RWCmoves

A comprehensive assessment of transportation within Redwood City.

July 2018

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ACKNOWLEDGEMENTS

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The **Citywide Transportation Plan** serves as a guiding document for the City as it seeks to improve transportation in Redwood City. It is primarily a planning and policy document and is not envisioned to approve specific transportation improvement projects or programs. Projects and programs that are advanced under this Plan would need to undergo their own design, environmental review and approval process prior to being implemented.

FEHR PEERS

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Chapter One

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The City's Envisioned Future

Redwood City's General Plan, adopted in 2010, outlines a bold vision for transportation in Redwood City. The General Plan differed significantly from earlier plans by shifting the focus of transportation in the City from automobile travel to one that embraced transportation in all forms – walking, bicycling, riding transit, and other modes – as well as travel by private automobile.

In the years following adoption of the General Plan, the City has undergone substantial change. Local and regional development growth and increases in population have worsened congestion and increasingly have affected neighborhoods. Caltrain ridership in Redwood City has nearly doubled in the last 5 years. Bicycle travel in the City is also at an all-time high. In response to this, in late 2016, Redwood City began development of its first-ever Citywide Transportation Plan.

The Citywide Transportation Plan, known as RWCmoves, establishes a new vision for transportation that builds on the foundation of the General Plan, and other relevant City documents like the 2015 Strategic Plan[1]. RWCmoves reflects the result of major community engagement process, and recognizes that by providing a robust transportation network for all travel modes, the City can most effectively address congestion and limit neighborhood cut-through traffic.

1 http://www.redwoodcity.org/home/showdocument?id=4495

RWCmoves Report Organization

This document is organized into several chapters, each describing different elements of the Plan development and project prioritization process:

Chapter 1: The City's Envisioned Future

This chapter introduces RWCmoves, and presents the vision and goals for the Plan.

Chapter 2: Where Are We Starting From (Existing Conditions)

This chapter describes the current state of transportation in Redwood City, ranging from existing traffic conditions to the bike network to ridership levels on local and regional transit services.

Chapter 3: Moving Ahead (Community Engagement)

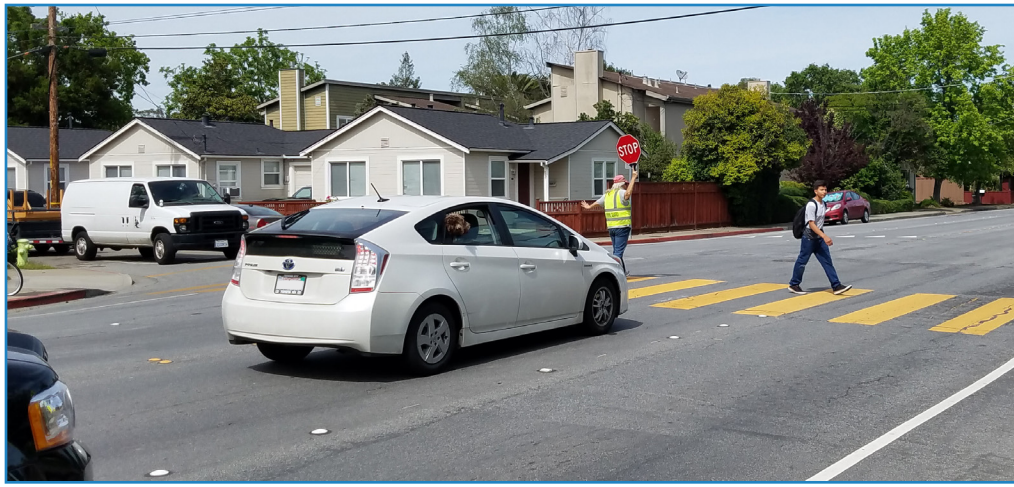
This chapter presents an overview of the extensive community engagement process that accompanied the Plan development process.

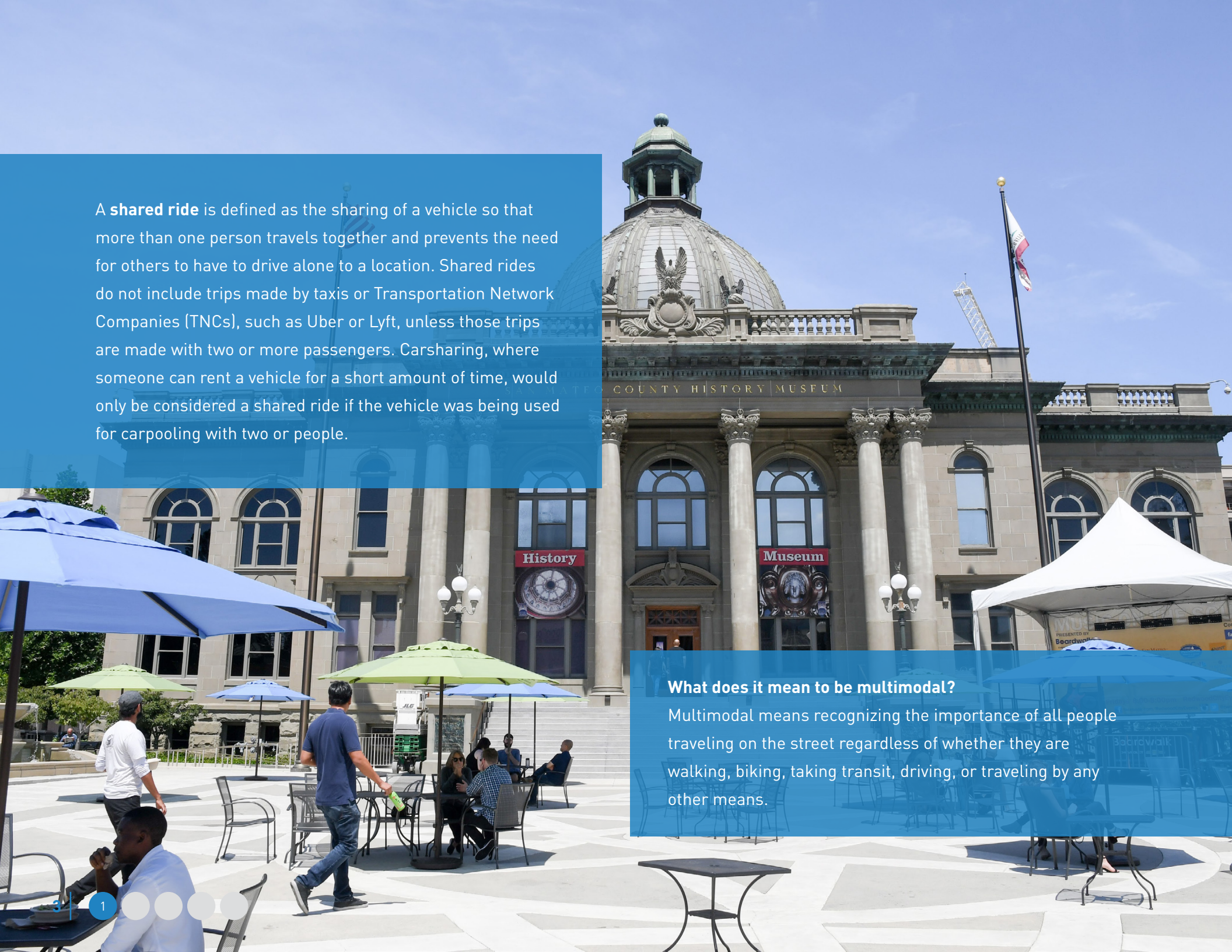
Chapter 4: Reaching Our Destination (Proposed Transportation Program)

This chapter includes the proposed projects and a transportation program that will guide transportation investment in the coming years. It describes how transportation projects were identified and evaluated to develop the City's highest priority projects presented in RWCmoves.

Chapter 5: Where Do We Go From Here? (Action Plan/Implementation)

This chapter discusses the process that the City will use to advance and implement projects. It covers topics of design, funding, environmental clearance, and ongoing transportation system performance monitoring.





A **shared ride** is defined as the sharing of a vehicle so that more than one person travels together and prevents the need for others to have to drive alone to a location. Shared rides do not include trips made by taxis or Transportation Network Companies (TNCs), such as Uber or Lyft, unless those trips are made with two or more passengers. Carsharing, where someone can rent a vehicle for a short amount of time, would only be considered a shared ride if the vehicle was being used for carpooling with two or people.

What does it mean to be multimodal?

Multimodal means recognizing the importance of all people traveling on the street regardless of whether they are walking, biking, taking transit, driving, or traveling by any other means.

RWCmoves Vision

The vision for the Citywide Transportation Plan tiers off the goals established in the City's General Plan. The General Plan envisions a City with a balanced, multimodal transportation network that accommodates all users. However, RWCmoves goes beyond the General Plan in recognition of the importance of improving transportation options in the City. As a result, the guiding vision for RWCmoves is to:

Promote the best travel experience possible for everyone in Redwood City by creating and maintaining a safe, multimodal, and accessible transportation network.

The vision allows the City to address increased traffic congestion in Redwood City and proactively manage its transportation network.

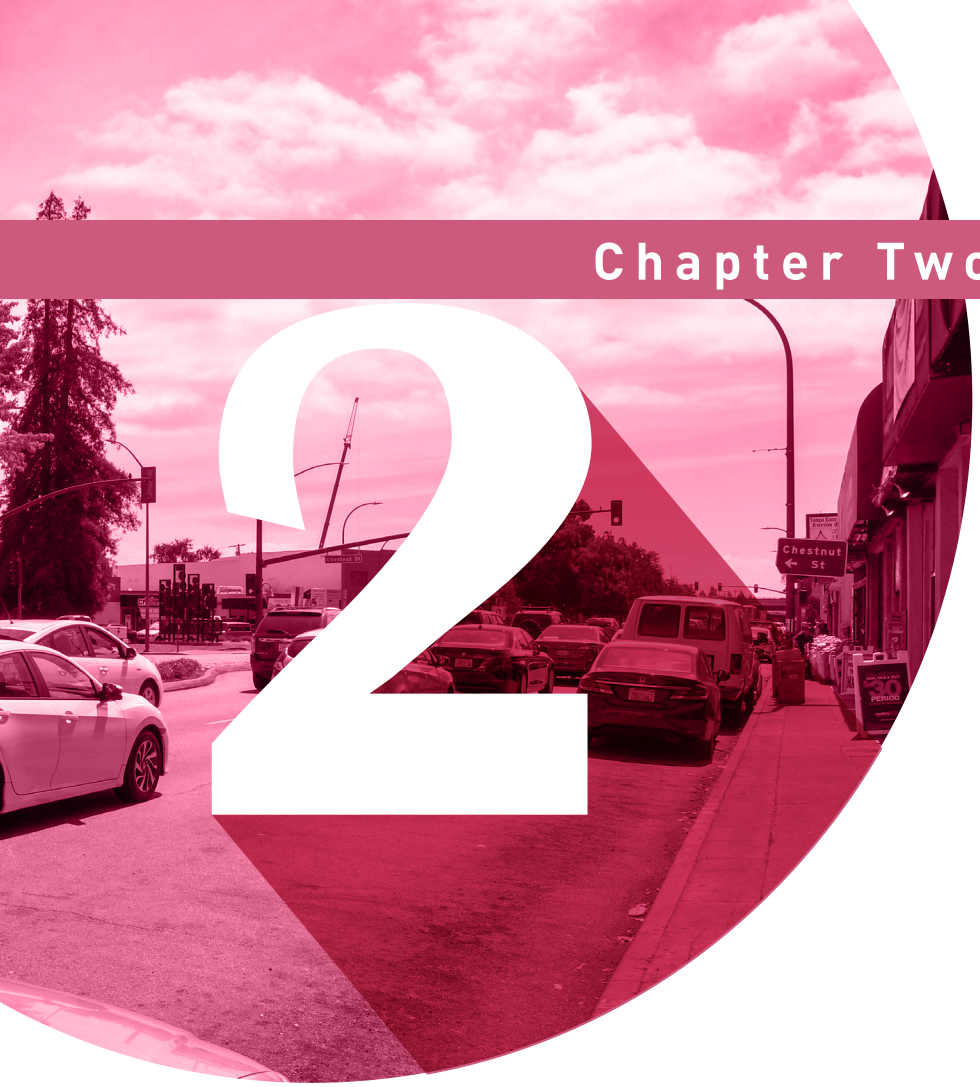
Through RWCmoves, the City identifies and prioritizes the types of projects and programs that most enhance transportation safety, mobility, equity, and access for everyone traveling in Redwood City.

RWCmoves Goals

Several goals support RWCmoves' vision of promoting mobility for all. In no particular order, the goals for RWCmoves are:

Goal 1	**Eliminate traffic fatalities and severe injuries** for all modes by 2030
Goal 2	Create a **walking and bicycling-friendly community** that provides a safe, balanced, and convenient transportation system
Goal 3	Provide **seamless connections** and improved street access to all areas within the City, but especially along mixed-use corridors designated in the General Plan and Citywide Transportation Plan
Goal 4	Embrace **innovation** in all forms of emerging technologies, especially in ways to creatively **manage congestion** and the transportation system
Goal 5	Reach **over 50% of all trips being by non-driving modes** by 2040; remaining automobile trips should be shared rides and/or zero emission trips
Goal 6	Invest in projects that support a **resilient, equitable and sustainable transportation system**

These goals inform the performance measures that are used to identify and prioritize projects in the Citywide Transportation Plan. Performance measures are described in detail in **Chapter 4** .



Chapter Two

2 Where Are We Starting From

(Existing Conditions)

Redwood City is served by a variety of transportation facilities and services that establish a foundation for a truly multimodal transportation network. The City's streets form the backbone of the transportation system and within this network, walking, bicycling, and transit facilities offer the greatest potential for increased capacity. More specifically, Redwood City has many qualities that make walking and biking an important and accessible way to travel, including level terrain, temperate weather, and numerous destinations within walking and biking distance. Redwood City's existing transportation system helps frame the opportunities to create and maintain a balanced transportation network aimed at further improving mobility and access for all modes.

Mode Share

Travelers in Redwood City use many different forms of transportation. The proportion of travelers taking different modes is referred to as "mode share". Redwood City's current commute trip mode share based on census data is shown in **Figure 1**.

Figure 1: How RWC Residents Travel to Work (% Trips)

Source: American Community Survey 2011-2015

Commute trips represent only a portion of all trips taken in Redwood City. When considering trips for other purposes, such as for shopping or recreation, there are oftentimes greater proportions of walking and bicycling trips that occur. To better understand how current trip patterns are different between residential and office land uses, person counts were conducted at several residential housing and commercial developments located throughout Redwood City. Residential housing surveys provided insight into how density of land development and availability of multimodal infrastructure influence the percentage of drive-alone trips versus other multimodal transportation options (see **Figure 2**).

Comparison of single-family detached housing, suburban apartments, and downtown apartments showed that drive-alone rates are much higher for single-family detached housing than for suburban and downtown apartments. Walking, biking, and transit rates were substantially higher for downtown apartments. This is similar for office developments in Redwood City, where drive alone rates are higher for suburban offices than downtown offices, as shown in **Figure 2**.

Downtown residential and office developments have more walking, biking and transit use and less drive-alone use, since the downtown has a greater mix of land uses, which shortens trip length and encourages more non-auto travel options; there are also more transportation options available as compared to the rest of the City.

The count results of existing Redwood City land uses show that having higher densities, mixing land uses, and investing in multimodal facilities influences how people choose to get around and overall can reduce congestion levels.

Redwood City's existing transportation network is summarized by mode in the following Summary Fact Sheets (**Figure 3** through **Figure 6**), entitled *Walking, Biking, Using Transit, and Driving in Redwood City*. Each Fact Sheet includes key takeaways related to current conditions, locations of existing facilities/services, travel characteristics such as percent of trips by a given mode and recent collision trends.

Vehicle Trip Generation

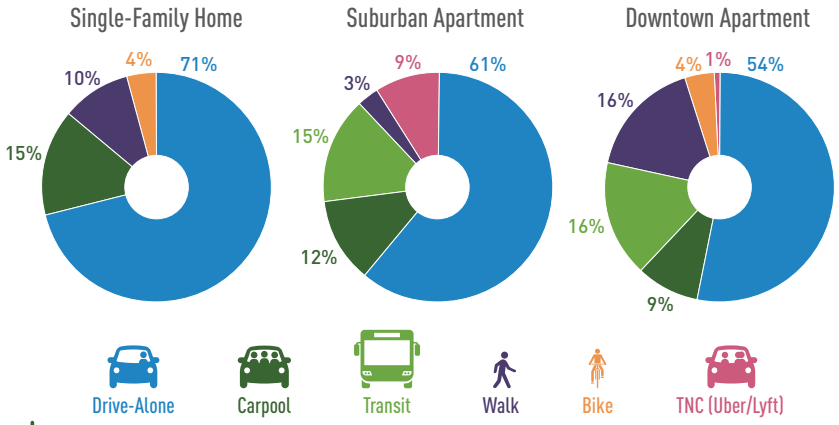
Similar to mode share counts, vehicle trip counts were collected to better understand how many vehicle trips are currently being generated at various land uses in Redwood City. A comparison of these counts with the assumptions used to develop the Environmental Impact Reports (EIRs) for Redwood City's General Plan and Downtown Precise Plan, show that in almost all cases vehicle trips are over-represented compared to what is actually occurring (see **Fgure 2**).


WINSLOW ST
EMERGENCY
CALL 9-1-1

SUMMARY FACT SHEET: **Mode Share & Trip Generation of RWC Land Uses**

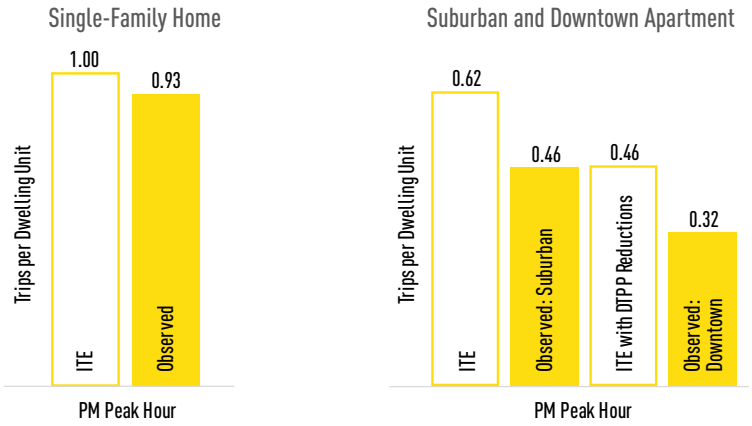
RESIDENTIAL LAND USES (PM PEAK HOUR)

MODE SHARE



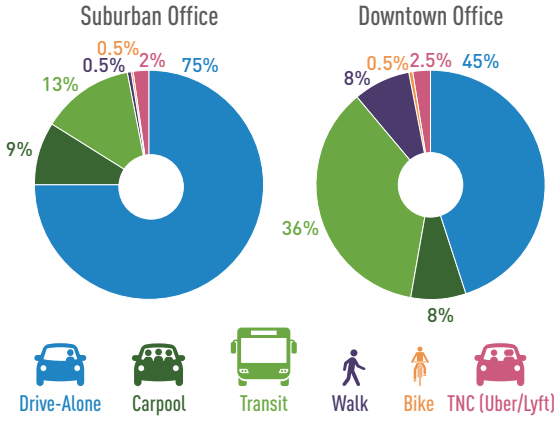
Source: Fehr & Peers, 2018.

TRIP GENERATION



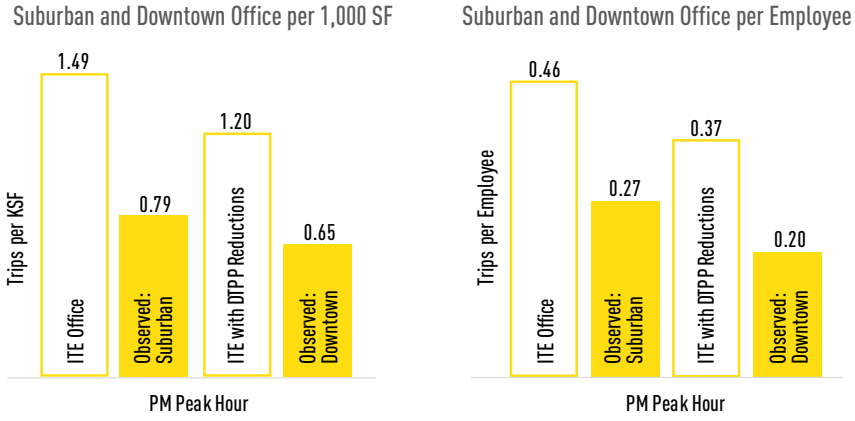
OFFICE LAND USES (PM PEAK HOUR)

MODE SHARE



Source: Fehr & Peers, 2018.

TRIP GENERATION



Sources: Institute of Transportation Engineers (ITE), 9th Edition, 2012; Fehr & Peers, 2018.

Notes:
- Data was collected in April, May, and December 2017
- Trip generation includes passenger cars/trucks, TNCs (Uber/Lyft) and employee shuttles
- Redwood City Downtown Precise Plan (DTPP) (2011) reduction: 25.1%
- Mode split is calculated as the number of person trips of each mode compared to the total number of observed person trips to and from the site

Figure 2: Mode Share & Trip Generation of RWC Land Uses

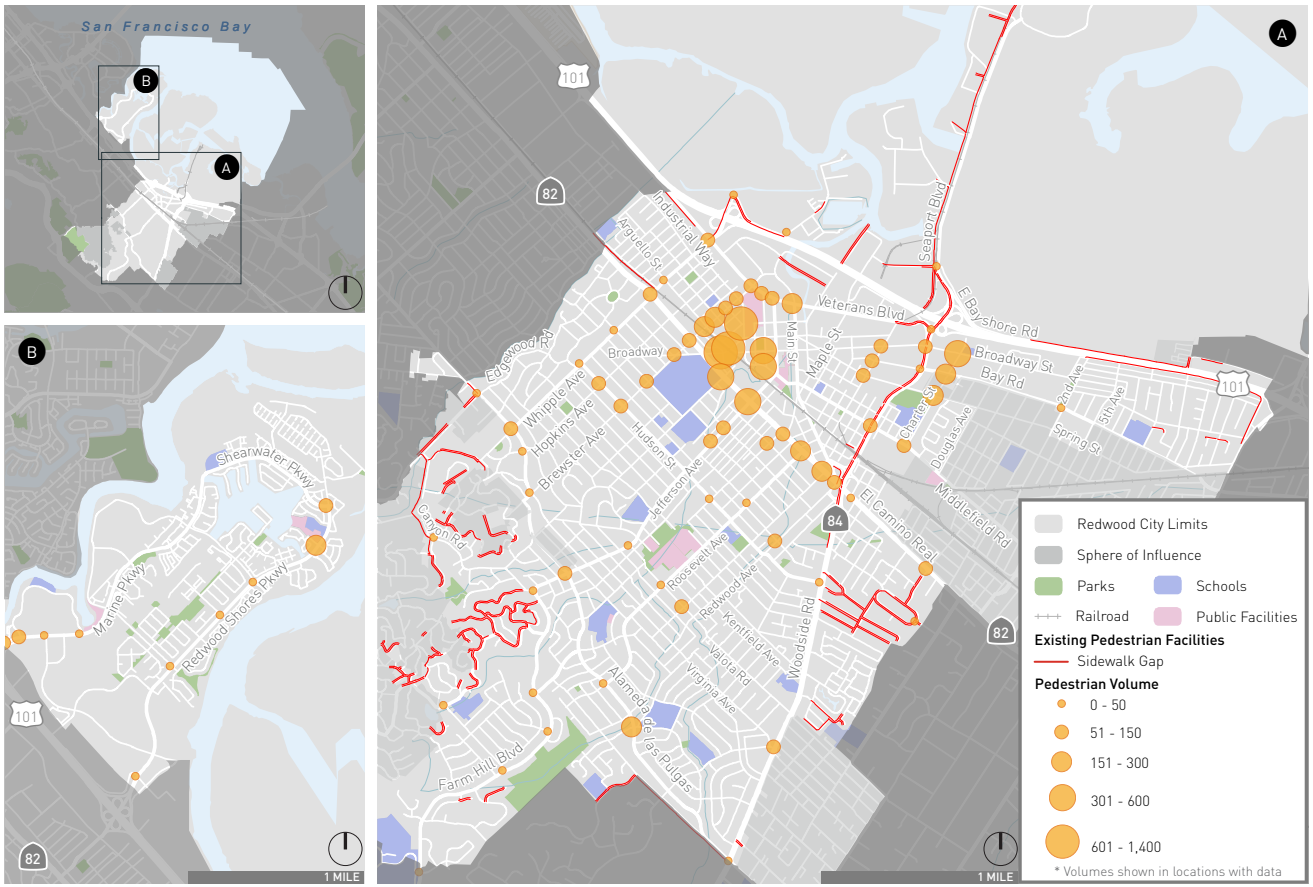
Walking in Redwood City

Walking destinations in Redwood City are connected by a system of sidewalks along all major streets as shown on **Figure 3**. The map on *Walking in Redwood City* also shows pedestrian volumes at available count locations. Redwood City's downtown is a particularly attractive destination for pedestrians, with many dining, retail, and entertainment destinations. As a result, the highest levels of pedestrian activity are mostly located along Broadway in the Downtown area.

Though Redwood City has a fairly robust sidewalk network, there are opportunities to improve the walking experience in terms of comfort, convenience, and safety. Potential opportunities to support walking in the City include enhancing crosswalk treatments near schools, in Downtown Redwood City, and near job centers, improving first/last mile pedestrian facilities to provide better access to transit, and enhancing the overall experience of walking along streets by managing traffic speeds, adding landscaping, and implementing pedestrian safety improvements in key locations.

SUMMARY FACT SHEET: **Walking in Redwood City**

Figure 3: Walking in Redwood City



Redwood City has many amenities that make walking an important and accessible mode of travel, including level terrain, temperate weather, and numerous destinations that are attractive to walkers.

A **key issue** identified through public outreach is low visibility at pedestrian crossings

A **key solution** identified through analysis of existing conditions is to enhance pedestrian crossings

Source: Morning (7-9 AM) and evening (4-6 PM) peak periods

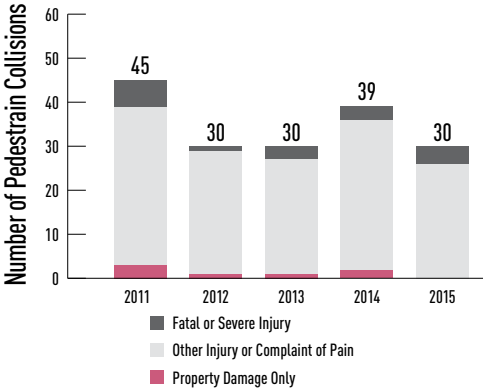
3% of residents walk to work today

Sidewalks are provided on **almost all** of RWC streets

Most walking trips are in **Downtown RWC**

4% of all collisions in RWC involve pedestrians

Pedestrians **make up 33%** of all severe traffic injuries and deaths



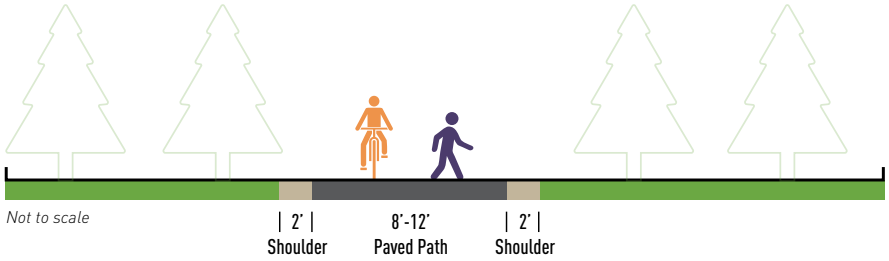
Source: Statewide Integrated Traffic System (SWITRS) database, January 1, 2011-December 31, 2015

Bicycling in Redwood City

The bicycle network in Redwood City provides both dedicated and shared space for vehicles and bicycles. **Figure 4** includes an overview of the existing bicycle network and bicycle volumes in the City. Most bicycle facilities in Redwood City are bicycle routes and bicycle lanes.

SHARED-USE PATH (CLASS I)

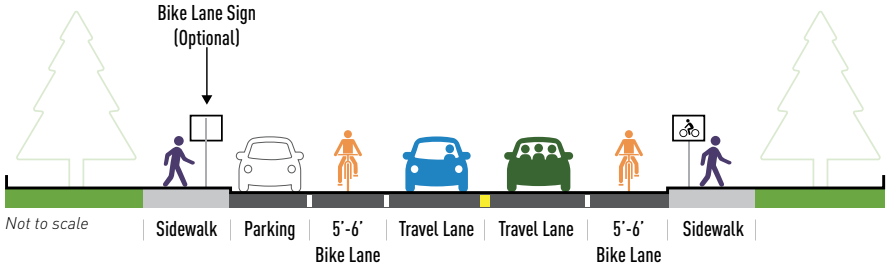
Completely separated right-of-way for exclusive use of bicycles and pedestrians



Shared-Use Paths (Class I) provide a completely separate right-of-way and are designated only for bicycle and pedestrian use. Bike paths serve corridors where there is enough right-of-way, or space, to allow them to be constructed or where on-street facilities are not appropriate due to vehicular volumes, speeds, or other roadway characteristics.

BICYCLE LANE (CLASS II)

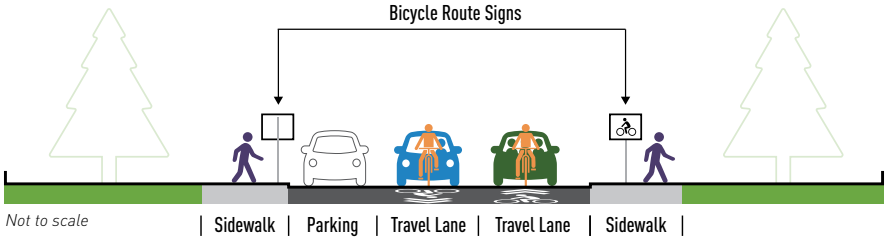
On-street striped lane for one-way bike travel



Bicycle Lanes (Class II) are dedicated lanes for bicyclists generally adjacent to the outer vehicle travel lanes. These lanes have special lane markings, pavement legends, and signage. Bicycle lanes are typically five to six feet wide.

BICYCLE ROUTE (CLASS III)

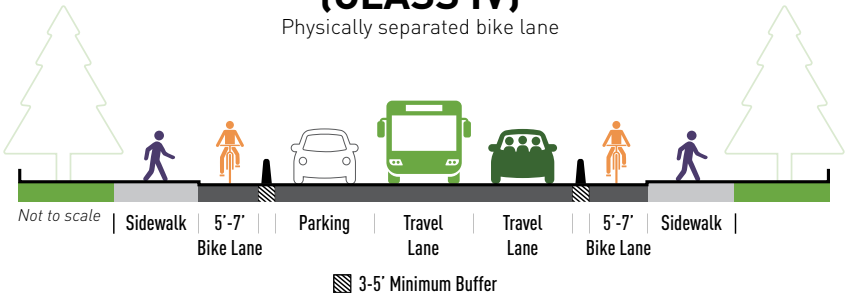
Shared on-street facility



Bicycle Routes (Class III) are designated by signs or pavement markings for shared use with motor vehicles, but have no separated bike right-of-way or lane striping. Bike routes serve to: a) provide a connection to other bicycle facilities where dedicated facilities are infeasible, and b) designate preferred routes along high-demand corridors.

CYCLE TRACK/SEPARATED BIKEWAY (CLASS IV)

Physically separated bike lane

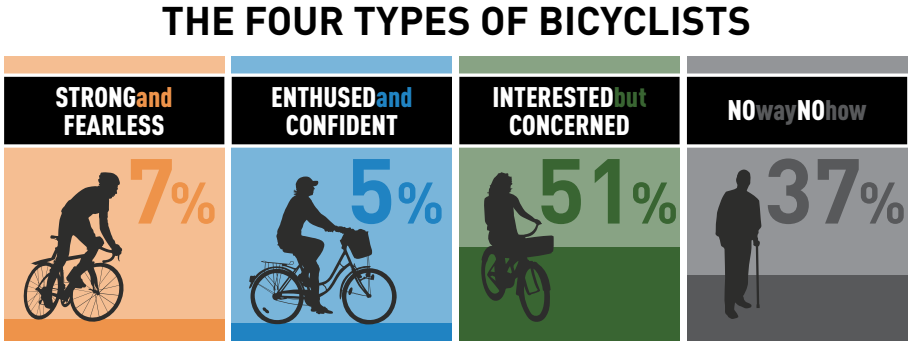


Cycle Tracks or Separated Bikeways (Class IV) provide a right-of-way designated exclusively for bicycle travel in a roadway and are protected from other vehicle traffic by physical barriers, including, but not limited to flexible posts, raised curbs, or parked cars.

Types of Bicyclists

Most people are willing to ride bicycles for recreation, particularly on paths that are separated from vehicle traffic. People differ substantially, however, in their willingness to use bicycles for transportation. The Portland (OR) Bureau of Transportation has developed a typology of transportation cyclists which divides the adult population into four groups:

- **Strong and Fearless:** People who will ride regardless of roadway conditions, and who are willing to use streets with high traffic volumes and/or speeds, and who do not necessarily prefer to use dedicated facilities such as bicycle lanes. Strong and fearless riders comprise 5 to 10 percent of the adult population;
- **Enthused and Confident:** These bicycle riders will share street space with automobiles, especially if traffic speeds are slow and volumes are low, but prefer to use dedicated facilities such as bike lanes, bike paths, and cycle tracks. Enthused and confident riders make up approximately 5 to 10 percent of the population;
- **Interested but Concerned:** These people are unwilling to ride on streets with high volumes or speeds of vehicle traffic, even if a bike lane is provided. They may bicycle within their neighborhoods but are unlikely to commute to work via bicycle or to ride for longer distances. Interested but concerned riders may comprise up to 50 to 60 percent of the population;
- **No Way, No How:** These people are not willing, not able, or very uncomfortable riding bicycles for transportation, even on a completely separated bike path. They make up approximately one-third of the population.

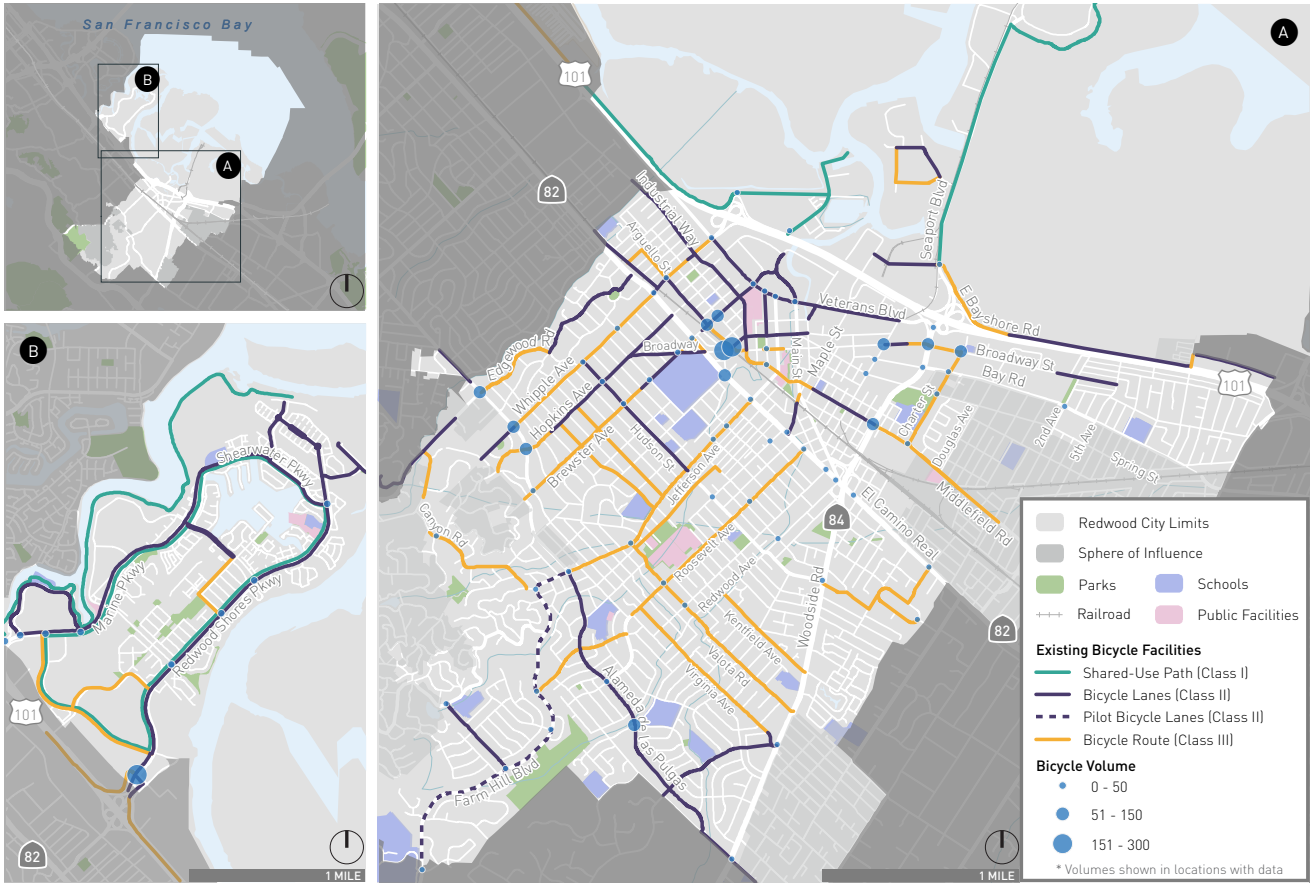


Source: Dill, Jennifer and McNeil, Nathan, 2016. Revisiting the Four Types of Cyclists

The City's existing bicycle commute mode share is two percent, which indicates that the streets in Redwood City and in adjacent cities currently may not serve the "interested but concerned" riders. Improvements to bicycle facilities and traffic calming may help encourage a larger share of the population to ride bicycles for transportation. There is, therefore, great opportunity to build out the City's bicycle network to be comfortable for all bicyclists, including the "interested but concerned" population who would bike if enhanced bicycle facilities (Class I and IV) provided connection to and from schools, downtown Redwood City, neighborhoods, and job centers.

SUMMARY FACT SHEET: **Bicycling in Redwood City**

Figure 4: Biking in Redwood City



The bicycle network is an important piece of the transportation network in Redwood City. The bike network should meet the needs of all cyclists: casual recreational riders, commuters, transportationists, and enthusiasts.

A **key issue** identified through community outreach is the need for more bicycle facilities that "everyday riders" are comfortable using.

A **key solution** identified through analysis of existing conditions is to develop a citywide bicycle network that provides low stress connectivity.

Source: Morning (7-9 AM) and Evening (4-6 PM) Peak Periods

2% of residents bike to work today

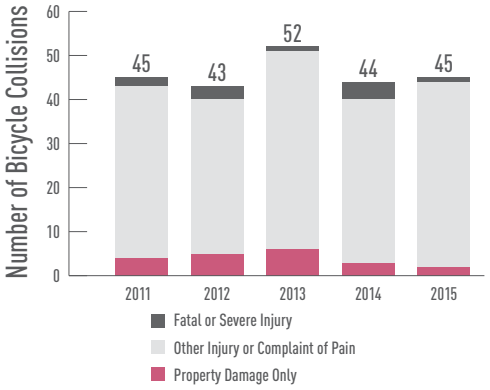
Bike lanes or routes are provided on **over 25%** of RWC streets

Most bicycle trips are in Downtown RWC and along Broadway, Brewster, and Alameda

Over 15% of survey respondents stated they would be interested in biking to work if better facilities were available

5% of all collisions in RWC involve bicyclists

Bicyclists **make up 21%** of all severe traffic injuries and deaths



Source: Statewide Integrated Traffic System (SWITRS) database, January 1, 2011-December 31, 2015

Using Transit in Redwood City

Caltrain and SamTrans provide transit service in Redwood City and surrounding communities. Caltrain operates 76 daily trains during the weekdays that serve Redwood City, and SamTrans currently operates 18 bus routes in the City. Caltrain operates express "Baby Bullet" service to San Francisco and San Jose, providing important regional transit access for Redwood City residents and employees alike. Redwood City Transit Center, the City's main bus transit hub, is located adjacent to the Redwood City Station.

In addition to public bus and rail transit, a local shuttle network provides service from Caltrain to employment centers around Redwood City. A senior shuttle provides seniors with transport through the Veterans Memorial Senior Center from Casa de Redwood, Redwood Plaza Village, and seniors' homes to Downtown Redwood City several times per week. Some area employers, such as Electronic Arts, Facebook, and Google, also operate private bus services for their employees that work or live in Redwood City. Existing transit services, including SamTrans bus routes and ridership, the Redwood City Station, and the shuttle network are shown on **Figure 5.**

Redwood City residents living in single-family homes do not use transit nearly as often as those who live in suburban or downtown apartments (see **Figure 2**). Although Redwood City's transit network does provide regional and local access, increasing transit frequency of service and comfort of transit stops and stations are opportunities to improve ridership and the overall quality of the transit system.

SUMMARY FACT SHEET: **Using Transit in Redwood City**

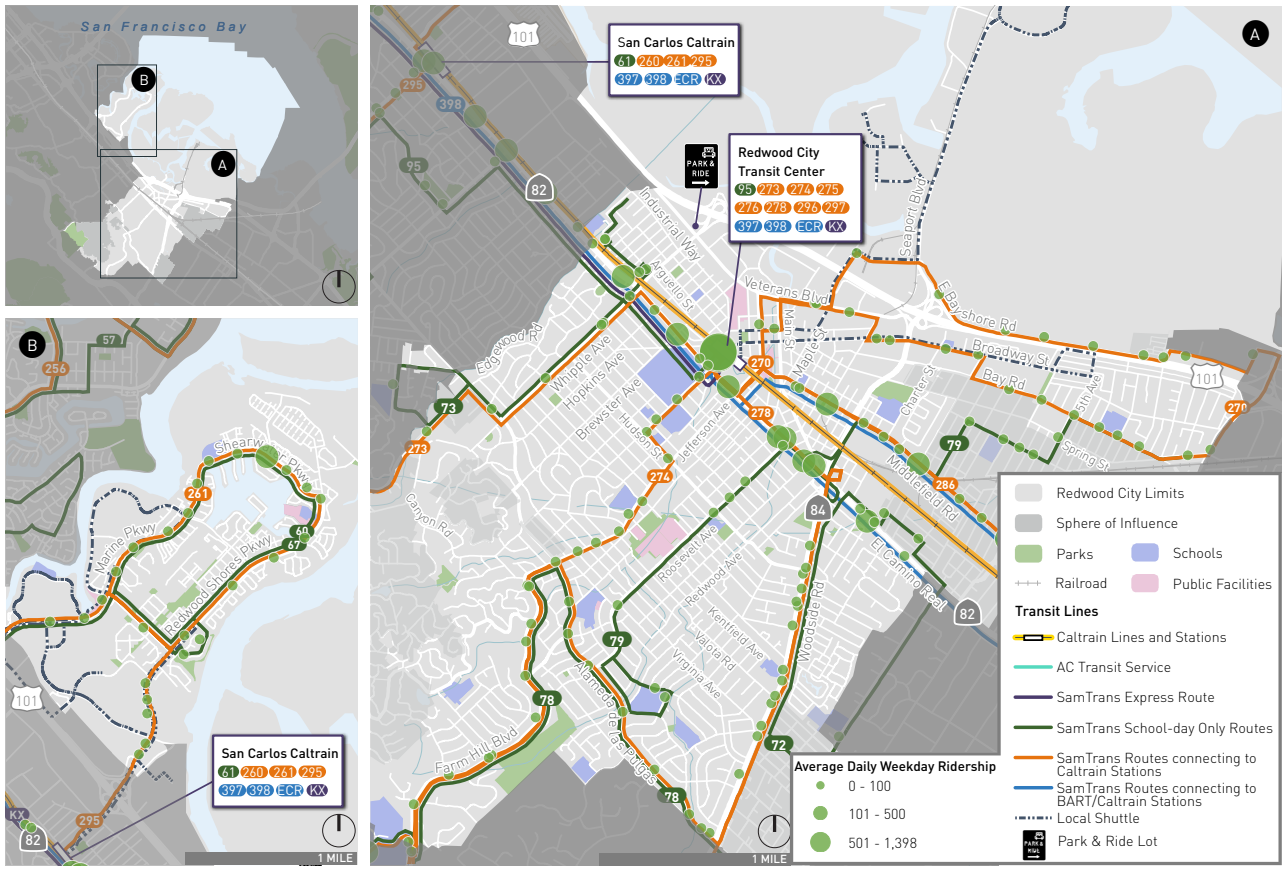


Figure 5: Using Transit in Redwood City

Redwood City aims to create easier access to all types of transit. RWC is working to influence this through land use and zoning decisions, increasing connectivity for pedestrians, bicyclists, and drivers, and improving traffic operations within key corridors to facilitate bus headways.

A **key issue** identified through community outreach is that transit service serving local roadways, neighborhoods, and schools could be improved

A **key solution** identified through existing conditions analysis is the opportunity to support enhanced transit service and reliability that provide connection with neighborhoods and schools

5% of residents take transit to work today

Caltrain averaged **over 3,800** boardings each weekday in 2016

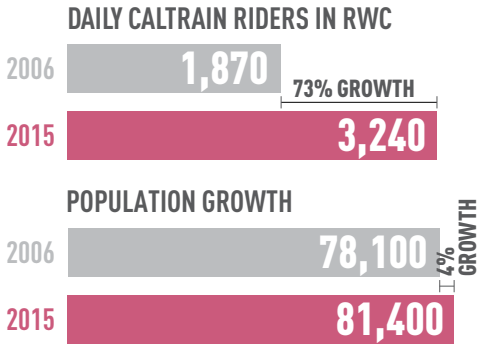
Caltrain ridership increased by nearly **20%** from 2015 to 2016

Over 20% of survey respondents stated they would be interested in commuting by public transit

Over 10% of survey respondents stated they would be interested in commuting by local shuttle

Local shuttle network ridership is **over 2,500** riders per month and provides connection for job centers to Caltrain stations

Senior center shuttle – 1100 riders per **month**



Source: SamTrans Automated Passenger Counter (APC) database, August 20, 2017-August 26, 2017

Driving in Redwood City

Redwood City has a street network that provides local and regional roadway connections. Streets are classified as transit streets, bicycle boulevards, pedestrian streets, connector streets, industrial streets, boulevards, auto dominated highways, and local streets in the General Plan. Although some of Redwood City's street network is in a grid-pattern, vehicular traffic often is channelized to specific streets because many streets do not provide direct connections to regional destinations, as shown on **Figure 6**.

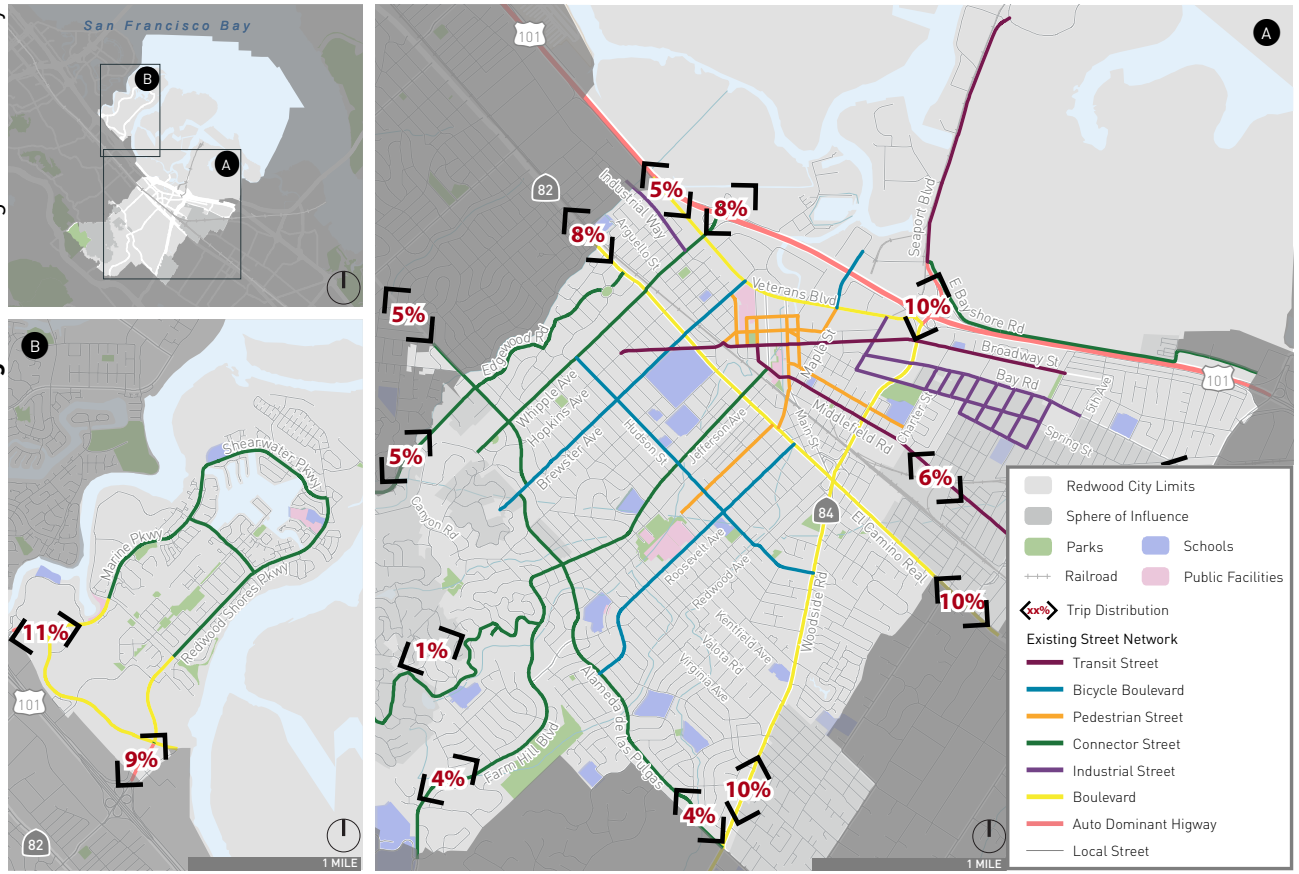
Vehicle Circulation, Congestion and Cut-Through Traffic

As traffic volumes have increased in the City, so has traffic congestion. Major corridors in the City, including Woodside Road and El Camino Real, regularly experience traffic congestion during weekday peaks. While some congestion is the result of local trips, there are also major regional traffic patterns that affect congestion in Redwood City as well as throughout the Bay Area. US 101 and Interstate I-280 are two major highways that provide connections between Redwood City and many other places in the San Francisco Peninsula and beyond. Due to their regional significance, US 101 and I-280 are used by many people during their morning and evening commutes, and typically become congested.

Residents of Redwood City have expressed concerns with challenging vehicular circulation, specifically with highly congested corridors and in some cases, traffic cut-through on residential neighborhood streets. Increases in vehicle congestion on higher volume streets can lead to more cut-through traffic, as travelers, often directed by mapping applications like Waze, seek less congested routes through residential neighborhoods. Redwood City is committed to pursuing programs that discourage cut-through behavior by implementing traffic calming strategies to encourage safer and more responsible driving at lower travel speeds.

SUMMARY FACT SHEET: **Driving in Redwood City**

Figure 6: Driving in Redwood City



Redwood City's fully developed street system allows easy movement within the City, while several larger roadways link the community to the region. The City is focused on maintaining vehicular access as it works toward a more balanced mode split with pedestrians, bicyclists, and transit.

Key issues identified through community outreach are increased congestion and high vehicle speeds along residential streets

A **key solution** identified through existing conditions analysis are increased traffic calming measures to reduce traffic speeds and volumes on neighborhood streets

73% of residents drive alone and 10% of residents carpool to work today

Some downtown RWC roads have traffic slowdowns in the AM and PM peak hours

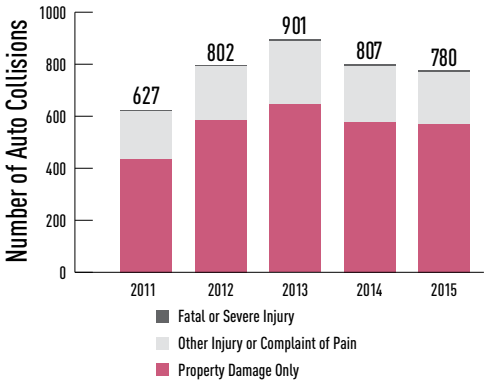
RWC mitigates neighborhood cut-through traffic by responding to requests and prioritizing **traffic calming measures**

Downtown parking supply is able to successfully accomodate the **parking demand** generated by use of downtown business & amenities

Auto-only collisions make up **over 90%** of all RWC collisions

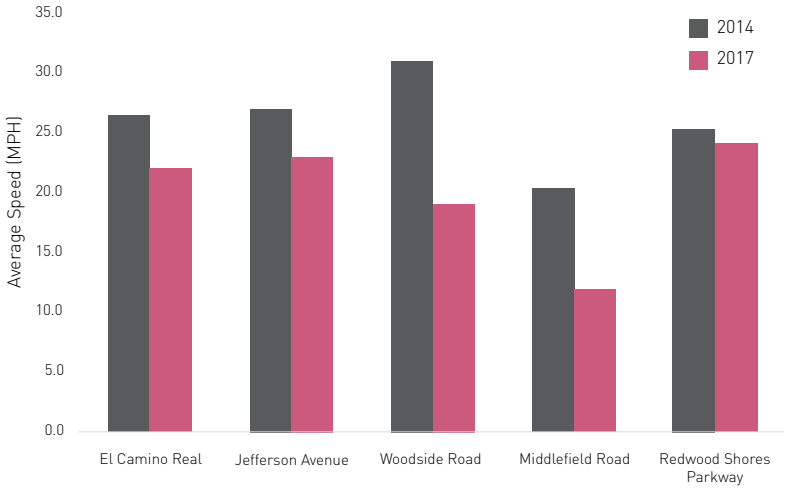
Less than 1% of auto-only collisions resulted in a severe injury or death

Almost 80% of RWC auto-only collisions result in property damage only



Source: Statewide Integrated Traffic System (SWITRS) database, January 1, 2011-December 31, 2015

Figure 7: Average Vehicle Speeds



Source: INRIX database, average morning (7-9 AM) and evening (4-6 PM) vehicle speed, March 2014 and 2017, and September 2017 and 2017, Tuesdays through Thursdays

Congestion Trends

Speeds are a direct indicator of congestion levels. INRIX speed data on key streets in Redwood City were compared between 2014 and 2017, shown in **Figure 7**. Overall, the data shows that speeds have decreased by approximately 15 to 20 percent on El Camino Real and Jefferson Avenue, and more drastically, by approximately 40 percent on Woodside Road and Middlefield Road. Speeds have decreased slightly, by 5 percent, on Redwood Shores Parkway. Decreased speeds are a result of an increase in vehicle volumes on Redwood City streets. This trend will likely continue as more growth occurs in the City and surrounding jurisdictions, unless road capacity is managed by shifting travel behavior from drive alone trips to walking, biking, using transit and carpooling, or trips are shortened through more dense, mixed-use development.

Parking

Parking demand is high in Redwood City in both the downtown area and in some residential neighborhoods.

Parking demand in the downtown area is driven by a concentration of popular destinations and a variety of activities. In the Downtown, on-street parking is available on most blocks and public parking is available in several garages and lots. Downtown parking demand is high at lunchtime on weekdays and during evenings and on Saturdays. In 2005, the City approved a progressive parking policy that allows for downtown parking rates to be adjusted as needed. Since then, the City has monitored parking demand and supply, and made changes to its parking policies to better manage its facilities. Changes include on-street meter rates and off-street parking fees, and growth of permit programs. The Marshall Garage, the Main Street Lot, and the Sequoia Station Garage have monthly permits available for downtown employees, residents, or other regular visitors. Additional parking meter program details are included in Appendix A. The City has successfully managed parking based on the goals of the 2005 plan. Changing land uses and popular Downtown events require ongoing monitoring, adjustments, and coordination. Intensified use of older buildings, which may have fewer or no parking spaces, can make it more difficult to find convenient parking for workers and visitors to downtown.

The revenue generated from the metered parking program increased from approximately $1.3 million to $2.4 million from FY 2012-2013 to FY 2015-2016. Downtown core parking fees and Marshall permit costs were increased in August 2014, likely accounting for much of the revenue increase over the few year period. During this same time period, the overall budget for the City's parking fund increased from $2 million to $2.4 million—each year, the amount of money required from the general fund to make up for the difference between budget and revenue decreased.

Parking in Redwood City's residential neighborhoods is also managed by the City, through a Residential Parking Permit (RPP) Program. There are currently two active permit areas: Permit Area A located southwest of downtown, and Permit Area S located southeast of downtown around Sequoia High School shown in **Figure A-40**. In these RPP areas, the time limit for vehicles parked on the street without a permit is 2 hours. Residents can obtain a permit for free by providing proof that they live in a permit area. There are 506 permits issued in Area A, and Area S has 60 permits issued. Parking supply in high density residential neighborhoods is available on street and off street (e.g., on driveways and in parking garages). High demand for on-street parking is possibly due to garages being used for storage rather than parking, commercial vehicles parking on the street, storing vehicles on-street, or residents owning more vehicles than can be parked in their garage.

Emerging Technologies

Technology and innovation developments, including Transportation Network Companies (TNCs), such as Uber and Lyft, automated vehicles (AVs), microtransit, automated delivery, and electric/shared mobility services are increasingly changing travel behavior locally in Redwood City and regionally in the Bay Area. These emerging technologies have begun to result in new transportation issues, but they also could provide opportunities to improve mobility in Redwood City. Addressing how these technologies are currently affecting the transportation system, and anticipating how future technological developments will alter the transportation system further is an important focus of RWCmoves. Key transportation technologies are discussed below.

Transportation Network Companies (TNCs)

TNCs provide point-to-point rides through smart phone interfaces with integrated payment systems. Lyft and Uber are two of the key players in the TNC industry. Though some expect TNCs would reduce vehicular miles traveled (VMT) and automobile ownership rates, the convenience and relatively low cost of TNCs could instead induce additional travel or shift trips away from low-impact transit, bicycling or walking modes. Redwood City allows TNCs to operate in the City, though impacts are currently not measured on a citywide or regional basis. Due to the increased usage currently observed in Redwood City, TNCs are most likely already decreasing parking demand, changing commute patterns by providing people with another choice in travel, and affecting curbside loading and unloading conditions. These effects are likely to become more pronounced if TNC travel becomes more popular.

Automated Vehicles (AVs)

Though not commonly seen in Redwood City today, automated vehicles (AVs) will likely affect the transportation system in the near future. AVs are capable of sensing their own environments in order to perform at least some aspects of safety-critical control without direct human input. Many industry professionals believe that shifting to AVs will offer some transportation benefits, including improved traffic flow, fewer traffic collisions, and enhanced mobility for vulnerable users. The potential of AVs is that travelers would no longer be concerned with traffic congestion, needing to find parking, and the financial and environmental costs associated with traffic and driving. However, the convenience of AVs could also result in more miles traveled if riders tolerate longer commutes, or if AVs make "deadhead" trips to look for new riders or cheap parking or are used to run errands. RWCmoves acknowledges AVs will likely need to be planned for and regulated based on the community values and provides the initial steps for how Redwood City can start proactively preparing for AVs.

Microtransit

A relatively new entrant in the field of public transportation is microtransit, defined as a privately-operated transit system, which in many cases mirrors the operations of public transit agencies along select routes. Microtransit services have been operating in San Francisco since 2014 and have since expanded to include routes throughout the greater San Francisco Bay Area, including several routes that serve Redwood City. Current microtransit providers in the Bay Area include Chariot and Lyft Shuttles.

Microtransit operators benefit from having a high level of flexibility in terms of operational decisions since they do not have the funding or regulatory constraints that commonly affect public transit operators and have the ability to tailor their operations to match short-term or long-term changes in travel behavior. Many microtransit providers advertise that their buses offer more space for riders, Wi-Fi, and USB outlets. Typical fares ranging from $3 to $6 a ride, which are higher than traditional public transit bus fares for similar routes ($1-$2). Microtransit operators also currently do not provide discounts for youth, seniors, or low-income riders or other types of subsidies. As a result, microtransit is perceived by some to cater to the more affluent. RWCmoves seeks to identify the new technologies that will likely affect transit service and mobility options in the future and includes actions the City can take to maximize the benefits while minimizing potential consequences

Automated Delivery

Automated delivery services, specifically autonomous delivery robots or delivery drones, have the potential to change last-mile delivery economics as they could replace many deliveries currently made by traditional delivery vehicles.

Redwood City approved a pilot program in late 2016 to allow the use of autonomous robots, or Personal Delivery Devices (PDD), through Starship Technologies Inc., a London based company that provides autonomous delivery robots. The PDDs were permitted to use sidewalks and streets to deliver food, groceries, and packages and can carry approximately three-grocery bags worth of goods. A human controller followed all PDD trips. The pilot program has not published conclusions to the public.

Possible benefits of the continuation of this program in Redwood City could include reduced roadway congestion, improved safety due to fewer conflicts between delivery vehicles and other modes, reduced roadway maintenance costs, and reduced greenhouse gas emissions. Possible limitations could include limits on package weights, overcrowding of sidewalk space, and potential conflicts with pedestrians, especially people with low vision. RWCmoves seeks to identify the new technologies that will likely affect goods movements in the future and includes actions the City can take to maximize the benefits while minimizing potential negative effects.

Delivery drones are unmanned aerial vehicles (UAVs) that can deliver lightweight packages. Though currently only allowed for testing purposes in the United States, delivery drones are expected to operate autonomously or remotely, with operators potentially overseeing multiple drones at once.

Possible benefits of delivery drones in Redwood City could include reduced roadway congestion and greenhouse gas emissions due to less VMT by delivery vehicles, and improved safety due to fewer conflicts between other travel modes. Possible limitations would need to be overcome before being adopted for commercial use in the City, such as the difficulty of designating drop-off locations, and constrained flight times resulting from excessive noise impacts. RWCmoves acknowledges the City should start proactively preparing for all types of automated delivery – ranging from existing sidewalk deliveries to automated drone deliveries – in order to ensure the benefits of these technologies are captured without adversely affecting the community.

Electric/Shared Mobility

Electric scooters (e-scooters) and electric bikes (e-bikes) are starting to show up as another alternative form of transportation in cities. Several companies have developed shared platforms to allow users to reserve an e-scooter or e-bike for a short amount of time using a mobile application. In comparison to traditional bikeshare systems, like Ford GoBike in the San Francisco Bay Area, companies have released dockless systems, meaning the e-scooters or e-bikes can be parked anywhere. Dockless systems add even more convenience for the user since they have the flexibility to park the scooter or bike where it is convenient.

Possible benefits of e-scooters and e-bikes include the opportunity to extend the typical 1 to 3 mile range of most bike trips, which is considered the optimal bicycling distance. They also have the potential to promote cycling in areas with significant grades, which can be a disincentive for bicycling or walking. Widespread use of e-scooters and e-bikes under these conditions has the potential to replace short distance automobile trips, which would reduce congestion, greenhouse gas, and air quality impacts associated with these trips. Possible challenges could include how cities respond to the overcrowding of sidewalk space resulting from scooters and bikes being used and parked on sidewalks, and potential conflicts with pedestrians, especially people with low vision. RWCmoves includes actions the City can take to maximize the benefits while minimizing potential negative effects. For electric/shared mobility modes, this includes requiring that mobility providers share travel and trip data with the City if allowed to operate on City streets.

Chapter Three

3

Moving Ahead

(Community Engagement)

Community engagement provided an exciting opportunity to engage Redwood City residents, workers, and business owners – people who walk, bike, take transit, and drive in the City – and to understand how their experience could not only be improved but how quality of life could be transformed with a great transportation system. Public outreach to develop RWCmoves incorporated a multifaceted outreach approach aimed at engaging the broadest cross-section of the community to help develop the Plan. This approach included the following.

- **A project website with an interactive web map** provided the public opportunities to use a web map to note specific areas that were either challenging or provided positive transportation experiences. The website and web map were developed in both Spanish and English.
- **Community "Pop-Up" events** were held to garner widespread interest in the project and encourage residents to provide input directly or through the web map.
- **Walking "audits"** with City staff provided the opportunity to receive input and discuss roadway improvement options at key roadway and intersection locations that are emblematic of common issues found in the City.

- **Focus groups** were held with key stakeholders and allowed for a more in-depth discussion of issues, opportunities, and feasibility for mobility improvements, and to measure public interest and willingness to use alternative modes of travel.
- **Social media/website updates** of fresh and branded material were released weekly to garner interest for the release of the public review draft of the Draft Plan.
- **Draft Plan survey** and **public workshops** were held in conjunction with release of the Draft RWCmoves plan to provide information about the plan elements and to collect feedback on the list of projects and policy recommendations.

What We Heard – Key Takeaways

Reaching Out to the Community: Plan Development

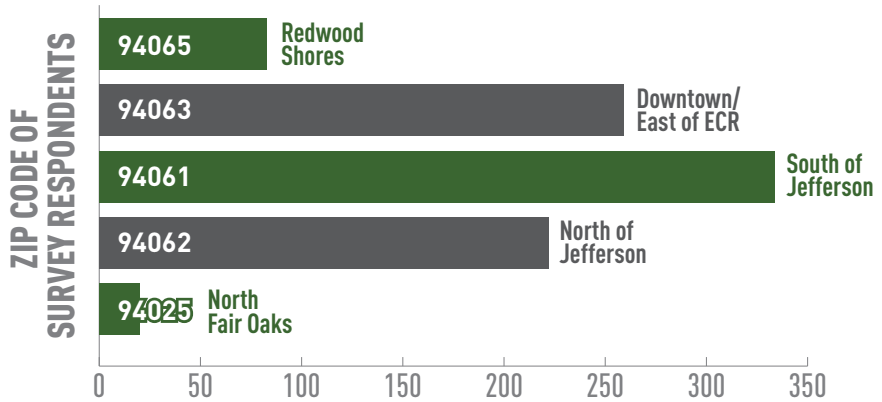
Interactive Web Map

A major component of community engagement for the initial draft plan development included a website and interactive web map. The RWCmoves project interactive web map gathered detailed information about where in Redwood City people live, work, and go to school. The survey was open from March through July 2017. Over 800 responses were received, and respondents identified over 2,000 locations in the City that have some sort of transportation issue or opportunity.

Characteristics of the survey participants are representative of Redwood City as a whole - participants represented residents, employees, or students of every zip code in Redwood City; all ages; men, and women; and all ethnic backgrounds. Over 65 percent of respondents live in, approximately 30 percent work or go to school in, and approximately 3 percent are visitors of Redwood City.

Survey participants were also asked where they work or attend school by zip code. The highest percentage of responses were for zip code 94061 (South of Jefferson Avenue). Other zip codes that were well represented include 94063 (Downtown/East of El Camino Real), 94062 (north of Jefferson Avenue), and 94065 (Redwood Shores). A small percentage of respondents listed 94025 (North Fair Oaks). This is shown below in **Figure 8**.

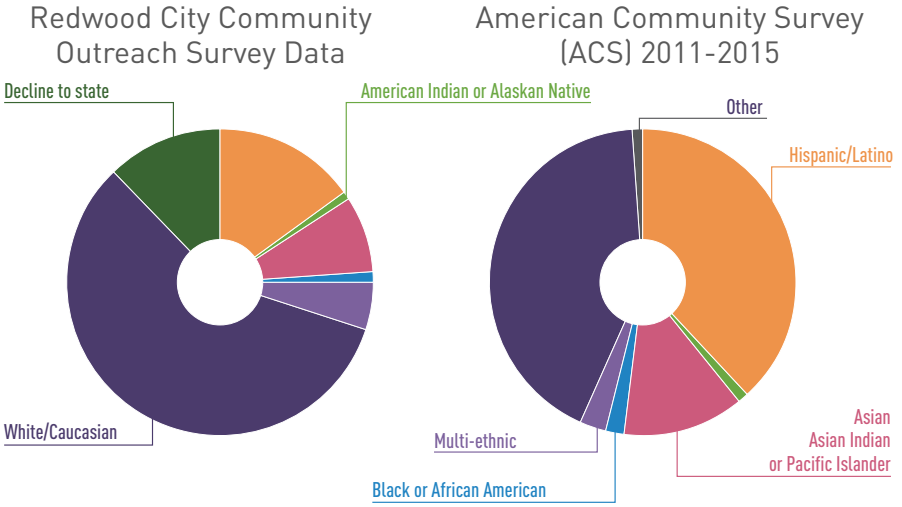
Figure 8: Zip Code Where Survey Participants Live, Work or Go to School



Note: Some respondents live and work or attend school in more than one Redwood City zip code.

Seven percent of part took the survey in Spanish. As shown in **Figure 9** below, Hispanic/Latino populations were underrepresented when comparing the stated ethnicity of respondents to American Community Survey 2011-2015 census data.

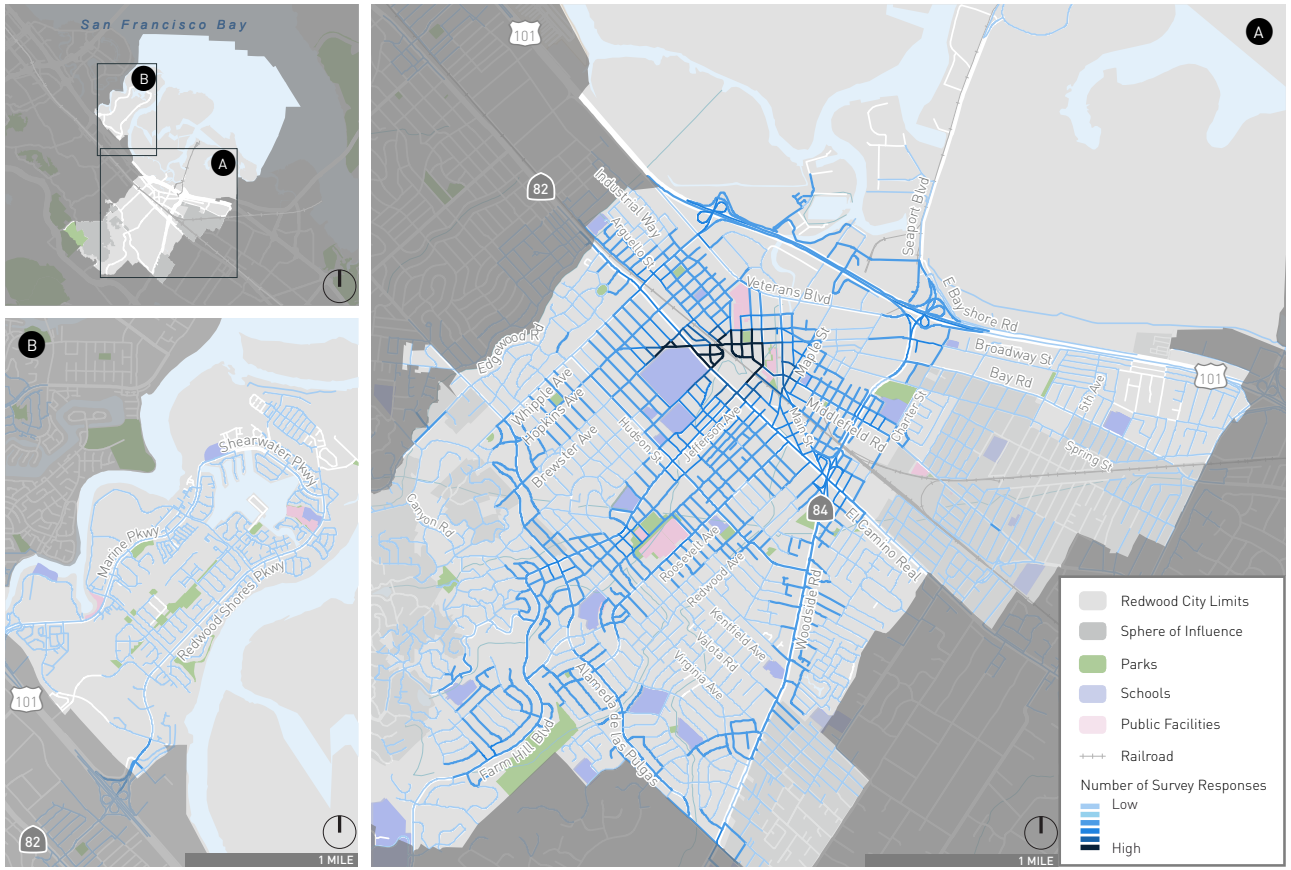
Figure 9: Comparison of Survey Participants' Ethnicity to Census Data.



Key takeaways from the web map survey are shown on **Figure 10**. The survey provided invaluable insight into the highlights and needs of the City's transportation system. The map on **Figure 10** shows the location density of comments placed by survey respondents. In general, areas with higher land use densities, such as Downtown, El Camino Real, Woodside/Broadway, and along major connector streets received more comments than residential areas of the City.

SUMMARY FACT SHEET: **Plan Development Survey Findings**

Figure 10: Plan Development Survey Findings



Community engagement provided an exciting opportunity to engage residents, workers and business owners – people who walk, bike, take transit and drive in the City – and to understand how their experience could not only be improved but how quality of life could be transformed with a great transportation system.

Over 1,000 visited the site, **800** provided **2,040** map responses

Respondents placed **1,530** negative pins and **~500** positive pins

Over 65% live in, **~30% work or go to school** in, and **~3% are visitors** to RWC

Over 70% stated they would be interested in commuting by a different mode if better infrastructure were available

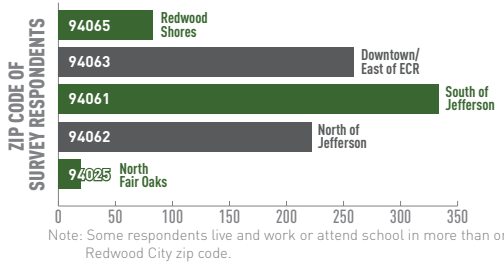
Biking, public transit, and private bus/shuttle were listed as preferred alternate commute modes

New or improved infrastructure was requested:
365 responses for pedestrian facilities
360 responses for auto facilities
350 responses for bicycle facilities
210 responses for transit service

Positive pins were placed most frequently for walking and biking

Negative pins were placed most frequently for biking and driving

Downtown RWC, El Camino Real, and Woodside/ Broadway received the most comments



Note: Some respondents live and work or attend school in more than one Redwood City zip code.

Additional Community Outreach Events

Feedback received from additional community outreach events for RWCmoves, including pop up events, a walking audit, and focus groups is summarized in **Table 1**. Participants were asked which facilities or aspects of the transportation system in Redwood City they were happy with, concerned with, and would like to see more of.

Overall, feedback from outreach events indicated that across the community, there is interest in Redwood City's transportation to be more walking, biking, and transit friendly while also maintaining and improving vehicular access. There was also a particular focus on making schools safer and easier to access by all modes, and improving connections to and from Downtown Redwood City and Redwood Shores.

Table 1: Feedback Summary from Plan Development Outreach Events

Outreach Type	Venue/Forum	No. of Participants	Community Feedback	
Pop Up Event	Redwood City Farmers Market patrons	~100	Participants were pleased with...	Downtown Redwood City being walkable and easily bikeable
			Participants would like to see...	More coordination between schools and transit agencies; bus schedules aligning better with extra-curricular activities
				More bicycle and pedestrian only streets
	Fair Oaks Community Center members	25	Participants were concerned with...	Congestion along key roadways connecting with US 101 and I-280
				Lack of bicycle parking in Downtown RWC
				Regular commute traffic often blocking driveways
				Cut-through traffic on residential streets
				Congestion and lack of vehicle parking in Downtown RWC
Walking Audit	City staff, Police Department representatives	15	Participants were pleased with...	Opportunities to connect existing bicycle facilities
			Participants would like to see...	Pedestrian and bicycle facilities improvements
				Traffic calming measures to slow speeds
				Landscaping and beautification
			Participants were concerned with...	Safety of school crossings

(Continue on page 30)

Table 1: Feedback Summary from Plan Development Outreach Events

Outreach Type	Venue/Forum	No. of Participants	Community Feedback	
Focus Group	Businesses & Merchants, Chamber of Commerce	6-10	Participants were pleased with...	Increased pedestrian and bicycle activity in downtown RWC
				Parking availability in downtown RWC
			Participants would like to see...	Pedestrian and bicycle facilities improvements especially across and along major barriers in the City, such as Woodside Road, El Camino Real and Jefferson Avenue
	Seniors, Fun After 50 Group, Veterans Memorial Senior Center	30-40	Participants would like to see...	Increased accommodations for high bicycle and pedestrian activity in Downtown RWC
				Green bike lanes, pedestrian scrambles, separated walkway and bikeways, wayfinding
				Traffic signal coordination and priorities and street lighting
				Shuttle style service to Downtown RWC
	Complete Streets Advisory Committee	6-10	Participants would like to see...	A comprehensive bicycle network
				A refined transit network throughout the City
				Improved access and circulation at Redwood City Station to accommodate future increases in transit demand
	Transit Agencies	6-10	Participants would like to see...	Opportunities to connect different forms of transit, including buses, rail, on-demand transit, shuttles, streetcars and access to ferries and the Dumbarton corridor in Downtown RWC
			Participants were concerned with...	Congestion and lack of vehicle parking in Downtown RWC

Source: Fehr & Peers, 2017.

Reaching Out to the Community: Draft Plan

Public input on the Draft Plan was collected through an interactive survey and three community workshops.

Draft Plan Survey

The Draft Plan Survey was available on the RWCmoves project website from early November 2017 through mid-January 2018. Over 170 participants provided input on the Draft Plan Survey. Approximately 90 percent of respondents live in Redwood City and 45 percent of respondents work or go to school in Redwood City.

By zip code, the greatest number of respondents were from the neighborhoods south of Jefferson Avenue. Neighborhoods north of Jefferson Avenue and Downtown/East of El Camino Real, and in Redwood Shores were also well represented in the Draft Plan Survey. There were no survey responses from the North Fair Oaks neighborhood.

Survey participants were also asked if this was their first time participating or providing input on the RWCmoves project. Approximately 75 percent of participants answered that they had not previously provided input on the project.

Participants were then asked to provide feedback on projects outlined in the Draft Plan (see **Chapter 4** for definitions of Tier 1 Projects, Signature Projects and Project Categories) and solicited input on:

- Favorite Tier 1 Projects
- Projects that should be removed from the Tier 1 Project list
- Favorite Signature Projects
- Projects that should be removed from the Signature Projects list
- Rank of Project Categories

Community Workshops and Study Sessions

Three community workshops were hosted to solicit feedback on the Draft Plan, including in the Friendly Acres, Redwood Shores, and Roosevelt neighborhoods. The community workshops provided a brief overview of the project and asked participants to provide feedback on the same questions included in the Draft Plan Survey. Community feedback was also received from additional community outreach events through presentations to the Complete Streets Advisory Committee, Planning Commission, and City Council. All together feedback indicated that safety and congestion relief are the greatest priorities for the community.

A summary of additional feedback from the Draft Plan Outreach Events are described in **Table 2**, and the overall key takeaways from the Draft Plan Survey are shown on **Figure 11**.

Additional presentations and updates on the Draft Plan were made upon request to groups, such as Redwood City San Mateo County - Transportation and Housing Forum, school district representatives, and the Complete Streets Advisory Committee.

Table 2: Feedback Summary from Draft Plan Outreach Events

Outreach Type	Venue/Forum	Date	No. of Participants	Community Feedback
Community Workshop	Police Activities League	November 16, 2017	15	Several suggestions on the proposed Bicycle Backbone Network, including support for Vera Bicycle Boulevard
				Favorite Tier 1 Projects included the Bicycle Master Plan, Crosswalk Program, Alameda de las Pulgas Complete Streets Project, and Bay Road and Florence Street Corridor Improvements
				Favorite Signature Projects included the US 101 and Woodside Road Interchange Improvements, and Whipple Avenue Railroad Grade Separation
				Support for more frequent bus service (10 minute headways) along arterials
	Redwood Shores Public Library	November 29, 2017	10	Several suggestions on the proposed Bicycle Backbone Network, including suggested bikes routes to connect to the Redwood City Transit Center
				Favorite Tier 1 Projects included the Bicycle Master Plan and the El Camino Real Corridor Plan Implementation - Short and Long Term Projects
				Favorite Signature Projects included the Whipple Avenue Railroad Grade Separation, Redwood City Transit Center - Implement Short Term Improvements, and the Long Term Vision for Downtown Transit Center and Redwood City Station
				Maple Street Railroad Grade Separation should not be considered a Signature Project
	Kennedy Middle School	December 9, 2017	15	Favorite Tier 1 Projects included the Bicycle Master Plan, Complete Street Design Guidelines, and Jefferson Avenue Operational Analysis
				Favorite Signature Projects included the Whipple Avenue Railroad Grade Separation, Redwood City Transit Center - Implement Short Term Improvements, Long Term Vision for Downtown Transit Center and Redwood City Station, and Commuter Ferry Service
				Support for improved transit service in the afternoon for students traveling to and from school

(Continue on page 33)

Table 2: Feedback Summary from Draft Plan Outreach Events

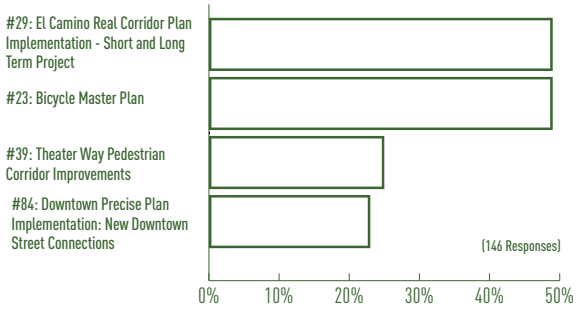
Outreach Type	Venue/Forum	Date	No. of Participants	Community Feedback
Study Session	Planning Commission Meeting	December 5, 2017	15	Support for multimodal transportation while recognizing the importance of vehicle travel in the community
				Include an explicit safety goal
				Coordinate with other cities
				Meet the needs of different neighborhoods
				Incorporate weighted performance measures that prioritizes safety, environment, and health
	Complete Streets Advisory Committee Meeting	December 12, 2017	10	Feedback on the Vision and Goals, Performance Measures, and transportation networks (bike, street, truck) in the Draft Plan
	City Council Meeting	February 12, 2018	30	Vision Zero and safety should be the #1 goal
				Incorporate performance measure weights and/or consolidate
				Ensure ability to monitor transportation system performance over time
				Incorporate neighborhood input on local projects
	Complete Streets Advisory Committee Meeting	March 13, 2018	10	Supports the proposed changes to Vision and Goals, but should add clear definition of "shared rides"
				Recommends prioritizing safety, multimodal, and person throughput projects as a baseline for initial project evaluation
				Include opportunities for neighborhood associations and advisory bodies to provide input on Tier 1, Signature, and Tier 2 Projects

Source: Fehr & Peers, 2018.

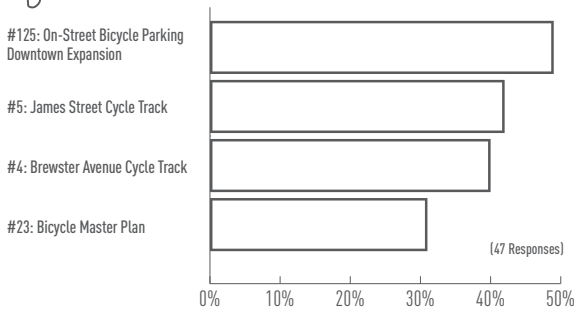
SUMMARY FACT SHEET: **Draft Plan Survey Findings**

Figure 11: Draft Plan Survey Findings

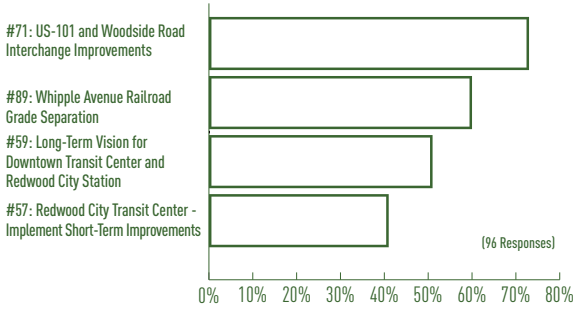
Favorite Tier 1 Projects



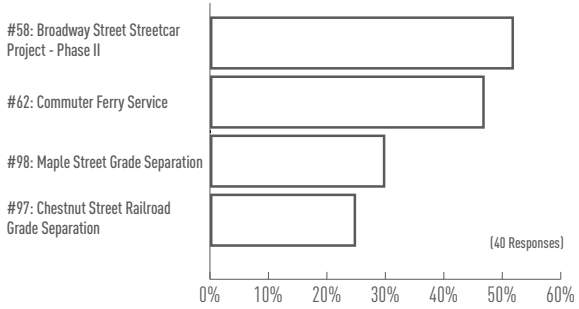
Projects That Should Not Be Tier 1 Projects



Favorite Signature Projects

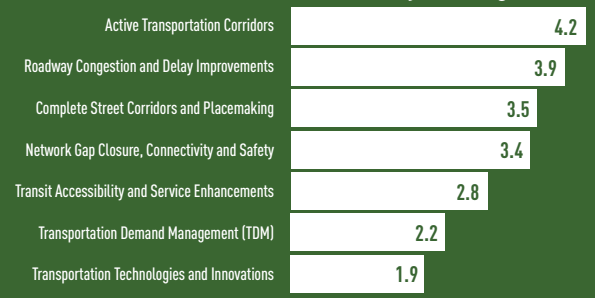


Projects That Should Not Be Signature Projects



Feedback on the Draft Plan was solicited through the Draft Plan Survey, which was available online from early November 2017 to mid-January 2018 and at three workshops. The survey intended to prioritize and refine Tier 1 and Signature projects outlined in the Draft Citywide Plan.

Favorite Project Categories

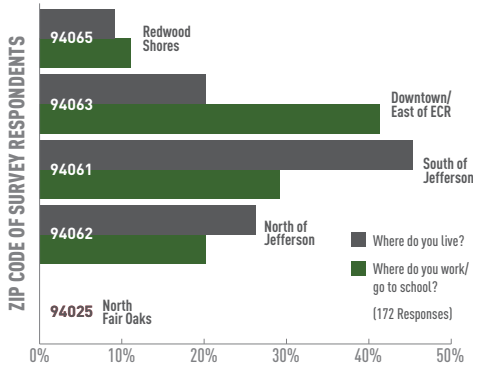


172 Redwood City residents, employees, and students **completed the Draft Plan survey**

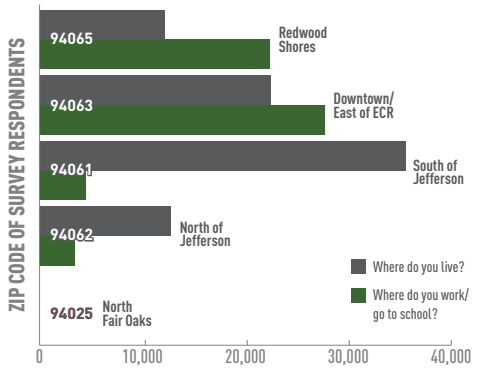
~90% live in and **~45% work or go to school** in RWC

75% of Draft Plan survey respondents **had not previously provided input on the project**

Draft Plan Survey Responses



Redwood City Population and Number of Employe



Note: Esri 2017 data by census block group. North Fair Oaks (9402 primarily includes residential areas of Menlo Park and would not accurately represent the North Fair Oaks area Draft Plan Survey responses includes feedback from workshops

Chapter Four

4

Reaching Our Destination

(Proposed Transportation Program)

The existing conditions findings and feedback received from community outreach were used to develop the proposed transportation program described in this Chapter. The transportation program is a coordinated series of actions the City will follow to guide future transportation investments in Redwood City.

As part of its transportation program, Redwood City developed a prioritization process that evaluates projects according to a series of performance measures. Transportation performance measures are used to assess the current performance of Redwood City's transportation system, demonstrate the value of multimodal transportation projects, prioritize and inform investments, and help monitor change over time.

RWCmoves evaluated a list of transportation projects and programs that are currently in progress or previously identified, as well as new projects and programs that emerged through the Plan development process. Projects were prioritized based on a two-stage evaluation process. First, a draft list of projects was developed based on how the projects improve performance of the transportation system. Following the initial performance measure based prioritization process, a second policy feedback step was incorporated to finalize the list of projects. Based on this two-stage evaluation process, RWCmoves identifies "Tier 1" (top ranking projects) and Signature Projects (major infrastructure projects) that represent the community's values to improve mobility in Redwood City. **Appendix B** provides detailed information on the project prioritization process and results.

Updating the citywide, multimodal Transportation Impact Fee (TIF) program to incorporate the Plan's high priority projects and programs would generate more funding for their implementation. TIF programs assess fees on new development to fund transportation projects needed to support growth in the City. Redwood City's TIF program could generate funding for Tier 1 projects, select Tier 2 projects, and expected locally-funded portions of Signature Projects.

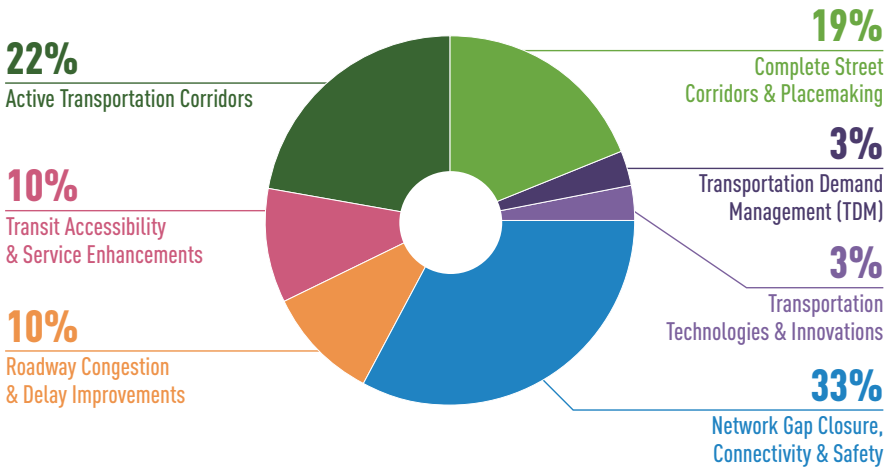
Project Categories

RWCmoves includes previously identified transportation projects and programs as well as a number of new projects and programs. New projects and programs were developed from community member and stakeholder input, as well as through the analysis of existing conditions and opportunities. Some new projects are entirely new efforts, while others are modifications of previously identified projects and programs. Based on their primary characteristics, the list of projects (see Appendix B) is organized into the following seven project categories:

- Active Transportation Corridors
- Complete Street Corridors and Placemaking
- Transit Access and Service Enhancements
- Roadway Congestion and Delay Improvements
- Network Gap Closure, Connectivity and Safety
- Transportation Technologies and Innovations
- Transportation Demand Management (TDM)

There are about 140 total projects included in the Plan prioritization process. **Figure 12** presents the proportion of projects within each project category. The remainder of this section provides detailed descriptions of each project category and improvement measures that could be considered as part or all of a project.

Figure 12: Division of Project List by Category



Source: Fehr & Peers, 2018.

Category 1: Active Transportation Corridors

Active transportation is any self-propelled, human-powered mode of transportation, such as bicycling or walking. Safer and more comfortable corridors encourage the use of active transportation, which can improve a person's overall health. Projects labeled as Active Transportation Corridors provide convenient connections for cyclists and pedestrians along corridors throughout the City and can enhance safety and reduce congestion. These types of projects include new or improved bicycle facilities, new or improved walking facilities, and better access to transit for active travel modes. Improved street design (wider sidewalks, low-stress bike routes, street trees, and street lighting) increases both the utilization of active transportation modes and spurs community interaction, which can in turn improve the health of the City's residents and increase economic activity.

Figure 13 shows the general locations of the Active Transportation Corridor projects included in the Plan.

Figure 13: Active Transportation Corridor Projects

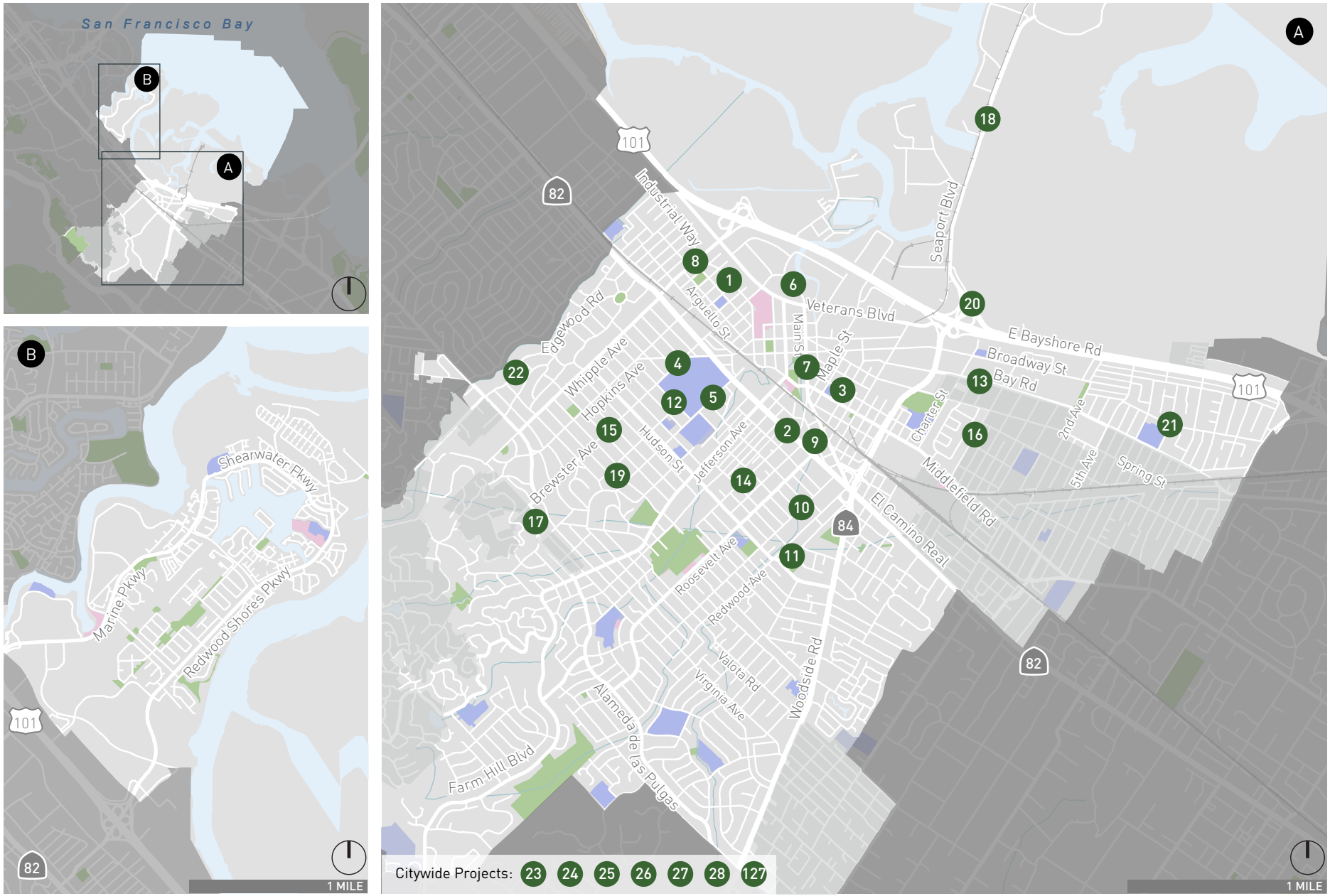


Figure 13

Active Transportation Corridor Projects

Pedestrian Hybrid Beacon (HAWK Signal)


Rectangular Rapid Flash Beacon
(aka Lighted Crosswalk)


High-Visibility Signs and Crosswalks

Advanced Yield Lines


Lane Reduction (aka Lane Reconfiguration)


Median Refuge Island


Curb Extension

Reduced Curb Radii


Pedestrian-Scale Lighting

Pedestrian Improvement Measures

Examples of pedestrian improvements that can improve the safety, comfort, and convenience of people who choose to walk include:

- **Pedestrian Hybrid Beacon (aka HAWK Signal):** Pedestrian Hybrid Beacons (PHBs), also known as High Intensity Activated Crosswalk (HAWK) Signals, are pedestrian-actuated signals that combine a beacon flasher and a traffic control signal. When actuated, PHBs displays a yellow (warning) indication followed by a solid red light. During pedestrian clearance, the driver sees a flashing red "wig-wag" pattern until the clearance interval has ended and the signal goes dark.
- **Rectangular Rapid Flash Beacon (Stutter Flash):** Rapid flashing LED lamps are installed on overhead signs, in advance of the crosswalk or at the crosswalk. The beacons may be push-button activated or activated with passive pedestrian detection.
- **High-Visibility Signs and Crosswalks:** High-visibility markings include a family of crosswalk striping styles including the "ladder" style. High-visibility fluorescent yellow green signs are posted at crossings to increase the visibility of a pedestrian crossings.
- **Advanced Yield Lines:** Standard white yield limit lines and "shark's teeth" are placed in advance of marked, uncontrolled crosswalks.
- **Lane Reduction (aka Lane Reconfiguration):** Lane reductions replace the existing number of vehicle travel lanes with a combination of wider sidewalks, bicycle lanes, vehicle parking, or converting parallel parking to angled or perpendicular parking.
- **Median Refuge Island:** Raised islands are placed in the center of a street, separating opposing lanes of traffic, and have cutouts along the pedestrian path.
- **Curb Extension:** Curb extension, also known as a pedestrian bulb-out, is a traffic-calming measure meant to slow traffic and increase driver awareness of pedestrians.
- **Reduced Curb Radii:** The radius of a curb can be reduced to require motorists to make a tighter turn. It consists of an extension of the curb into the street, making the pedestrian space (sidewalk) wider.
- **Pedestrian-Scale Lighting:** Pedestrian-scale light fixtures range in height between 12 and 18 feet (to light source) and can be stand-alone or attached to taller street light fixtures (ideally of the same style).

Enhanced Bicycle Lane

Cycle Track

Bicycle Signal

Protected Intersection

Bicycle Boulevard

Supportive Bicycle Facilities (example: bike locker)

Bicycle Improvement Measures

Bicycle improvements that increase the safety, comfort, and convenience of people who choose to bike include:

- **Bicycle Backbone Network:** A bicycle backbone network is a system of low-stress bicycle routes that provide safe and convenient and connections throughout the City. Low-stress bicycle routes include a network of bicycle boulevards, buffered bike lanes, and cycle tracks (see definitions below) that provided designated spaces for cyclists away from streets with high vehicle volumes (3,000 vehicles per day maximum) and high vehicle speeds (above 25 mph).
- **Enhanced Bicycle Lane:** Bicycle lanes are a portion of the street that are designated by signage, striping, and pavement markings for use of bicyclists. Bicycle lanes are most appropriate on streets with more than 3,000 vehicles per day and with posted speed limits greater than 25 mph. On streets with high vehicle volumes, truck traffic, high parking turnover, or speed limits greater than 35 mph, bicycle lanes can be enhanced to further separate vehicles from bicyclists. Bicycle lanes can be enhanced by adding a painted, landscaped buffer or parking-protected buffer.
- **Bicycle Signal:** Bicycle signals are traffic control devises that should only be used at existing traffic signals or hybrid beacons. Bicycle signals generally provide additional guidance for cyclists at intersections where their needs may differ from other road users. For example, bicycle signal phases, bicycle only movements, and lead bicycle intervals at signalized intersections.
- **Bicycle Boulevard:** Bicycle boulevards, also known as greenways, are streets with low traffic volumes and speeds that are designed to accommodate bicycle travel as a priority. Many local streets with low vehicle speeds and volumes are already conducive to safe bicycling environments. These types of streets can be enhanced with a range of treatments to create bicycle boulevards. Bicycle boulevards can provide direct access to destinations, slow motor vehicle speeds, reduce motor vehicle volumes, reduce bicyclist delay, provide safe and convenient crossings, and enhance surrounding environments.
- **Cycle Track:** Cycle tracks, often referred to as Class IV bicycle facilities, are bike facilities that physically separated from motor vehicle traffic and from the sidewalk. Cycle tracks can be designed as one-way protected or two-way cycle tracks, and can be at street level, sidewalk level, or at an intermediate level. Cycle tracks are most appropriate on streets that could cause many bicyclists to feel stress from factors such as high vehicle speeds, high vehicle volumes, multiple vehicle travel lanes, high parking turnover. They can also be considered on streets with high bicycle volumes and at locations where special considerations should be given, like near transit stops to manage bicycle and pedestrian conflicts.
- **Protected Intersection:** Protected intersections use a combination of design elements to create safe and comfortable conditions for bicyclists and pedestrians. Protected intersection design elements can include: high quality bicycle waiting areas at corners, colored pavement to guide bicycle travel paths, and narrowed intersections with small curb radii to reduce vehicle-turning speeds. Protected intersections slow turning vehicles, provide good sight lines for all users, and shorten bicycle and pedestrian crossing distances.
- **Supportive Bicycle Facilities:** Supportive facilities include bicycle racks, bicycle lockers, bicycle fix-it stations, and other features that make it easier for people to use a bicycle as a common mode of travel. These types of facilities should be located at locations with high demand and in areas that are most convenient for cyclists.

Category 2:
Complete Street Corridors and Placemaking

California's Complete Streets Act (AB 1358) was signed into law in 2008 and mandates that "complete street" policies and standards be incorporated into City General Plans. The "complete street" concept recognizes that transportation corridors have multiple users with different abilities and mode preferences (e.g., pedestrians, bicyclists, transit riders, and drivers) that need to be accommodated. An effective transportation system allows for the use of multiple modes and offers a variety of travel options for people to move around in ways that best suit them. Complete street corridor projects can make streets safer, more comfortable and convenient for people using all travel modes. Specific improvements that could be considered as part of complete street corridor projects include the placemaking improvements listed below, as well as improvements discussed in other sections, including Active Transportation Corridors, Transit Access and Service Enhancements, and Roadway Congestion and Delay Improvements.

Not only do public streets facilitate the movement of people and goods, they provide "places" for people to congregate, sit, watch, and interact. Creating vibrant and welcoming public spaces for people to live, work, and play is known as "placemaking." Placemaking improves spaces where people gather, such as streets and sidewalks, in order to generate greater activity and interaction between people. As the City continues to expand and invest in its infrastructure, improvements must also be made to enhance the streetscape realm, creating attractive environments for walking, biking, and transit to create a balanced transportation system.

Figure 14 shows the locations of the Complete Street Corridor and Placemaking projects included in the Plan.

Placemaking Improvement Measures

Placemaking improvements that can be used to enhance the streetscape and encourage activity include:

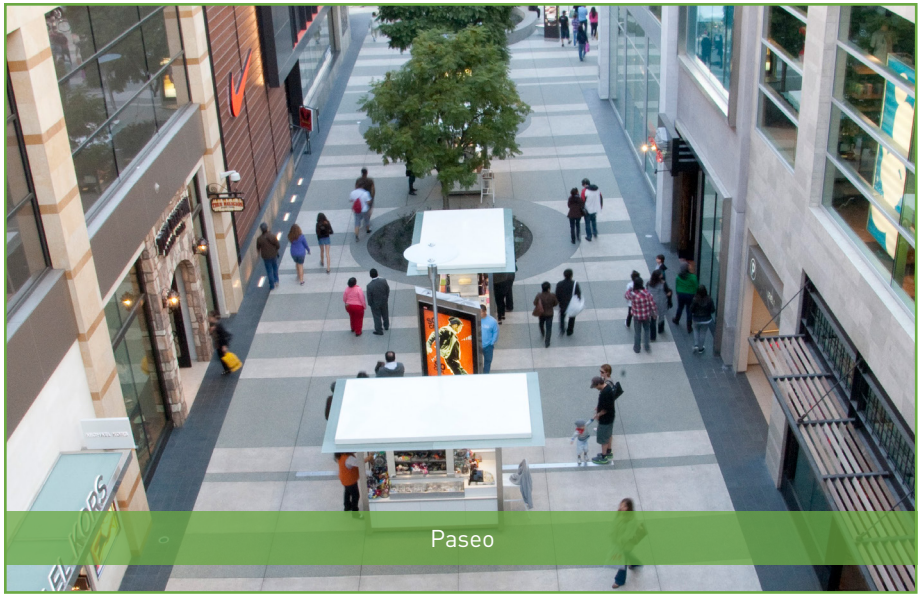
- **Public Art:** Public art can include sculptures, fountains, murals and other forms of art that encourage people to look around and explore their surroundings.
- **Public Seating:** Seating, such as traditional park benches or "parklets," provide comfortable and convenient places for people to sit and rest. Parklets, also known as street seats or curbside seating, are platforms that transform parking spaces into public seating areas and generally incorporate elements of landscaping (see description below) and/or bicycle racks. Parklets can be considered where there are narrow or congested sidewalks, or where local property owners or residents see a need to expand seating capacity in an area.

- **Public Plaza:** A plaza is an open public space that serves as a place where people gather, such as a city square.
- **Paseo:** A paseo, also known as a promenade, is a public place or path designed for walking.
- **Shared Space:** Shared space is a street design that minimizes the separation of bicyclists, pedestrians, and vehicles. This can be done by removing street markings, traffic lights, traffic signs, and curbs. By creating a greater sense of place and making it unclear what travel mode has priority, drivers will reduce their speed, and in turn improve safety for all users.
- **Landscaping:** Landscaping adds to the enjoyment of a place by providing scenery, offering shade, and separating people from moving vehicles on the street. Stormwater management and native vegetation are two common landscaping treatments that help create a sense of place. Stormwater management includes bioswales, permeable pavement, and rain gardens. Native vegetation are plants that are indigenous to the area and provide habitat for wildlife.
- **Wayfinding:** Wayfinding provides information signage about the direction, distance and sometimes travel time by mode to destinations. The signs are designed to create a sense of community, and make the destinations feel more walkable and bikeable.

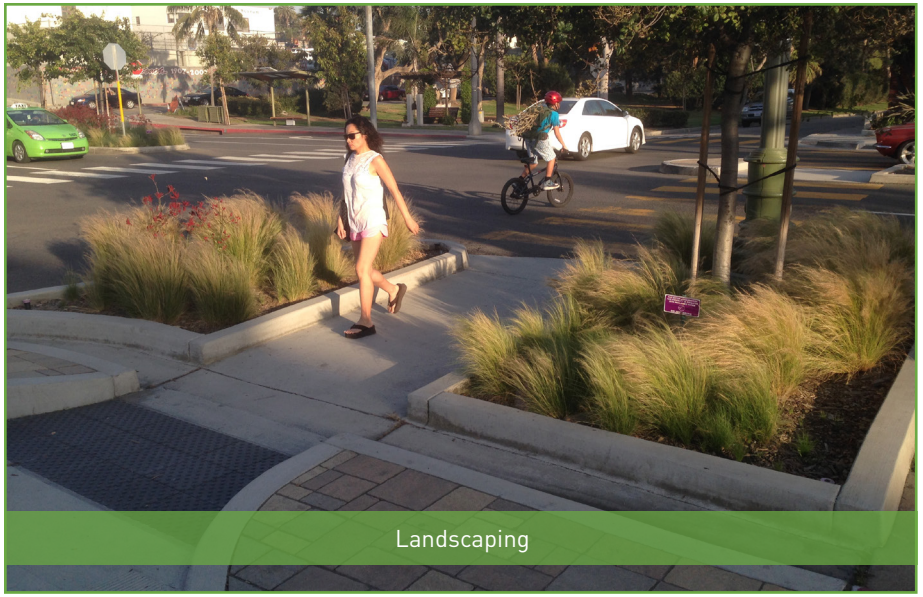

Public Art

Public Seating

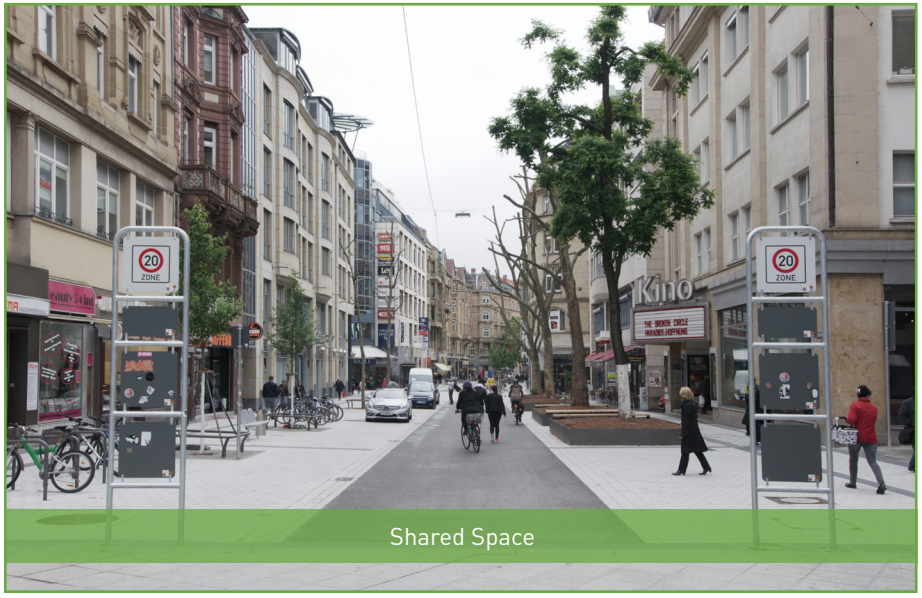
Public Plaza



Paseo



Landscaping



Shared Space

Wayfinding

Figure 14: Complete Street Corridors and Placemaking Projects

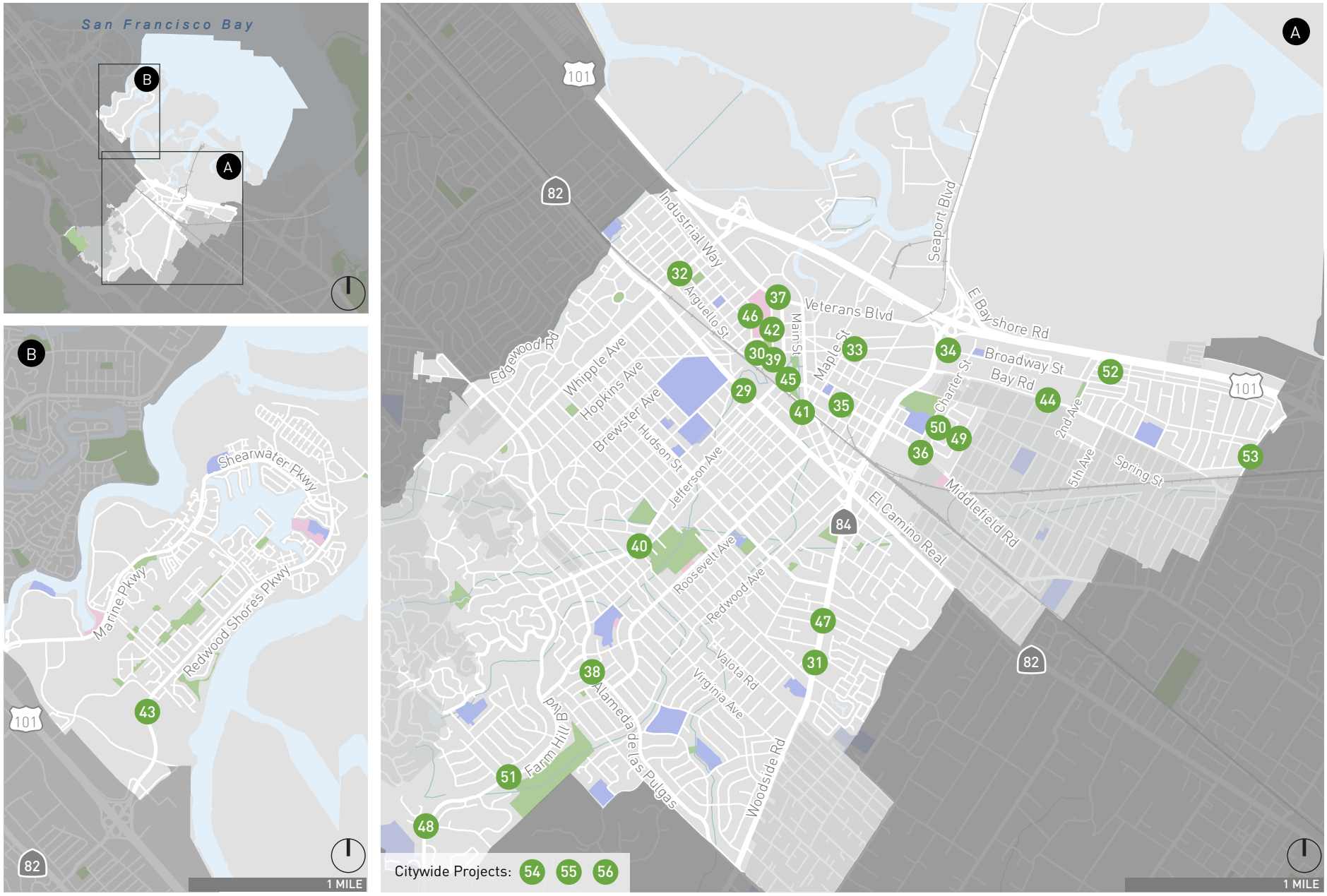


Figure 14

Complete Street Corridors and Placemaking Projects

Category 3:
Transit Access and Service Enhancements

Access, performance, convenience, and comfort are key factors for improving the public transportation experience and encouraging new riders. Projects that improve transit access and service seek to enrich the round-trip experience for users of public transportation by improving the transit service directly, or by developing transit-enhanced streets. Transit enhanced streets may receive a number of design elements to improve transit performance and/or the overall user experience for people who walk and take transit. Enhancements may range from streetscape improvements that make walking safer and easier, to transit shelters, or bus priority at intersections. Just as significant, providing reliable and frequent transit service that is convenient and safe, increases roadway capacity by reducing drive-alone trips, shifts more people to transit, and integrates transit access and service investments with the identity of the surrounding street.

Figure 15 shows the locations of the Transit Access and Service Enhancement projects included in the Plan.

Transit Access and Service Enhancement Measures

Several transit service enhancements that can increase multimodal connectivity throughout the City, and improve transit service and reliability for those who choose to take public transit include:

- **Transit Signal Priority (TSP):** TSP technology detects approaching transit vehicles to an intersection and extends green lights or shortens red lights to reduce transit delay. TSPs can increase frequency and reliability throughout the transit network, as well as reduce fuel costs and greenhouse gas emissions.
- **Integrated Passenger Information System:** Integrated passenger information system compiles traveler information from multiple transit providers into one place. Passenger information can include transit schedules and fares, real-time transit vehicle locations with estimated departure/arrival time, and wayfinding signage.
- **Enhanced Transit Stop:** Potential enhancements to transit stops include improved pedestrian access, waiting areas, shelters, seating, bicycle storage facilities, and lighting. These upgrades provide safe, comfortable, and convenient experience for passengers.
- **Demand-Responsive Transit:** Demand-responsive transit (DRT), sometimes referred to as dial-a-ride transit (DART) and flexible transport services, is a form of public transit offering flexible routing and scheduling of small/medium sized vehicles operating between origins and destinations according to passenger needs.
- **Queue Jump Lane:** Queue jump lanes (a transit only lane on the approach to a signalized intersection) allow transit vehicles to bypass traffic queues at signalized intersections. Queue jump lanes increase transit efficiency by reducing delay for buses at signalized intersections.
- **Bus Bulbouts:** Bus bulbouts are sidewalk extensions at transit stops that expand the curb space from the edge of the curb to the travel lane. Bus bulbouts reduce delay by eliminating the need for buses to pull in and out of traffic and they provide more space for amenities (i.e. bus shelters, wayfinding maps, landscaping). Bus bulbouts can also increase safety for riders as they no longer need to enter the street for boarding.
- **Access Improvements:** Access improvements make it easier to walk, bike or drive to transit stops. Examples include enhanced bike lanes, intersection treatments, park-and-ride lots, curb ramps, and crossing signals.

Transit Signal Priority (TSP)

Integrated Passenger Information System

Enhanced Transit Stop

Demand-Responsive Transit

Access Improvements

Bus Bulbouts

Figure 15: Transit Access and Service Enhancement Projects

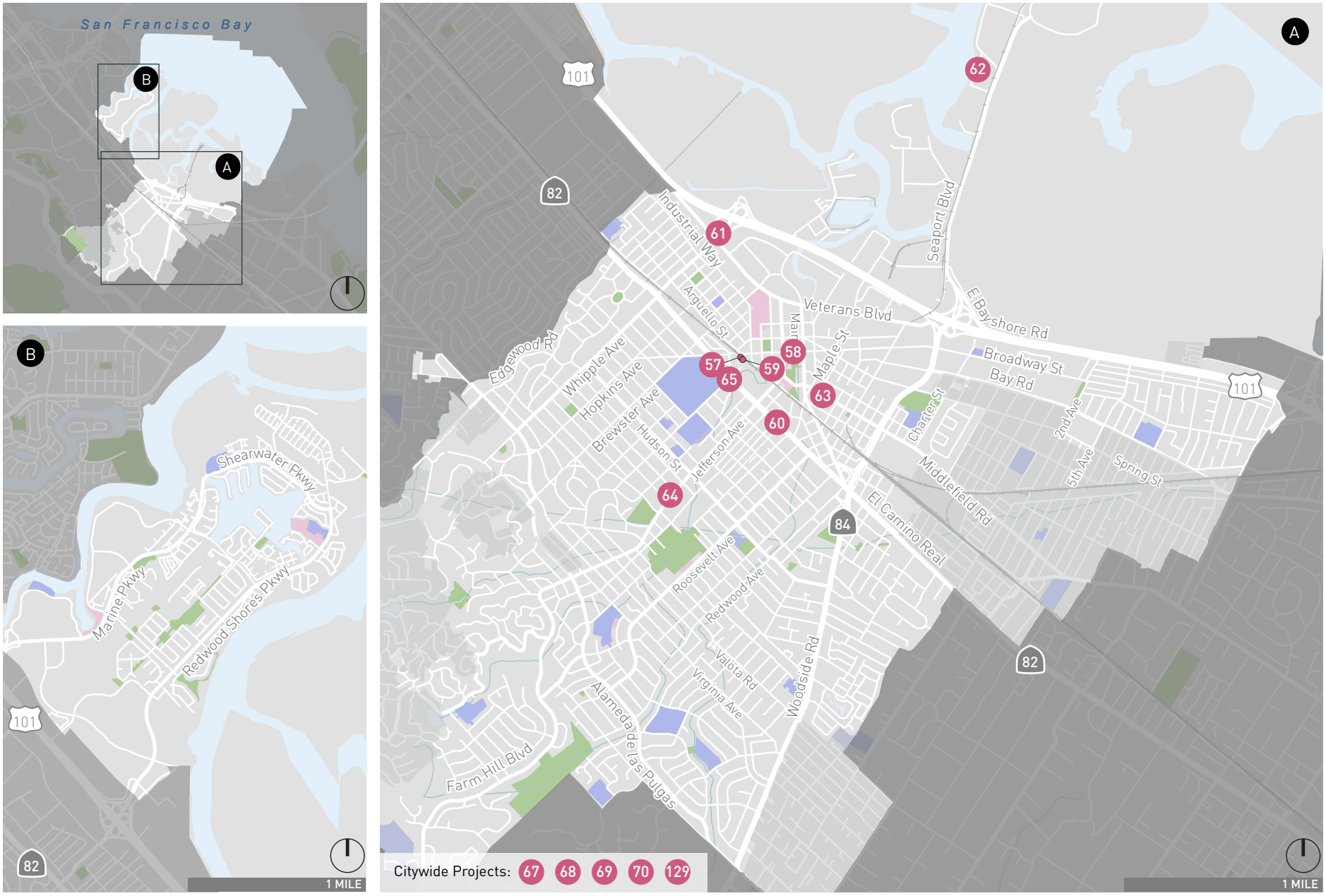


Figure 15

Transit Access and Service Enhancement Projects

Category 4:
Roadway Congestion and Delay Improvements

Areas with high employment activity, such as Downtown, Redwood Shores, Pacific Shores, and major streets that serve regional commuters, like Woodside Road and El Camino Real, experience greater-than-average levels of peak period congestion. Additionally, congestion is the greatest when both work commute and school trips peak, though only occurring for about 20 minutes on mornings when schools are in session. Proposed congestion and delay improvements include considerations for school traffic. In addition to the multimodal improvements identified, enhancements to directly reduce vehicle congestion and delay will improve the overall experience for all users. Enhancements may range from traffic flow improvements and turn-restrictions to make vehicles travel more efficiently along a corridor, to major intersection and interchange treatments. Improved transit access and service, TDM programs, and active transportation projects, increase person throughput and proactively help manage traffic congestion and reduce neighborhood cut-through traffic.

Figure 16 shows the locations of the Roadway Congestion and Delay Improvement projects included in the Plan.

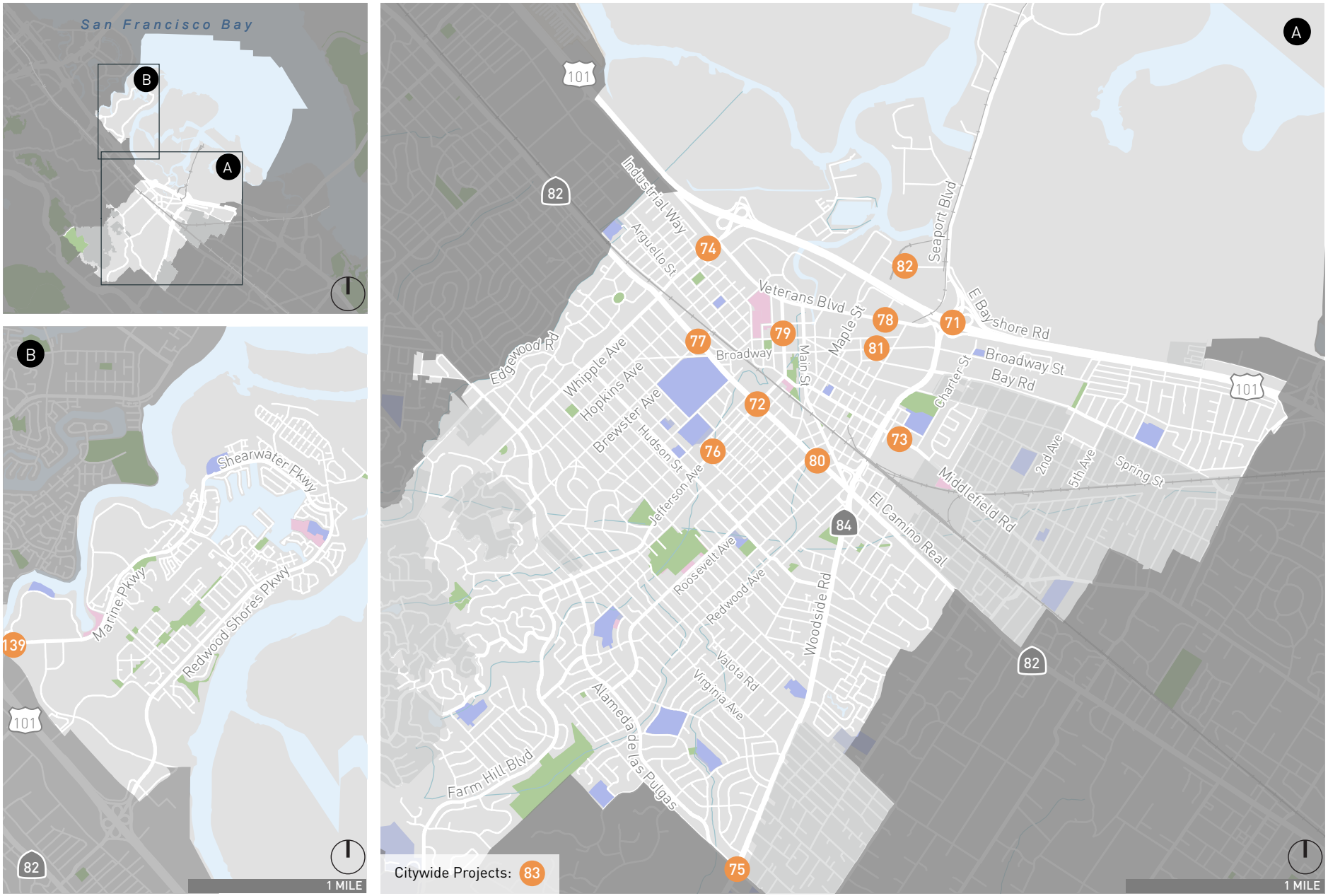
Roundabouts

Congestion and Delay Improvement Measures

Proposed congestion and delay improvements include:

- **Adaptive Signal Timing:** Adaptive signal timing is a specialized form of signal timing that dynamically adjusts signal cycles and phasing in response to real-time traffic conditions. It is most effective on heavily traveled corridors to reduce delays for all modes, including transit. Adaptive signal timing can reduce levels of congestion along a major street corridor, which benefits private automobiles and transit.
- **Signal Coordination:** Coordinated signal timing manages the movement and speed of vehicles to increase vehicle throughput. Coordinated signal timing should be considered along corridors with closely spaced signalized intersections (1/4 mile or less), and where there is a desire for a seamless flow of traffic or steady speed progression along a corridor. Signal coordination also provides the opportunity to monitor congestion and adjust signal timings through a central traffic management center.
- **Roundabouts:** Roundabouts accommodate high traffic levels in a way that can be more efficient and safer than standard signals. Installing roundabouts could reduce congestion and increase safety for all modes. Roundabouts should be considered at a wide range of intersections, but perform best at intersections with similar traffic volumes in all directions, and at intersections with heavy left turning movements.
- **School Transportation Programs**: The City should coordinate with schools to reduce congestion during peak times. For example, staggered school start times, school-focused transit, and safe routes to school programs can reduce vehicle travel during peak times.

Figure 16: Roadway Congestion and Delay Improvement Projects



Redwood City Limits
Sphere of Influence
Railroad
Parks
Schools
Public Facilities
Roadway Congestion and Delay Improvement Projects

Figure 16

Roadway Congestion and Delay Improvement Projects

Category 5: Network Gap Closure, Connectivity and Safety

Safety ranks as a top priority for many in Redwood City and is an important factor in creating a multimodal and accessible transportation network. Streets that are safe and stress-free are suitable for all ages and all modes of travel. In terms of transportation, concerns for physical safety stem from traffic speeds and volumes, conflict between different modes of travel, and a lack of dedicated infrastructure. With active modes of transportation becoming part of more people's everyday behavior, connectivity and safety measures must take into account the most vulnerable users – people walking and riding bikes. Enhancements may range from bicycle and pedestrian crossings across major barriers, such as US 101 and the railroad tracks, and safe routes to school programs to make walking safer and easier for children. These projects and programs can reduce congestion by making it easier and safer for people to make trips by non-driving modes.

Figure 17 shows the locations of the Network Gap Closure, Connectivity, and Safety projects included in the Plan.

Network Gap Closure and Connectivity Measures

Several measures that close gaps and improve connectivity in the network include:

- **Connection to Popular Destinations:** Providing bicyclists and pedestrians with convenient access to points of interest, such as schools, transit, parks, neighborhoods, and landmarks, enhances access to these popular destinations, promotes active transportation and reduces travel by vehicle.
- **Connection to Regional Trail Network:** Regional trail networks provide bicyclists and pedestrians with a low-stress travel route. Providing better access to regional trails promotes non-auto travel modes for people who choose to walk or bike and increases recreational opportunities.
- **New or Improved Street Connection:** Developing new or improved street connections increase access to destinations by expanding the potential number of routes. If implemented with active travel modes in mind, new or improved street connections can also encourage people to walk or bike by creating alternative routes that are safer or more convenient.
- **Grade Separation:** Grade separation is the process of aligning two or more travel routes, such as streets, railroad tracks, bike paths, or footpaths, at different heights (grades) so that they do not disrupt other intersecting modes of travel. Overpasses (bridges), underpasses (tunnels), or combinations of both are used for grade separations.

Connection to Regional Trail Network

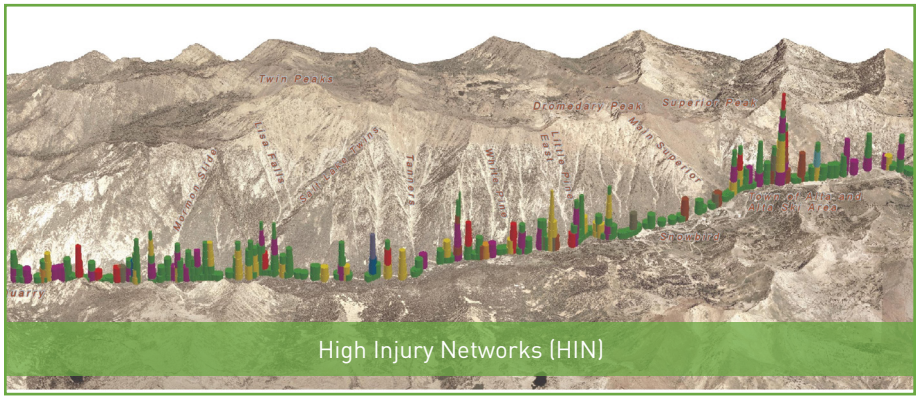
Grade Separation

Safety Measures and Programs

Several measures that can increase the safety and comfort for all travel modes along streets in the City include:

- **Safe Routes to School Program:** Safe routes to school programs increase the safety and convenience of children traveling to and from school. These programs create more opportunities for children to walk or bike to school, which could have a secondary benefit of decreasing vehicle trips.
- **Vision Zero Policy:** Vision Zero is an approach to street safety where no loss of life is acceptable. As part of advancing Vision Zero in the City, High Injury Networks (HIN) are the intersections, blocks, corridors, or community-wide locations with the highest safety issues. The HIN locations are determined using observed collision data and anticipated collision risk, and are used for recommending, designing, and funding safety countermeasures.
- **Leading Pedestrian Intervals (LPI):** A Leading Pedestrian Interval typically provides pedestrians crossing an intersection with a 3-7 second head start over vehicles traveling in the same direction. LPIs improve the visibility of pedestrians and enhance their right-of-way over turning vehicles, especially at locations with a history of pedestrian and vehicle conflicts.

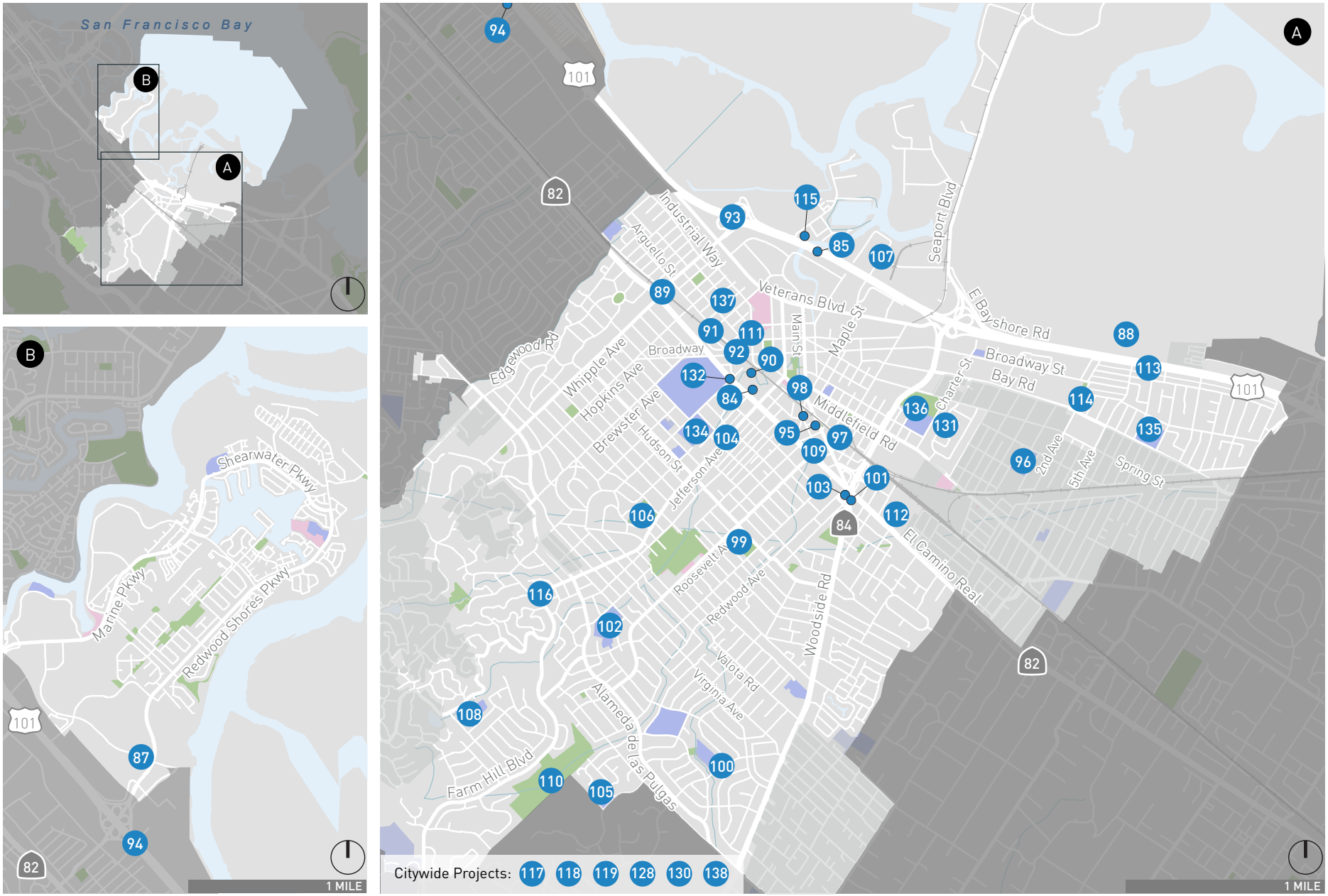
Safe Routes to School Program



High Injury Networks (HIN)


Leading Pedestrian Intervals (LPI)

Figure 17: Network Gap Closure, Connectivity and Safety Projects



Redwood City Limits
Sphere of Influence
Railroad
Parks
Schools
Public Facilities
Network Gap Closure, Connectivity and Safety Projects

Figure 17

Network Gap Closure, Connectivity and Safety Projects

Category 6: Transportation Technologies and Innovations

Technology is dramatically altering travel behavior and peoples' relationship with streets. Increasingly, TNCs and ridematching services are using mobile technology to connect ordinary drivers with passengers needing a ride, while carsharing companies provide easy, short-term access to a private car. These innovations offer a convenient and cost-effective alternative to buying and owning a car. In the future, AV technology may remove the need for human drivers. AVs will need to be properly managed and accommodated as they are released and become more widely used on public streets. Proactively working to develop strategies for all new types of innovations will help maximize the benefits of these new technologies for the City.

Electric Vehicle (EV) Strategy

Goods Delivery Strategy

Automated Vehicle (AV) Strategy

Curbspace Management Strategy

Transportation Technologies and Innovations Strategies

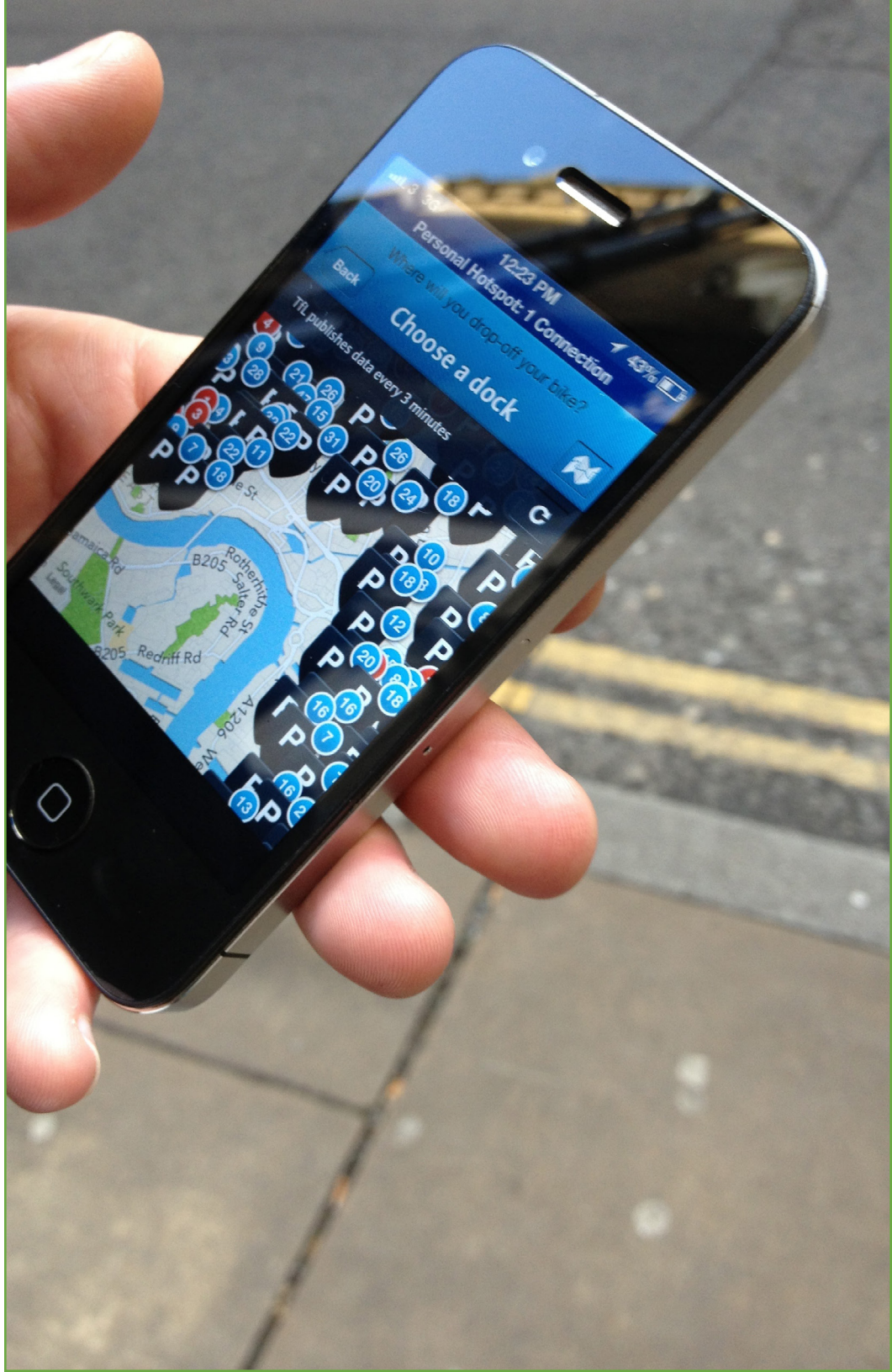
Projects and programs related to transportation technologies and innovations include:

- **Electric Vehicle (EV) Strategy:** Electric vehicle (EV) is a term used to describe any car that runs on battery power that is rechargeable from the electricity grid. Developing strategies that support, educate, and encourage more EV usage in the City will help reduce the environmental impacts of vehicle travel.
- **Automated Vehicle (AV) Strategy:** A citywide AV strategy proactively manages the new technology before it becomes available on public streets. This includes, but is not limited to, developing an AV policy, designating routes or areas where AVs can or cannot operate, adopting rules to govern parking and pick-up/drop-off areas, and managing curb space. AVs, while emerging quickly, are still relatively new to the transportation field, making it difficult to determine how and where the technology will be used.
- **Goods Delivery Strategy:** Goods delivery typically refers to the process of delivering goods to predefined locations. A goods delivery strategy will regulate automated delivery services, such as robotic deliveries, and typical goods delivery systems through a proactive designation of loading/unloading zones and enforcement. A comprehensive goods delivery strategy will not only address current delivery systems but also emerging technologies like automated delivery drones, which are unmanned aerial vehicles (UAVs) that can deliver lightweight packages to local destinations.
- **Curbspace Management Strategy:** Locations for designated pick-up and drop-off curb space for private shuttle services, such as employer shuttles, and shared ride services, like Lyft, could be determined by current demand and expected future need. Curb space located adjacent to popular designations, like downtown and Redwood City Station, could also be effectively managed through strategies in flexible or scheduled use.

Category 7: Transportation Demand Management (TDM)

In Redwood City, 73 percent of residents commute by driving alone. Drive-alone rates add to severe delays and traffic congestion, among other problems. A variety of programs and strategies, which are collectively referred to as Transportation Demand Management (TDM), influence long-term travel behavior and can reduce the percentage of commuters who drive alone. This is accomplished by providing attractive alternatives to driving alone, raising awareness of these alternatives, and by providing incentives to use them.

Per the Bay Area Air Quality Management District, all employers with 50 or more employees are required to offer commuter benefits and participate in the Bay Area Commuter Benefits Program. Building off of this, the City is developing a TDM Plan to reduce the number of residents and employees who drive alone to work. The TDM Plan will also include a framework for establishing a Transportation Management Association (TMA), which is a member-controlled, non-profit organization that provides transportation services within a specific area. The proposed TDM Plan is attached in **Appendix E**.

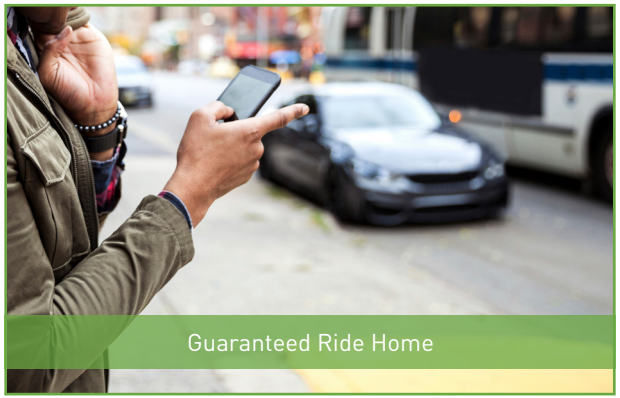



Shuttle Service


Rideshare/Carshare


Bikeshare

Carpool/Vanpool


Guaranteed Ride Home


Bicycle Facilities

Last-Mile Connection to Transit

Reduced Parking

Paid Parking

TDM Measures

TDM programs and strategies to reduce dependence on single-occupancy vehicles include:

- **Guaranteed Ride Home:** People who choose to use transit, carpools, or vanpools are guaranteed a ride home by their employer in case of emergency or if they need to work late, which helps to reduce concerns about not having a car at work.
- **Shuttle Service:** Operation of a shuttle service to nearby rail and transit stations and possibly to midday destinations makes it easier for people to use transit to get to work.
- **Rideshare/Carshare:** People who bike or walk or use transit, carpools, or vanpools can hail a rideshare vehicle or utilize a carshare vehicle located nearby, which helps to reduce concerns and inconveniences of not having a vehicle.
- **Bikeshare:** Bikeshare is a program that allows users to pick up bicycles at one location and return it to another location within the service area. A bikeshare program provides people with bicycles and potentially bicycle helmets that can help eliminate trips made by car during the day.
- **Carpool/Vanpool:** Ride-matching programs help carpools and vanpools to form by matching drivers and passengers and providing preferential parking. These programs reduce congestion by increasing the number of people in vehicles.
- **Bicycle Facilities (Infrastructure Improvements/Parking):** Improving bicycle infrastructure by filling in gaps in the network, upgrading existing facilities, and creating a low-stress bicycle network, providing bike parking, or installing wayfinding signage helps support bicycle riders and encourages more people to travel by bicycle.
- **Last-Mile Connection to Transit:** Shuttles or rideshare services, like Lyft, can be used as a last-mile strategy to get a group of people from a major transit stop to the employer location or home, making it easier for people to use transit even if they don't live or work close to a transit station or stop.
- **Flexible Work Hours:** Employees set or modify their arrival and departure times, which can provide the flexibility people need to use alternative modes.
- **Telecommuting:** Telecommuting allows employees to work from home or other locations, including coffee shops, co-working spaces, and libraries, via telephone, email, and on-line meetings. Telecommuting reduces trips made to an employer site.
- **Reduced Parking:** When combined with companion TDM measures, reduced parking discourages drive-alone commuting by limiting parking options.
- **Paid Parking:** Charging money for parking requires the user to consider the cost of driving, which includes parking, and will encourage people to use an alternative mode to driving alone.

Project Prioritization Process

Project prioritization for RWCmoves included a two-staged process. First, projects were evaluated based on the eleven performance measures. Second, policy feedback allowed for additional community input when finalizing the prioritized project list.

Performance Measures

Redwood City's transportation investments were first prioritized through an assessment of relevant and preferred performance measures. Performance measures were developed based on the City's Strategic Plan, input from the City and community members, Fehr & Peers' Active Transportation Performance Measures manual, and comparable cities' transportation system performance measures. The prioritization process assigns each project a score (1 to 5) based on the project's ability to help achieve each performance measure. Of the eleven performance measures, three received a "multiplier" to assign added weight to them. The weighted measures help to ensure that community values on safety, multi-modal transportation, and congestion relief were reflected in the prioritization process. Projects with the highest scores are projects that will have the greatest impact in achieving the City's long-term mobility goals.

Projects are rated on the following 11 performance measures with the noted weights:

- Increases safety for all travel modes (weighted with a multiplier of 3 to make safety the highest priority performance measure)
- Improves overall public health and minimizes environmental impacts
- Promotes attractive, well-designed streets through placemaking, public art, and improved landscaping
- Improves pedestrian facilities and street quality
- Improves bicycle facilities and street quality
- Improves access to transit and enhances multimodal connectivity
- Increases the share of people who walk, bike and take transit (weighted with a multiplier of 2 to prioritize projects that have the potential to increase non-driving trips)
- Increases person throughput and proactively manages traffic congestion (weighted with a multiplier of 2 to prioritize projects that help manage traffic congestion in the City)
- Accommodates all users, including people with disabilities, low-income, and the young and elderly, with equal access to goods and services.
- Project applies current design standards and is feasible and constructible
- Project has a positive return on investment

The remainder of this section defines each performance measure that Redwood City will use to prioritize projects.

Performance Measure 1: Increases Safety for All Travel Modes

Projects are measured on their expected safety benefit for all travel modes. Safety ranks as a top priority for many in Redwood City and is an important factor in creating a sustainable transportation network. Vision Zero, adopted by many cities around the world, is an approach to street safety that aims to achieve a transportation system with no fatalities or serious injuries. RWCmoves includes an official Vision Zero policy, and will continue to evaluate safety for all modes by tracking collisions and the details surrounding them, including where they occurred, when they occurred, who was involved, and what precipitating actions led to the crash. The frequency of severe collisions or collisions involving vulnerable populations, such as children and seniors, will also be monitored. Redwood City will also consider the risk of future collisions in evaluating projects by assessing surrounding built environment and traffic conditions. Anticipated collision risk or severity reduction is often determined based on vehicle volumes and speed, as well as the frequency with which a pedestrian or bicyclist interacts with vehicles. Projects that improve safety for all travel modes will receive a higher score under this performance measure. Based on input from the community, City Council, Planning Commission, and with guidance from the Complete Streets Advisory Committee, safety received a threefold weighting increase in the project prioritization process (compared to other performance measures).

Performance Measure 2: Improves Overall Public Health and Minimizes Environmental Impacts

Projects are measured based on a project's potential to increase health and environmental benefits, and its potential to reduce vehicle miles traveled (VMT). Transportation projects and programs have the ability to influence public health outcomes through their effects on individual activity and the natural environment. Active transportation investments can promote healthier lifestyles through increased access to physical activity and reduced exposure to pollutants. Redwood City can measure environmental impacts by tracking the average VMT by City residents. The California Governor's Office of Planning and Research (OPR) will soon require projects to assess a project's impact on the City's VMT. Projects that minimize the environmental impacts of transportation per capita will receive a higher score under this performance measure.

Performance Measure 3: Promotes Attractive, Well-Designed Streets through Placemaking, Public Art, and Improved Landscaping

Projects are measured based on a project's contribution to improved urban design and placemaking. Redwood City wants to create vibrant and welcoming public spaces for people to live, work, and play through transportation projects and programs. When located in public spaces, public art and events can serve as attractions that residents and visitors gather around. These relate to active transportation and the need for attractive and well-designed streets because many visitors arrive on foot or by bicycle and take part in the festivities by walking around. Projects that promote attractive and well-designed streets for people will receive a higher score under this measure.

Performance Measure 4: Improves Pedestrian Facilities and Street Quality

The quality of Redwood City's walking network is another measure by which the City assesses the transportation system performance. Projects that include pedestrian enhancements are measured based on the walking potential in a particular project location. Pedestrian projects are evaluated based on the Fehr & Peers' Active+ walking demand score in the City (see **Appendix D**). The Active+ tool reports Redwood City's pedestrian demand using a geographic information system (GIS) analysis. The pedestrian demand analysis considers existing activity levels (using Census Data), important attractors (transit, commercial corridors and districts, regional attractions, and major schools, employers and services), existing infrastructure support, and deficiencies (barriers and gaps, lack of facilities, collision rates). The Active+ tool assesses various geographic areas (i.e. street segments, intersections) in terms of their intrinsic potential to attract a specific level of walking activity. Using this approach, projects with higher walking potential in a particular project location will receive a higher score. The City should update its Active+ walking demand maps every two to three years.

Performance Measure 5: Improves Bicycle Facilities and Street Quality

The quality of Redwood City's bicycle network is a measure by which the City assesses the transportation system performance. Projects that include bicycle enhancements are measured based on the biking potential in a particular project location. Pedestrian projects are evaluated based on the Fehr & Peers' Active+ biking demand score in the City (see **Appendix D**). The Active+ tool reports Redwood City's bicycle demand using a GIS analysis. The bicycle demand analysis considers existing activity levels (using Census Data), important attractors (transit, commercial corridors and districts, regional attractions, and major schools, employers and services), existing infrastructure support, and deficiencies (barriers and gaps, lack of facilities, collision rates). The Active+ tool assesses various geographic areas (i.e. street segments, intersections) in terms of their intrinsic potential to attract a specific level of bicycling activity. Using this approach, projects with higher biking potential in a particular project location will receive a higher score. The City should update its Active+ biking demand maps every two to three years.

Performance Measure 6: Improves Access to Transit and Enhances Multimodal Connectivity

Evaluating pedestrian and bicycle access to transit and amenities near transit stations (first/last three-mile access) is a measure by which the City assess the transportation system performance. Identifying gaps in the multimodal transportation system helps prioritize those opportunities to improve connectivity throughout the City. The extent to which projects close gaps in the existing multimodal network, accommodate first/last three-mile access to transit, and provide links to existing trails or other facilities can also be tracked over time. Projects with the potential to increase transit ridership and improve multimodal network connectivity will receive a higher score under this measure.

Performance Measure 7: Increases the Share of People Who Walk, Bike and Take Transit

Mode split is an indicator of the presence and quality of bicycle, pedestrian, transit, and vehicular networks in Redwood City. Tracking travel behavior through overall volumes, ridership, and mode split in the City will be used to generate system-wide vehicle, bicycle, and pedestrian miles traveled over

time. The City will incorporate mode split data into the evaluation process in order to identify multimodal projects and invest in opportunities to encourage non-auto travel modes. Under this approach, projects with the potential to increase non-auto mode splits will receive a higher score. Based on input from the community, City Council, Planning Commission, and with guidance from the Complete Streets Advisory Committee, multimodal transportation received doubled weighting in the project prioritization process.

Performance Measure 8: Increases Person Throughput and Proactively Manages Traffic Congestion

Vehicular level-of-service (LOS) is often used to assess vehicular mobility. Travel times on key corridors indicates if the City is proactively managing traffic congestion. Redwood City can also work towards increasing person throughput by tracking pedestrian, bicyclist, transit and vehicular throughput and delay at key hotspots. Projects with the potential to increase person capacity and reduce person-delay will receive a higher score under this measure. Based on input from the community, City Council, Planning Commission, and with guidance from the Complete Streets Advisory Committee, congestion relief also received a doubled weighting.

Performance Measure 9: Accommodates All Users, Including People with Disabilities, Low-Income, and the Young and Elderly, with Equal Access to Goods and Services

Access to transportation options is not equal across all populations. Data from MTC-designated Communities of Concern (CoC) and Priority Development Areas (PDA) are used as a metric for evaluating equity. Communities of Concern are identified by census tract according to eight disadvantage factors: minority and low-income residents, non-English language speaking and zero-car households, seniors age 75+, persons with a disability, single-parent households, and cost-burdened renters. Using this approach, scoring for equity is based on a project's location within a CoC and/or a PDA (see **Appendix B**).

Performance Measure 10: Project Applies Current Design Standards and is Feasible and Constructible

In keeping with the state of the practice, all improvements should apply design standards that are current at the time of the implementation. Furthermore, the feasibility and constructability of a project are important criteria to consider, because if the project or program is infeasible or difficult to construct, then it will be difficult to implement. Project feasibility can be related to right-of-way constraints, jurisdictional responsibilities, costs, and other considerations. Projects are scored based on the expected project feasibility and compliance with current standards.

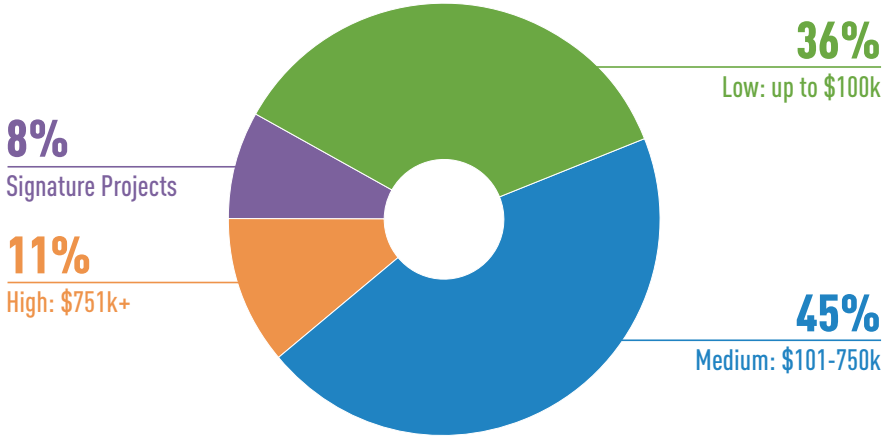
Performance Measure 11: Project has a Positive Return on Investment

Projects are evaluated on whether they will provide a positive return on investment. Project costs and benefits are qualitative estimates based on project descriptions. A future cost-benefit analysis could be completed for representative projects to more accurately determine expected return on investment. Under this measure, the expected project costs are weighted against project benefits. Projects with more benefits in relation to costs receive a higher score.

Generalized Project Costs

Order of magnitude project costs are beneficial in identifying the largest scale transportation improvements and generating a high-level understanding of available funding need to complete the project. Estimated project costs are assigned to each project as low (up to $100,000), medium ($100,001 to $750,000) or high (more than $750,000), and "Signature Projects," which are projects that include major changes to infrastructure. **Figure 18** shows the proportion of projects by cost. The majority of projects and programs included as part of RWCmoves are estimated to cost below $750,000 to implement.

Figure 18: Division of Project List by Order of Magnitude Cost



Policy Feedback on Prioritization Process

Following the initial evaluation process, a policy feedback step is included to help ensure that community values are reflected in the final list of Tier 1 Projects (see **Table 3**). To accomplish this, the City's Complete Streets Advisory Committee and neighborhood associations are provided the opportunity to review and offer qualitative input on the final list of project priorities. The Complete Streets Advisory Committee has the option to review and request that City Staff examine the evaluation scoring results for any projects included in RWCmoves and can provide input on the final list of Tier 1, Signature, and Tier 2 Projects and Programs. Similarly, each of the City's neighborhood associations have the opportunity to provide input on Neighborhood Priority Projects (Tier 1) in their neighborhood.

Once the Complete Street Advisory Committee and neighborhood associations have had the opportunity to provide input on the project prioritization process, City Staff reviews the feedback and develops the final lists of Tier 1, Signature, and Tier 2 projects and programs.


HISTORY MUSEUM

PERFORMANCE MEASURES AND PRIORITIZATION PROCESS

Project Sources

- General Plan
- Precise Plans
- Ongoing Transportation Planning Projects
- RWCmoves Existing Conditions
- RWCmoves Community Outreach

140+ Projects

Project Costs

- Low (up to $100k)
- Medium ($100k to $750k)
- High (more than $750k)
- Signature Projects

Project Categories

- Active Transportation Corridors
- Complete Street Corridors and Placemaking
- Transit Accessibility and Service Enhancements
- Roadway Congestion and Delay Improvements
- Network Gap Closure, Connectivity and Safety
- Transportation Technologies and Innovations
- Transportation Demand Management (TDM)

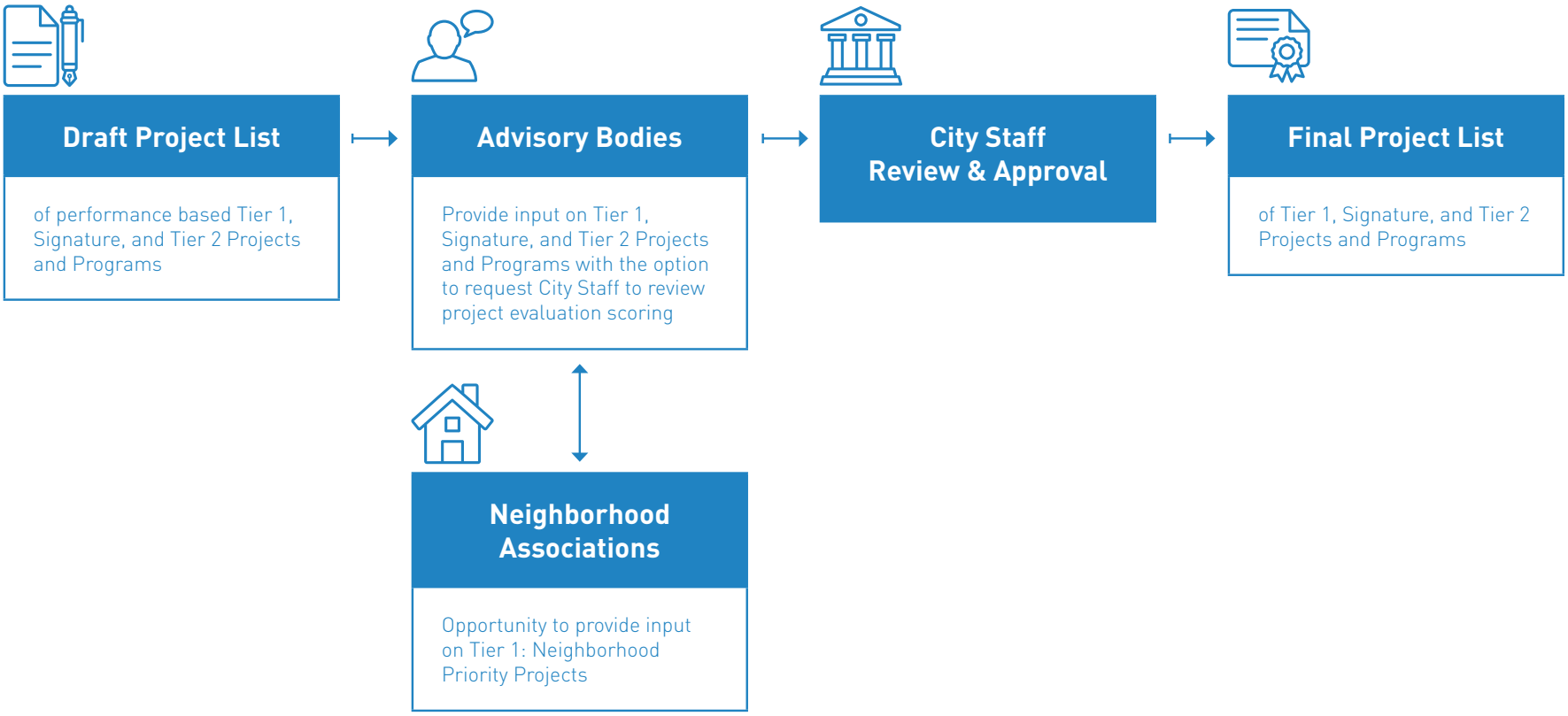
Performance Measure and Performance Criteria

- ★★★ Increases safety for all travel modes
- ★ Improves overall public health and minimizes environmental impacts
- ★ Promotes attractive, well-designed streets through placemaking, public art, and improved landscaping
- ★ Improves pedestrian facilities and street quality
- ★ Improves bicycle facilities and street quality
- ★ Improves access to transit and enhances multimodal connectivity
- ★★ Increases the share of people who walk, bike and take transit
- ★★ Increases person throughput and proactively manages traffic congestion
- ★ Accommodates all users, including people with disabilities, low-income, and the young and elderly, with equal access to goods and services.
- ★ Project applies current design standards and is feasible and constructible
- ★ Project has a positive return on investment

Total Evaluation Score

Draft Project List

POLICY FEEDBACK ON PRIORITIZATION PROCESS



Final Tier 1 Projects and Programs

Projects with the greatest impact in achieving the City's long-term mobility goals are categorized as "Tier 1 Projects." Tier 1 Projects (as shown in **Table 3**) are organized into three categories: Top Scoring Projects, Early Investment Projects, and Neighborhood Priority Projects. These subcategories help to ensure projects considered to be Tier 1 received the highest evaluation scores, but also did not exclude projects that can be easily implemented and/or key projects dispersed and equally distributed throughout the City. Key attributes considered for each subcategory are described below.

Top Scoring Projects

Top Scoring Projects are the projects that received the highest evaluation scores of all RWCmoves projects. Top Scoring Projects are all projects scoring at least 65 out of 75 total points possible. RWCmoves includes nine Top Scoring Projects.

Early Investment Projects

Early Investment Projects are those scoring at least 40 out of 75 total points, identified to be low in cost (below $100,000), applies current design standards and are feasible for construction. RWCmoves includes fifteen Early Investment Projects with scores ranging from 40 to 59.

Neighborhood Priority Projects

Neighborhood Priority Projects are projects that provide benefits to the surrounding neighborhood. To help ensure a more equitable distribution of the City's investments, Neighborhood Priority Projects were evaluated separately within each of the City's neighborhoods. Each of the seventeen neighborhoods in Redwood City that did not already have a Tier 1 or Signature Project within its boundaries received one Neighborhood Priority Project. As a result, RWCmoves includes nine Neighborhood Priority Projects with scores ranging from 35 to 57.

Following the process of policy feedback on prioritization, RWCmoves includes 32 Tier 1 Projects and Programs with scores ranging from 35 to 68.

The final list of Tier 1 Projects and Programs are listed in **Table 3** along with their project description, category, and cost ranges.

Table 3: RWCmoves Final List of Tier 1 Projects and Programs

Number	Title	Description	Category	Cost Range	Score (Max 75)
Tier 1: Top Scoring Projects					
23	Bicycle Master Plan	Develop stand alone Bicycle Master Plan for Redwood City. The Bicycle Master Plan would provide a more detailed analysis of existing conditions for bicyclists, and recommend projects and programs aimed specifically at increasing bicycle ridership in the City.	Active Transportation Corridors	Low: up to $100k	66
25	Pedestrian Master Plan	Develop stand alone Pedestrian Master Plan for Redwood City. The Pedestrian Master Plan would provide a more detailed analysis of existing conditions for pedestrians, and recommend projects and programs aimed specifically at increasing pedestrian activity in the City.	Active Transportation Corridors	Low: up to $100k	65
31	Woodside Road Complete Street Corridor Study	Conduct a Complete Street Corridor Study of Woodside Road to evaluate potential enhancements to all modes that increase safety and reduce travel time through the corridor.	Complete Street Corridors and Placemaking	Medium: $101-750k	66
54	Complete Streets Design Guidelines	Develop Complete Streets Design Guidelines. Guidelines would incorporate industry best practices, such as recommendations from the National Association of City Transportation Officials (NACTO), and also be tailored to meet the City's local needs and desires.	Complete Street Corridors and Placemaking	Low: up to $100k	65
84	Downtown Precise Plan Implementation: New Downtown Street Connections	Establish plan lines for new street segments identified in the Downtown Precise Plan that would be constructed as redevelopment occurs [See page 50 of Downtown Precise Plan for more information].	Network Gap Closure, Connectivity and Safety	Medium: $101-750k	68
85	Bay Trail (between Whipple Avenue and Woodside Road) Enhancements	Support, evaluate and design projects to improve bicycle and pedestrian travel along and connecting with the Bay Trail between Whipple Avenue and Woodside Road.	Network Gap Closure, Connectivity and Safety	Medium: $101-750k	68
88	Bay Trail (south of Woodside Road) Enhancements	Support, evaluate and design projects to improve bicycle and pedestrian travel along and connecting with the Bay Trail south of Woodside Road.	Network Gap Closure, Connectivity and Safety	Medium: $101-750k	67

(Continue on page 73)

Table 3: RWCmoves Final List of Tier 1 Projects and Programs

Number	Title	Description	Category	Cost Range	Score (Max 75)
117	Vision Zero Strategic Plan	Develop and adopt a strategic plan to meet the goal of eliminating traffic fatalities and serious injuries for all modes by 2030.	Network Gap Closure, Connectivity and Safety	Medium: $101-750k	65
124	Citywide Transportation Demand Management (TDM) Strategy	Adopt Citywide Transportation Demand Management (TDM) ordinance to reduce drive-alone trips for major employers.	Transportation Demand Management (TDM)	Medium: $101-750k	65
Tier 1: Early Investment Projects					
14	Vera Avenue Bicycle Boulevard	Design and install bicycle boulevard (Class III) along Vera Avenue between Alameda de las Pulgas and El Camino Real.	Active Transportation Corridors	Low: up to $100k	52
24	Wayfinding Signage Program	Develop and install citywide wayfinding signage network to popular destinations, such as Redwood City Transit Center & Station, Downtown, Woodside Road, parking areas, and low-stress bicycle network.	Active Transportation Corridors	Low: up to $100k	59
39	Theatre Way Pedestrian Improvements	Develop plans and construct Theatre Way as a permanent pedestrian street.	Complete Street Corridors and Placemaking	Low: up to $100k	54
69	Transit Access Improvements	Collect inventory, design, and construct accessibility improvements to transit stops throughout Redwood City to meet current ADA requirements.	Transit Accessibility and Service Enhancements	Low: up to $100k	50
79	Jefferson Avenue Operational Analysis	Evaluate traffic operations on Jefferson Avenue, between Veterans Boulevard and El Camino Real, to reduce delays associated with special events, high pedestrian volumes, and parking garages.	Roadway Congestion and Delay Improvements	Low: up to $100k	40
96	Fair Oaks Community School Safe Routes to School	Support San Mateo County's efforts to implement recommended projects and programs at Fair Oaks Community School from the Redwood City Safe Routes to School Report (2013).	Network Gap Closure, Connectivity and Safety	Low: up to $100k	57

(Continue on page 74)

Table 3: RWCmoves Final List of Tier 1 Projects and Programs

Number	Title	Description	Category	Cost Range	Score (Max 75)
118	Crosswalk Program	Develop formal crosswalk program to manage and maintain crosswalks in the City, and identify policies for striping new crosswalks based on citizen requests, pedestrian demand and other City priorities.	Network Gap Closure, Connectivity and Safety	Low: up to $100k	54
119	Update ADA Transition Plan	Update the City's existing ADA Transition Plan to include all public rights of way and identify prioritization process for improving accessibility of curb ramps and sidewalks.	Network Gap Closure, Connectivity and Safety	Low: up to $100k	52
125	On-Street Bicycle Parking Downtown Expansion	Expand on-street bicycle parking in retail areas, near important public facilities, and at various high bicycle demand locations in the Downtown area.	Transportation Demand Management (TDM)	Low: up to $100k	54
127	Bicycle Education and Encouragement Program	Implement formal bicycle education and encouragement program designed to increase safety, enhance skills, and build confidence for people of all ages and abilities.	Active Transportation Corridors	Low: up to $100k	51
128	Sidewalk and Pedestrian Access Program	Develop formal sidewalk and pedestrian access program to manage and maintain pedestrian access in the City, and identify policies for maintaining or adding sidewalks based on citizen requests, pedestrian demand and other City priorities.	Network Gap Closure, Connectivity and Safety	Low: up to $100k	55
129	Enhanced Bus Routes and Stops Program	Identify and evaluate potential enhancements to bus routes and stops, such as opportunities for new or expanded bus routes.	Transit Accessibility and Service Enhancements	Low: up to $100k	46
130	Intersection Safety Improvements Program	Develop formal intersection safety improvements program to manage and maintain safe intersections in the City, and identify policies for improvements based on citizen requests, pedestrian and bicycle demand and other City priorities.	Network Gap Closure, Connectivity and Safety	Low: up to $100k	58
137	Orion Safe Routes to School Project	Complete a walking and bicycling audit for the school.	Network Gap Closure, Connectivity and Safety	Low: up to $100k	50

(Continue on page 75)

Table 3: RWCmoves Final List of Tier 1 Projects and Programs

Number	Title	Description	Category	Cost Range	Score (Max 75)
Tier 1: Neighborhood Priority Projects					
4	Brewster Avenue Cycle Track	Evaluate, design and install cycle track (Class IV) along Brewster Avenue from Main Street to Fulton.	Active Transportation Corridors	Medium: $101-750k	57
17	Alameda de las Pulgas Buffered Bicycle Lanes	Evaluate, design and install buffered (Class II) bicycle lanes along the entire length of Alameda de las Pulgas.	Active Transportation Corridors	Low: up to $100k	46
22	Edgewood Road Buffered Bicycle Lanes	Evaluate, design and install buffered (Class II) bicycle lanes along the entire length of Edgewood Road.	Active Transportation Corridors	Medium: $101-750k	35
36	Middlefield Road (South of Woodside Road) Corridor Study	Conduct a Complete Street Corridor Study of Middlefield Road, south of Woodside, to evaluate potential enhancements to all modes that increase safety and reduce vehicle and transit travel times through the corridor.	Complete Street Corridors and Placemaking	Medium: $101-750k	57
38	Alameda de las Pulgas Complete Corridor Study	Conduct a Complete Street Corridor Study of Alameda de las Pulgas to evaluate potential enhancements to all modes that increase safety and reduce travel time through the corridor.	Complete Street Corridors and Placemaking	Medium: $101-750k	55
40	Jefferson Avenue Complete Street Corridor Study	Conduct a Complete Street Corridor Study of Jefferson Avenue to evaluate potential enhancements to all modes that increase safety and reduce travel time through the corridor.	Complete Street Corridors and Placemaking	Medium: $101-750k	52
43	Redwood Shores Parkway Complete Street Corridor Study	Conduct a Complete Street Corridor Study of Redwood Shores Parkway to evaluate potential enhancements to all modes that increase safety and reduce travel time through the corridor.	Complete Street Corridors and Placemaking	High: $751k+	50
100	Massachusetts Avenue Corridor Improvements	Evaluate, design, and install roadway modifications to reduce vehicle speeding and to increase safety for people crossing Massachusetts Avenue, between Woodside Road and Alameda de las Pulgas.	Network Gap Closure, Connectivity and Safety	Low: up to $100k	55
108	Roy Cloud School Safe Routes to School	Design and construct "Medium" priority improvements from the Redwood City Safe Routes to School Report (2013).	Network Gap Closure, Connectivity and Safety	Medium: $101-750k	51

Source: Fehr & Peers, 2018.

Conceptual Renderings of Select Tier 1 Projects and Programs

Vera Avenue/Maple Street (Before)

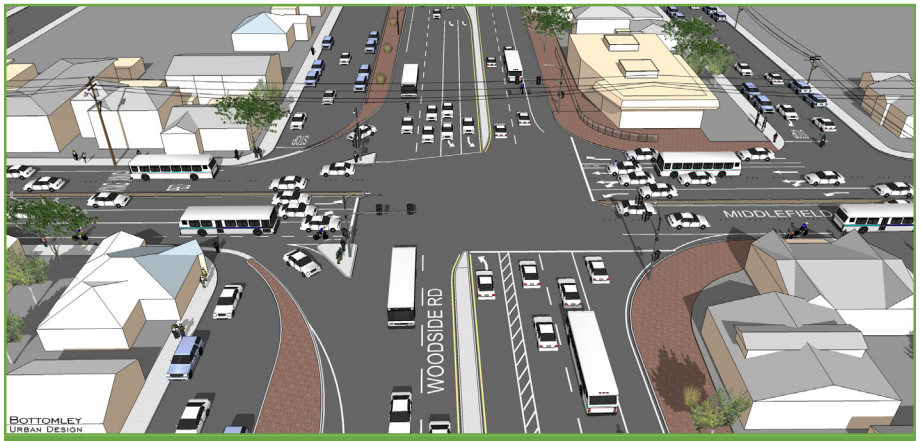
Redwood Shores Parkway (Before)

Vera Avenue/Maple Street (After)

Redwood Shores Parkway (After)

Conceptual Renderings of Select Tier 1 Projects and Programs

Jefferson Avenue/Cleveland Street (Before)



Woodside Road/Middlefield Road (Before)

Jefferson Avenue/Cleveland Street (After)

Woodside Road/Middlefield Road (After)

Conceptual Renderings of Select Tier 1 Projects and Programs

Whipple Avenue (Before)

Whipple Avenue (After)


REDWOOD CITY
CLIMATE BEST BY GOVERNMENT TEST
Maple St

Final Signature Projects and Programs

Signature Projects include major changes to infrastructure, such as railroad grade separations, redesigned interchanges, or new transit services and stations. These projects represent some of the larger and more complex concepts identified during development of the Plan.

Several Signature Projects support construction for full railroad grade separations at various locations throughout the City. Due to the scale and complexity of these Signature Projects, a feasibility study would be required as a next step by the City to determine each project's practicality and evaluate potential design concepts. RWCmoves recommends two separate feasibility studies be conducted to evaluate options for full railroad grade separation in the City. The division of scope for these feasibility studies was determined based on a project's location and proximity to adjacent at-grade rail crossings. One feasibility study would review the Whipple Avenue, Brewster Avenue and Marshall Street-Broadway Railroad Grade Separation project locations, while the other would evaluate the Main Street, Chestnut Street and Maple Street Railroad Grade Separation project locations. These railroad grade separation feasibility studies are noted in **Table 4** as the next step towards implementing full grade separations in Redwood City.

Following the process of policy feedback on prioritization, RWCmoves includes 10 Signature Projects with scores ranging from 54 to 69. The final list of Signature Projects and Programs are listed in **Table 4** along with their project description, category, and cost ranges.

Table 4: RWCmoves Final List of Signature Projects and Programs

#	Project	Description	Next Steps	Category	Cost Range	Evaluation Score
Railroad Grade Separation Signature Projects						
89	Whipple Avenue Railroad Grade Separation	Evaluate Whipple Avenue and railroad grade separation and consider opportunities to improve connectivity across the railroad tracks for people walking and biking.	Railroad Grade Separation Feasibility Study	Network Gap Closure, Connectivity and Safety	Signature Projects	65
91	Brewster Avenue Railroad Grade Separation	Evaluate Brewster Avenue and railroad grade separation and consider opportunities to improve connectivity across the railroad tracks for people walking and biking.		Network Gap Closure, Connectivity and Safety	Signature Projects	64
92	Marshall Street - Broadway Railroad Grade Separation	Evaluate Marshall Street - Broadway and railroad grade separation and consider opportunities to improve connectivity across the railroad tracks for people walking and biking.		Network Gap Closure, Connectivity and Safety	Signature Projects	64
95	Main Street Railroad Grade Separation	Evaluate Main Street and railroad grade separation and consider opportunities to improve connectivity across the railroad tracks for people walking and biking.	Railroad Grade Separation Feasibility Study	Network Gap Closure, Connectivity and Safety	Signature Projects	58
97	Chestnut Street Railroad Grade Separation	Evaluate Chestnut Street and railroad grade separation and consider opportunities to improve connectivity across the railroad tracks for people walking and biking.		Network Gap Closure, Connectivity and Safety	Signature Projects	55
98	Maple Street Railroad Grade Separation	Evaluate Maple Street and railroad grade separation and consider opportunities to improve connectivity across the railroad tracks for people walking and biking.		Network Gap Closure, Connectivity and Safety	Signature Projects	55

(Continue on page 82)

Table 4: RWCmoves Final List of Signature Projects and Programs

#	Project	Description	Next Steps	Category	Cost Range	Evaluation Score
Other Signature Projects						
57	Redwood City Transit Center: Implement Short to Medium Term Improvements	Design and implement short to medium-term enhancements to the Redwood City Transit Center to improve bus operations and facilitate intermodal transfers. For example, provide long-term bicycle parking, such as a bicycle station, at Redwood City Transit Center.	Proceed with Project Design	Transit Accessibility and Service Enhancements	Signature Projects	69
58	Broadway Street Streetcar Project: Phase II	The Broadway Streetcar Study is currently assessing the feasibility of a Broadway Streetcar line. Next steps would include completing Environmental Clearance and Engineering Design.		Transit Accessibility and Service Enhancements	Signature Projects	66
62	Commuter Ferry Service	Study and develop conceptual design of ferry terminal and identify potential private funding partners to support project. If the study determines that the project is feasible and fundable, then a second project would be to design and construct terminal and coordinate with WETA to operate.	Conduct Long Term Vision Study	Transit Accessibility and Service Enhancements	Signature Projects	54
71	US 101 and Woodside Road Interchange Improvements	Construct US 101 and Woodside Road interchange improvements.	Secure Funding	Roadway Congestion and Delay Improvements	Signature Projects	63

Source: Fehr & Peers, 2018.

Conceptual Renderings of Select Signature Projects and Programs

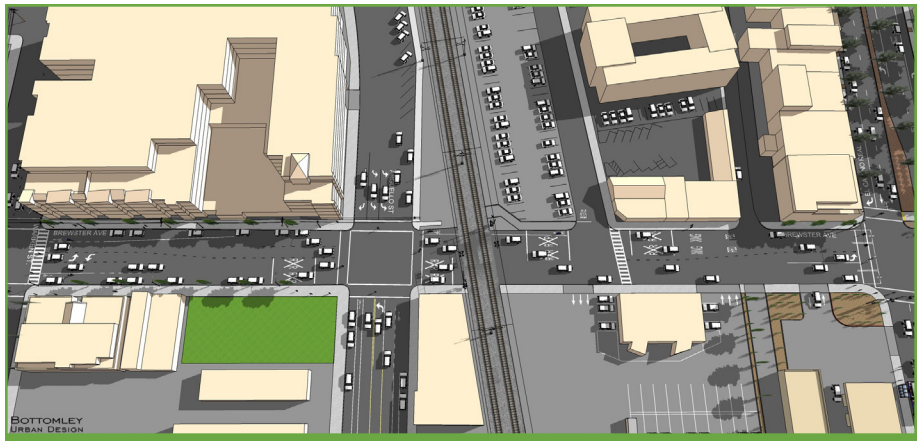
Brewster Avenue Grade Separation (Before)

Brewster Avenue Grade Separation (Before)

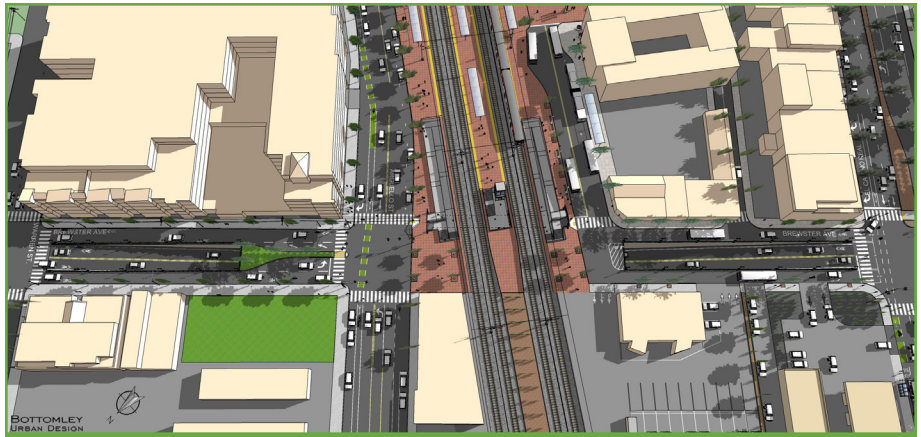
Brewster Avenue Grade Separation (After)

Brewster Avenue Grade Separation (After)

Conceptual Renderings of Select Signature Projects and Programs



Brewster Avenue Grade Separation (Before)



Brewster Avenue Grade Separation (After)

Monitoring Projects Over Time

RWCmoves acknowledges travel behavior is hard to predict and that sometimes projects or programs are not as effective as intended. Recognizing the importance maximizing the benefits of transportation projects, the City should include the option to monitor projects after they have been implemented in order to assess projects overtime, evaluate their effectiveness, and ensure consistency with community values. Depending on the type of project, the City could conduct surveys, count activities of vehicles, bicycles, and pedestrians, and/or observe behavior to gauge progress and adjust as needed over time.

Regularly Updating Project Priority List

RWCmoves acknowledges that projects and programs identified in **Chapter 4** may need to be periodically reevaluated in order to ensure they remain feasible, cost-effective and consistent with the RWCmoves transportation vision. As a result, in order to maximize the benefits of transportation projects, the City should reevaluate project priorities on a periodic basis – typically every two to three years. This process may also involve adding new projects to the evaluation framework. Conducting periodic updates will ensure the set of Tier 1 projects remains current and that RWCmoves is adaptable and resilient to the expected future changes in transportation.

In addition, the City should consider monitoring select projects after they have been implemented in order to evaluate their effectiveness and ensure ongoing consistency with community values. Depending on the type of project, the City could conduct surveys, count pedestrians, bicyclists, transit users, and vehicles, and/or observe typical travel behavior.

Chapter Five

5

Where Do We Go From Here?

(Action Plan/Implementation)

To advance RWCmoves' transportation program, the City should take several implementation actions to ensure the City's vision for its transportation future comes to fruition. These include several General Plan modifications to align the City's General Plan with RWCmoves, identifying funding strategies for transportation programs and projects, and ensuring the RWCmoves transportation program remains current through regular updates.

The implementation actions recognize that the transportation system, including supporting services, technologies, and improvement projects, will change over time. Thus, RWCmoves is intended to be a living document that should be updated every two to three years to allow the plan to evolve with the City.

General Plan Modifications

Redwood City's General Plan lays the groundwork for RWCmoves and includes policies and programs supporting the vision of RWCmoves. However, some updates to the General Plan are needed to improve consistency with RWCmoves. Specifically, modifications to certain aspects of the General Plan's policies, programs, street typologies, truck routes, and bicycle network are

needed to align with RWCmoves. Adoption of RWCmoves does not approve any revisions to the General Plan, these are identified as immediate next steps on page 103.

Modified Policies and Programs

Appendix F describes the primary General Plan transportation policies and policies that should be amended as part of RWCmoves to further support the City's transportation goals. These include refinements of existing policies and programs, and a new mobility evaluation policy that provides a framework to support the implementation of RWCmoves. While **Appendix F** highlights major policies that should be revised, a careful review of all General Plan policies should also be conducted to incorporate any minor edits to fine-tune the policies.

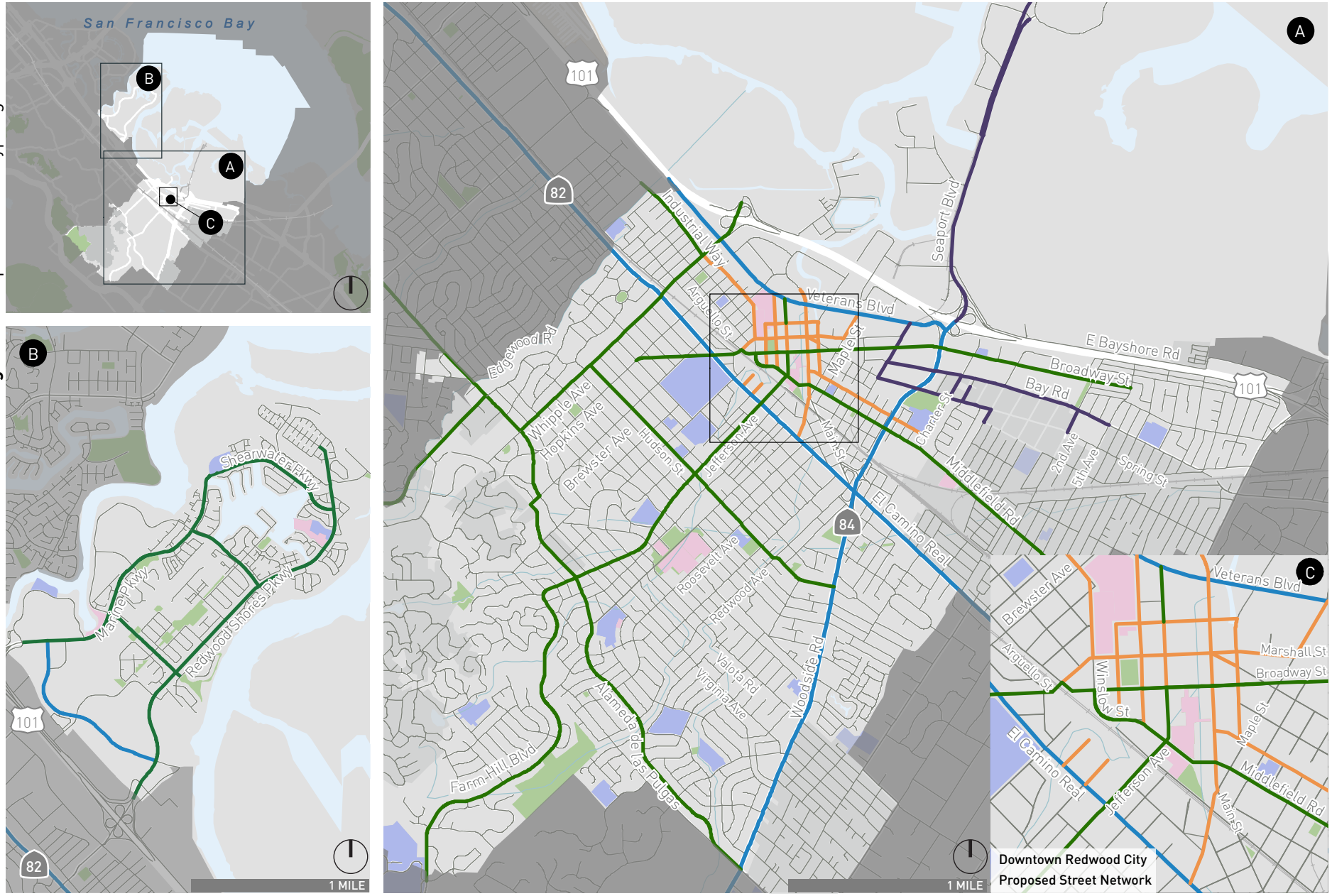
Street Typology Updates

To ensure a balanced, multi-modal transportation network, the City's General Plan organizes its transportation facilities according to typologies that consider their context and use. In addition, the General Plan typologies prioritize different travel modes for each street. Together, the typologies provide a layered network of "complete streets" that accommodate all types of local transportation modes.

One of the six goals of RWCmoves is to "create a walking and bicycling-friendly community that provides a safe, balanced, and convenient transportation system." To support this goal, RWCmoves strives to implement the updated street typologies network shown on **Figure 19**. The updated street typology network builds off those established in the General Plan, but incorporate elements of the National Association of City Transportation Officials' (NACTO) Urban Street Design Guide (and other related design guidance), which are based on the principle that streets are public spaces for people as well as roadways for traffic and transportation.

These street network typologies would serve to guide future transportation studies and improvements, so that they consider relationships to surrounding land uses, appropriate travel speeds, and the need to accommodate multiple travel modes and various users.

Figure 19: Proposed Street Typologies Network



Redwood City Limits
Sphere of Influence
Railroad
Parks
Schools
Public Facilities

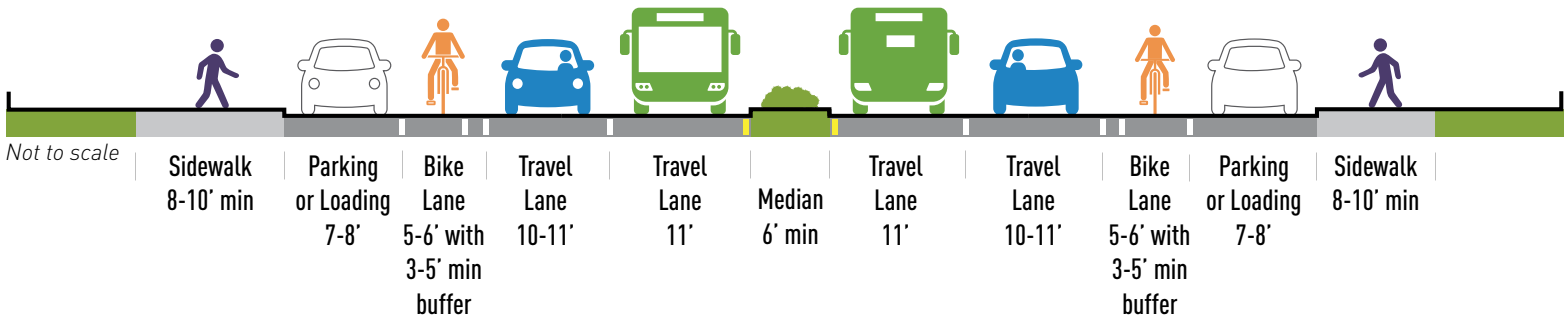
Proposed Street Network
Neighborhood Main Street
Connector Street
Industrial Street
Boulevard
Neighborhood Street

Figure 19

Proposed Street Typologies Network

BOULEVARD

Through Routes



Boulevard

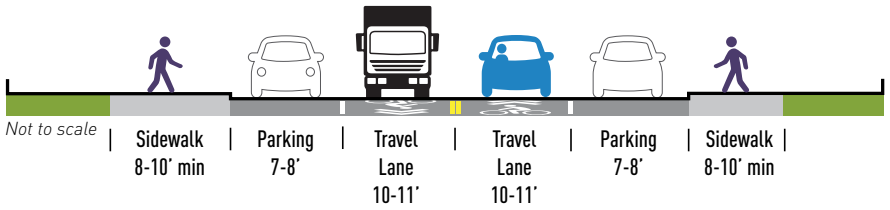
Boulevards are major roadways that typically have four to six travel lanes (both directions combined) and accommodate larger vehicle volumes, while providing wide sidewalks and dedicated bike facilities (such as bike lanes and cycle tracks). Creating an inviting corridor for all roadway users helps to encourage development and increases commercial activity along corridors originally solely developed for cars. Boulevards serve as primary routes to destinations within the community or through the City. As such, Boulevards are focused on ensuring person throughput, not only for cars and trucks, but also for pedestrians and bicyclists.

Design elements of boulevards may include:

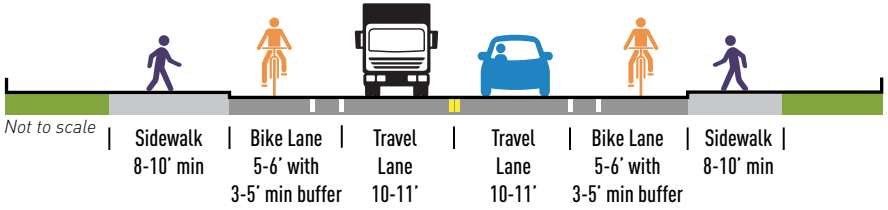
- Enhanced bike lanes or cycle tracks, including the use of green paint at potential conflict points
- Use of lane striping and narrow lane widths to create the illusion of a more compact corridor, thereby reducing vehicle speeds, collision severity, and increasing safety for all users
- Refuge islands and curb bulbs to reduce crossing distance for people walking and biking
- Raised sidewalks and curb bulbs at crossings of frontage roads
- Green stormwater control, infiltration strips, bioswales, and street trees
- Speed limits are typically 30 to 35 mph to maintain vehicle throughput
- Transit priority signal and other features

Example Boulevards include El Camino Real, Veterans Boulevard, and Woodside Road.

CONNECTOR
with Parking



CONNECTOR
with Bike Lanes



Connector

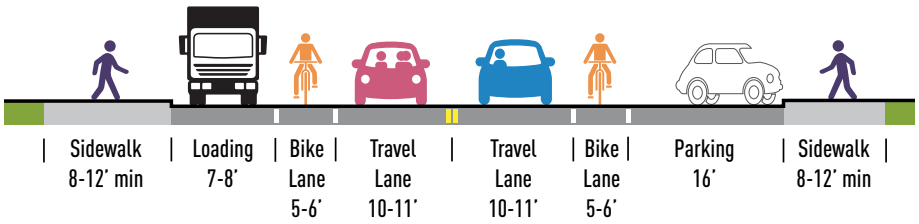
This versatile street type is a true multi-purpose roadway designed to move vehicles while providing good access for people biking and walking. They provide connections to Boulevards or other major through routes in the City. Connectors generally have two to three travel lanes and provide on-street bicycle facilities or on-street parking, in addition to sidewalks. As street width permits, Connectors may have four travel lanes and/or provide both on-street parking and on-street bicycle facilities.

Design elements may include:

- Accommodations for a wide variety of vehicles
- Use of lane striping and narrow lane widths to create the illusion of a more compact corridor, thereby reducing vehicle speeds, collision severity, and increasing safety for all users
- Transit signaling
- Speed limits not to exceed 30 mph for safety of people walking and biking
- Landscaping and other street enhancements

NEIGHBORHOOD MAIN STREET

Loading Zones and Bike Lanes



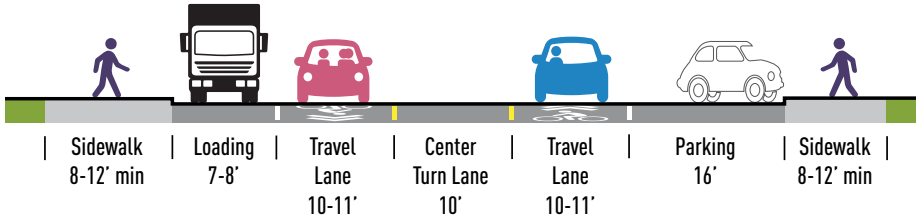
Neighborhood Main Street (Downtown Streets)

Neighborhood Main Streets are where mobility related to higher density commercial and housing converge into a single corridor where people do business, live, and interact with each other. These streets are typically not used as through routes, but rather serve as destination corridors, with lower traffic speeds, higher pedestrian and bicycle volumes, and frequent turnover of on-street parking. Neighborhood Main Streets have narrower cross-sections that accommodate wider sidewalks and typically two to three travel lanes. Design is focused on providing pedestrian and bicycle access from nearby parking lots/garages and transit centers to the land uses along Neighborhood Main Streets through dedicated facilities, traffic calming, and reduced roadway crossing distances.

Design elements may include:

NEIGHBORHOOD MAIN STREET

Center-turn Lane and Sharrow

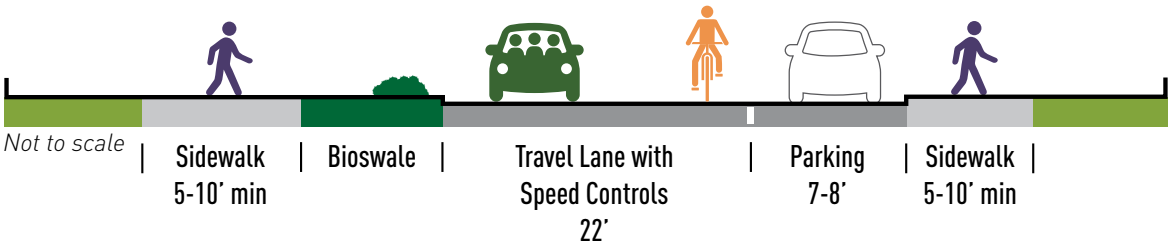


- Time-limited and/or metered on-street parking to increase parking turnover and ensure availability of parking for business customers
- Pick up/drop off areas and very short-term parking (for example 5 to 15 minutes maximum) for parcel deliveries or TNC usage
- Clear wayfinding to longer-term parking
- On-street commercial loading areas (curbside or in center-turn lane for large vehicles)
- Mid-block speed humps, pinchpoints, or chicanes to reduce vehicle speeds
- Green stormwater control, infiltration strips, bioswales, and street trees
- Mid-block crosswalks to facilitate accessibility
- Expanded walking spaces and bike lanes
- Parklets, street cafes, and street furniture
- Enhanced landscaping and street trees
- Lower speed limits (20 to 25 mph)

Example Neighborhood Main Streets include Bradford Street, Main Street, Marshall Street, Stambaugh Street, and Winslow Street.

NEIGHBORHOOD

Stormwater Management and Traffic Control



Neighborhood Street

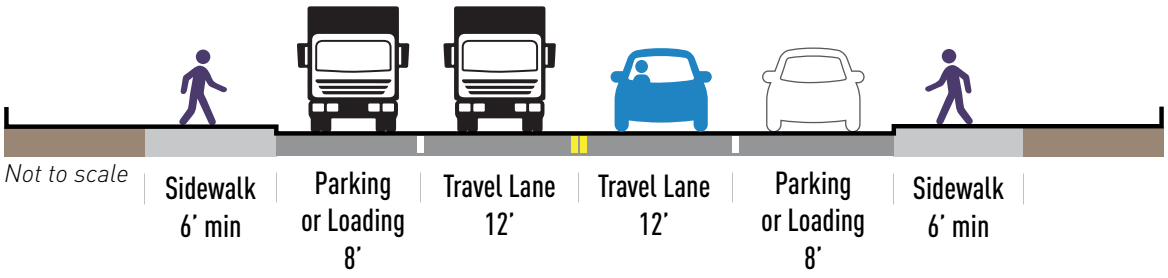
Local streets in residential neighborhoods provide mobility space for people to access their living space, recreational opportunities through play, walking, and biking; and offer public areas for neighbors to gather and interact with each other. Designed properly, a neighborhood street can become the meeting space for a group of residents. In addition, these streets should provide easy and safe access between residential and near-by commercial areas, schools, parks, and community centers. These streets typically have two travel lanes and discourage through traffic through traffic calming.

Design elements may include:

- Use of lane striping and narrow lane widths to create the illusion of a more compact corridor, thereby reducing vehicle speeds, collision severity, and increasing safety for all users
- Green stormwater control, infiltration strips, bioswales, and street trees
- Mid-block speed humps, pinchpoints, or chicanes to reduce vehicle speeds
- Traffic circles at intersections to reduce vehicle speeds
- Lower speed limits (15 to 25 mph)

INDUSTRIAL STREET

Loading Zones and Parking



Industrial Street

Industrial corridors are designed to serve the needs of businesses that produce, construct, deliver, or repair products and require access by larger and heavier vehicles. Common vehicles often include vans, single unit trucks, and smaller semi-trucks. As industrial areas tend to be spread out, workers often access them by private vehicle but accommodations should be made for those choosing to walk and bike or use transit access along major corridors. Industrial Streets maintain medium speeds (30 to 35 mph) and have two to four travel lanes, limited bicycle facilities, and standard pedestrian facilities.

Design elements may include:

- Sharrows to delineate biking facilities
- Thicker pavement sections for increased resiliency against heavy, low-speed vehicles
- Speed limits are typically 30 to 35 mph to maintain vehicle throughput
- Sidewalks on one or both sides to accommodate people walking
- Truck aprons to manage vehicle speed and truck turns
- Layover space for trucks waiting to make deliveries
- Swales and other surface water treatments to reduce pollution and sediments in runoff

Intersection Design

Excess space in intersections encourages people driving to drive at higher speeds that are often unsuitable to their surroundings. Utilizing excess space, whether by creating a more compact intersection or adding additional amenities, helps reduce vehicle speeds while improving access for all users.

Intersections provide traffic control for vehicular flow and serve as key points for people walking and biking to cross streets. In these places where pedestrians and cyclists cross the vehicle travel space, it is pertinent that those crossing the street are given appropriate priority and visibility to drivers.

Design elements may include:

- Dutch-style bicycle-protected intersections where appropriate
- Two aligned/directional curb ramps per crossing (eight total at a four-way intersection)
- Reduced radius curb to encourage slower turning speeds by people driving
- Closing slip lanes and removing "pork-chop" islands to lower speeds and increase visibility for people walking and biking
- Truck aprons to accommodate larger vehicle turns while encouraging drivers in smaller vehicles to treat the corner as a reduced radius curb. This typically takes the form of a 15-30' radius curb to allow for movements up to WB-50 size trucks with an added 15' radius truck apron to slow passenger vehicles and smaller delivery trucks.
- A large corner radius (35' or more) should not be used to facilitate large trucks turning from right-hand lane to right-hand lane.
- Restricting right turns in places of high pedestrian volume
- Squaring up intersections to meet at 90-degree angles where possible to reduce crossing distances and vehicle speeds
- Reducing curb radius with paint and flexiposts in lieu of rebuilding curb lines
- Public plazas, temporary spaces, pavement removal, and large street furniture (bollards, planters, etc.) in locations with excess right-of-way at non-square intersections
- Leading pedestrian walk interval. Pedestrian crossings activate 2 seconds before vehicle lanes receive green to give people walking and biking a chance to cross with the full attention of turning drivers.
- Bike boxes and green pavement treatments to delineate space for people biking
- Reduced cycle times to reduce waiting time and frustration for all users
- Pavement treatments for people walking and biking to properly define and delineate spaces
- Raised crosswalks

Truck Route Updates

Figure 20 illustrates proposed truck routes in the City. These route updates build off the those presented in the General Plan and account for the network changes proposed as part of the street typologies and bicycle backbone network. The intent of the truck routes is to preserve freight access to industrial districts while protecting residential neighborhoods.

Bicycle Backbone Network

The intent of a bicycle backbone network is to create a low-stress bicycle network that cyclists of all ages and abilities will be comfortable riding. **Figure 21** includes the proposed bicycle backbone network, which is in addition to and builds upon the City's Bikeway Plan in the General Plan. The backbone network creates a cohesive bicycle network that provides easily accessible connections to all of Redwood City. The backbone network does not include every existing or proposed bicycle facility in the City but instead focuses on a priority network of low-stress streets that the City will seek to implement over time.

Figure 20: Proposed Truck Routes

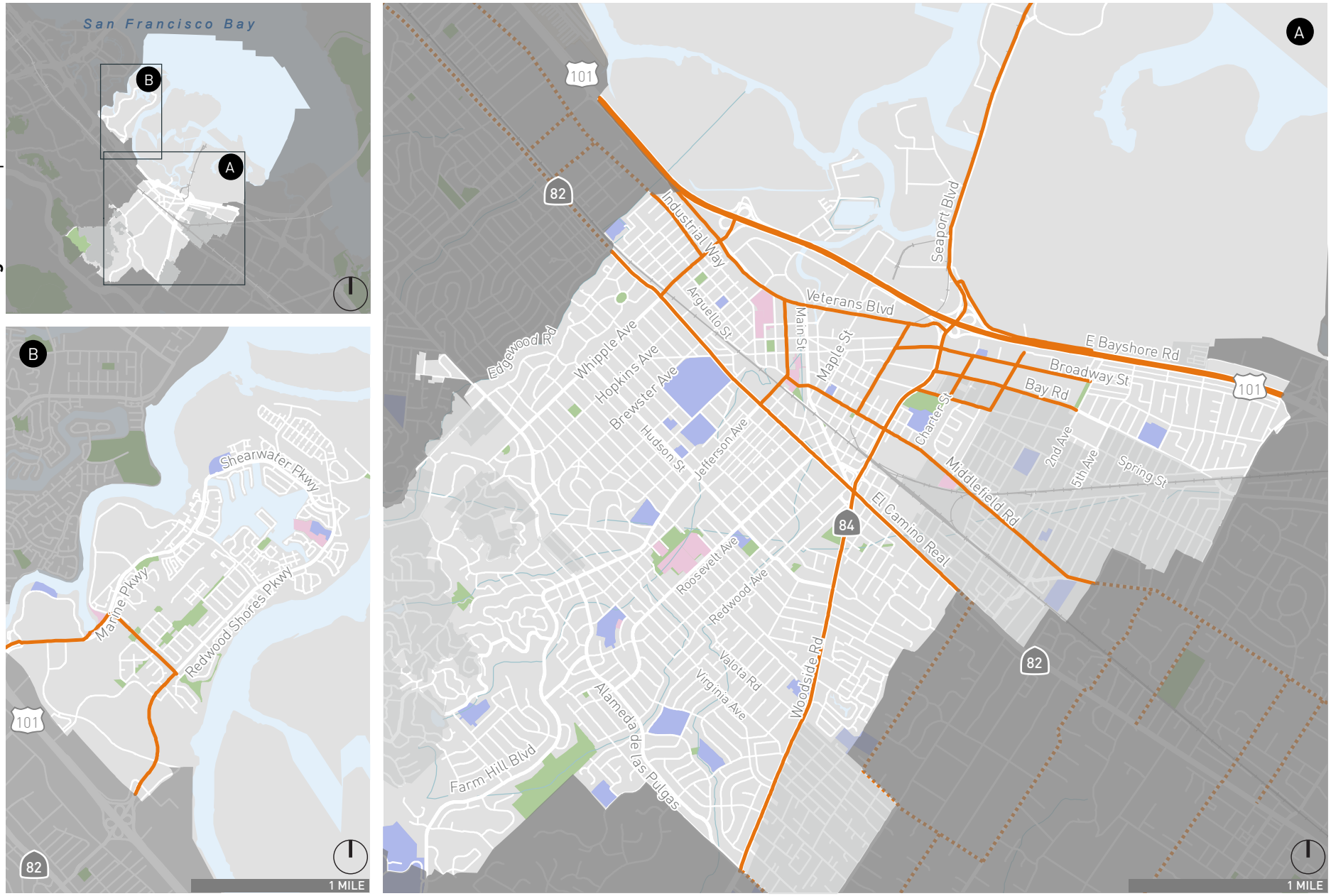


Figure 20

Proposed Truck Routes

Figure 21: Proposed Bicycle Backbone Network

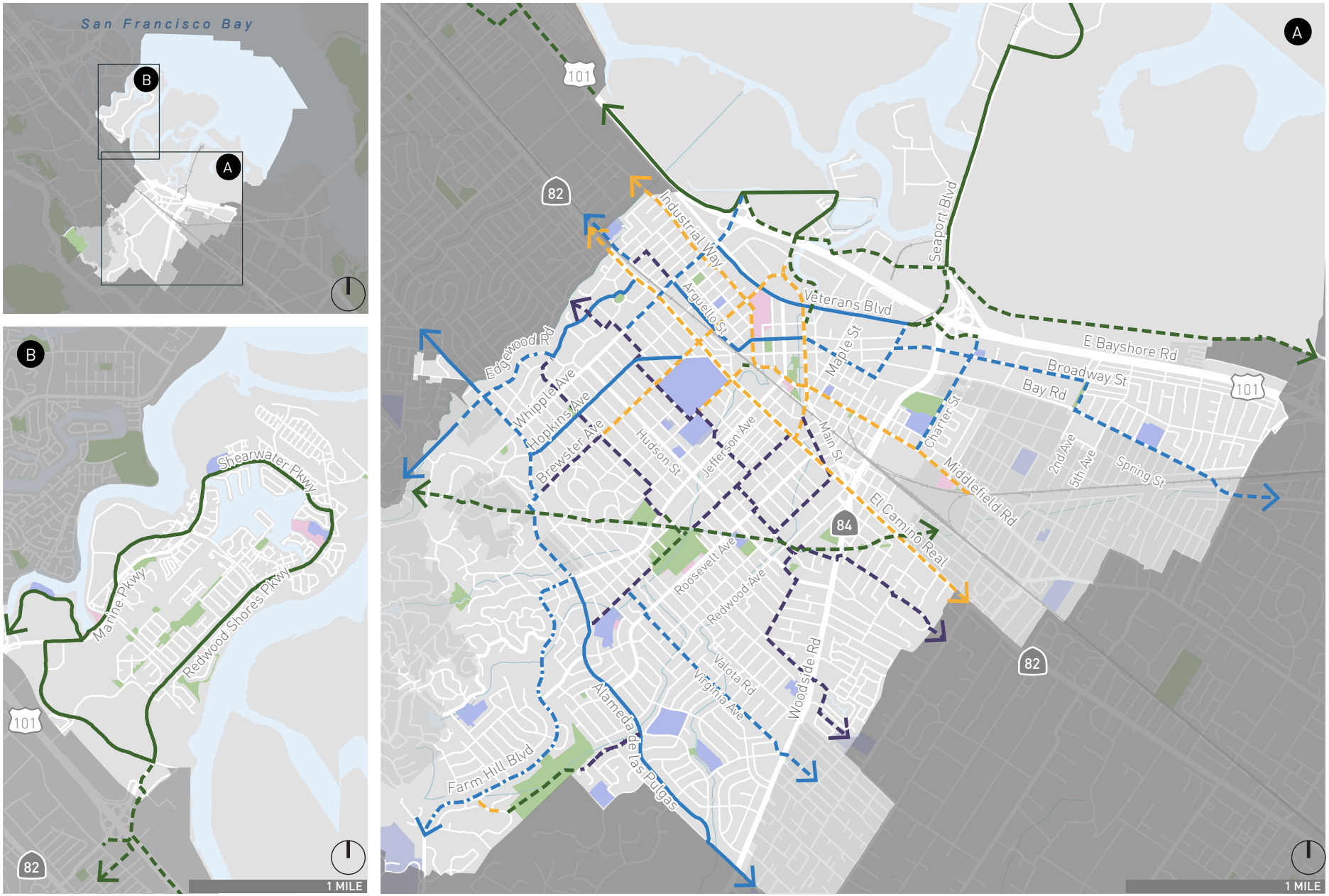


Figure 21

Proposed Bicycle Backbone Network

Evolution of RWCmoves

In recognition that Redwood City's transportation system is continuously evolving due to changing needs and priorities, technological innovations, and new projects and developments, RWCmoves is designed as a living document to allow the plan to evolve as the City changes. Redwood City staff would need to take the following actions to ensure RWCmoves is updated appropriately:

- **Conduct Ongoing Transportation Performance Monitoring:** Monitor performance of transportation system and investment levels bi-annually
- **Establish Guiding Principles for Emerging Transportation Services:** Proactively respond to innovations in transportation technologies that may impact the future of travel
- **Regularly Update Project Priority List:** Update RWCmoves Project Priority List every two to three years to reflect additional project needs and priorities

Ongoing Transportation Performance Monitoring

Evaluating the City's success in achieving the vision and goals outlined in this document will be done through bi-annual monitoring. To do this, the City will establish a transportation system monitoring program that closely relates to the performance measures outlined in the previous chapter. **Table 5** summarizes the monitoring metrics the city should use to evaluate progress over time. Following the table is a detailed description of the potential monitoring strategies.

As part of the bi-annual monitoring, a project summary should be included that outlines the projects implemented within the last two years. The summary should include discussion of the number of projects, types of projects (project categories), total dollar value, percent of projects that are within equity areas, and the percent of projects that included placemaking elements. These project summaries should be compared to previous monitoring report updates.

Table 5: Redwood City Bi-Annual Transportation Monitoring Program Strategy

Monitoring Metric	Monitoring Data	Data Source	Established Baseline Data	Data Collection Time Frame	Data Processing	Level of Effort	Data Visualization
Traffic Collisions	Number of collisions, collision severity and primary collision factors by mode	SWITRS and TIMS	Appendix A: Existing Conditions	Most recently available five-years	For each mode, determine percent of total collisions presented by year and collision severity, and percent of total collisions by primary collision factors	Low	Bar Chart
Vehicle Miles Traveled (VMT)	Average citywide VMT per employee and resident population	Citywide Model or Off-model tool	To be established outside of RWCmoves	To be established outside of RWCmoves	To be established outside of RWCmoves	High	Line Graph
Pedestrian Counts	Total morning and evening peak period pedestrian counts at 10 to 15 key intersections	Surveys	Appendix A: Existing Conditions	Mid-week (Tuesday to Thursday) morning (7-9 AM) and evening (4-6 PM) peak periods in September to mid-October	Total number of pedestrians during morning and evening peak periods at 10 to 15 key intersections	Low	Bar Chart
Bicycle Counts	Total morning and evening peak period bicycle counts at 5 trail locations and 10 to 15 key intersections	Surveys	Appendix A: Existing Conditions	Mid-week (Tuesday to Thursday) morning (7-9 AM) and evening (4-6 PM) peak periods in September to mid-October	Total number of bicyclists during morning and evening peak periods at 5 trail locations and 10 to 15 key intersections	Low	Bar Chart
Transit Ridership	Average weekday ridership at all stops/stations in Redwood City, as available from Caltrain and SamTrans	Surveys	Appendix A: Existing Conditions	Weekdays (Monday to Friday) between September and mid-October	Average weekday ridership (boardings and alightings) at all stops/stations in Redwood City separated by Caltrain and SamTrans	Low	Bar Chart
Travel Mode Share	Percent of trips made by travel modes by land use (office or residential) and location (downtown or suburban)	Surveys	Appendix A: Existing Conditions	Mid-week (Tuesday to Thursday) morning (7-9 AM) and evening (4-6 PM) peak periods in September to mid-October	Percent of total trips by each mode (drive-alone, carpool, transit, walk, bike, TNC, and other) presented as a weighted average based on location size	High	Bar Chart
Vehicle Congestion	Average vehicle speeds along major corridors (El Camino Real, Jefferson Avenue, Woodside Road, Middlefield Road, and Redwood Shores Parkway) during the evening peak period	Inrix data, or similar data source such as travel time surveys	RWCmoves Chapter 2	Mid-week (Tuesday to Thursday) morning (7-9 AM) and evening (4-6 PM) peak periods in September to mid-October	Determine average vehicle speed (mph) for each major corridor	Low	Bar Chart

Source: Fehr & Peers, 2018.

Traffic Collisions

The City should review Statewide Integrated Traffic Records System (SWITRS) and Transportation Injury Mapping Systems (TIMS) collision data to monitor trends in:

- Injury collisions
- Collisions involving pedestrians
- Collisions involving bicyclists
- Types of collisions
- Fatal and severe injury collisions
- Primary Collision Factors

Success will be measured through reduction in collision rates for each collision metric evaluated. In addition, creating collision heat-maps could be used to understand spatial trends in collisions throughout Redwood City.

Vehicle Miles Traveled (VMT)

The California Governor's Office of Planning and Research (OPR) will soon require projects to assess its own impact on the City's VMT. VMT could be measured through the development of a citywide travel demand model or the development of an off-model VMT measurement tool. VMT as an analysis metric is addressed in more detail in the City's Transportation Analysis Guidelines.

Pedestrian Counts

The City should conduct pedestrian counts at 10 to 15 key locations throughout the City. By defining key areas, the City can monitor increases in pedestrian activity over time. Pedestrian counts should be collected on typical mid-week days. A typical mid-week day is defined as a work day while school is in session and it is not raining. The premise is that increased pedestrian network quality will result in increased pedestrian activity.

Bicycle Counts

The City should conduct bicycle counts at 5 trail locations and 10 to 15 key intersections throughout the City. By defining key areas, the City can monitor increases in bicycle activity over time. Bicycle counts should be collected on typical mid-week days. A typical mid-week day is defined as a work day while school is in session and it is not raining. The premise is that increased bike network quality would result in increased bicycle activity.

Transit Ridership

A key feature to evaluating access to transit is increases in transit ridership. The City should collect ridership data from Caltrain and SamTrans to report on ridership trends over time, and compare it to the systemwide ridership trends.

Travel Mode Share

Mode share is an indicator of the presence and quality of multimodal networks, and varies depending on density, land use, and location in Redwood City. Mode share data should be collected at several office and residential developments in the downtown and suburban areas of Redwood City through surveys at driveways on typical mid-weekdays. A typical mid-week day is defined as a work day while school is in session and it is not raining.

Vehicle Congestion

Average vehicle speeds on key corridors, including El Camino Real, Jefferson Avenue, Woodside Road, Middlefield Road, and Redwood Shores Parkway, are a direct indicator of vehicle congestion in Redwood City. Average vehicle speeds should be used to and indicate if the City is effectively managing traffic congestion. Decreased speeds are a result of an increase in vehicle volumes on streets. Redwood City can also work towards increasing person throughput by tracking pedestrian, bicyclist, transit and vehicular throughput and delay along major corridors.

Guiding Principles for Emerging Transportation Services

The future of transportation will affect the travel behavior of communities and the structure of people's lives. Already a variety of transportation services and technologies have emerged, such as TNCs, microtransit, automated delivery, electric bikes and scooters, and even automated vehicles (AVs), which are currently being tested and have the potential to improve transportation in Redwood City. Although most new services other than TNCs are not widely used in Redwood City yet, they will affect transportation in the City and regionally when implemented more broadly.

To support Redwood City's vision and long-term mobility goals, the City will use these guiding principles as the policy framework when considering how to approach emerging transportation services. The following guiding principles were developed in light of the performance measures included in **Chapter 4** and underline the importance of communication between emerging transportation service providers, the City, and the community.

- **Safety:** Emerging transportation services must be consistent with Redwood City's goal for eliminating traffic fatalities and severe injuries for all modes by 2030.
- **Multimodal:** Emerging transportation services must prioritize, rather than compete with, walking, biking, carpooling, and transit services.

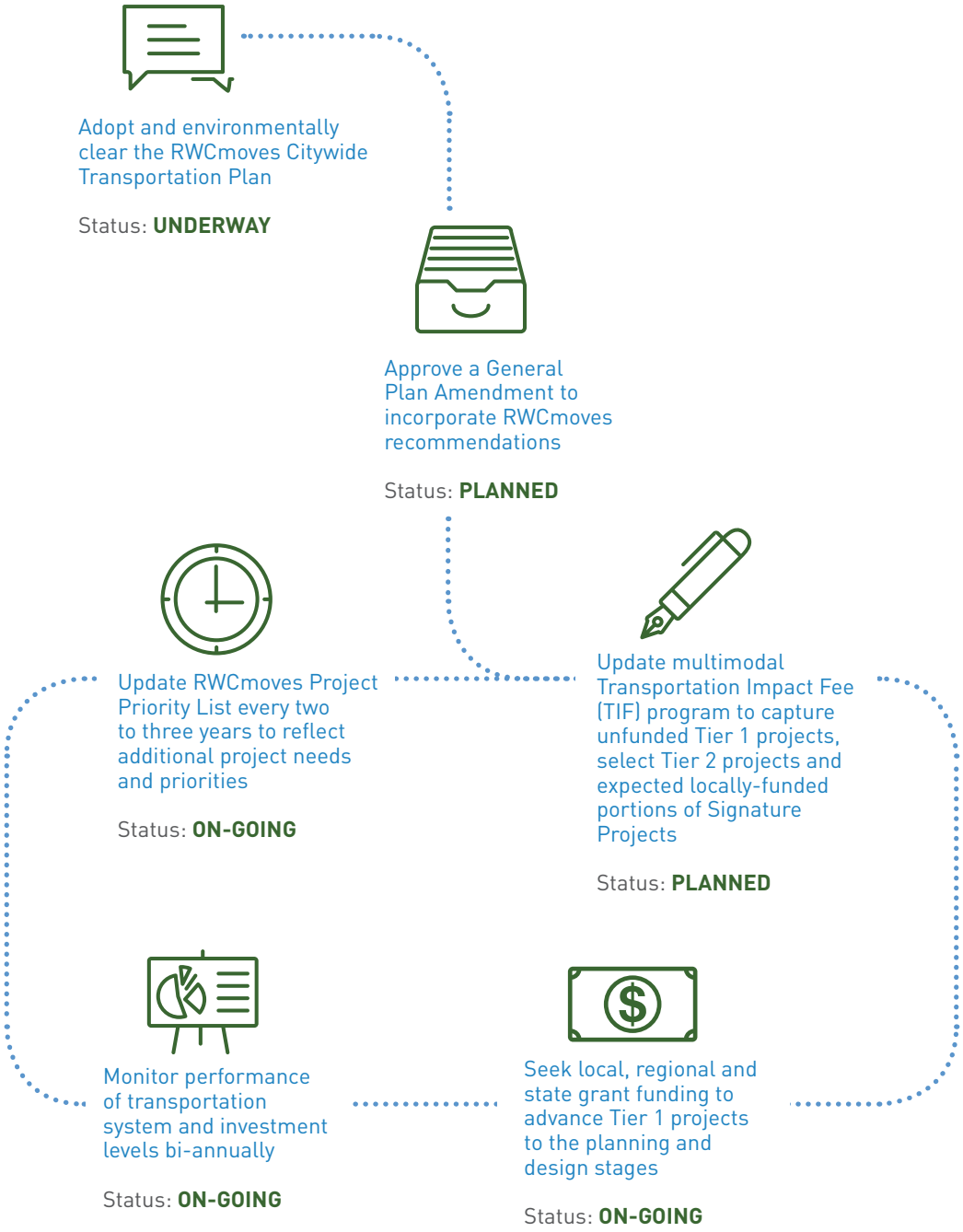
- **Equitable Access:** Emerging transportation services must promote equitable access to goods and services for all people, including people with disabilities, low-income, and the young and elderly.
- **Efficiency:** Emerging transportation services must consider person throughput and travel time reliability.
- **Public Health:** Emerging transportation services must promote public health and help to reduce environmental impacts, including greenhouse gas (GHG) emissions and energy consumption.
- **Accountability:** Emerging transportation service providers must share relevant data so that the City and the public can effectively evaluate impacts on the transportation system.
- **Collaboration:** Emerging transportation service providers must collaborate effectively with the City and the community to ensure new services are planned for and regulated based on the community values.

Immediate Next Steps

The Redwood City Council, with support from City staff, would need to take the following next steps to implement the RWCmoves' vision and supporting goals, policies, programs, and projects:

- Adopt and environmentally clear the RWCmoves Citywide Transportation Plan
- Approve a General Plan Amendment to incorporate RWCmoves' recommendations
- Update the multimodal Transportation Impact Fee (TIF) program to capture unfunded Tier 1 projects, select Tier 2 projects and expected locally-funded portions of Signature Projects
- Seek local, regional and state grant funding to advance Tier 1 projects to the planning and design stages

These implementation actions will allow the RWCmoves Plan to respond to current transportation needs and opportunities, while at the same time recognizing the changing nature of the transportation system. By doing so, the City will be well-positioned to achieve its vision of creating a multimodal, safe and accessible transportation network that provides the best travel experience possible for everyone in Redwood City.


Adopt and environmentally clear the RWCmoves Citywide Transportation Plan
Status: UNDERWAY
Approve a General Plan Amendment to incorporate RWCmoves recommendations
Status: PLANNED
Update multimodal Transportation Impact Fee (TIF) program to capture unfunded Tier 1 projects, select Tier 2 projects and expected locally-funded portions of Signature Projects
Status: PLANNED
Seek local, regional and state grant funding to advance Tier 1 projects to the planning and design stages
Status: ON-GOING
Monitor performance of transportation system and investment levels bi-annually
Status: ON-GOING
Update RWCmoves Project Priority List every two to three years to reflect additional project needs and priorities
Status: ON-GOING


Bike Car
Your new student loan ally: your employer.
SoFi