the "interested but concerned" cyclist.

The analysis uses the Mineta Transportation Institute's (MTI) nationally recognized research on low-stress bicycling and network connectivity. It is based on the premise that a person's level of comfort on a bicycle increases as separation from vehicular traffic increases and as traffic volumes and/or speeds decrease. The MTI methodology was applied by using available data and by generating assumptions for speed and volume assumptions for varying local contexts. Unique assumptions were created for coastside and bayside applications since motor vehicle volume estimates for cities along the bayside are generally much higher than those along coastside roadways. The volume and speed assumptions used in this Plan follows the same approach as that of the Unincorporated San Mateo County Active Transportation Plan that is being developed concurrently.

Exact speed and volume data for each street segment were unavailable for this analysis but available data was used where possible. Roadway classification and an estimate of vehicular traffic volume were used to calculate the level of comfort of existing roadways. Vehicular traffic volume estimates were derived using an average of a sample urban and rural roadways with known vehicular traffic volumes. Figure 17 shows the results of the level of traffic stress analysis, but only the higher stress routes. Refer to Appendix B for level of traffic stress analysis maps for each jurisdiction in San Mateo County.

KEY TAKEAWAYS

LTS scores range from 1 to 4. Figure 16 provided examples of the types of bicycle facilities and roadway environments that meet each LTS stress score. Throughout the county, residential local roads scored LTS 1, while collectors and major arterials scored LTS 3 or 4. In many communities in San Mateo County, the residential streets do not form a complete network, and arterials and collectors are needed to travel across town and access many destinations, so though a majority of roadway miles are low stress, they would not enable people to comfortably bike to destinations. Each jurisdiction has at least one LTS 4 roadway.

A more detailed examination of traffic volume and speed is needed for arterials, but it is likely that many of the LTS 3 and 4 streets will require the addition of Class I, Class II, or Class IV bikeways to be considered comfortable for the "interested but concerned" rider.

Table 3. Countywide Roadway Mileage by Level of Traffic Stress Score

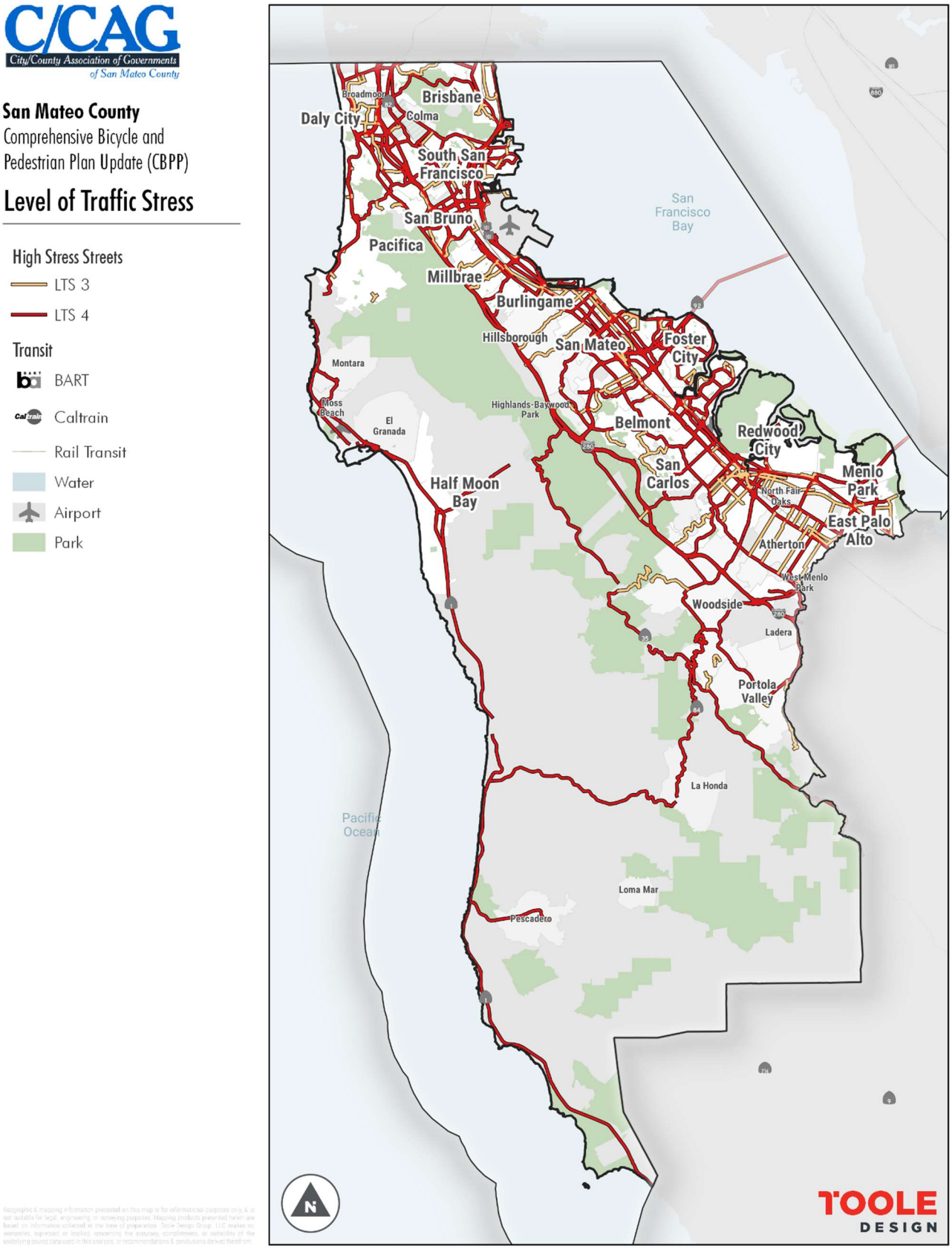
Level of Traffic Stress (LTS) Score	Mileage*	Share of Mileage*
LTS 1	1,597	54%
LTS 2	631	21%
LTS 3	134	4%
LTS 4**	610	21%
Total	2,972	100%

*Mileages are rounded to the nearest whole number.
**Mileage estimates for LTS 4 are slight over-estimates due to dual carriageways in the spatial data.

APPLICATION

This information will be used to analyze the existing and proposed bicycle network in greater detail. This assessment indicates that in most places, residential streets are suitable for Class III Bicycle Boulevards, but arterials need to be examined in closer detail to determine which type of bikeway is most suitable.

Figure 17. Existing Bikeway Level of Traffic Stress Analysis



BICYCLE-INVOLVED COLLISIONS

OVERVIEW

Enhancing safety for people bicycling is a key part of improving bicycling conditions and encouraging more people to bike. As part of this planning process, the project team analyzed bicycle-involved collision data from the Statewide Integrated Traffic Records System (SWITRS) dataset for a five-year period (2014 to 2018). Figure 19 shows the distribution of bicycle-involved collisions throughout San Mateo County. Note that this data does not include collisions that did not result in an injury and therefore likely underrepresents the total number of bicycle collisions. Note also that this dataset only includes police-reported collisions. These two facts mean that the analysis may not be representative of all bicycle collision trends.

KEY TAKEAWAYS

During the analysis period, there were 1,187 collisions involving bicyclists. The collisions resulted in nine deaths and 1,218 injured victims. Figure 18 show the distribution of bicycle collisions by injury severity. Approximately 10 percent of bicycle collisions resulted in a fatal or life-changing injury. Among the victims involved in the collisions, the majority were male (82 percent) and 24 percent of victims were under 20 and six percent were 65 years old or older.

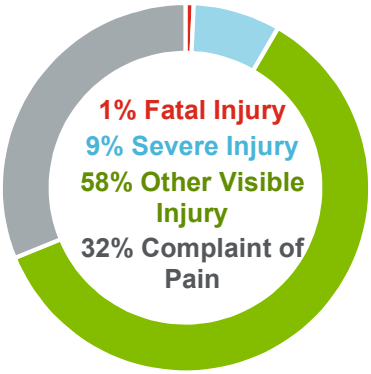


Figure 18. Bicycle Collisions by Injury Severity

The top three categories of violations associated with bicyclist collisions were automobile right of way, improper turning (among drivers and bicyclists), and unsafe speed. These three categories were associated with approximately 57 percent of bicycle-involved collisions. Automobile right of way refers to situations where the driver failed to yield right of way to a bicyclist.

A notable share of crashes with motor vehicles were broadside (20 percent) or sideswipe (9 percent) crashes. These two crash types suggest there may not be sufficient separation or visibility between road users.

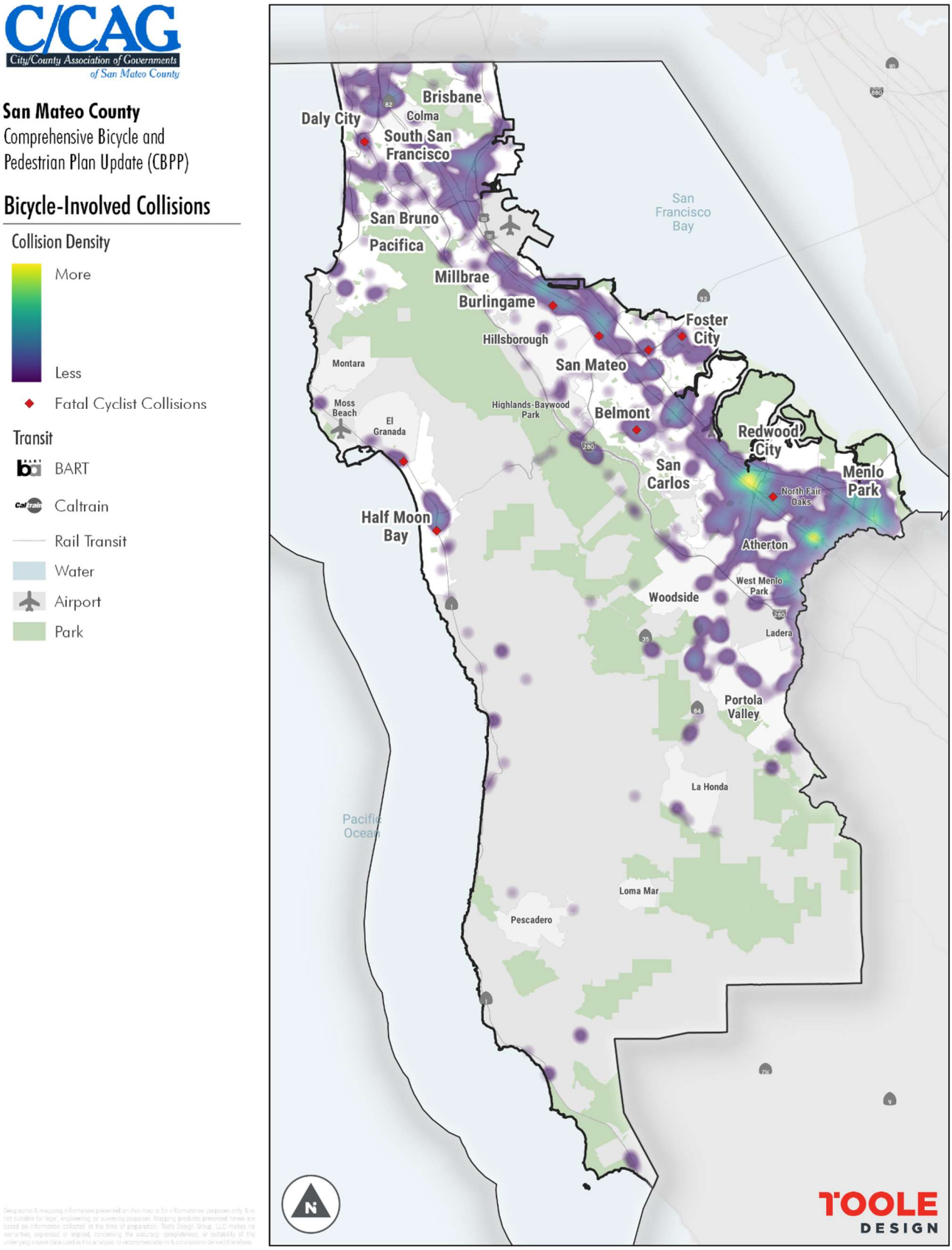
The majority of crashes occurred in daylight, but 13 percent of crashes occurred under dark conditions with streetlights and four percent of collisions occurred either during dawn, dusk, or dark conditions without streetlights.

Approximately 55 percent of crashes did not occur at an intersection, 27 percent of crashes occurred at a controlled intersection and 17 percent occurred at an uncontrolled intersection (one percent of collisions did not include intersection location information). These trends suggest that a high percentage of crashes likely occur in more rural areas, possibly during recreational rides. Approximately 17 percent of collisions occurred on state highways.

APPLICATION

The key trends presented above will inform the development of program and policy recommendations and may be used in combination with future analyses to identify locations where bicycle improvements are needed. C/CAG may also use collision data or the development of high injury networks as criteria in during project prioritization.

Figure 19. Bicycle-involved Collisions, 2014 - 2018



BIKEWAY GAPS TO TRANSIT AND BETWEEN JURISDICTIONS

OVERVIEW

When planning for bicycles at the regional scale, it is important to examine infrastructure and facility gaps near transit stations and between jurisdictions as these connections are key for local and inter-jurisdiction travel. Active transportation network gaps near transit stations was also a key barrier mentioned in both the local jurisdiction staff surveys and interviews. Figure 21 uses information gathered during the interviews to show specific bicycle network gaps and barriers near transit stations and between jurisdictions in San Mateo County.

KEY TAKEAWAYS

County and local jurisdiction staff identified gaps to regional transit stations in every jurisdiction with a regional transit station. Staff identified gaps based on issues they were familiar with through an informal assessment; staff in different jurisdictions did not necessarily follow a consistent methodology when identifying gaps. County and local jurisdiction staff identified more than 30 gaps near transit. Examples of theses gaps include Tunnel Avenue in Brisbane, Huntington Avenue in San Bruno, and South Delaware Street in San Mateo.

Figure 20. Bicyclist in San Mateo (city) rides by transit station

There are also many areas throughout San Mateo County that do not provide facilities for bicyclists to travel safely and comfortably between jurisdictions. County and local jurisdiction staff identified more than 30 gaps between jurisdictions. Examples of these gaps include El Camino Real, Woodside Road, and Bayshore Boulevard.

Table 4 shows a list of all of the bicycle network gaps that staff identified near transit stations and between jurisdictions. The list of gaps presented in Table 4 provides examples of bikeway gaps, it is not a comprehensive list of *all* gaps.

APPLICATION

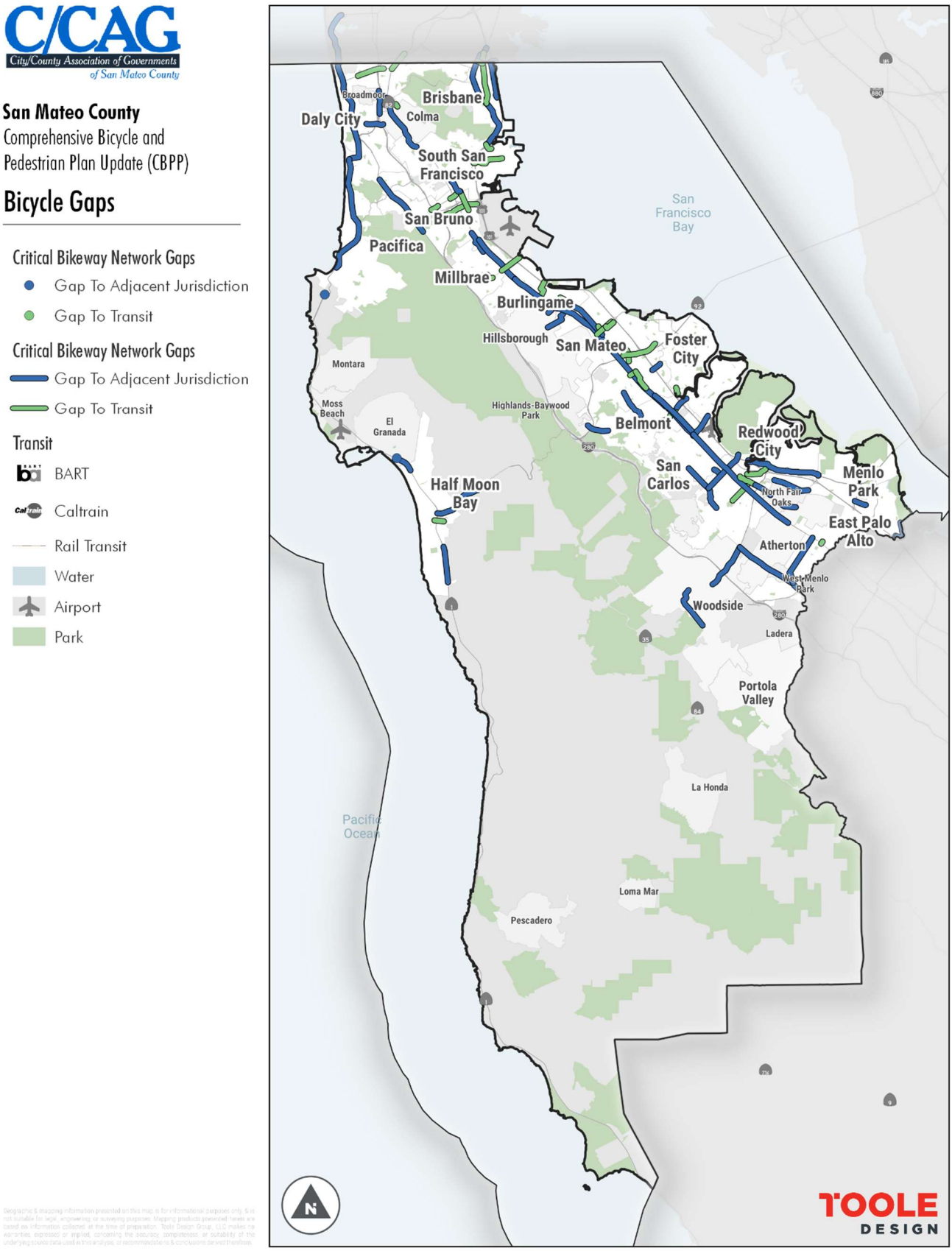
The barriers identified in this section may be reviewed in greater detail in the gaps and barriers identification phase of the project to identify whether specific projects or recommendations are needed to help mitigate them. The project team will also determine whether addressing network barriers such gaps near transit stations and between jurisdictions should be part of the project prioritization process. Reducing the network gaps near transit stations and between jurisdictions will require collaboration between local jurisdictions and regional planning and transit agencies. Additional network gaps will be identified during the development of the countywide backbone network.

Table 4. Bicycle Network Gaps to adjacent Jurisdictions and near Transit

Gaps to Adjacent Jurisdictions	Gaps to Transit
Skyline Blvd (Multiple Jurisdictions)	Millbrae Ave (Millbrae)
El Camino Real (Multiple Jurisdictions)	A St (Daly City)
Old County Rd (Multiple Jurisdictions)	Hillside Blvd (Daly City)
Bayshore Blvd (Brisbane)	San Jose Ave (Daly City)
Holly St (San Carlos)	Tunnel Ave (Brisbane)
Warwick St (Redwood City)	Grand Ave (South San Francisco)
Whipple Ave (Redwood City)	Oyster Point Blvd (South San Francisco)
Highway 1 (Pacifica)	Huntington Ave/Centennial Trail (San Bruno)
Alameda de las Pulgas (Menlo Park)	Sneath Ln (San Bruno)
Middlefield Rd (Redwood City)	Euclid Ave/Bayhill Dr/ Walnut St (San Bruno)
Southgate Ave (Daly City)	Spur Trail Gap (Millbrae)
Junipero Serra Blvd (Daly City)	Carmelita Ave/Broadway (Burlingame)
Bay Trail (Multiple Jurisdictions)	Howard Ave (Burlingame)
Huntington Ave (San Bruno)	Carolan Ave (Burlingame)
Linden Ave (Millbrae)	Delaware St (San Mateo)
Magnolia Ave (Millbrae)	19th St/Fashion Island Blvd (San Mateo)
Floribunda Ave (Burlingame)	3rd Ave (San Mateo)
Howard Ave/Borroilhet Ave (Burlingame)	4th Ave (San Mateo)
Hillsdale Blvd (San Mateo)	B St (San Mateo)
San Mateo Dr (San Mateo)	28th Ave (San Mateo)
Ralston Ave/Marine Pkwy (Belmont)	Delaware St/Pacific Blvd (San Mateo)
Polhemus Ave (San Mateo County)	Ralston Ave (Belmont)
Bay Rd (Multiple Jurisdictions)	O'Neil Slough Trail (Foster City)
University Ave (East Palo Alto)	Middlefield Rd (Redwood City)
Newbridge St (East Palo Alto)	Vera Ave/Maple St (Redwood City)
Verbena Dr (East Palo Alto)	Marshall St/Seaport Blvd/Chestnut St (Redwood City)
San Francisquito Creek Trail West (East Palo Alto)	John Daly Blvd (Daly City)
Santa Cruz Ave (Menlo Park)	Middle Ave (Menlo Park)
Woodside Rd (Woodside)	Kelly Ave (Half Moon Bay)
Highway 92 (Multiple Jurisdictions)	Bayshore Station (Brisbane)
Trail connections between unincorporated areas **and** coastal communities **(Multiple Jurisdictions)**	

Note: Locations in parentheses include locations where projects were identified, this does not necessarily indicate that a staff member from the location listed identified the project.

Figure 21. Bicycle Network Gaps



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BARRIERS TO BICYCLE ACCESSIBILITY

OVERVIEW

Many different types of barriers can discourage people from bicycling. Linear facilities such as freeways, railways, and arterial roads represent major barriers to bicycling because they interrupt the street network and sometimes separate neighborhoods or jurisdictions and require circuitous routing and backtracking. Other physical barriers include interchanges and natural barriers (e.g. steep grade changes and creeks waterways). These barriers negatively affect bicycling more than driving because a detour of more than a quarter or half of a mile has a larger impact on travel time for someone walking or bicycling compared to someone driving. In many cases, a roadway crossing of the barrier may exist, but lacks bike lanes and/or sidewalks. This section examines potential infrastructure and natural barriers along the existing bicycle network. Figure 22 uses information gathered during the interviews to show specific bicycle network gaps in San Mateo County.

KEY TAKEAWAYS

County and local jurisdiction staff identified several linear barriers to bicycling in the region, including freeway corridors and interchanges, railroad tracks, waterways, and major intersections. In many cases, the same major arterial, railway, or highway acts as a barrier in multiple jurisdictions. The majority of the barriers identified were railroad track crossings in the eastern side of the county and major intersection crossings on both sides of the county. Two of the waterways mentioned include Frenchmans Creek and Pilarcitos Creek. Table 5 presents the number and type of bikeway network barriers identified by county and local jurisdiction staff.

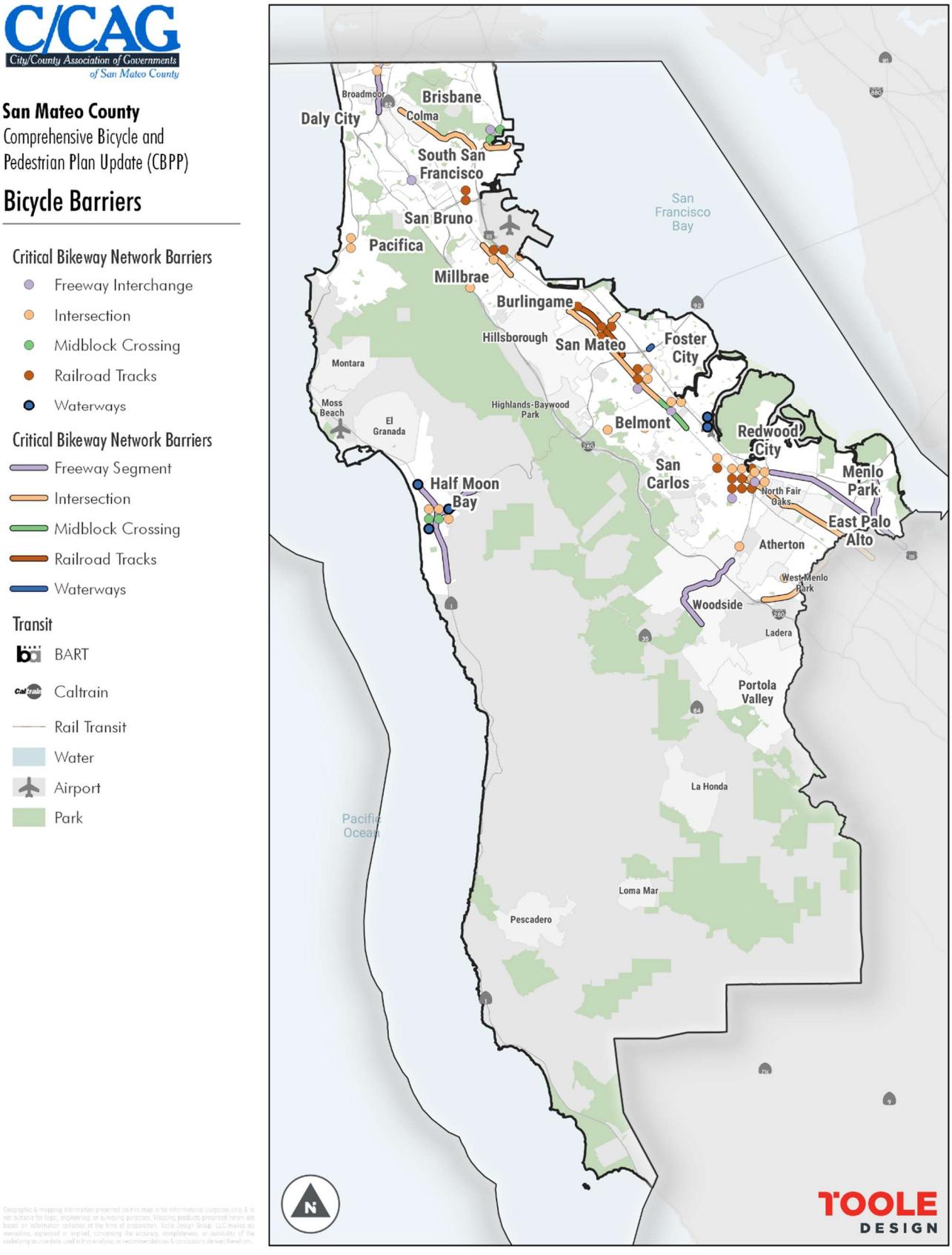
Table 5. Linear Barriers and Difficult Crossings Identified by County and Local Jurisdiction Staff

Barrier Type	Number of Locations
Major Intersection	34
Railroad Track Crossings	18
Freeway Corridors	6
Freeway Interchanges	6
Waterways	6
Midblock Street Crossing	5

APPLICATION

The barriers identified in this section may be reviewed in greater detail in the gaps and barriers identification phase of the project to identify whether specific projects or recommendations are needed to help mitigate them. The *Caltrans District Four Bicycle Plan* (2018) provides a review of state highway barriers and can be used to help identify recommendations to address state-highway barriers to bicycling. The Plan Development Team will also determine whether addressing these network barriers should be part of the project prioritization process. Reducing the network gaps near transit stations and between jurisdictions will require collaboration between local jurisdictions and regional planning and transit agencies.

Figure 22. Bicycle Network Barriers



CONSTRAINED CORRIDORS

OVERVIEW

Along some streets, it can be difficult to install bicycle and pedestrian improvements due to a limited amount of right-of-way serving multiple transportation demands, the need to add width to existing pavement within existing right-of-way, or topographical constraints. These areas are referred to as constrained corridors. This section presents constrained corridors identified by county and local jurisdiction staff. Figure 23 presents a map of the constrained corridors in San Mateo County.

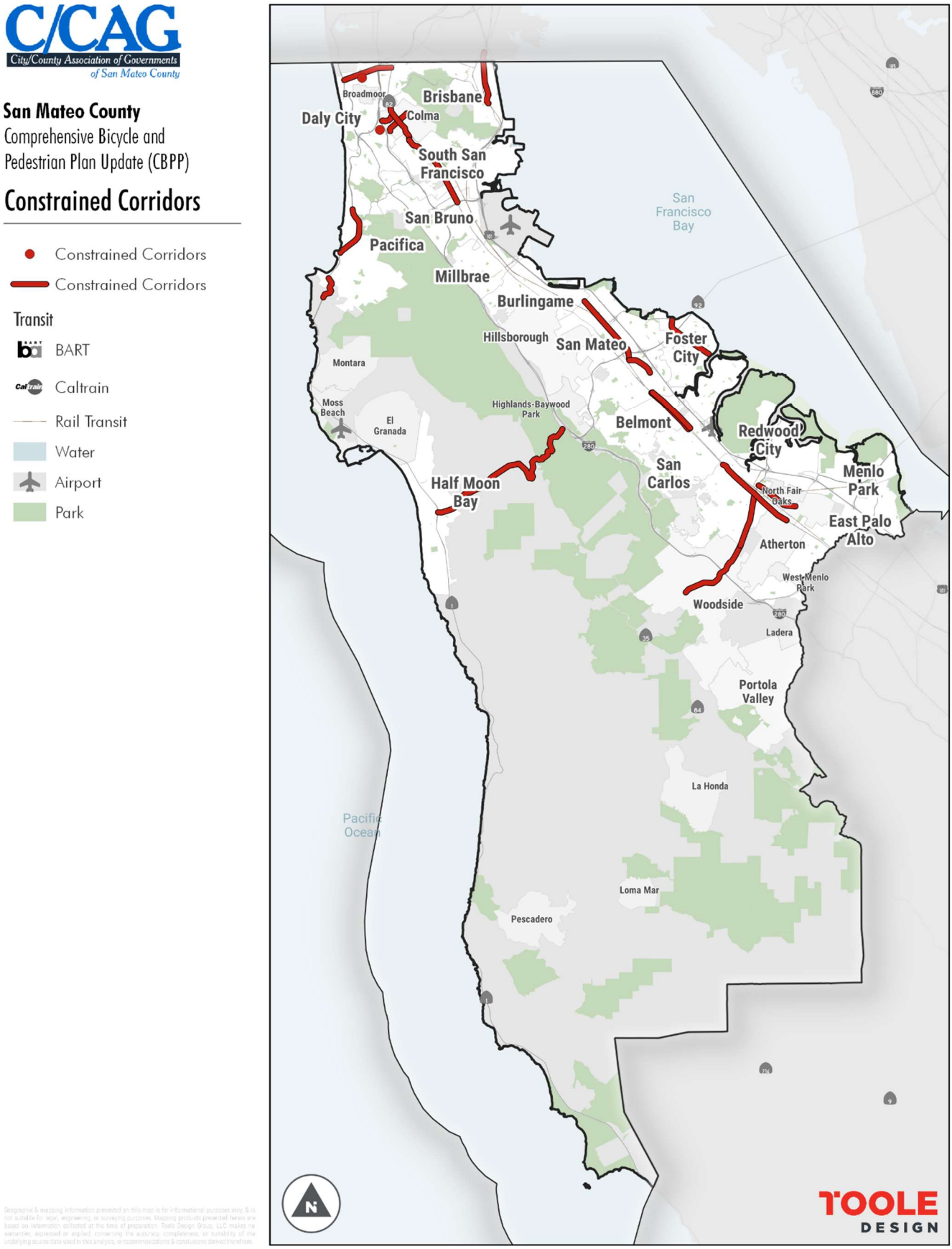
KEY TAKEAWAYS

County and local jurisdiction staff identified approximately 20 constrained corridors. The majority of these corridors are located on the western side of the county, but sections of Highway 1 and Highway 92 are constrained corridors for coastal communities like Pacifica and Half Moon Bay. These areas are often along coastal bluffs as two-lane roadways with limited shoulder space. Notable constrained corridors on the Bay side of the county include Highway 84, El Camino Real, Foster City Boulevard, and John Daly Boulevard where traffic volumes may limit how space could be reallocated.

APPLICATION

When considering approaches to bicycle and pedestrian network improvements along these constrained corridors, the Plan Development Team will need to determine whether road re-allocation projects (i.e., road diets) are possible or whether alternative, parallel routes will be needed. In some locations, widening projects may require higher levels of investments to install shoulder along the coast bluff or mountainous areas.

Figure 23. Constrained Corridors



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CHAPTER 3: COUNTYWIDE PEDESTRIAN FACILITIES OVERVIEW

TYPES OF PEDESTRIAN FACILITIES

A functional and safe pedestrian network generally consists of well-connected sidewalks, trails, and crossing treatments. Sidewalks and trails in the public right of way must follow the Americans with Disabilities Act ("ADA") guidelines. There are a multitude of crossing treatments which can be used to improve pedestrian safety and comfort depending on the conditions. In general, pedestrian-specific crossing treatments are important in areas where high volumes of pedestrians are expected, such as in downtown districts or near parks, schools, and transit stops. Sidewalks are not always suitable in rural areas; advisory or paved shoulders and side paths may be preferred. Note that there is currently no comprehensive countywide sidewalk inventory.

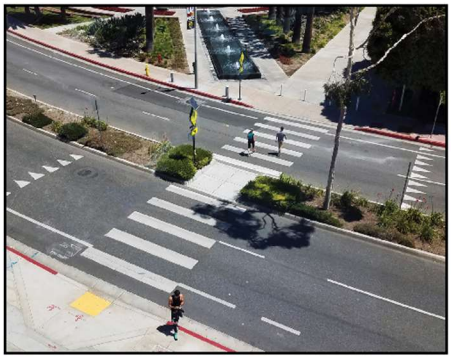
WithinSan Mateo County, the pedestrian network consists largely of sidewalk infrastructure supported by crossing treatments, multi-use paths, and unpaved recreational trails. Table 6 and Figure 24 identify the variety of pedestrian facilities that County staff can use to build and improve the pedestrian network.

Table 6. Pedestrian Facilities Applicable in Urban and Rural Areas

Treatment	Description
Median Crossing Islands	• Allows pedestrians to cross a street in two stages • Visually and physically narrows the roadway which helps reduce vehicle speeds • Used on multi-lane roadways or roadways with high traffic volume
Rectangular Rapid Flashing Beacons	• Combines a crossing warning sign with a bright flashing beacon that is activated on demand when a pedestrian or bicyclist is present • Increases drivers' yielding compliance and pedestrian visibility • Often used at midblock crossings or unsignalized intersections of lower speed, two-lane roadways.
Pedestrian Hybrid Beacon	• Traffic signal for major street activated on demand when a pedestrian or bicyclist is present • Increases drivers' yielding compliance and pedestrian visibility • Often used at midblock crossings on higher speed, multi-lane roadways
Signals	• **Pedestrian Signal Timing** – Signal head displays "Walk", countdown, and "Don't Walk"; crossing time accommodates a normal walking pace • **Accessible Pedestrian Signals** – Communicates information aurally to accommodate the visually impaired • **Leading Pedestrian Interval** – Walk phase begins three to seven seconds before drivers are given the green light which increases pedestrian visibility and reduces conflicts
ADA-compliant Sidewalk	• Provides a continuous clear path designated for pedestrians of all ages and abilities • A firm, stable, and slip-resistant surface, typically concrete
High-visibility Crosswalk Markings	• Improves visibility of crossing with bold, reflective striping which can increase yielding rates at intersections and midblock • ADA-accessible curb ramps provide access and detectable warning for the physically and visually impaired (respectively), and are useful to people pushing strollers or baskets
Curb Extensions	• Reduces pedestrian crossing distances at intersections or midblock crossings • Visually and physically narrows the roadway which helps to reduce vehicle speeds and turning speeds
Raised Crosswalk	• Reduces vehicle speeds at intersection or midblock crossings • Increases visibility of pedestrians

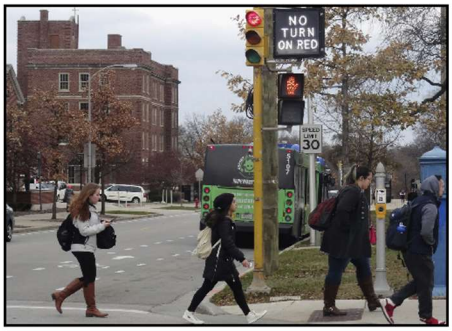
Figure 24. Types of Pedestrian Facilities

HIGH-VISIBILITY CROSSWALK/CURB RAMPS



MEDIAN CROSSING ISLAND

PEDESTRIAN PUSH BUTTONS

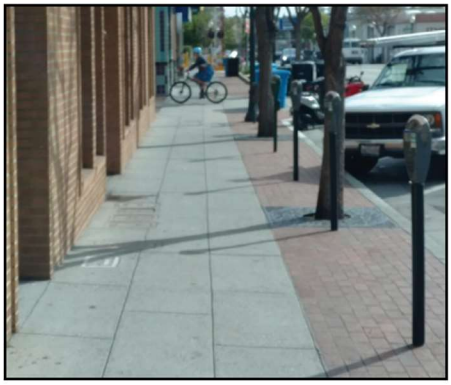


PEDESTRIAN DON'T-WALK SIGNAL

PEDESTRIAN PATH

ADVISORY SHOULDER

CURB EXTENSION



ADA-COMPLIANT SIDEWALK

PEDESTRIAN HYBRID BEACON

RAISED CROSSWALK

RECTANGULAR RAPID FLASHING BEACON (RRFB)

PAVED SHOULDER

PEDESTRIAN PROJECT IMPLEMENTATION PAST 5-10 YEARS

OVERVIEW

Over the last few years, there have been many improvements to the pedestrian network in San Mateo County. Staff from the County and local jurisdictions have been implementing a variety of pedestrian projects throughout the region either as standalone projects or as part of Complete Streets projects.[5]

KEY TAKEAWAYS

Figure 25 summarizes key data related to pedestrian project implementation in San Mateo County over the last decade, based on results from fourteen jurisdiction staff interviews completed in early 2020 (six jurisdictions did not participate in interviews). All jurisdictions have closed sidewalk gaps, installed curb ramps (or other ADA retrofits), and installed pedestrian-activated beacons (e.g., rectangular rapid flashing beacons). Most jurisdictions have also been marking crosswalks, installing curb extensions, and adding mid-block crossing opportunities. Several communities have also completed major crossing improvements by implementing curb extensions, pedestrian crossing islands, and raised crossings. Table 7 presents a complete list of recently installed pedestrian projects.

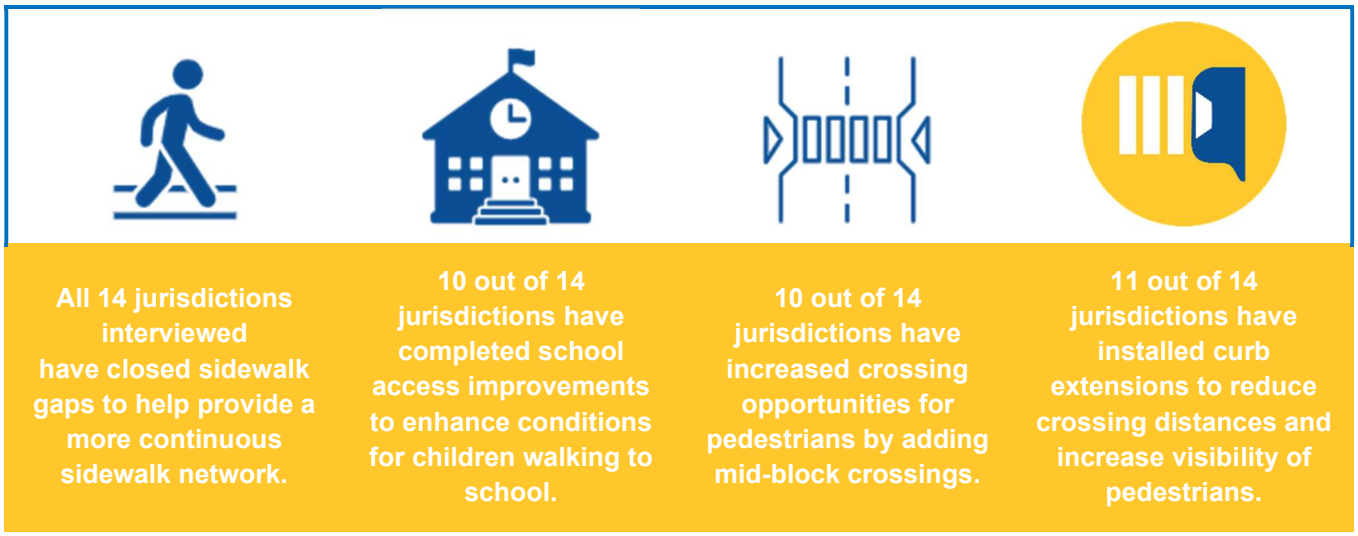


Figure 25. Pedestrian Project Implementation Highlights

APPLICATION

Moving forward, this information can help local agencies identify opportunity areas to continue to make these types of improvements throughout their jurisdictions, including completing more sidewalks, installing more pedestrian-activated beacons, marking crosswalks, improving curb ramps, and adding mid-block crossings where they are needed. The information presented in this section will inform the project recommendations for the pedestrian focus areas and the content of the design toolkit.

[5] Complete Streets are streets that are designed to promote safe access for all roadway users, including pedestrians, bicyclists, and motor vehicle drivers of all ages and abilities.

Table 7. Pedestrian Projects Implemented or Designed in the last 5 to 10 Years*

Jurisdiction	Sidewalk Infill	Marked Crosswalk	Curb Ramp Installation or Retrofit	Pedestrian -activated Beacon	Curb Extension	Raised Crossing	Mid-block Crossing	Crossing Island	Pedestrian Signal Installation or Retrofit	Pedestrian Amenities (e.g., benches, lighting)	School Access Improvements
Belmont	X	X	X	X							
Brisbane	X	X	X	X	X		X	X	X	X	X
Colma	X	X	X	X							
Daly City	X	X	X	X	X	X	X				
East Palo Alto	X	X	X	X	X	X	X	X	X	X	X
Foster City	X	X	X	X	X	X			X	X	X
Half Moon Bay	X	X	X	X	X		X		X	X	X
Millbrae	X	X	X	X	X		X			X	X
Pacifica	X	X	X	X	X		X	X		X	X
Redwood City	X	X	X	X	X	X	X	X	X	X	X
San Mateo	X	X	X	X	X		X	X	X	X	X
South San Francisco	X		X	X	X		X	X		X	X
Woodside	X	X		X							
San Mateo County	X	X	X	X	X		X				X

PEDESTRIAN-INVOLVED COLLISIONS

OVERVIEW

Enhancing safety for people walking is a key part of improving conditions for pedestrians and encouraging more people to walk. As part of this planning process, the project team analyzed pedestrian-involved collision data from the Statewide Integrated Traffic Records System (SWITRS) dataset for a five-year period (2014 to 2018). Figure 27 shows the distribution of pedestrian-involved collisions throughout San Mateo County. Note that this data does not include collisions that did not result in an injury nor does it include collisions that were not reported to the police and therefore likely underrepresents the total number of pedestrian collisions and the analysis may not be representative of all pedestrian collision trends.

KEY TAKEAWAYS

During the analysis period, there were 1,242 collisions involving pedestrians. The collisions resulted in 52 deaths and 1,297 injured victims. Figure 26 shows the distribution of pedestrian collisions by injury severity. Nearly 20 percent of pedestrian-involved collisions resulted in a fatal or life-changing injury, this distribution is very similar to that of bicycle-involved collisions.

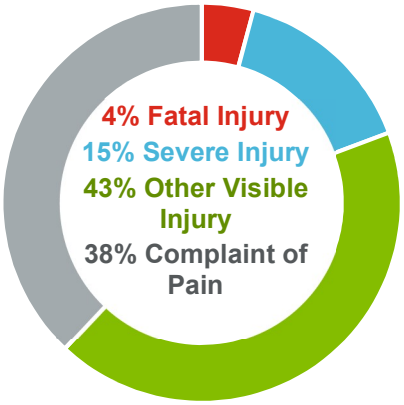


Figure 26. Pedestrian Collisions by Injury Severity

Among the victims involved in the collisions, a slight majority were male (54 percent); approximately 21 percent of victims were under 20 years old and 17 percent were age 65 or older.

The top three categories of violations associated with pedestrian collisions were pedestrian right of way, pedestrian violation, and unsafe speed. These three categories were associated with 78 percent of pedestrian collisions; however, pedestrian right of way and pedestrian violations were much more common than unsafe speed violations.

Approximately 48 percent of crashes did not occur at an intersection, 34 percent of crashes occurred at a controlled intersection and 17 percent occurred at an uncontrolled intersection (approximately one percent did not include a location). Approximately 20 percent of collisions occurred on state highways.

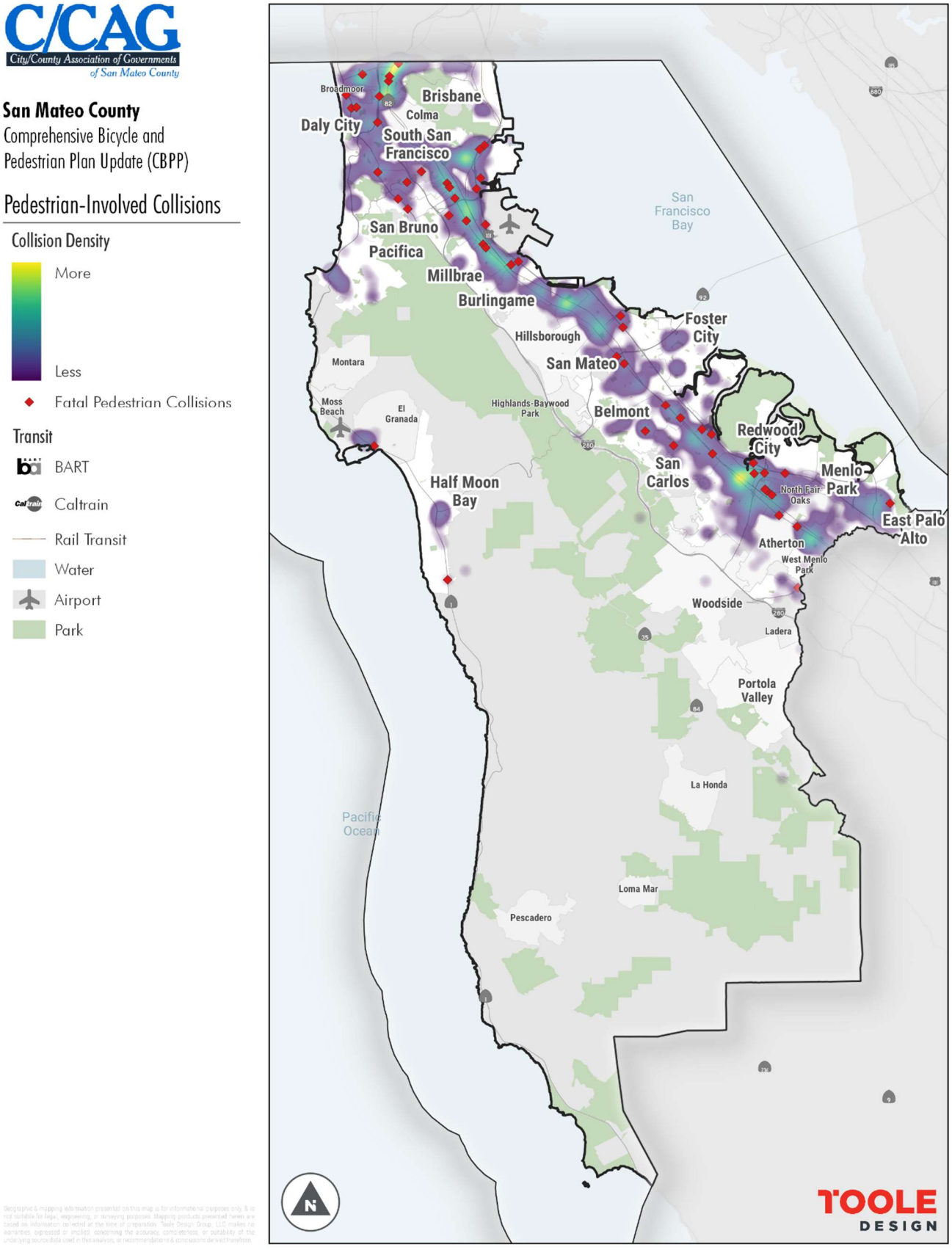
The majority of crashes occurred in daylight, but 32 percent of crashes occurred under dark conditions with streetlights and nearly eight percent of crashes occurred either at dawn, dusk, or under dark conditions without streetlights.

Approximately 53 percent of crashes occurred while a pedestrian was crossing in a crosswalk at an intersection, 21 percent occurred while the pedestrian was crossing outside of a designated crosswalk, 14 percent occurred while the pedestrian was walking along the road (including shoulders), and the remaining 12 percent involved a combination of other scenarios.

APPLICATION

The pedestrian collision data will not undergo any additional analysist. However, the key trends presented above will inform the development of program and policy recommendations and may be used in combination with future analyses to identify locations where pedestrian improvements are needed. In addition, C/CAG may decide to use safety as a criterion for prioritizing projects and could use pedestrian collision data as one of the metrics for safety.

Figure 27. Pedestrian Collisions in San Mateo, 2014 - 2018



PEDESTRIAN GAPS TO TRANSIT AND BETWEEN JURISDICTIONS

OVERVIEW

When planning for pedestrians at the regional scale, it is important to examine infrastructure and facility gaps near transit stations and between jurisdictions as these connections are key for local and inter-jurisdiction travel. Active transportation network gaps near transit stations was also a key barrier mentioned in both the local jurisdiction staff surveys and interviews. Figure 29 uses information gathered during the interviews to show specific pedestrian network gaps and barriers near transit stations and between jurisdictions in San Mateo County.

KEY TAKEAWAYS

County and local jurisdiction staff identified 16 major gaps to regional transit stations in every jurisdiction with a regional transit station. Examples of theses gaps include University Avenue in East Palo Alto, the Redwood City Transit Center, and Millbrae Avenue in Millbrae.

There are also many areas throughout San Mateo County that do not provide facilities for pedestrians to travel safely and comfortably between jurisdictions. County and local jurisdiction staff identified more than 9 gaps between jurisdictions. Examples of these gaps include Mission Street, Geneva Avenue, and El Camino Real.

Table 9 presents all of the pedestrian network gaps identified near transit stations and between jurisdictions.

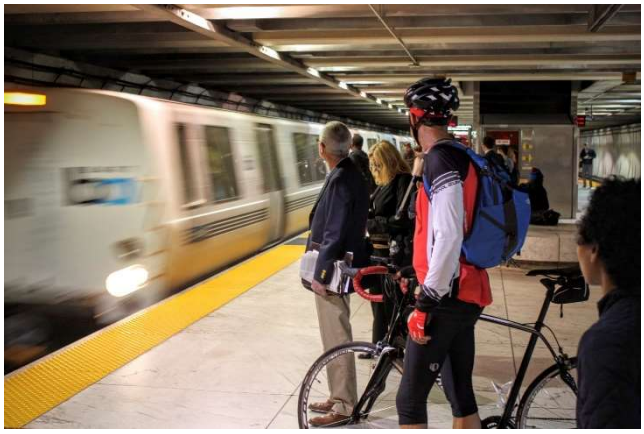


Figure 28. People Walking and Bicycling Use BART to travel throughout San Mateo County

APPLICATION

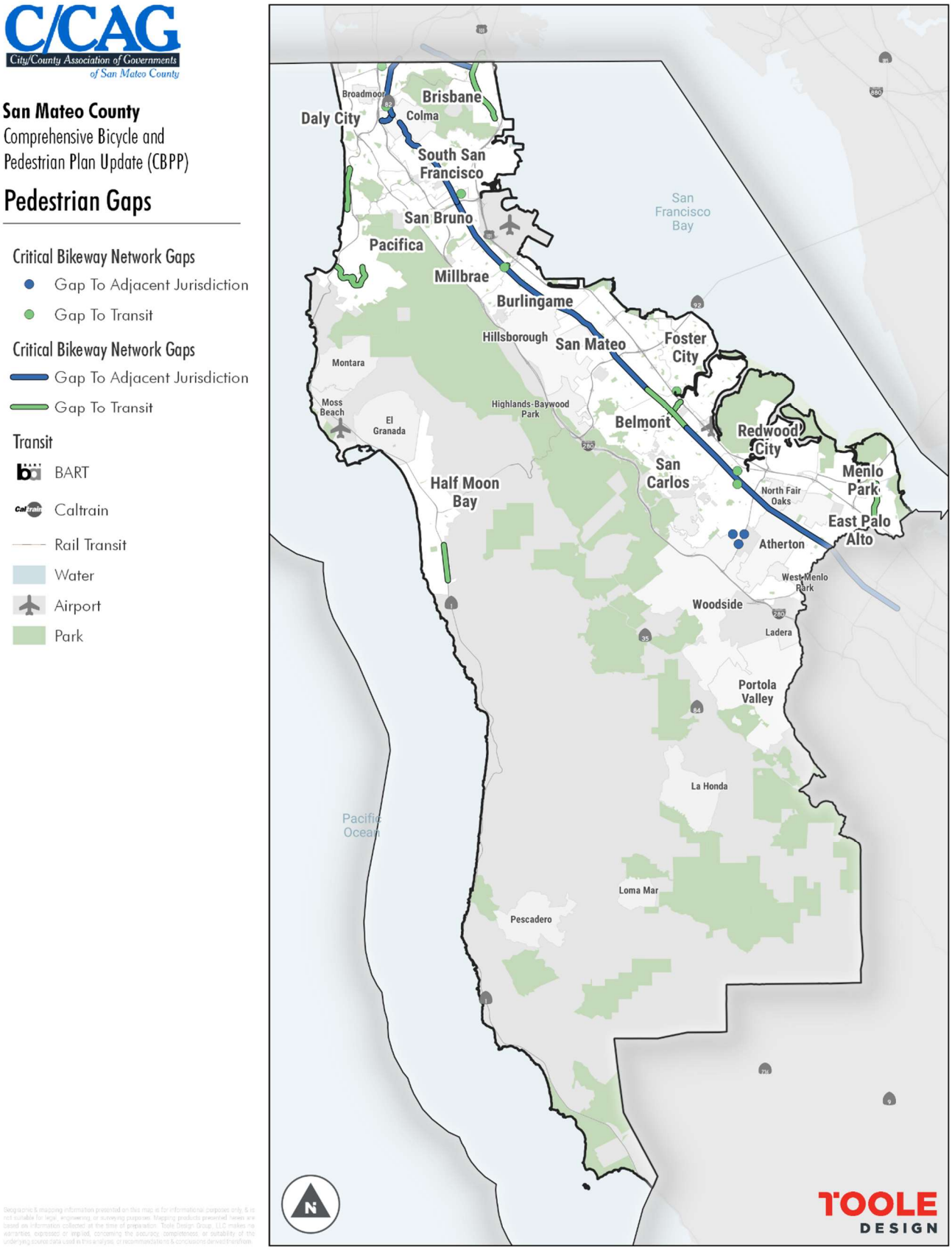
The barriers identified in this section may be reviewed in greater detail in the gaps and barriers identification phase of the project to identify whether specific projects or recommendations are needed to help mitigate them. The project team will also determine whether addressing network barriers such gaps near transit stations and between jurisdictions should be part of the project prioritization process. Reducing the network gaps near transit stations and between jurisdictions will require collaboration between local jurisdictions and regional planning and transit agencies.

Table 8. Pedestrian Network Gaps to Adjacent Jurisdictions and near Transit

Gaps to Adjacent Jurisdictions*	Gaps to Transit*
Colma Blvd (Daly City)	University Ave (East Palo Alto)
El Camino Real (Multiple Jurisdictions)	Ralston Ave (Belmont)
Mission St (Daly City)	El Camino Real (Multiple Jurisdictions)
Geneva Ave (Daly City)	Bayshore Blvd (Brisbane)
Woodside Rd (Multiple Jurisdictions)	Belmont Overcrossing (Belmont)
Alameda de las Pulgas (Redwood City)	Redwood City Transit Center (Redwood City)
	James St and El Camino Real (Redwood City)
	Millbrae Ave (Millbrae)
	Palmetto Ave (Pacifica)
	Crespi Dr (Pacifica)
	San Bruno BART Station (San Bruno)
	Connection from Moonridge to Half Moon Bay (Half Moon Bay)
	Colma BART Station (Colma)
	Daly City BART Station (Daly City)

*Some streets include multiple locations.
Note: Locations listed in parentheses include locations of gaps, and do not necessarily coincide with the jurisdiction staff member who reported the gap.

Figure 29. Pedestrian Network Gaps



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PEDESTRIAN NETWORK BARRIERS

OVERVIEW

Many different types of barriers can discourage people from walking. Linear facilities such as freeways, railways, and arterial roads represent major barriers to walking because they interrupt the street network and sometimes separate neighborhoods or jurisdictions and require circuitous routing and backtracking. Other physical barriers include interchanges, and natural barriers (e.g. steep grade changes and creeks waterways). These barriers negatively affect walking more than driving because a detour of more than a quarter or half of a mile has a larger impact on travel time for someone walking or bicycling compared to someone driving. In many cases, a roadway crossing of the barrier may exist, but lacks sidewalks or safe crossing opportunities. This section examines potential infrastructure and natural barriers along the pedestrian network. Figure 30 uses information gathered during the interviews to show specific pedestrian network barriers in San Mateo County.

KEY TAKEAWAYS

County and local jurisdiction staff identified several linear barriers to walking in the region, including freeway corridors, railroad tracks, and major intersections. In many cases, the same major arterial, railway, or highway acts as a barrier in multiple jurisdictions. The majority of the barriers identified are intersections. All of the railroad track crossing barriers are located in Redwood City or Atherton. Table 9 presents the number and type of pedestrian network barriers identified by county and local jurisdiction staff.

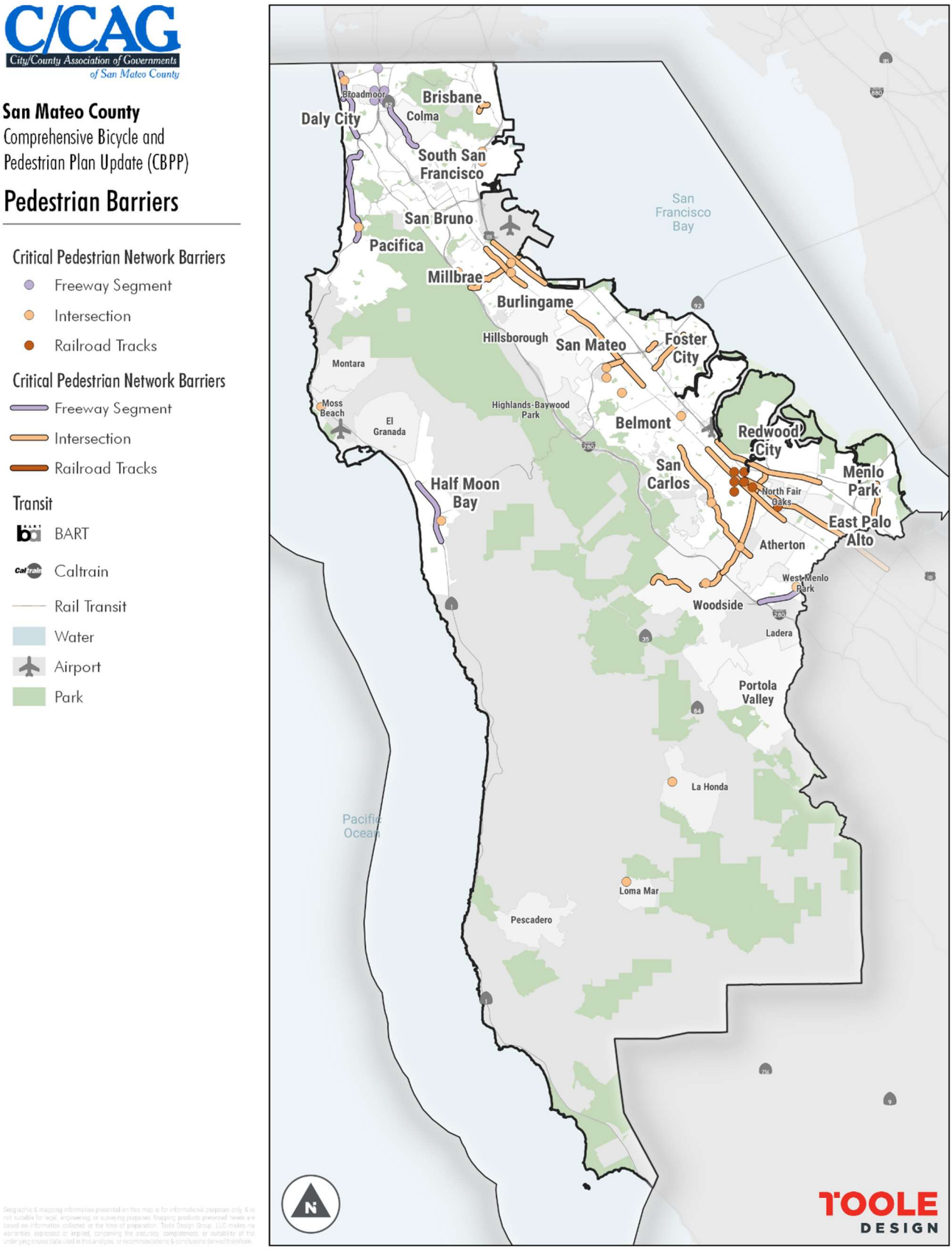
Table 9. Linear Barriers and Difficult Crossings Identified by County and Local Jurisdiction Staff

Barrier Type	Number of Locations
Intersection	36
Railroad Track Crossings	7
Freeway Corridors and Major Arterials	11
Freeway Interchanges	0
Waterways	0
Midblock Street Crossing	0

APPLICATION

The barriers identified in this section may be reviewed in greater detail in the gaps and barriers identification phase of the project to identify whether specific projects or recommendations are needed to help mitigate them. The Plan Development Team will also determine whether addressing these network barriers should be part of the project prioritization process. Reducing the network gaps near transit stations and between jurisdictions will require collaboration between local jurisdictions and regional planning and transit agencies. The forthcoming Caltrans *District Four Pedestrian Plan* can be used to inform the recommendations to address pedestrian barriers along the state highway network.

Figure 30. Pedestrian Network Barriers

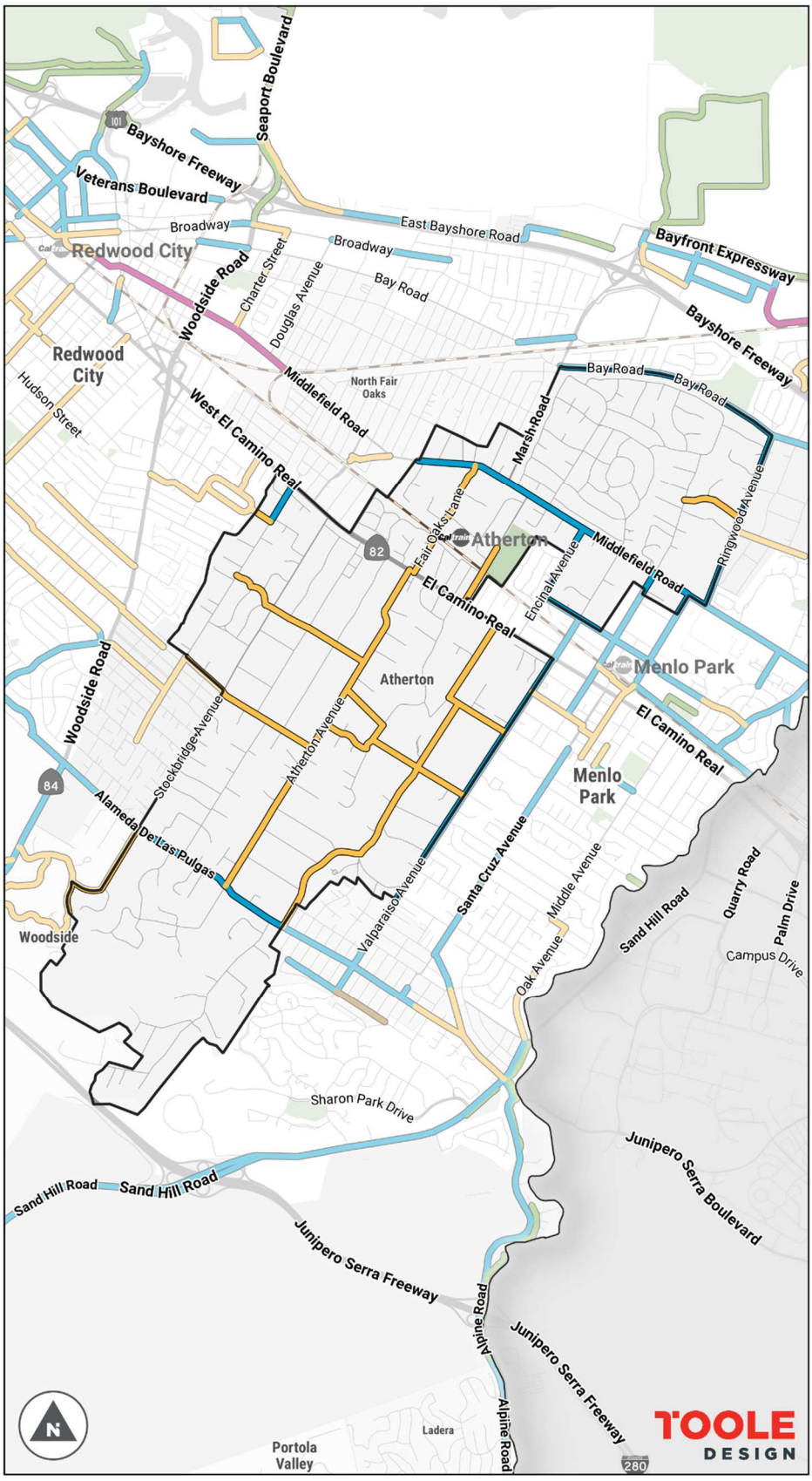


APPENDIX A: EXISTING BICYCLE FACILITIES BY JURISDICTION

C/CAG
City/County Association of Governments of San Mateo County

Atherton
Comprehensive Bicycle and Pedestrian Plan Update (CBPP)

Existing Bicycle Facilities



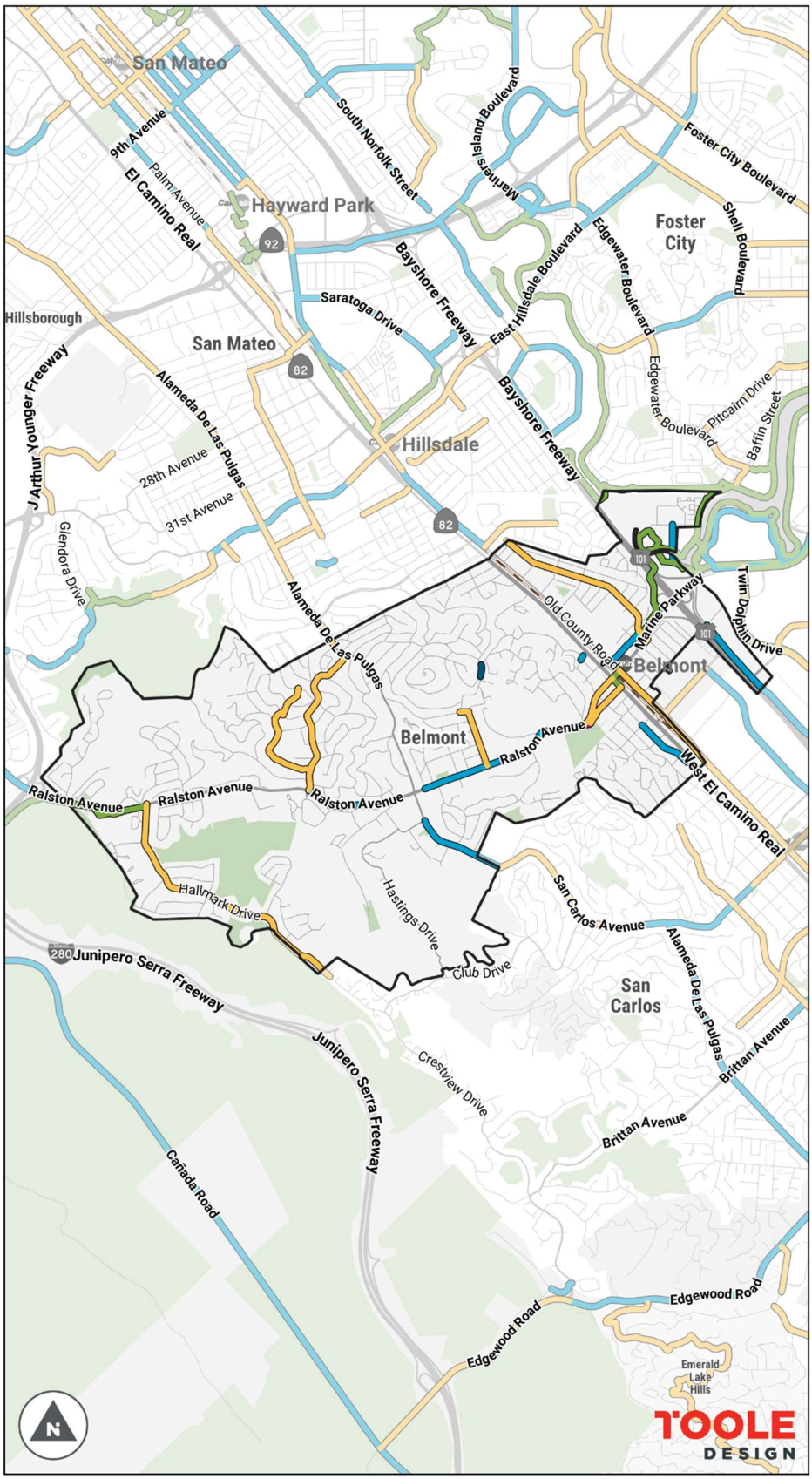
C/CAG
City/County Association of Governments of San Mateo County

Belmont
Comprehensive Bicycle and Pedestrian Plan Update (CBPP)

Existing Bicycle Facilities

Bicycle Facilities
- Class 1 Path
- Class 2 Bicycle Lane
- Class 2b Buffered Bicycle Lane
- Class 3 Bicycle Route
- Class 3b Bicycle Boulevard
- Class 4 Separated Bicycle Lane

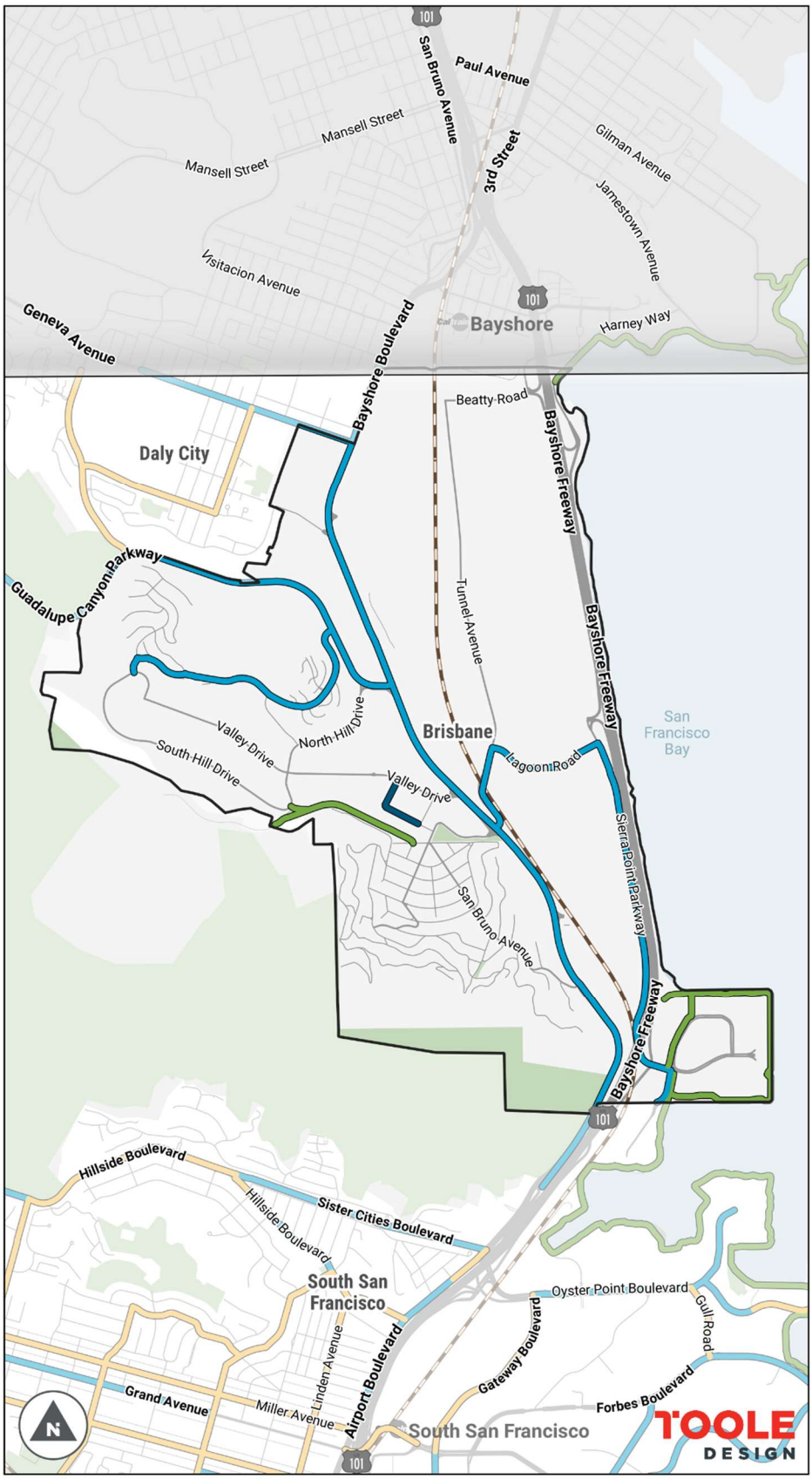
Transit
- BART
- Caltrain
- Rail Transit
- Water
- Airport
- Park



C/CAG
City/County Association of Governments of San Mateo County

Brisbane
Comprehensive Bicycle and Pedestrian Plan Update (CBPP)

Existing Bicycle Facilities



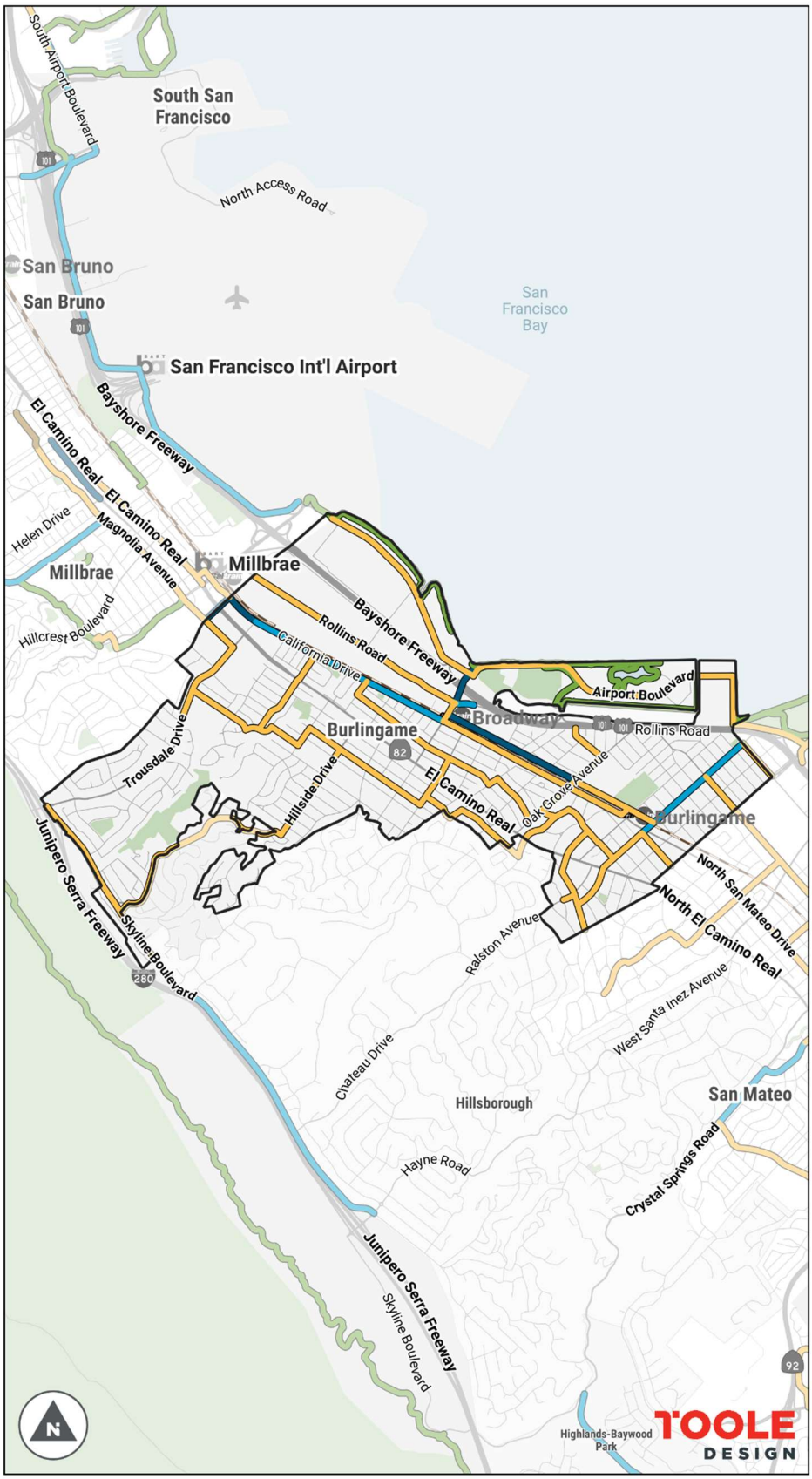
C/CAG
City/County Association of Governments of San Mateo County

Burlingame
Comprehensive Bicycle and Pedestrian Plan Update (CBPP)

Existing Bicycle Facilities

Bicycle Facilities
- Class 1 Path
- Class 2 Bicycle Lane
- Class 2b Buffered Bicycle Lane
- Class 3 Bicycle Route
- Class 3b Bicycle Boulevard
- Class 4 Separated Bicycle Lane

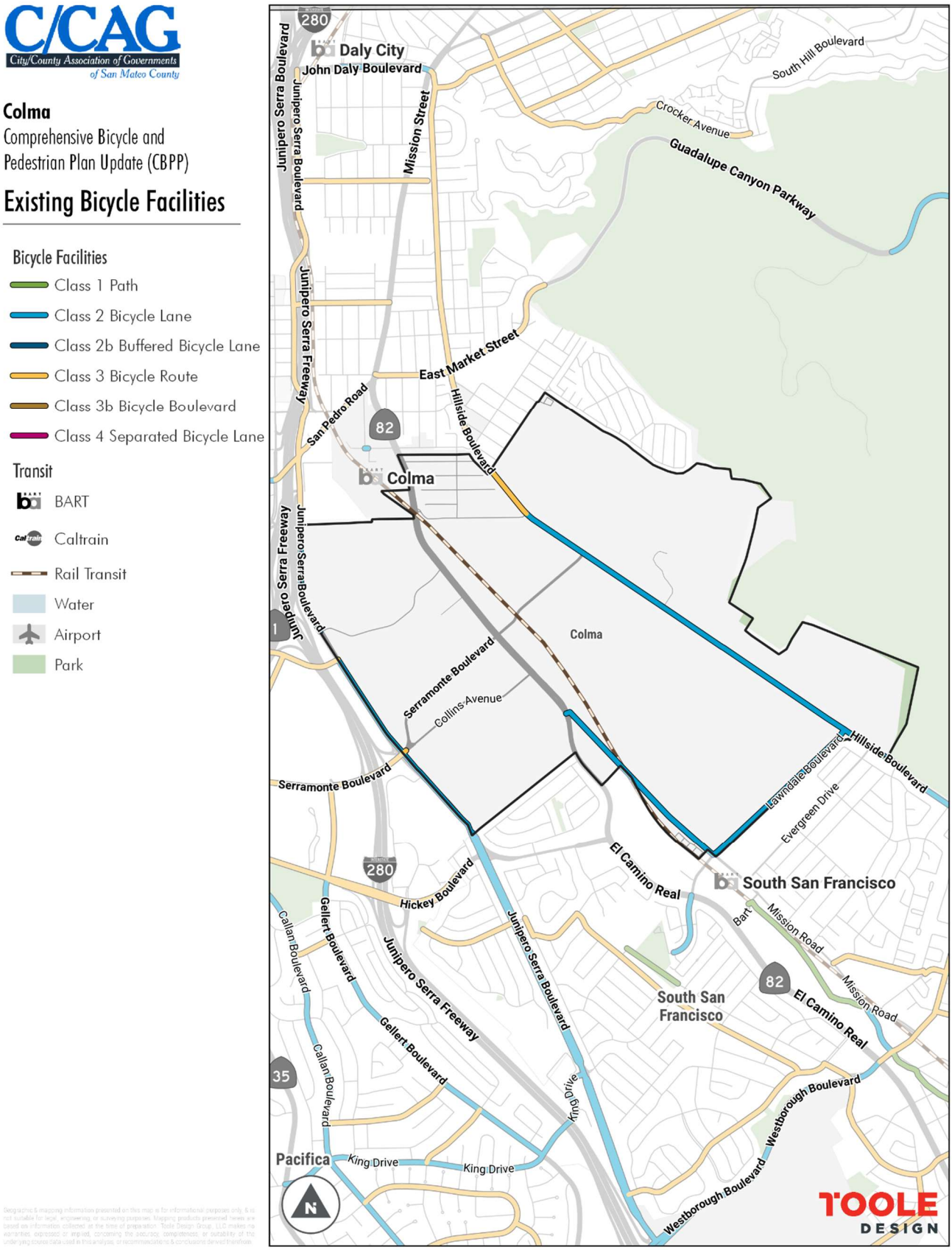
Transit
- BART
- Caltrain
- Rail Transit
- Water
- Airport
- Park



C/CAG
City/County Association of Governments of San Mateo County

Colma
Comprehensive Bicycle and Pedestrian Plan Update (CBPP)

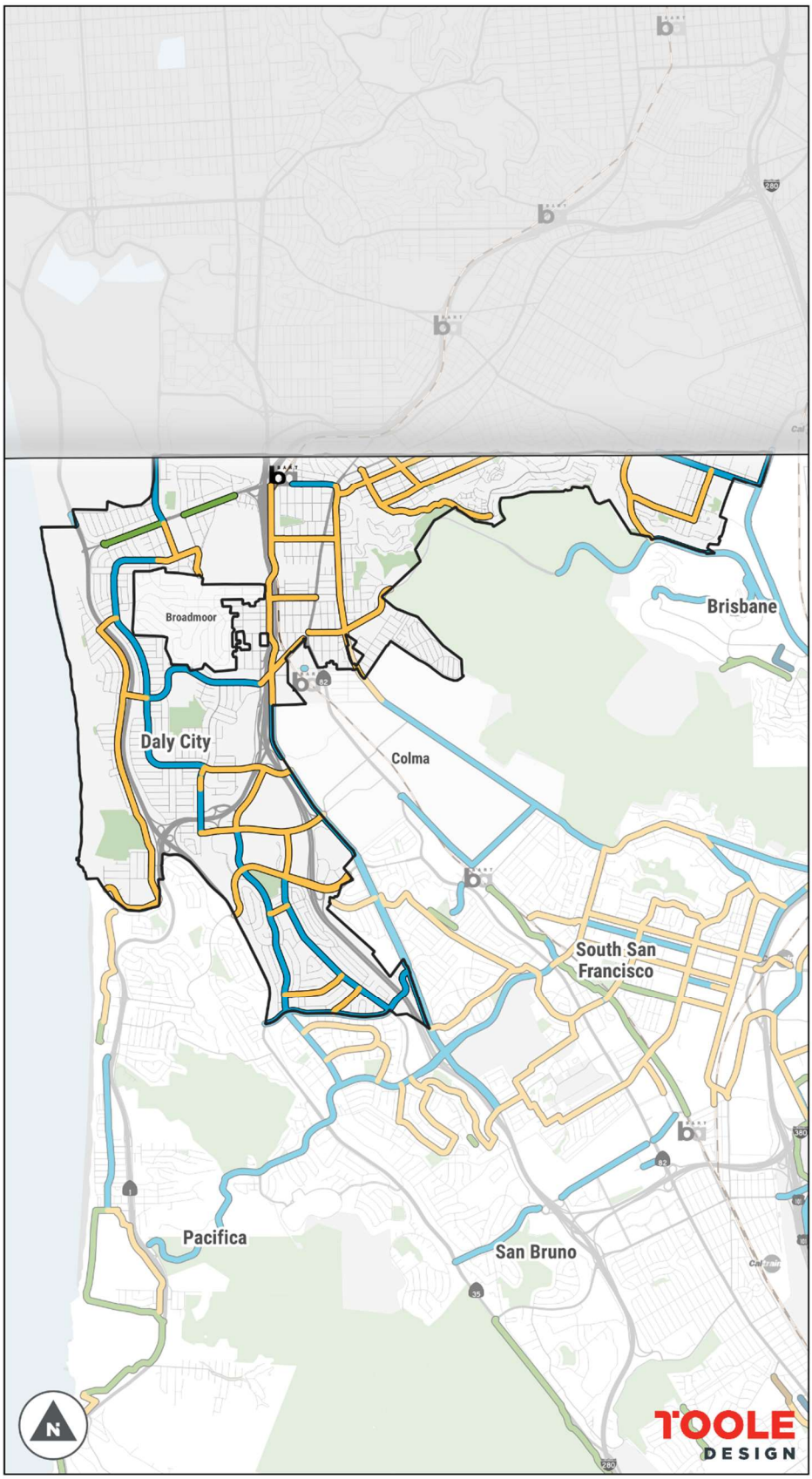
Existing Bicycle Facilities



C/CAG
City/County Association of Governments of San Mateo County

Daly City
Comprehensive Bicycle and Pedestrian Plan Update (CBPP)

Existing Bicycle Facilities



C/CAG
City/County Association of Governments of San Mateo County

East Palo Alto
Comprehensive Bicycle and Pedestrian Plan Update (CBPP)

Existing Bicycle Facilities

Bicycle Facilities
- Class 1 Path
- Class 2 Bicycle Lane
- Class 2b Buffered Bicycle Lane
- Class 3 Bicycle Route
- Class 3b Bicycle Boulevard
- Class 4 Separated Bicycle Lane

Transit
- BART
- Caltrain
- Rail Transit
- Water
- Airport
- Park

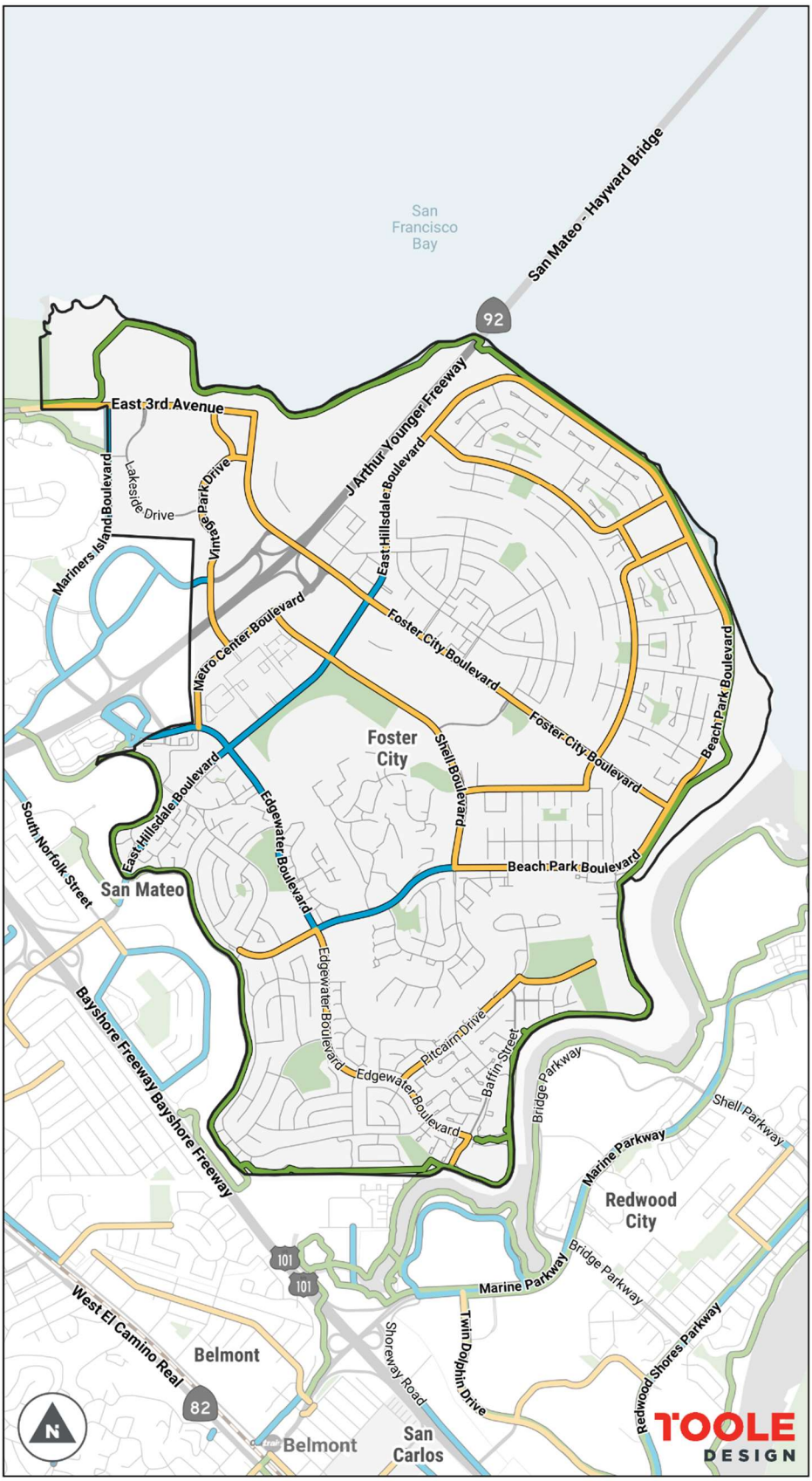
C/CAG
City/County Association of Governments of San Mateo County

Foster City
Comprehensive Bicycle and Pedestrian Plan Update (CBPP)

Existing Bicycle Facilities

Bicycle Facilities
- Class 1 Path
- Class 2 Bicycle Lane
- Class 2b Buffered Bicycle Lane
- Class 3 Bicycle Route
- Class 3b Bicycle Boulevard
- Class 4 Separated Bicycle Lane

Transit
- BART
- Caltrain
- Rail Transit
- Water
- Airport
- Park



C/CAG
City/County Association of Governments of San Mateo County

Half Moon Bay
Comprehensive Bicycle and Pedestrian Plan Update (CBPP)

Existing Bicycle Facilities

Bicycle Facilities
- Class 1 Path
- Class 2 Bicycle Lane
- Class 2b Buffered Bicycle Lane
- Class 3 Bicycle Route
- Class 3b Bicycle Boulevard
- Class 4 Separated Bicycle Lane

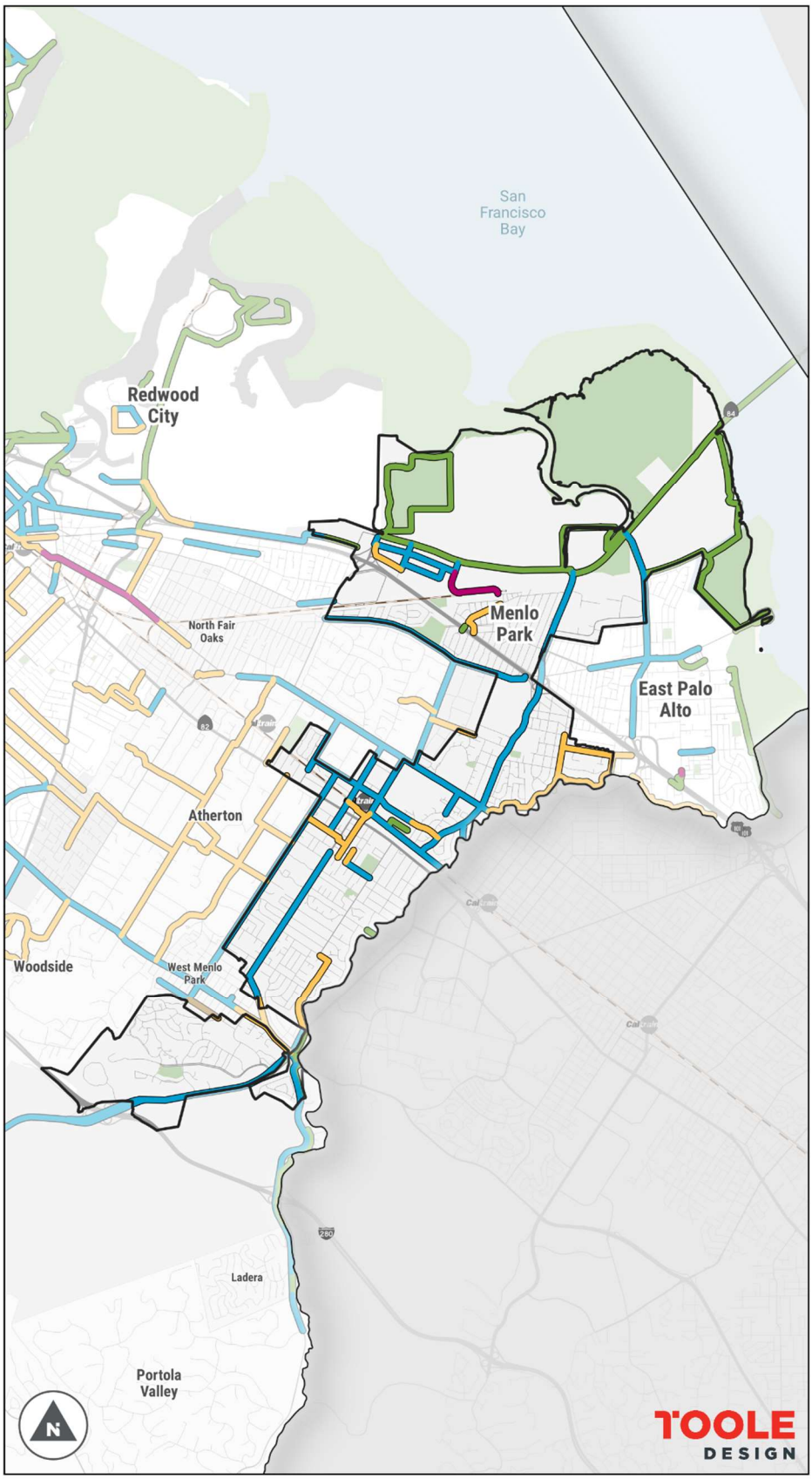
Transit
- BART
- Caltrain
- Rail Transit
- Water
- Airport
- Park

Comment

C/CAG
City/County Association of Governments of San Mateo County

Menlo Park
Comprehensive Bicycle and Pedestrian Plan Update (CBPP)

Existing Bicycle Facilities



C/CAG
City/County Association of Governments of San Mateo County

Millbrae
Comprehensive Bicycle and Pedestrian Plan Update (CBPP)

Existing Bicycle Facilities

Bicycle Facilities
- Class 1 Path
- Class 2 Bicycle Lane
- Class 2b Buffered Bicycle Lane
- Class 3 Bicycle Route
- Class 3b Bicycle Boulevard
- Class 4 Separated Bicycle Lane

Transit
- BART
- Caltrain
- Rail Transit
- Water
- Airport
- Park

C/CAG
City/County Association of Governments of San Mateo County

Pacifica
Comprehensive Bicycle and Pedestrian Plan Update (CBPP)

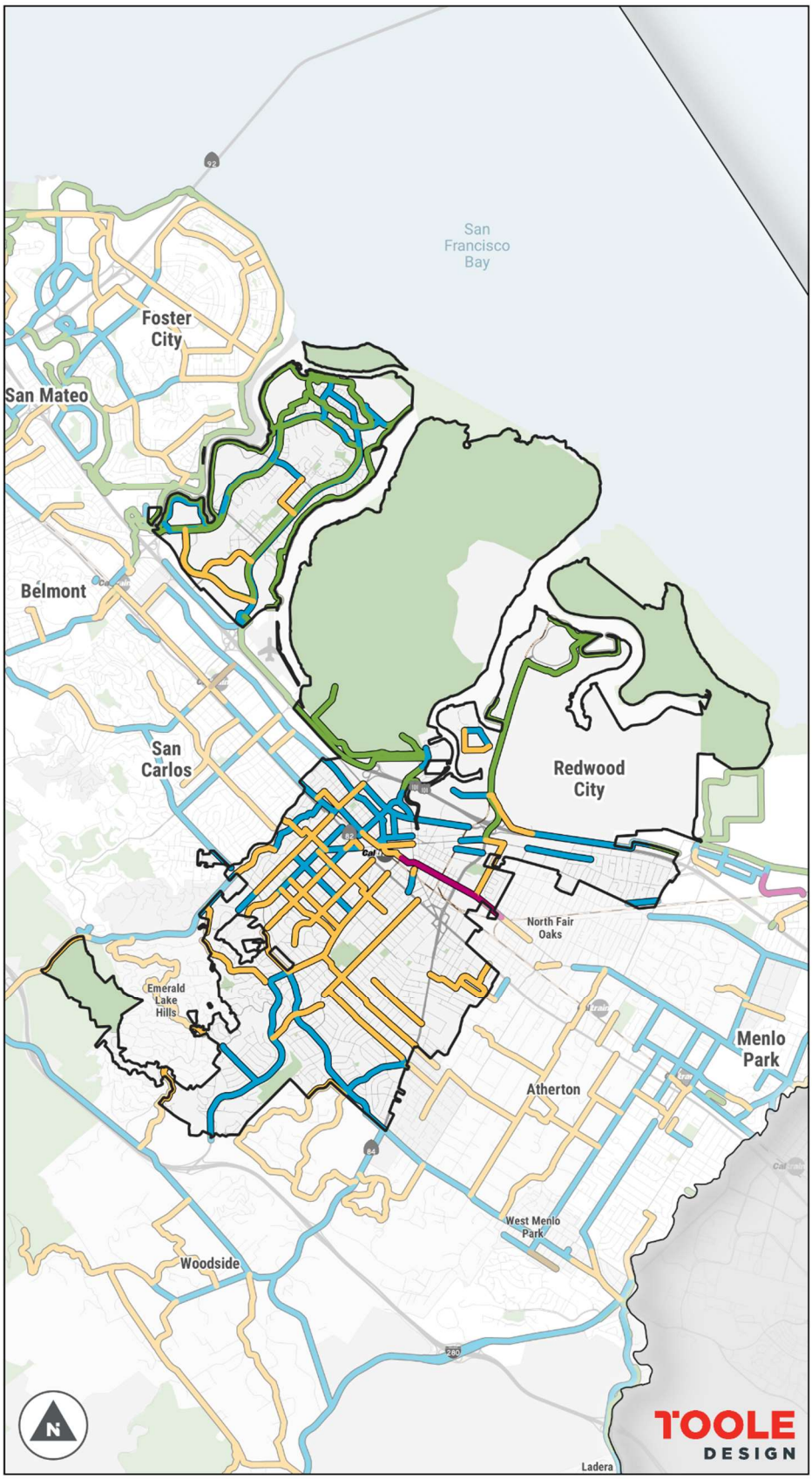
Existing Bicycle Facilities

Comment

C/CAG
City/County Association of Governments of San Mateo County

Redwood City
Comprehensive Bicycle and Pedestrian Plan Update (CBPP)

Existing Bicycle Facilities



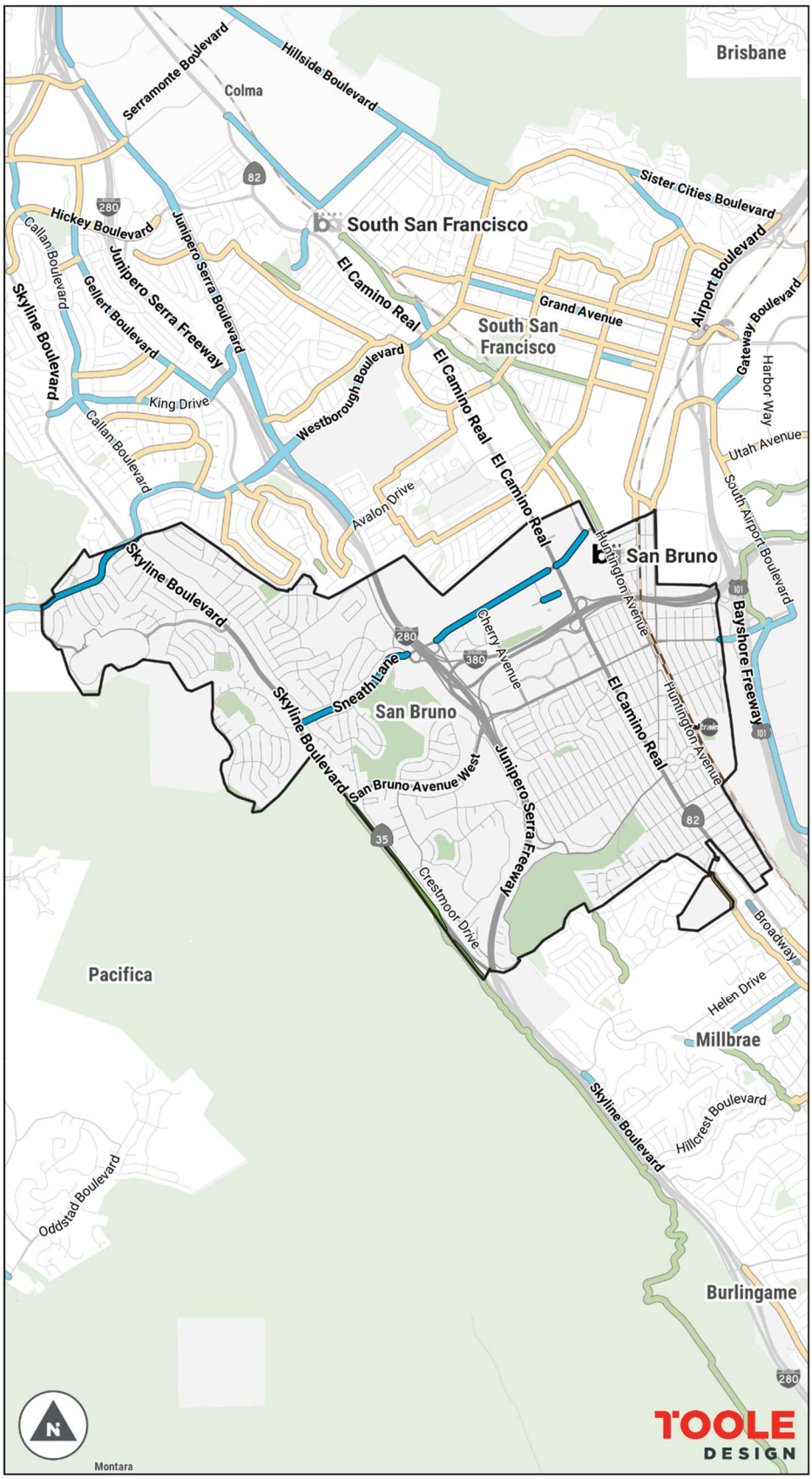
C/CAG
City/County Association of Governments of San Mateo County

San Bruno
Comprehensive Bicycle and Pedestrian Plan Update (CBPP)

Existing Bicycle Facilities

Bicycle Facilities
- Class 1 Path
- Class 2 Bicycle Lane
- Class 2b Buffered Bicycle Lane
- Class 3 Bicycle Route
- Class 3b Bicycle Boulevard
- Class 4 Separated Bicycle Lane

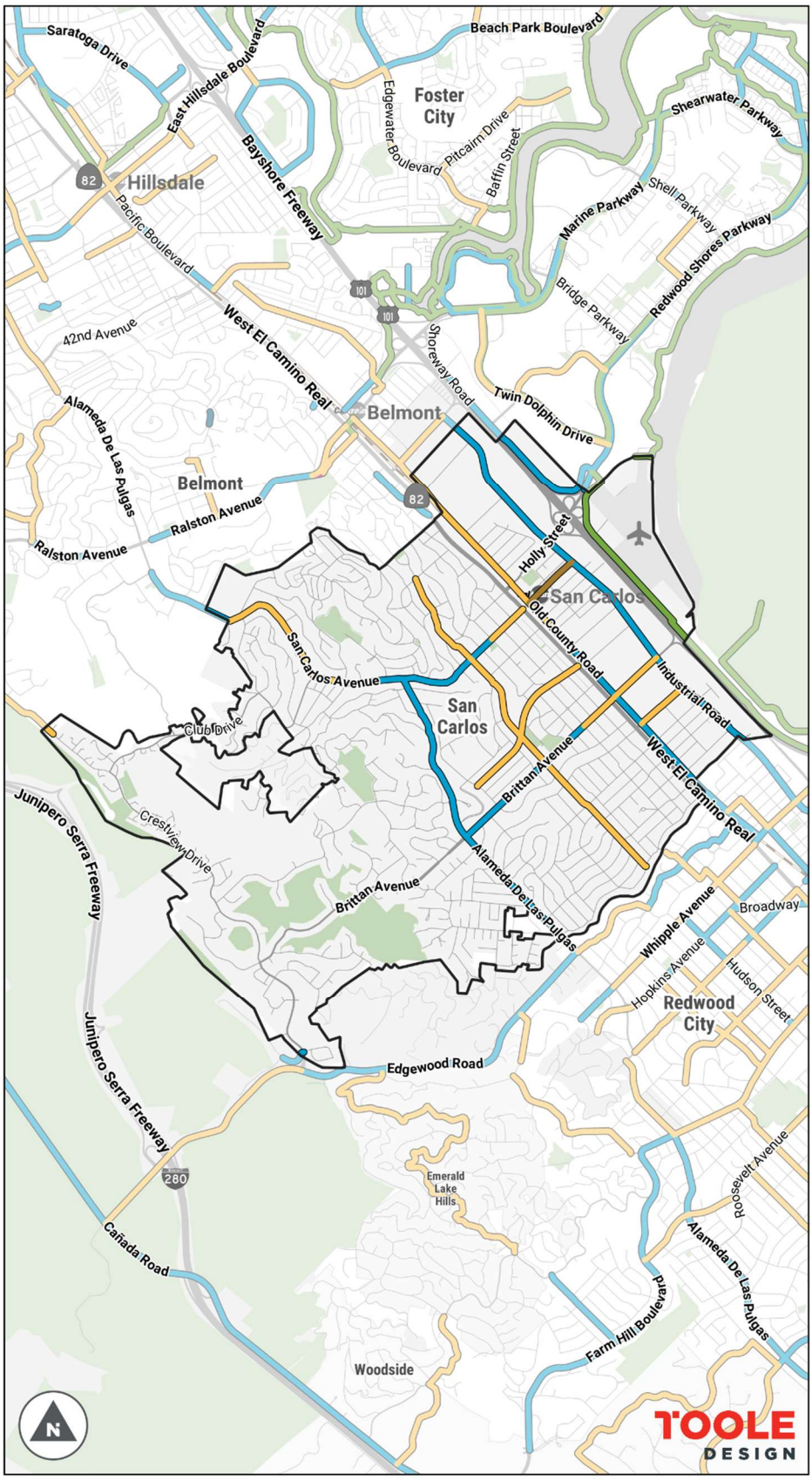
Transit
- BART
- Caltrain
- Rail Transit
- Water
- Airport
- Park



C/CAG
City/County Association of Governments of San Mateo County

San Carlos
Comprehensive Bicycle and Pedestrian Plan Update (CBPP)

Existing Bicycle Facilities



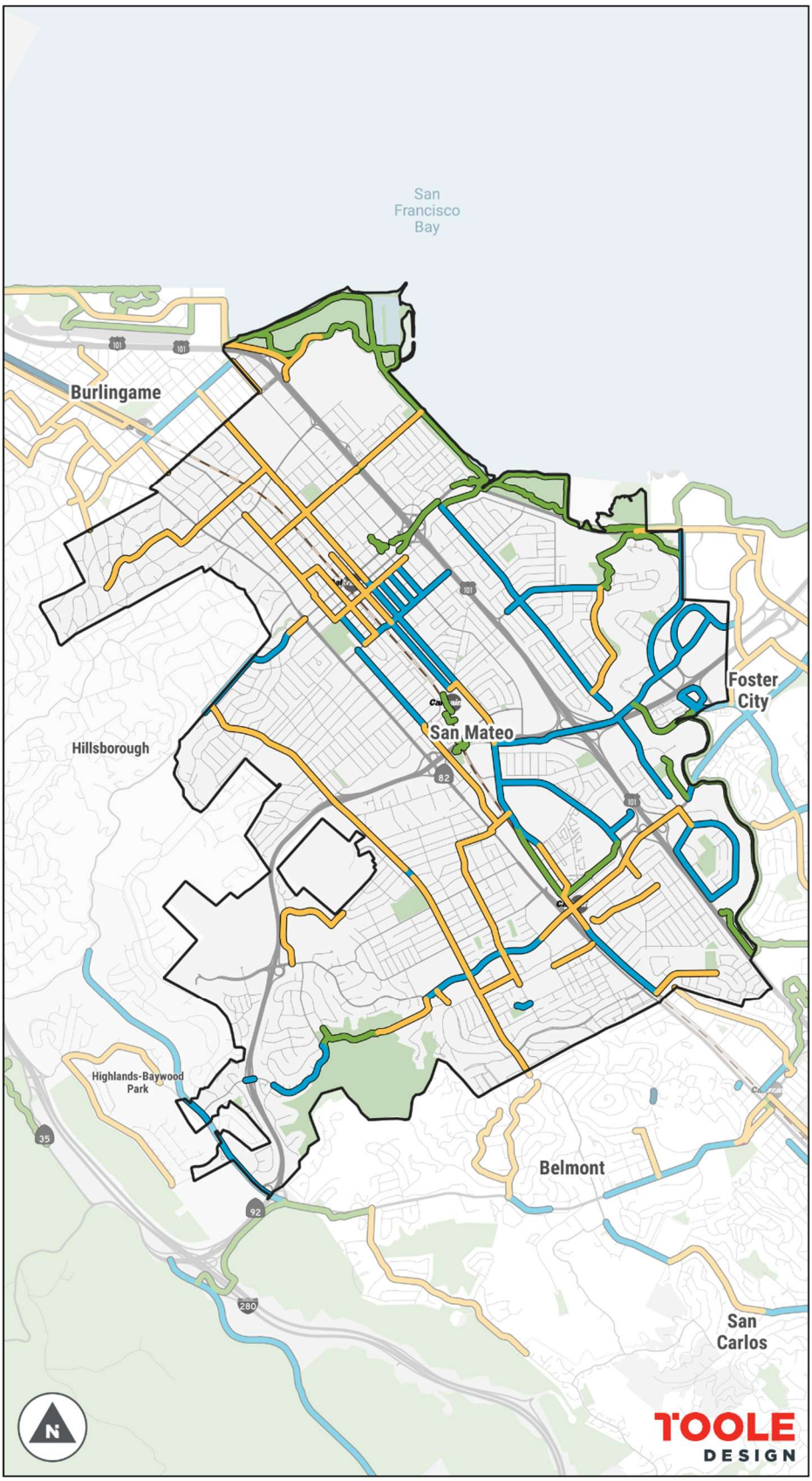
Bicycle Facilities
- Class 1 Path
- Class 2 Bicycle Lane
- Class 2b Buffered Bicycle Lane
- Class 3 Bicycle Route
- Class 3b Bicycle Boulevard
- Class 4 Separated Bicycle Lane

Transit
- BART
- Caltrain
- Rail Transit
- Water
- Airport
- Park

C/CAG
City/County Association of Governments of San Mateo County

San Mateo
Comprehensive Bicycle and Pedestrian Plan Update (CBPP)

Existing Bicycle Facilities



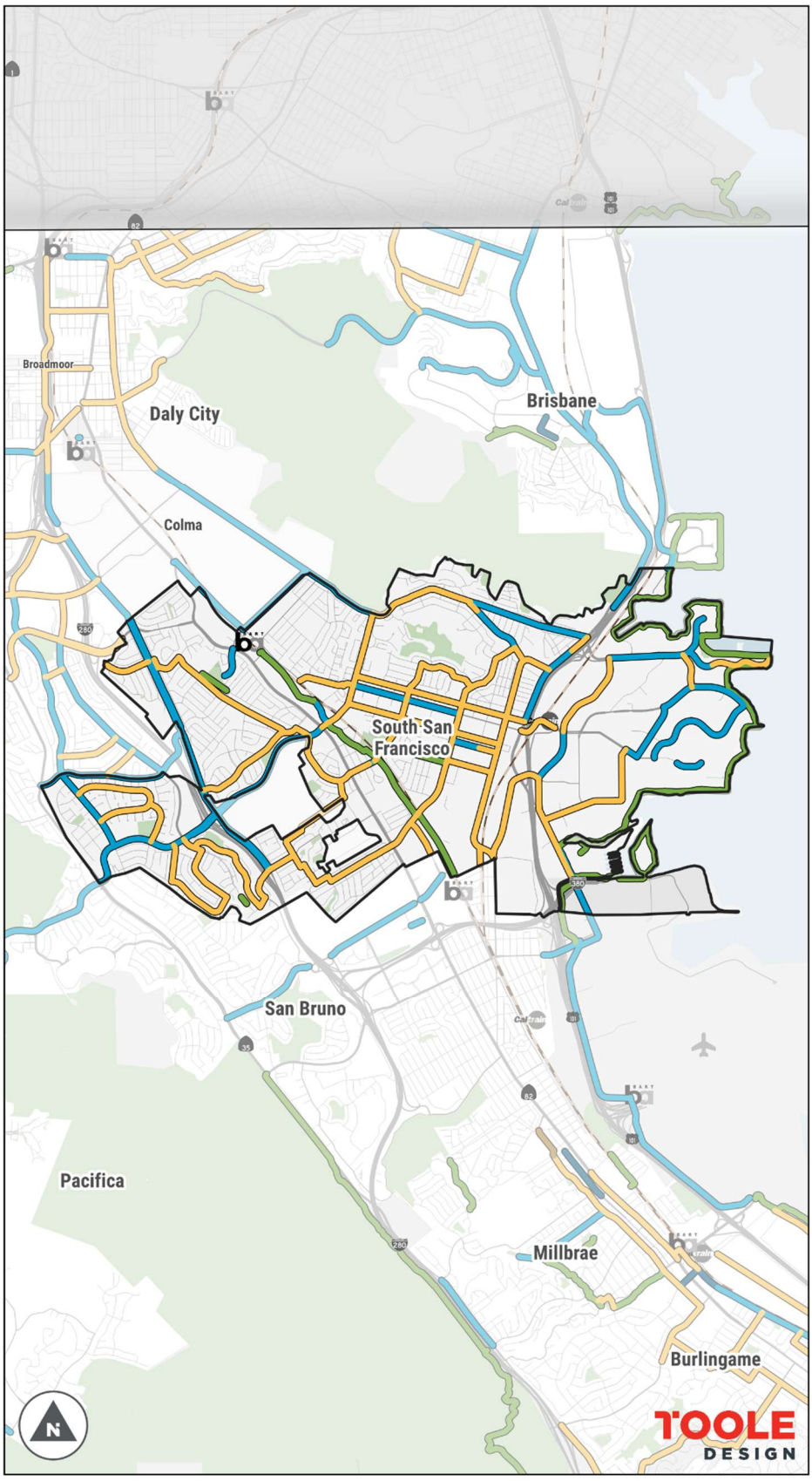
C/CAG
City/County Association of Governments of San Mateo County

South San Francisco
Comprehensive Bicycle and Pedestrian Plan Update (CBPP)

Existing Bicycle Facilities

Bicycle Facilities
- Class 1 Path
- Class 2 Bicycle Lane
- Class 2b Buffered Bicycle Lane
- Class 3 Bicycle Route
- Class 3b Bicycle Boulevard
- Class 4 Separated Bicycle Lane

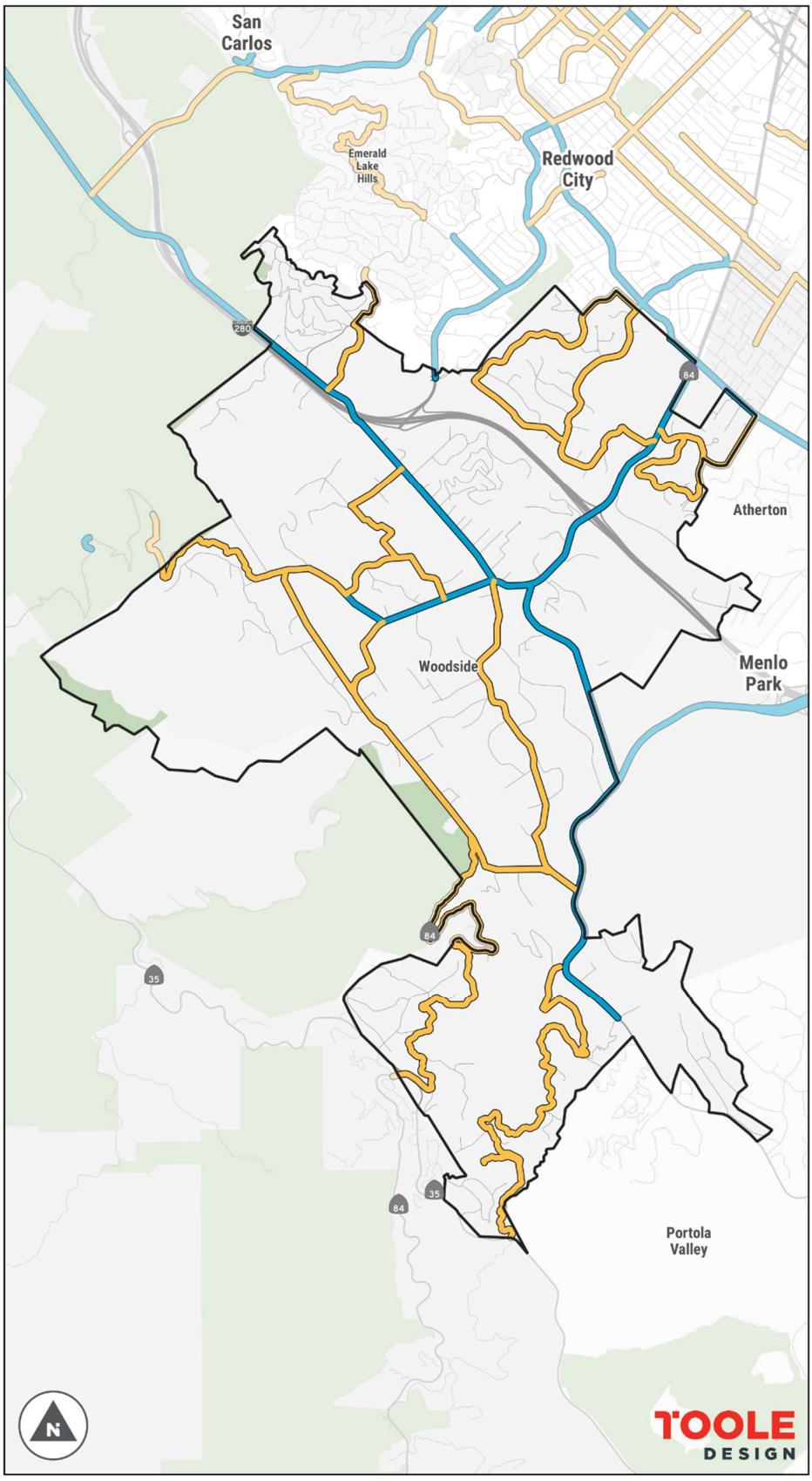
Transit
- BART
- Caltrain
- Rail Transit
- Water
- Airport
- Park



C/CAG
City/County Association of Governments of San Mateo County

Woodside
Comprehensive Bicycle and Pedestrian Plan Update (CBPP)

Existing Bicycle Facilities



Bicycle Facilities
- Class 1 Path
- Class 2 Bicycle Lane
- Class 2b Buffered Bicycle Lane
- Class 3 Bicycle Route
- Class 3b Bicycle Boulevard
- Class 4 Separated Bicycle Lane

Transit
- BART
- Caltrain
- Rail Transit
- Water
- Airport
- Park

APPENDIX B: LEVEL OF TRAFFIC STRESS RESULTS FOR EACH JURISDICTION

C/CAG
City/County Association of Governments of San Mateo County

Atherton
Comprehensive Bicycle and Pedestrian Plan Update (CBPP)

Level of Traffic Stress

Stress Level
- LTS 1
- LTS 2
- LTS 3
- LTS 4

Transit
- BART
- Caltrain
- Rail Transit
- Water
- Airport
- Park

C/CAG
City/County Association of Governments of San Mateo County

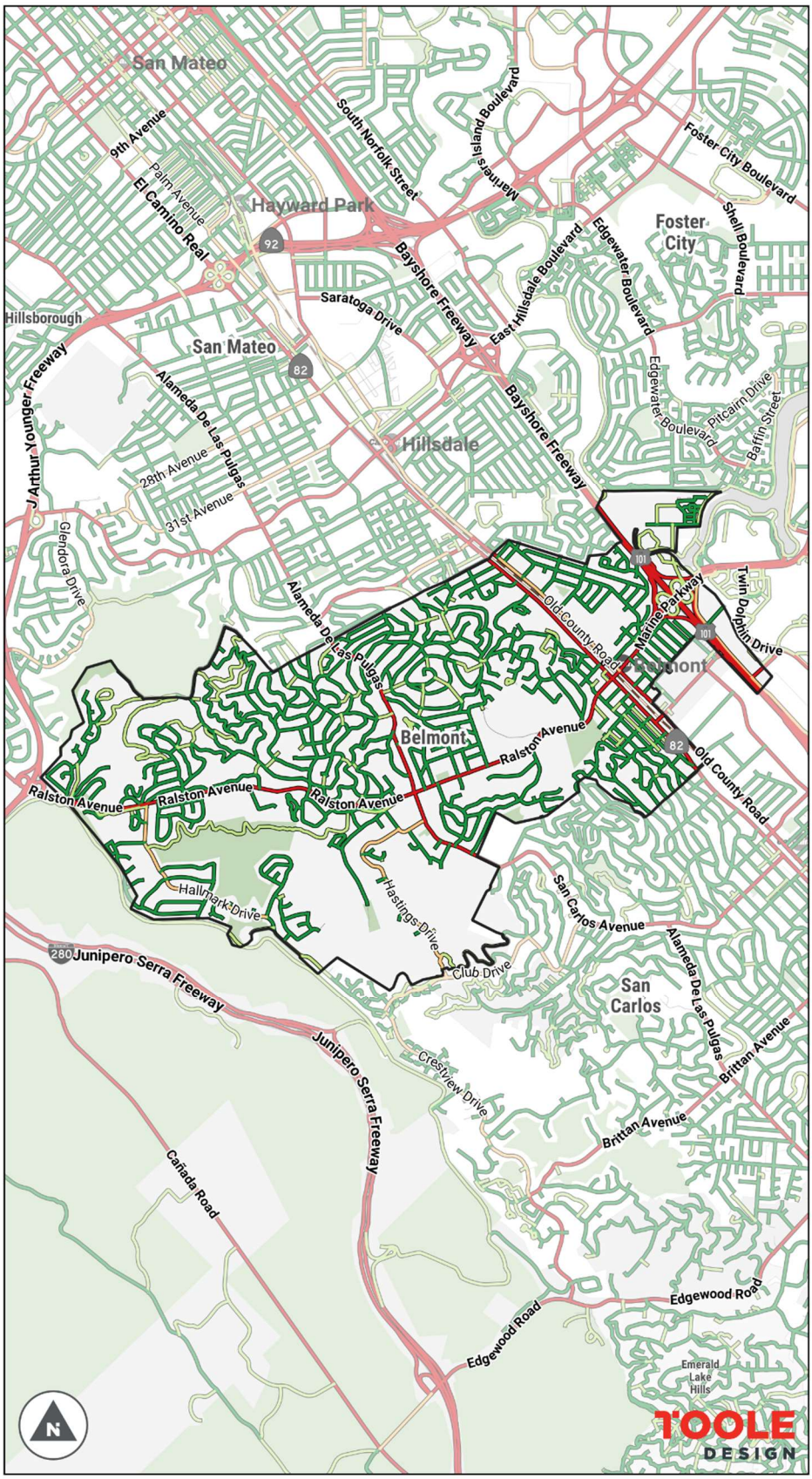
Belmont
Comprehensive Bicycle and Pedestrian Plan Update (CBPP)

Level of Traffic Stress

Stress Level
- LTS 1
- LTS 2
- LTS 3
- LTS 4

Transit
- BART
- Caltrain
- Rail Transit

Water
Airport
Park



C/CAG
City/County Association of Governments of San Mateo County

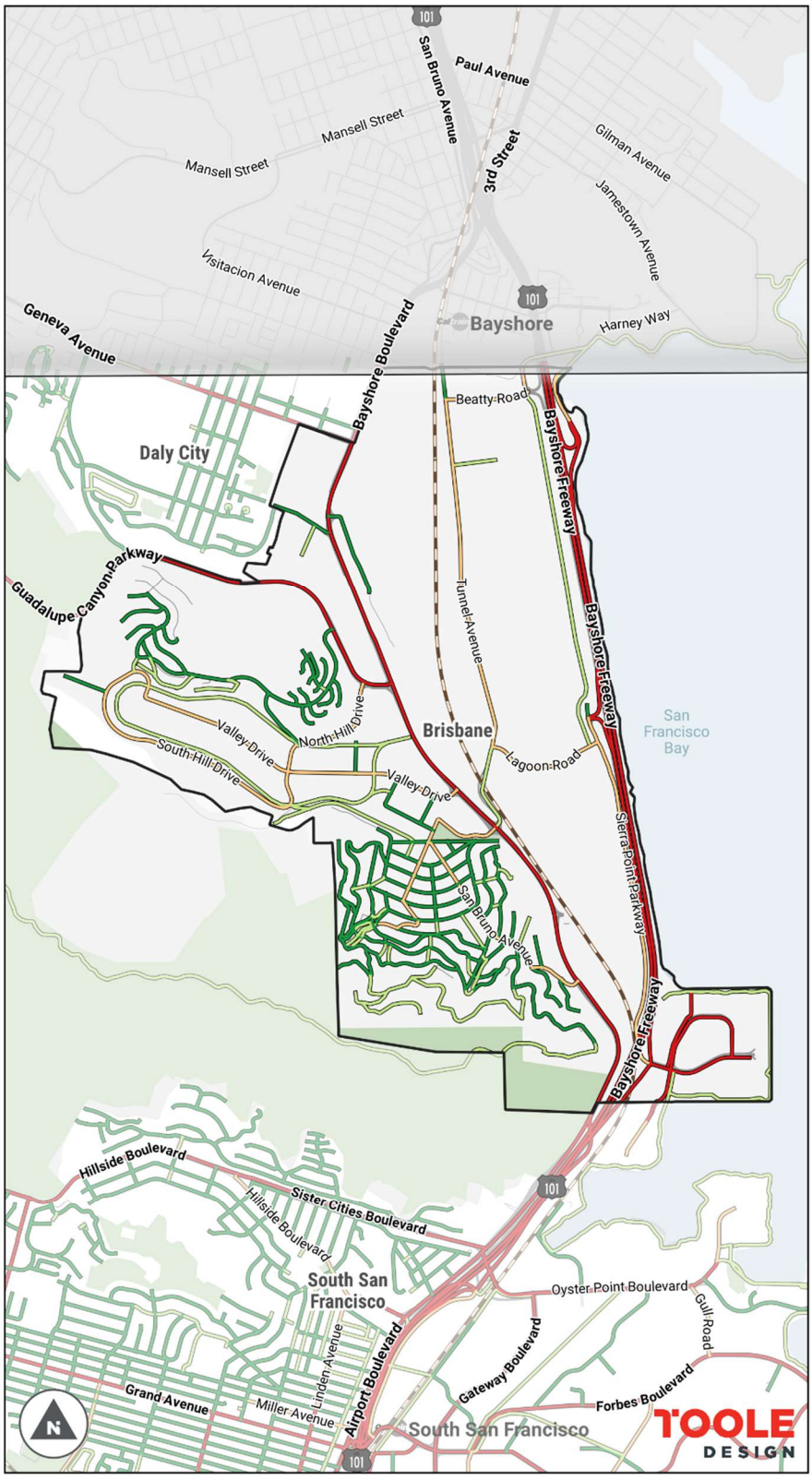
Brisbane
Comprehensive Bicycle and Pedestrian Plan Update (CBPP)

Level of Traffic Stress

Stress Level
- LTS 1
- LTS 2
- LTS 3
- LTS 4

Transit
- BART
- Caltrain
- Rail Transit

Water
Airport
Park



Comment

C/CAG
City/County Association of Governments of San Mateo County

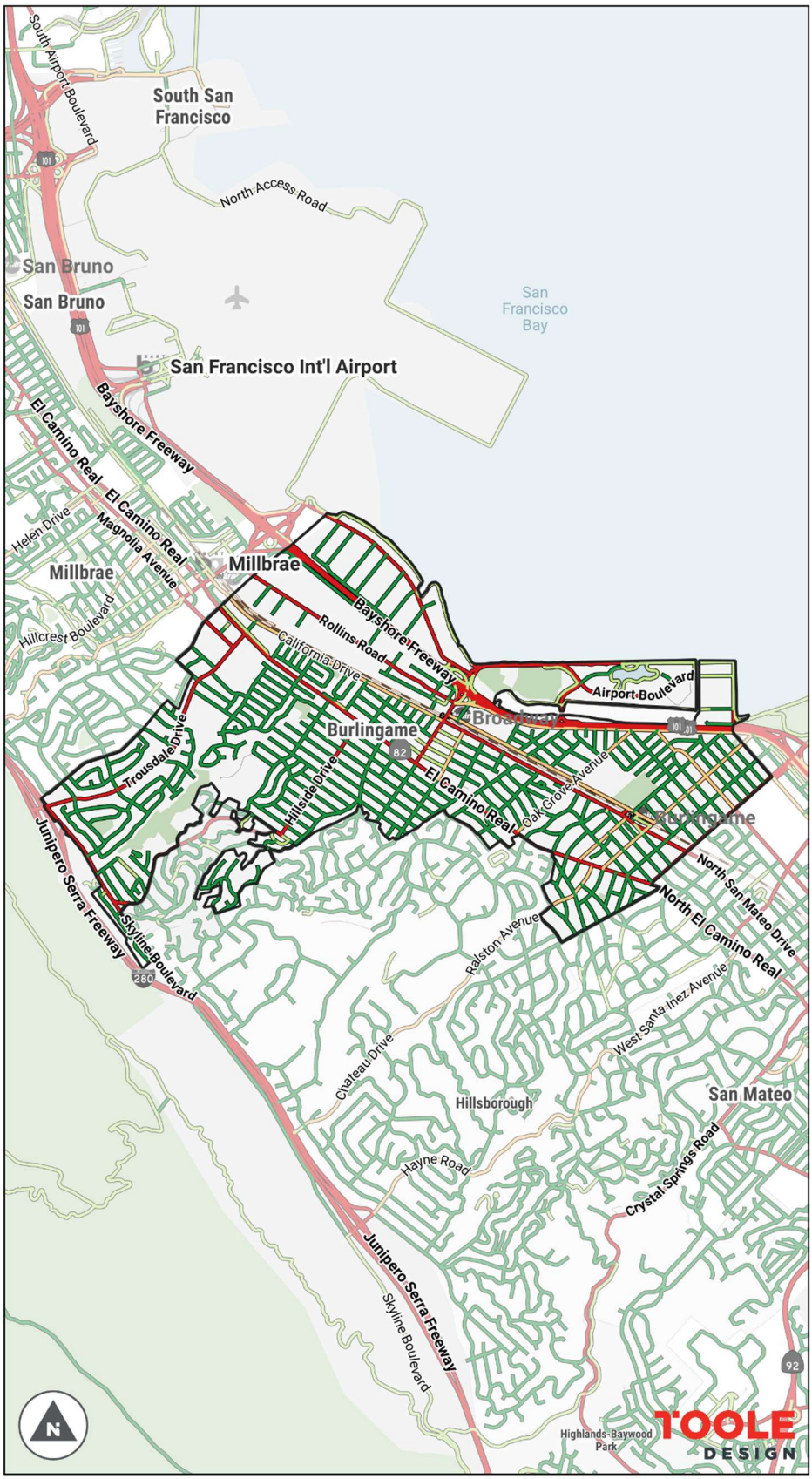
Burlingame
Comprehensive Bicycle and Pedestrian Plan Update (CBPP)

Level of Traffic Stress

Stress Level
- LTS 1
- LTS 2
- LTS 3
- LTS 4

Transit
- BART
- Caltrain
- Rail Transit

Water
Airport
Park



C/CAG
City/County Association of Governments of San Mateo County

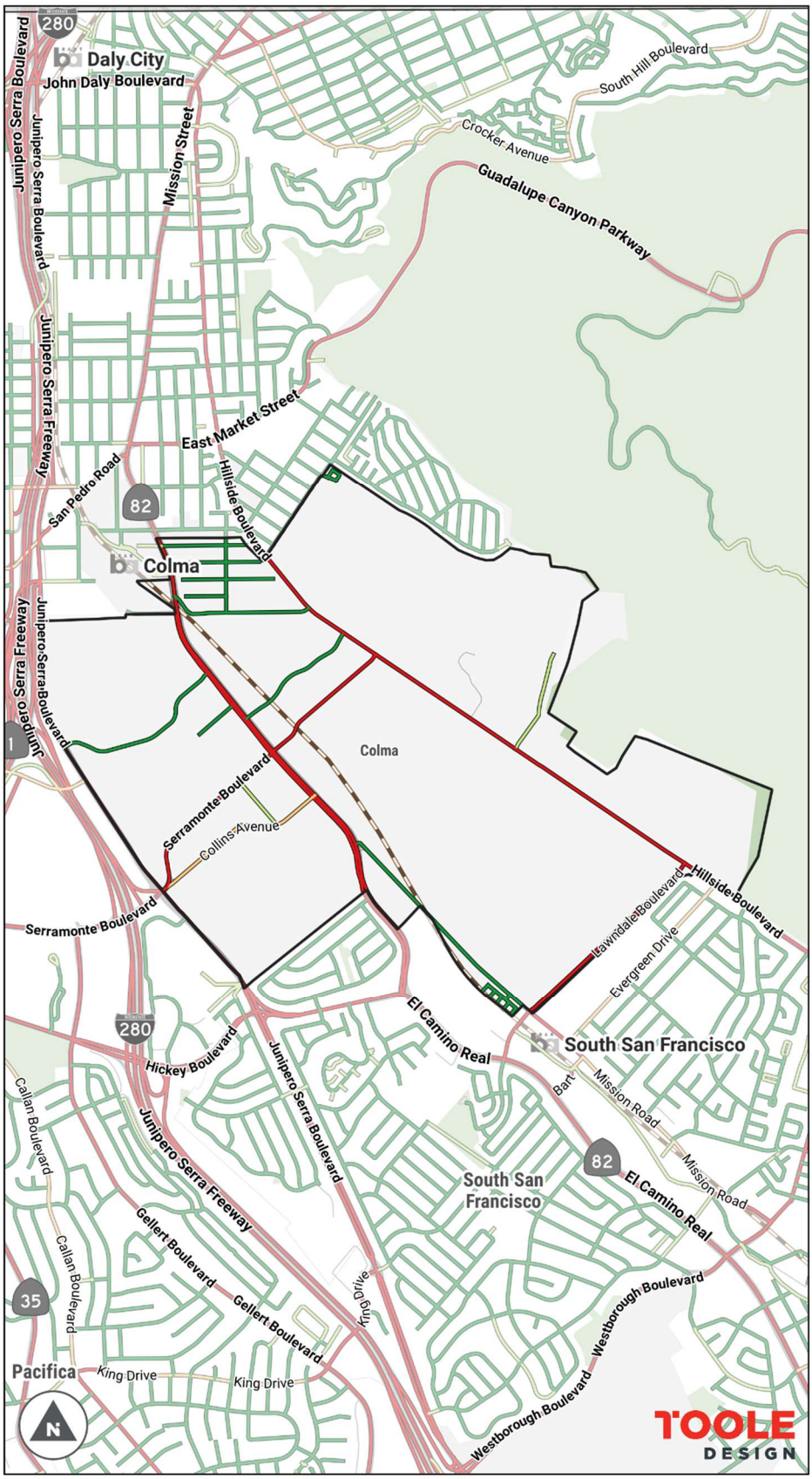
Colma
Comprehensive Bicycle and Pedestrian Plan Update (CBPP)

Level of Traffic Stress

Stress Level
- LTS 1
- LTS 2
- LTS 3
- LTS 4

Transit
- BART
- Caltrain
- Rail Transit

Water
Airport
Park



TOOLE DESIGN

C/CAG
City/County Association of Governments of San Mateo County

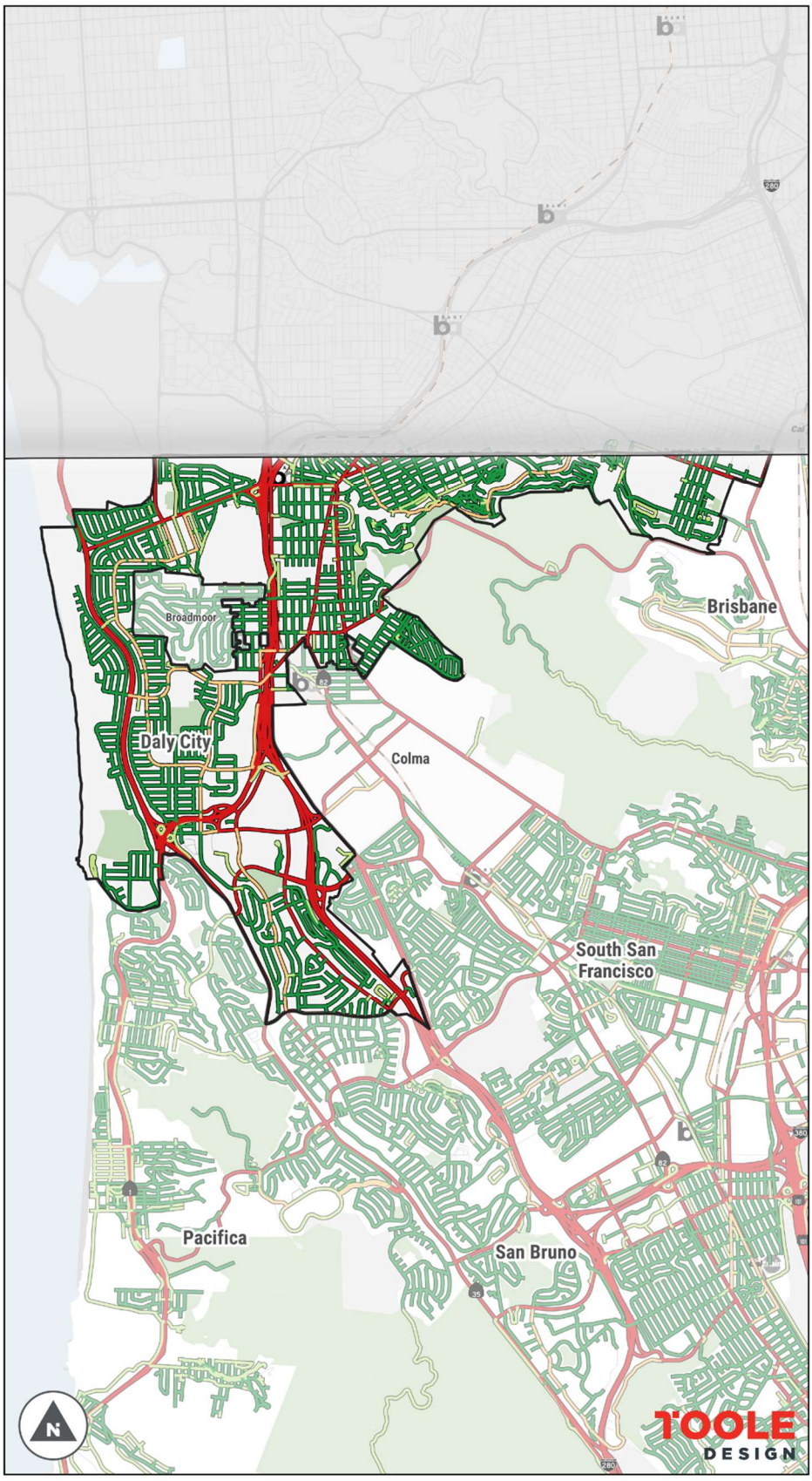
Daly City
Comprehensive Bicycle and Pedestrian Plan Update (CBPP)

Level of Traffic Stress

Stress Level
- LTS 1
- LTS 2
- LTS 3
- LTS 4

Transit
- BART
- Caltrain
- Rail Transit

Water
Airport
Park



C/CAG
City/County Association of Governments of San Mateo County

East Palo Alto
Comprehensive Bicycle and Pedestrian Plan Update (CBPP)

Level of Traffic Stress

Stress Level
- LTS 1
- LTS 2
- LTS 3
- LTS 4

Transit
- BART
- Caltrain
- Rail Transit

Water
Airport
Park

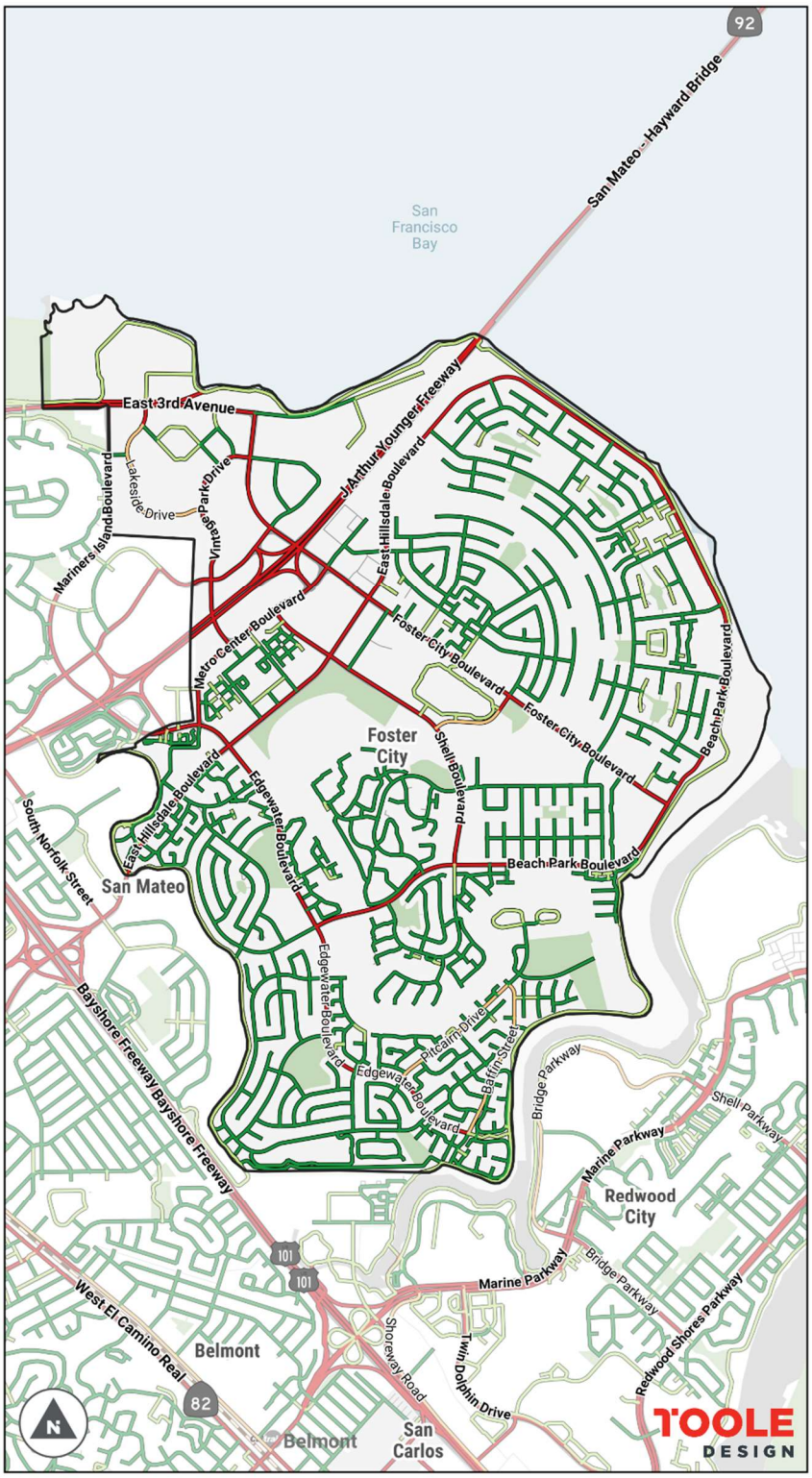
C/CAG
City/County Association of Governments of San Mateo County

Foster City
Comprehensive Bicycle and Pedestrian Plan Update (CBPP)

Level of Traffic Stress

Stress Level
- LTS 1
- LTS 2
- LTS 3
- LTS 4

Transit
- BART
- Caltrain
- Rail Transit
- Water
- Airport
- Park



Comment

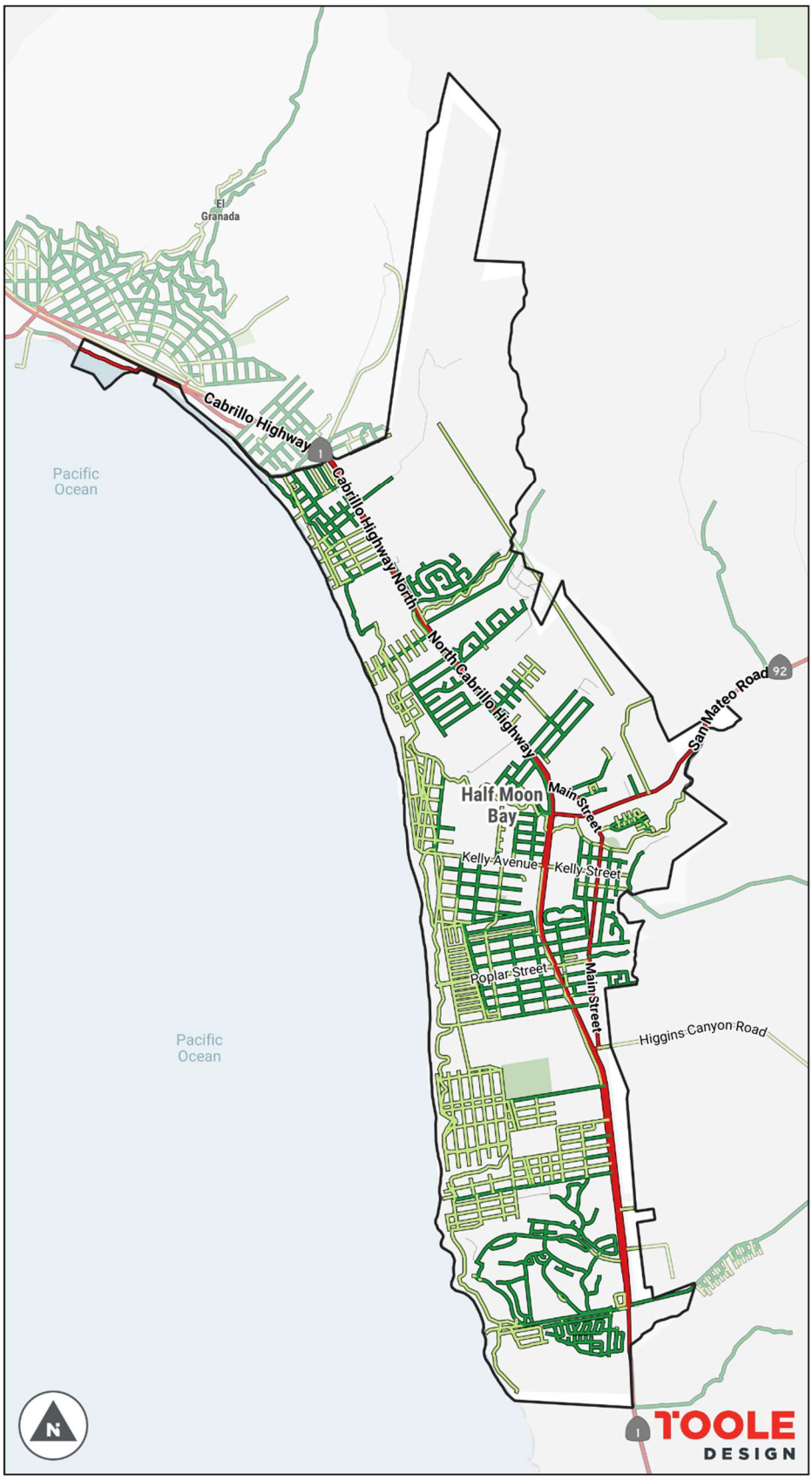
C/CAG
City/County Association of Governments of San Mateo County

Half Moon Bay
Comprehensive Bicycle and Pedestrian Plan Update (CBPP)

Level of Traffic Stress

Stress Level
- LTS 1
- LTS 2
- LTS 3
- LTS 4

Transit
- BART
- Caltrain
- Rail Transit
- Water
- Airport
- Park



C/CAG
City/County Association of Governments of San Mateo County

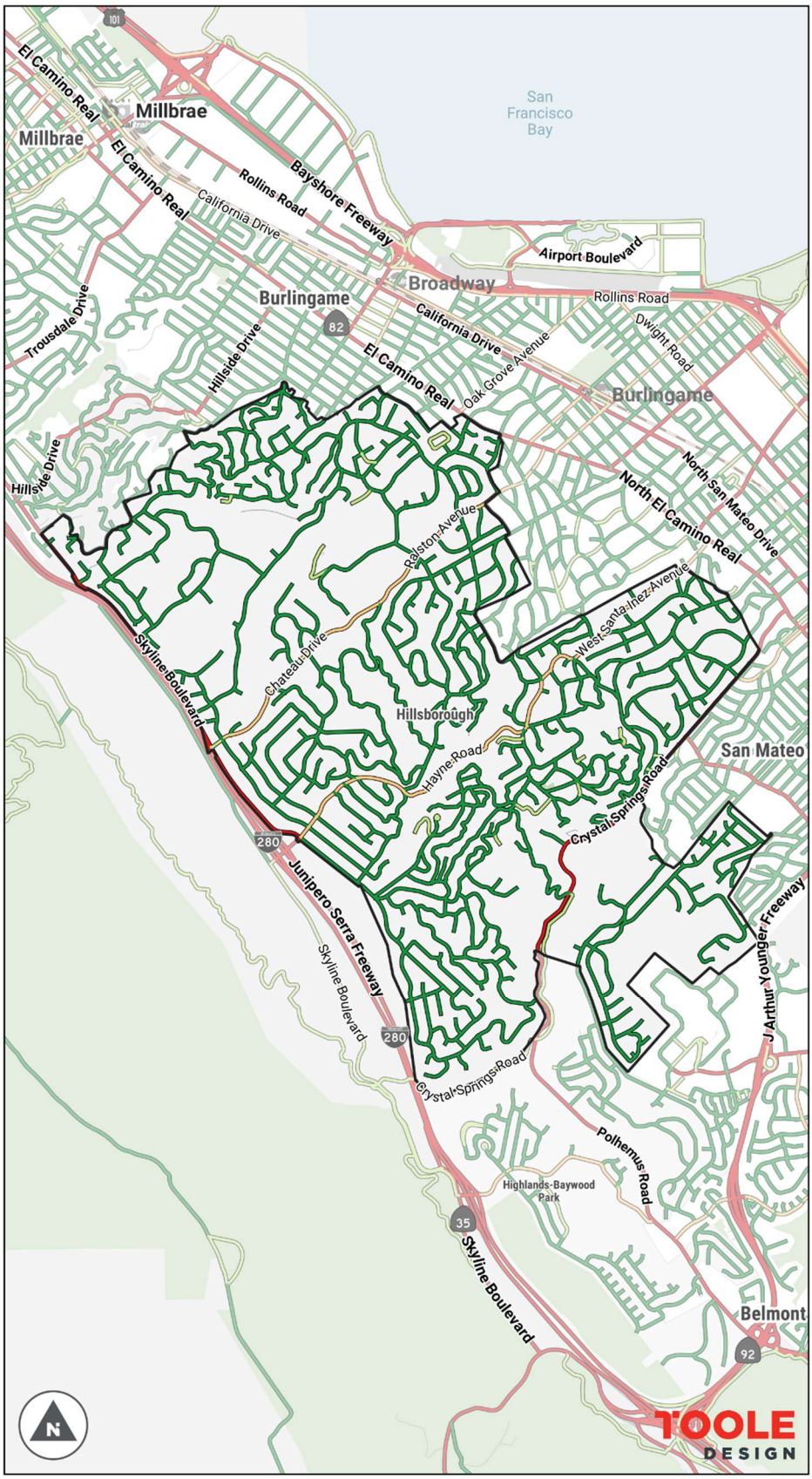
Hillsborough
Comprehensive Bicycle and Pedestrian Plan Update (CBPP)

Level of Traffic Stress

Stress Level
- LTS 1
- LTS 2
- LTS 3
- LTS 4

Transit
- BART
- Caltrain
- Rail Transit

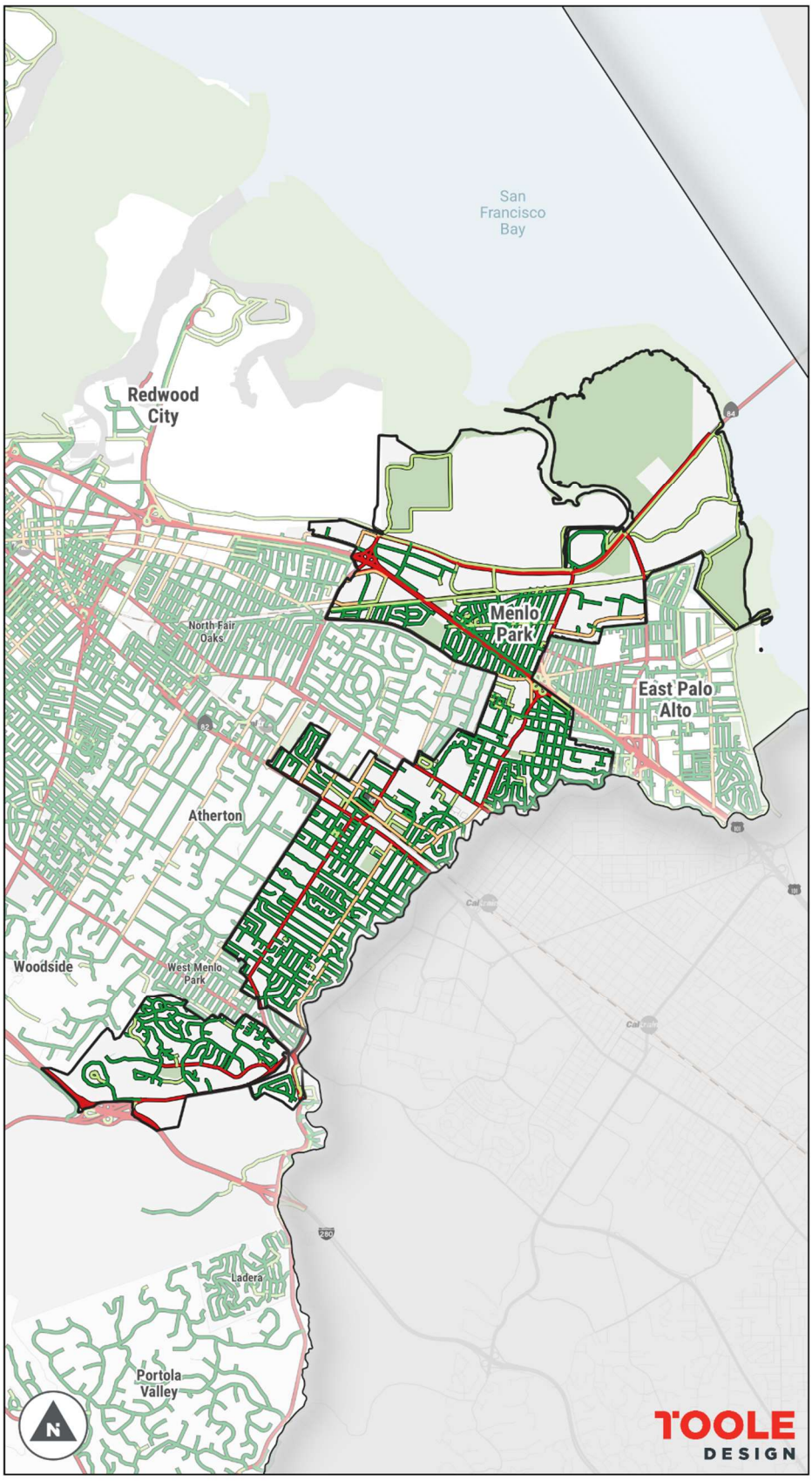
Water
Airport
Park



C/CAG
City/County Association of Governments of San Mateo County

Menlo Park
Comprehensive Bicycle and Pedestrian Plan Update (CBPP)

Level of Traffic Stress



C/CAG
City/County Association of Governments of San Mateo County

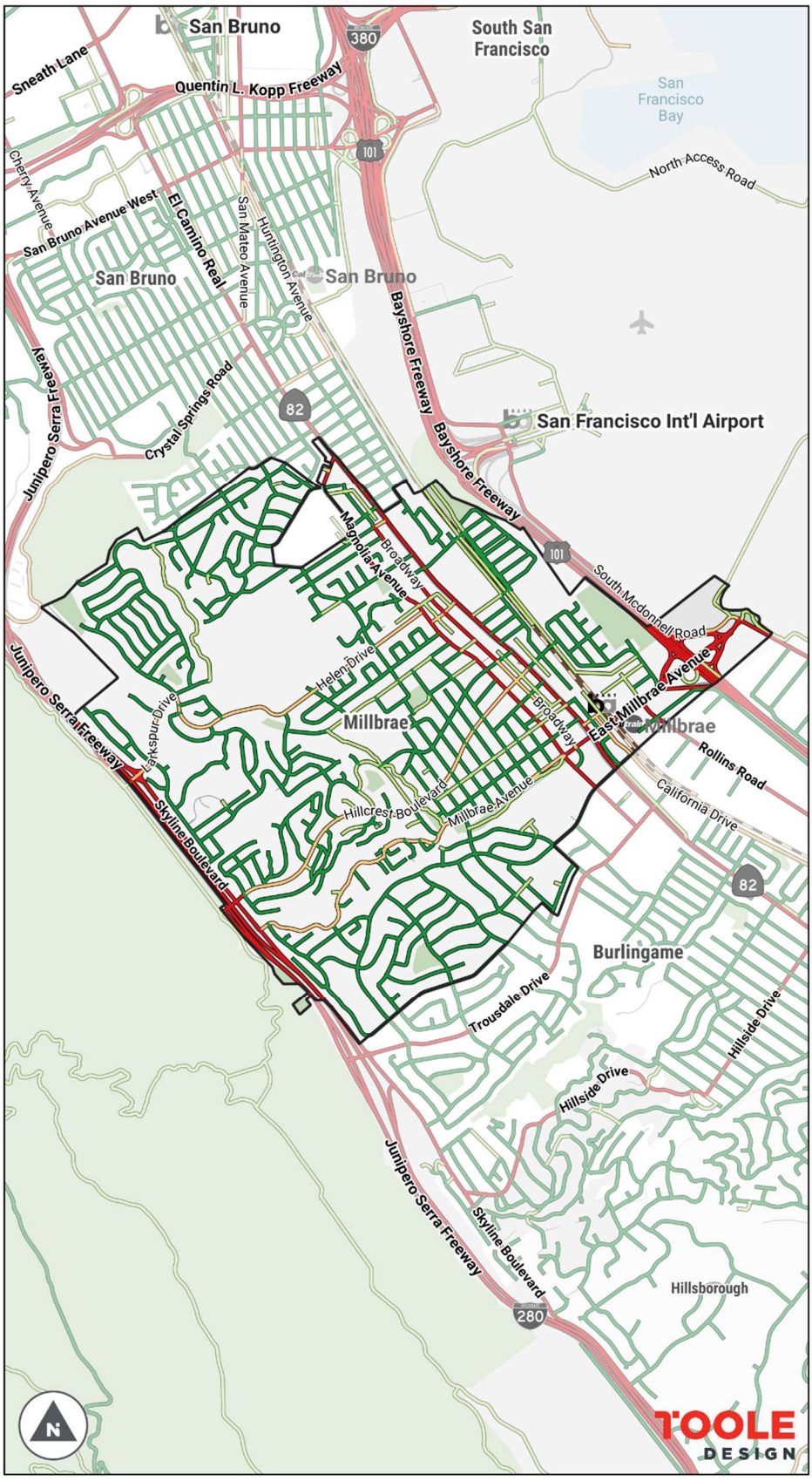
Millbrae
Comprehensive Bicycle and Pedestrian Plan Update (CBPP)

Level of Traffic Stress

Stress Level
- LTS 1
- LTS 2
- LTS 3
- LTS 4

Transit
- BART
- Caltrain
- Rail Transit

Water
Airport
Park



C/CAG
City/County Association of Governments of San Mateo County

Pacifica
Comprehensive Bicycle and Pedestrian Plan Update (CBPP)

Level of Traffic Stress

Stress Level
- LTS 1
- LTS 2
- LTS 3
- LTS 4

Transit
- BART
- Caltrain
- Rail Transit

Water
Airport
Park

C/CAG
City/County Association of Governments of San Mateo County

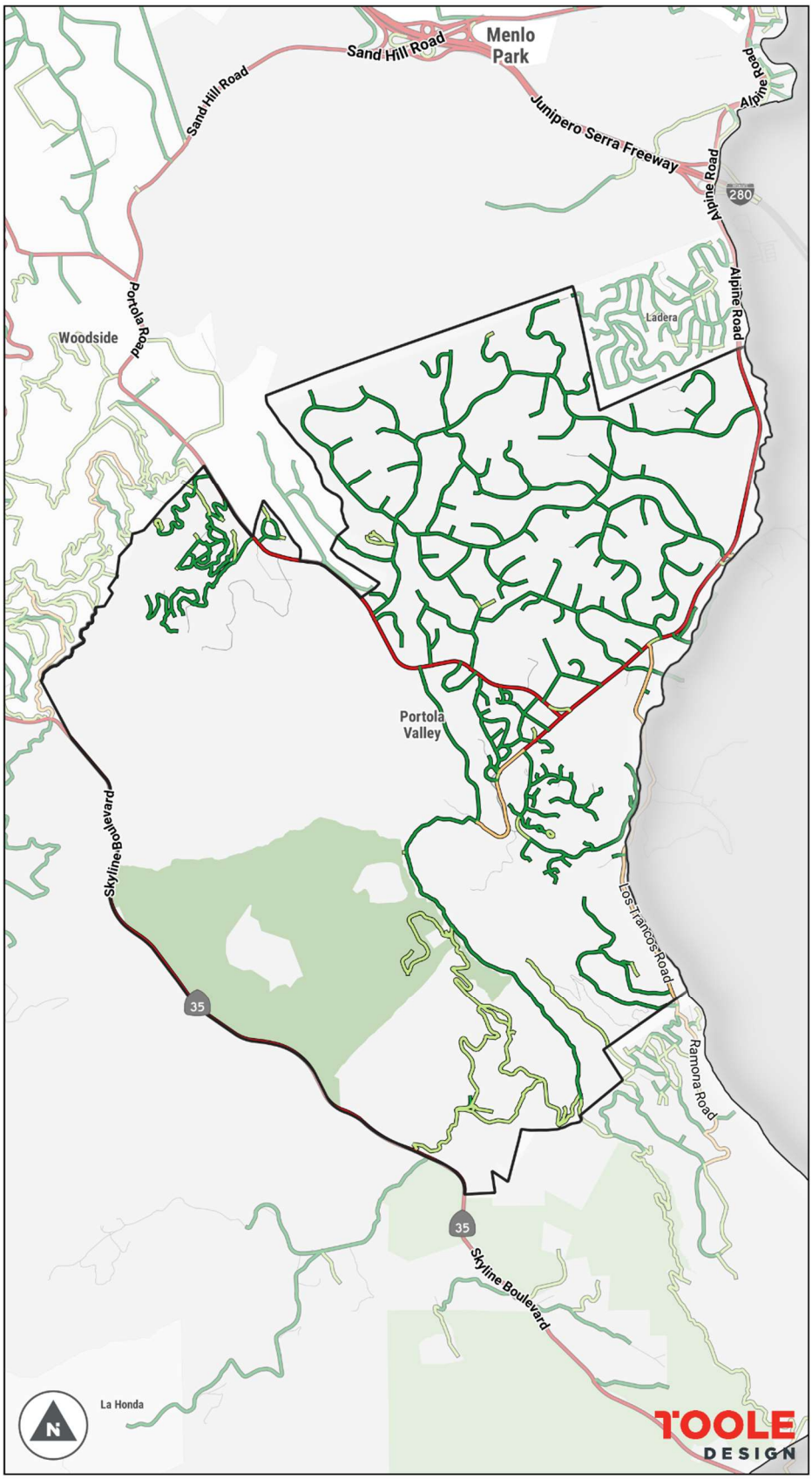
Portola Valley
Comprehensive Bicycle and Pedestrian Plan Update (CBPP)

Level of Traffic Stress

Stress Level
- LTS 1
- LTS 2
- LTS 3
- LTS 4

Transit
- BART
- Caltrain
- Rail Transit

Water
Airport
Park



C/CAG
City/County Association of Governments of San Mateo County

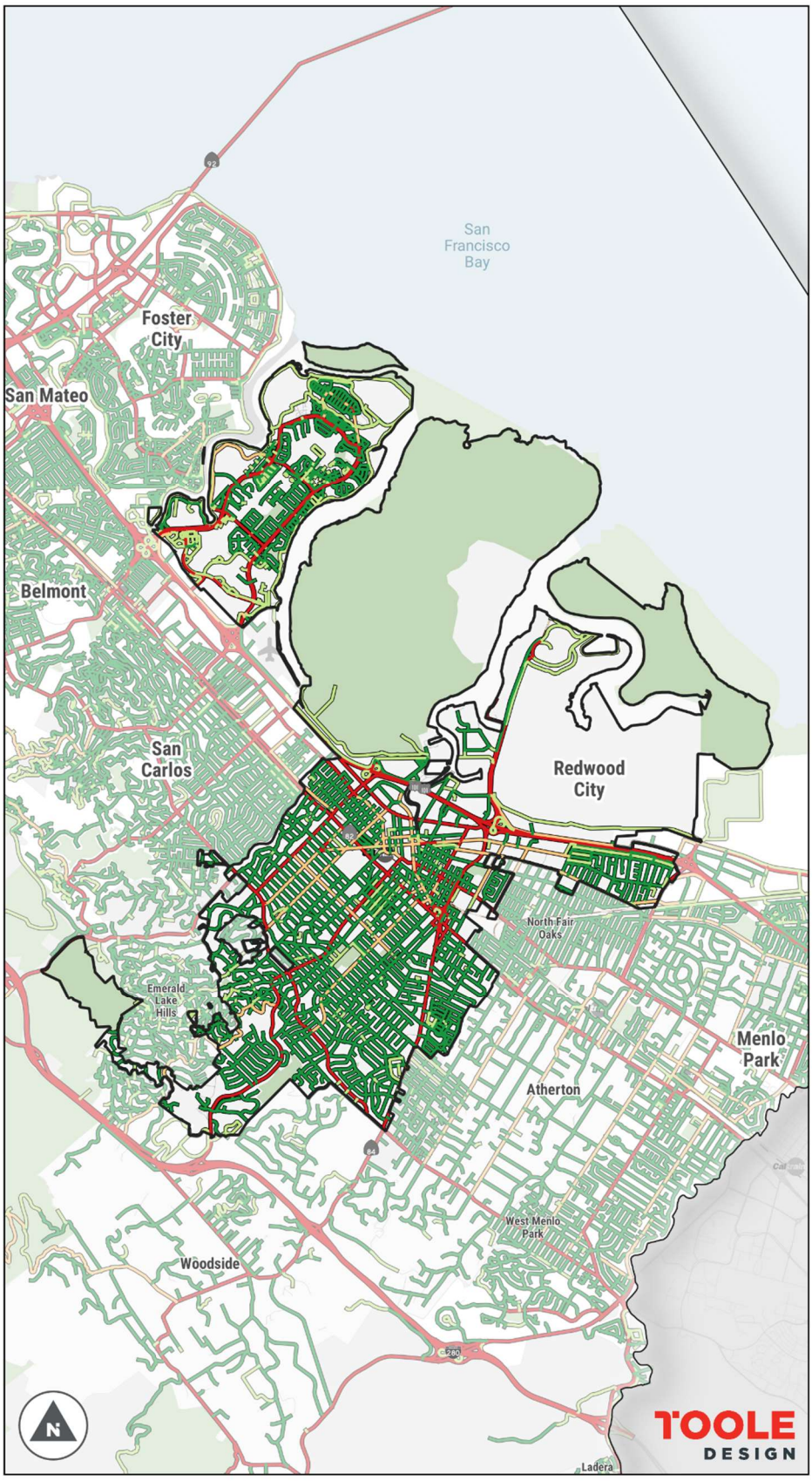
Redwood City
Comprehensive Bicycle and Pedestrian Plan Update (CBPP)

Level of Traffic Stress

Stress Level
- LTS 1
- LTS 2
- LTS 3
- LTS 4

Transit
- BART
- Caltrain
- Rail Transit

Water
Airport
Park



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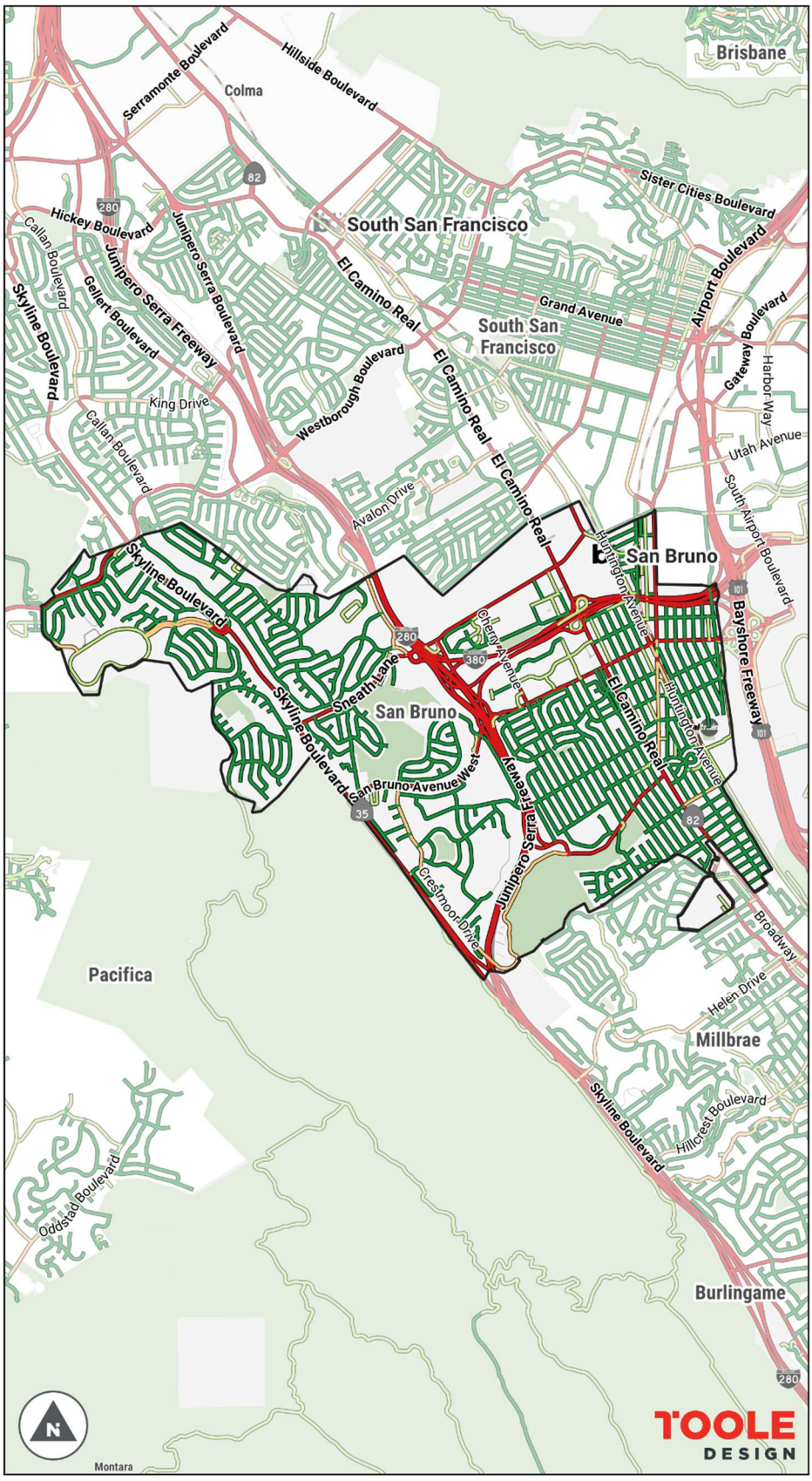
San Bruno
Comprehensive Bicycle and Pedestrian Plan Update (CBPP)

Level of Traffic Stress

Stress Level
- LTS 1
- LTS 2
- LTS 3
- LTS 4

Transit
- BART
- Caltrain
- Rail Transit

Water
Airport
Park



C/CAG
City/County Association of Governments of San Mateo County

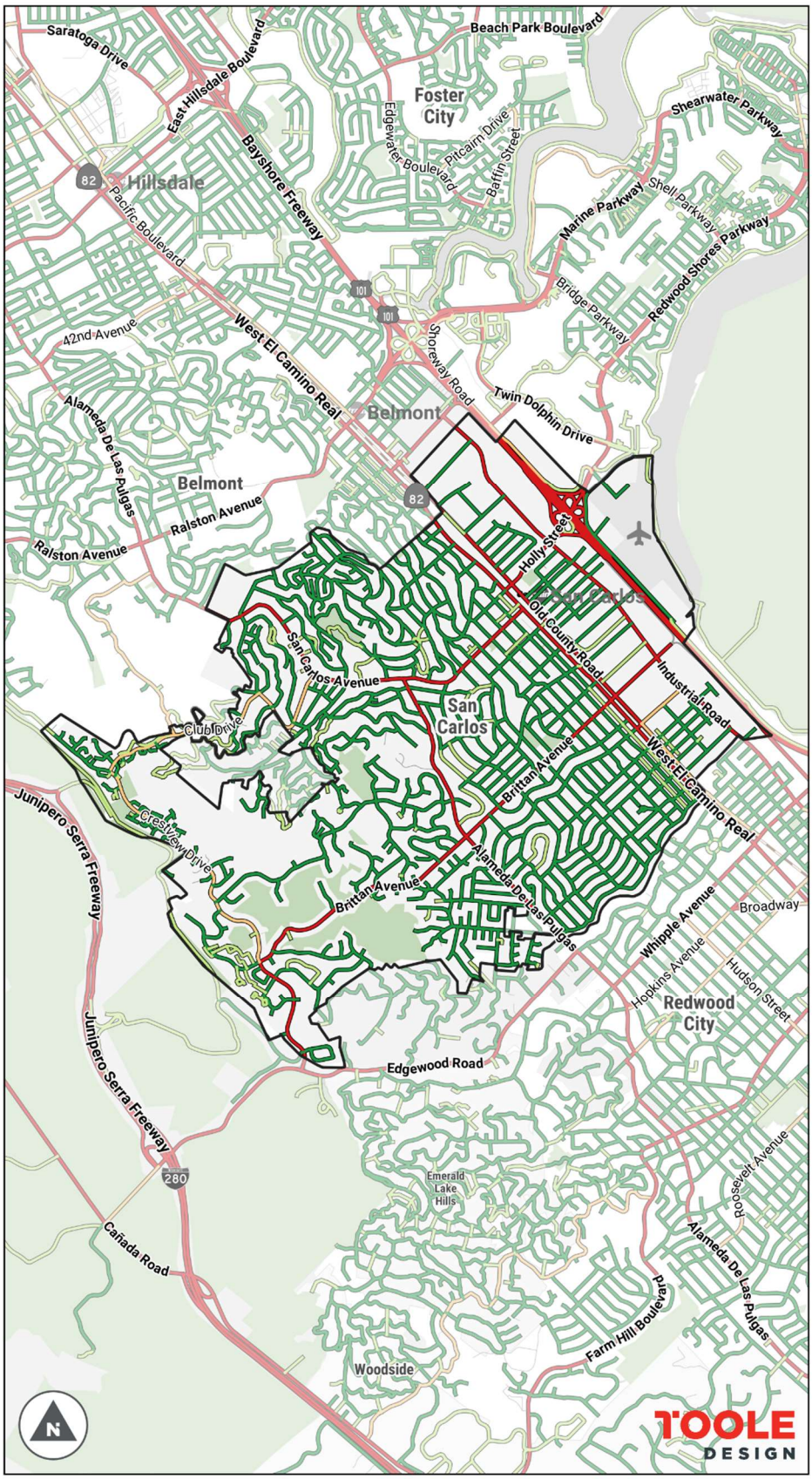
San Carlos
Comprehensive Bicycle and Pedestrian Plan Update (CBPP)

Level of Traffic Stress

Stress Level
- LTS 1
- LTS 2
- LTS 3
- LTS 4

Transit
- BART
- Caltrain
- Rail Transit

Water
Airport
Park



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San Mateo
Comprehensive Bicycle and Pedestrian Plan Update (CBPP)

Level of Traffic Stress

Stress Level
- LTS 1
- LTS 2
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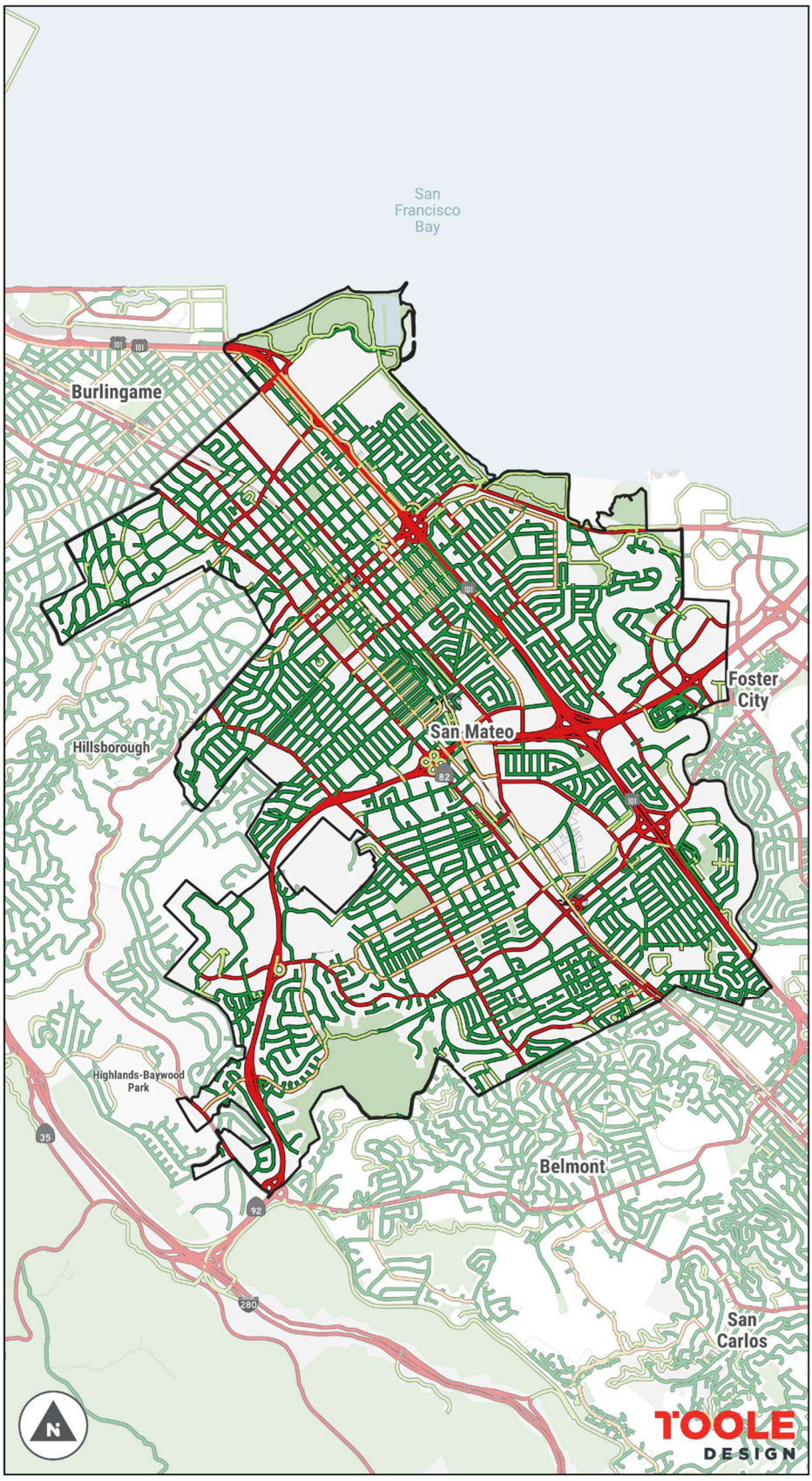
Transit
- BART
- Caltrain
- Rail Transit

Water
Airport
Park



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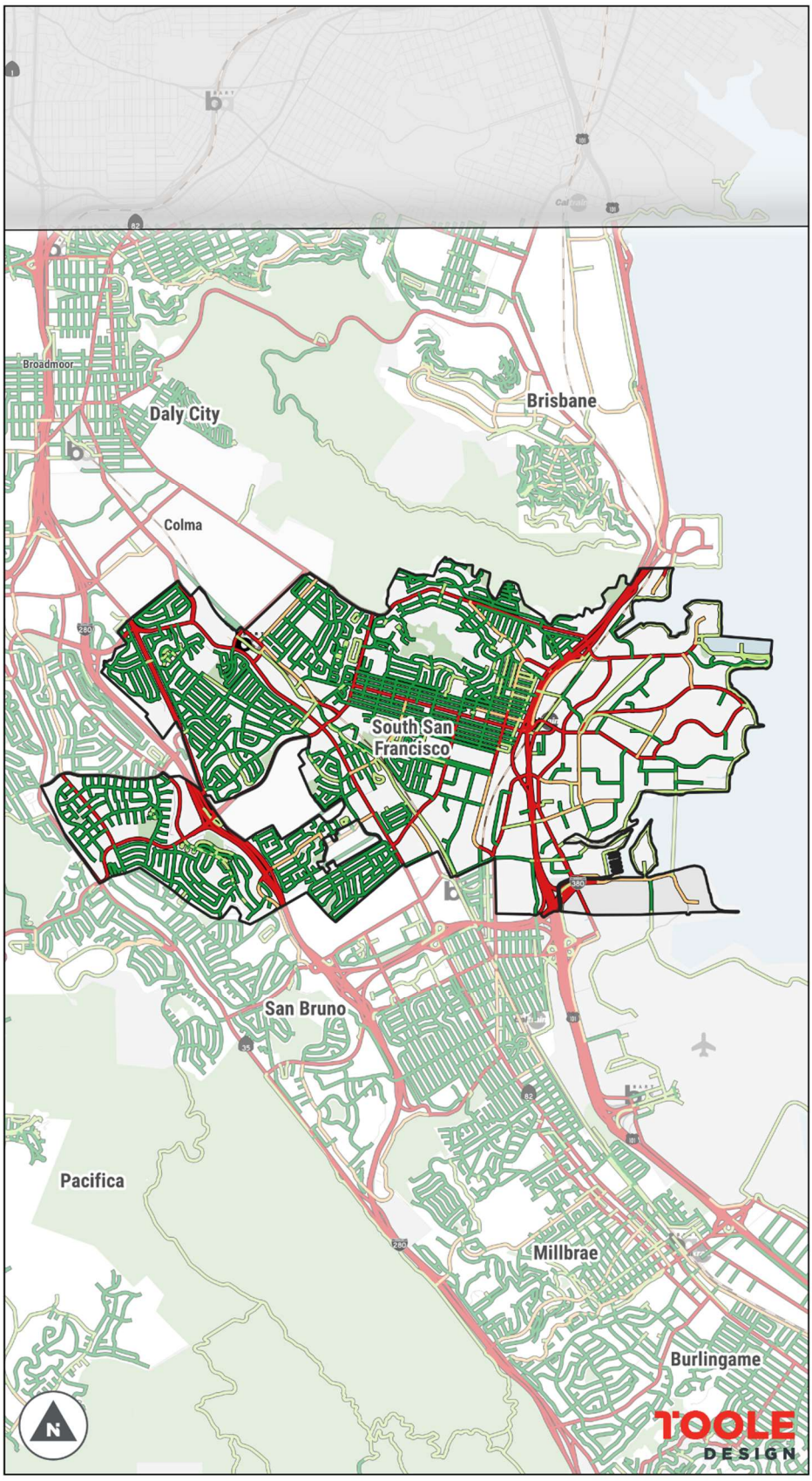
South San Francisco
Comprehensive Bicycle and Pedestrian Plan Update (CBPP)

Level of Traffic Stress

Stress Level
- LTS 1
- LTS 2
- LTS 3
- LTS 4

Transit
- BART
- Caltrain
- Rail Transit

Water
Airport
Park



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Woodside
Comprehensive Bicycle and Pedestrian Plan Update (CBPP)

Level of Traffic Stress

Stress Level
- LTS 1
- LTS 2
- LTS 3
- LTS 4

Transit
- BART
- Caltrain
- Rail Transit

Water
Airport
Park