

SANTA MONICA BIKE ACTION PLAN AMENDMENT



OCTOBER 13, 2020





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MAKING BICYCLING SAFER IN SANTA MONICA

WHY A BIKE PLAN AMENDMENT?

For over a decade, Santa Monica has led regional bike adoption in order to support carbon-emission-related sustainability goals, expand mobility access, and improve quality of life for residents and visitors. Guided by the comprehensive Land Use and Circulation Element and the 2011 Bike Action Plan, the City has installed over 100 miles of bike facilities, launched LA County's first bike share system—Breeze Bike Share, and piloted one of the first regulatory frameworks for dockless shared micro-mobility services in the country.

The 2011 Bike Action Plan serves as the guide for Santa Monica to implement a citywide bike network, policies, and programs. This Amendment provides a technical update introducing a new type of facility to advance Santa Monica's existing bike network - protected bike lanes.

At this moment, four factors drive the need for a Bike Action Plan Amendment:

1. The COVID-19 public health crisis has amplified the need for active transportation solutions that support physical distancing requirements without increasing vehicle congestion.
2. Successful economic recovery depends on increasing access to local business districts and promoting the buy local program. This Amendment will also help Santa Monica qualify for competitive grants, which will be essential in fiscally constrained times.
3. Santa Monica has seen substantial increases in the number and length of scooter and shared bike trips. Protected bikeways will prevent inexperienced riders from using the sidewalk when they feel unsafe riding on the street.
4. An updated Bike Action Plan that focuses on comfortably connecting underserved neighborhoods to important activity centers, transit and job opportunities will advance equitable transportation access in Santa Monica.



Two-way protected bicycle lanes on the Colorado Avenue promenade in Santa Monica.

Building on Past Efforts

The Bike Action Plan Amendment builds on the foundations of the 2010 Land Use and Circulation Element (LUCE) and the 2011 Bike Action Plan (BAP). More recently, Santa Monica adopted the 2019 Climate Action and Adaptation Plan, which emphasizes the continuing need to increase the number of people who use active transportation around town, and encourages biking in Santa Monica in order to meet climate goals.

The Climate Action and Adaptation Plan is a community plan to reduce climate emissions and become climate resilient. Sustainable mobility is one of three focus areas for emissions reduction, and includes the objective of converting 50% of local trips to foot, bike, scooter, and skateboard.



Many past plans and projects in Santa Monica have helped increase options for people to travel to and from work, local businesses, school, parks, and other destinations. This Amendment focuses on making bicycle connections safer and more accessible.

Protected Bike Lanes

At the time of the Bike Action Plan's adoption in 2011 protected bike lanes (PBLs), also known as cycletracks, were not a common design treatment. There was no formal design guidance or research regarding safety outcomes available, locally or nationally. Since then, PBLs have been introduced to communities across the country, sparked by People for Bikes' Green Lane Project, which supported the design and installation of PBL facilities in select cities. In the last ten years, the National Association of City Transportation Officials, Caltrans, and the Federal Highway Administration, among others, have developed formal guidance for design and implementation of PBLs.

Protected Bike Lanes are now considered a nationwide best practice for creating a safe, comfortable bicycling environment that is attractive to people of all ages and skill levels. They improve on standard bicycle lanes by adding an extra layer of separation between people bicycling and people driving. Different materials can be used to create separation, including curbs, flex-posts or even parking lanes.



Parking-protected bicycle lanes on Broadway in Santa Monica.

Today, PBLs are found in Los Angeles, San Jose, San Francisco, and peer cities nationwide. Santa Monica has several existing PBLs. Colorado Avenue is a premier example of a two-way PBL adjacent to the Downtown Expo Station and connecting to the Pier. Since its opening, bicycle and scooter volumes have more than doubled.¹ More recently, a section of parking protected PBL has been completed on Broadway between 16th and 20th Streets.

“We love the new protected bike lanes on Broadway and cycle in them regularly. They are the only bike lanes that we feel safe in and more relaxed.”

- Santa Monica Resident

WHAT'S IN THIS AMENDMENT?

This Amendment builds on the 20-year vision of the Bike Action Plan. It refines the 20-year map by identifying the bike facilities that are most necessary to convert to protected bikeways. Using practical guides of demand, feasibility, and safety, the amendment strategically identifies a key network of protected facilities within a five year horizon. The Amendment was developed following the same goals and objectives of the Bike Action Plan and the LUCE.

This is a technical amendment with the limited scope of introducing a new facility type enabled by changes to State and Federal transportation guidelines. It does not revisit the baseline policy and bike network established by the 2011 Bike Action Plan. Instead, this Amendment identifies priority corridors for protected bicycle lanes and how to implement them on existing roads in a way that balances the needs of all users, including loading and parking needs.

This Amendment includes:

1. A clear **process** to identify priority corridors for protected bike lanes.
2. An **action plan**, including project summary sheets outlining design considerations and conceptual designs for the five-year protected bikeway vision.
3. **Next steps** to guide the implementation of this Amendment.

The Amendment creates a path forward for Santa Monica to build a protected bike lane network citywide in the next five years, compete for outside grant funding, continue progress towards the community's climate, safety, and mobility goals, and build resilience in these uncertain economic times. This is an achievable plan, focused on high-impact projects that the City can get done in the near future.

BIKE ACTION PLAN GOALS

- ▶ Create a complete network of high-quality bicycle facilities, starting with a minimum of one new north-south and one new east-west dedicated bicycle path, with the aim of increasing the number of people who use bicycles for everyday transportation.
- ▶ Ensure that the bicycle network is attractive to cyclists of all ages and experience levels.
- ▶ Create a safer, comfortable cycling environment in the city through facility design and public education.

PROTECTED BIKE LANE PRINCIPLES

How do protected bike lanes encourage more people to ride?

Most people will not ride a bike in places they do not feel safe. Protected bike lanes remove many of the stresses inherent on larger streets by creating physical separation between people riding bikes and people driving cars. On any street with a maximum speed over 20 mph, people riding bicycles and walking generally feel more comfortable with a larger separation from moving vehicle traffic.

People who bike in Santa Monica have a range of experience levels. Trained, experienced, or fearless cyclists feel confident riding closer to motor vehicles. Families with children and novice riders who might not ride in the straightest lines, or who are nervous about traffic, benefit from facilities like protected bike lanes. By reducing opportunities for conflict, protected bike lanes create an environment that is more welcoming to a broader array of people.

Santa Monicans have routinely stated that their number one barrier to riding more is the perception of safety on the roadway. In 2017, as part of the City of Santa Monica's Resident Travel Survey, respondents were asked if they

felt safe bicycling in Santa Monica. Nearly 32% of respondents said they did not feel safe. When asked what would make them feel safer, the number one choice was protected bike lanes.²

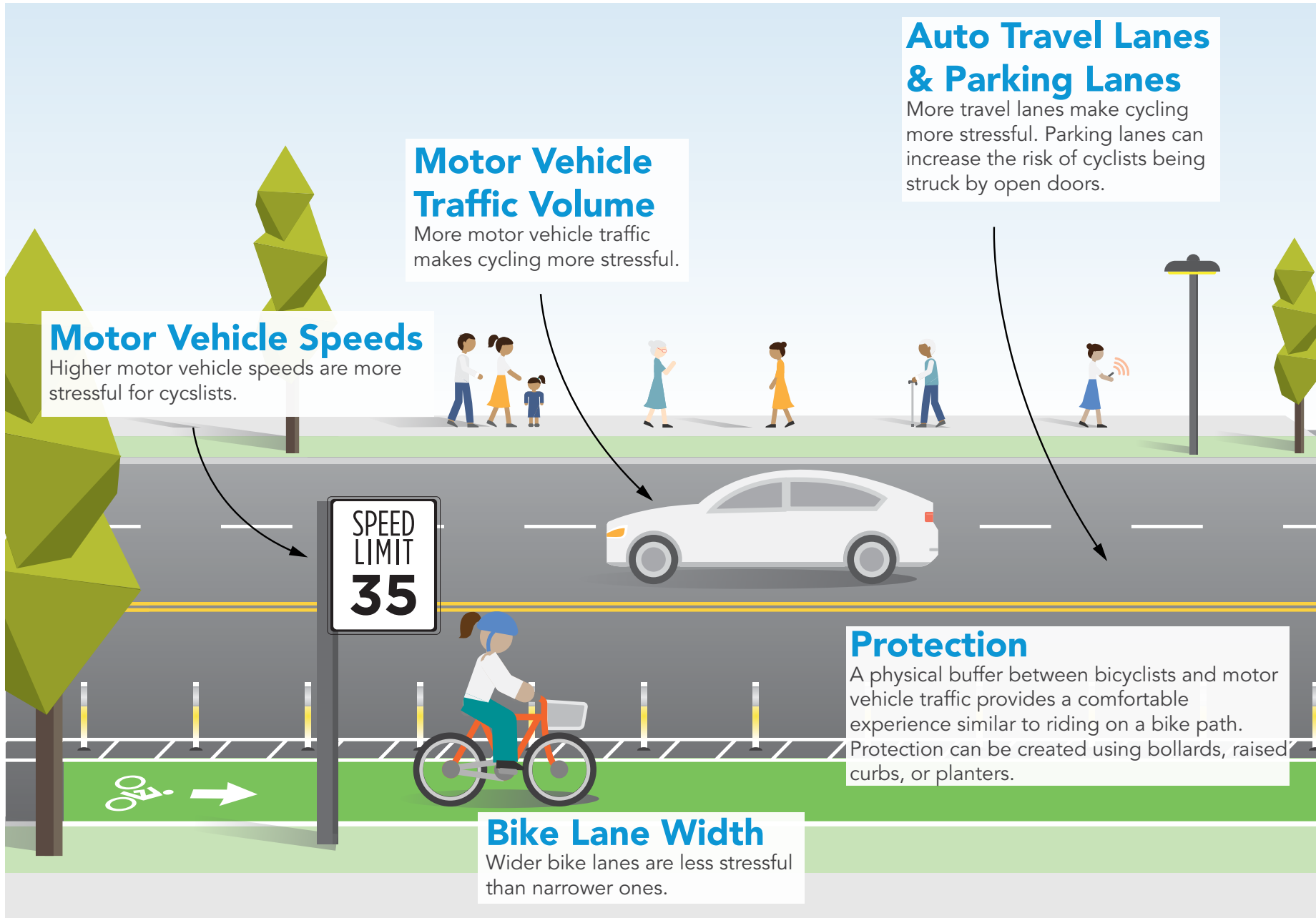
As part of the intercept survey for COAST 2019, participants were asked: "what would encourage you to walk/bike more?" 42% of respondents stated that having more protected bikeways would make them bike more. Finally, as part of the shared mobility pilot program users were asked: "What barriers, if any, prevent you from using e-scooters/e-bikes in Santa Monica as much as you would like?" Nearly half of respondents cited a lack of bike lanes as the primary barrier.

By providing more protected facilities on Santa Monica's bike network, more residents and types of riders can feel safer and comfortable riding a bike. And when they feel safer, they are much more likely to choose to ride.

"The new bike lane on Broadway between 20th and 16th makes me feel safest as a biker. Keeps me outside of the car driver and car parking risk zones, and the meters and curb provide a natural break between bikers and walkers. More of this type of bike lane and pedestrian safe roads please :)"

- Santa Monica Resident

Protected bike lanes reduce stress



Auto Travel Lanes & Parking Lanes

More travel lanes make cycling more stressful. Parking lanes can increase the risk of cyclists being struck by open doors.

Motor Vehicle Traffic Volume

More motor vehicle traffic makes cycling more stressful.

Motor Vehicle Speeds

Higher motor vehicle speeds are more stressful for cyclists.

Protection

A physical buffer between bicyclists and motor vehicle traffic provides a comfortable experience similar to riding on a bike path. Protection can be created using bollards, raised curbs, or planters.

Bike Lane Width

Wider bike lanes are less stressful than narrower ones.

How do protected bike lanes relate to Vision Zero efforts?

Santa Monica is committed to eliminating fatal and severe crashes in the City by creating safer facilities for all people that use its streets, sidewalks, and bikeways. A key component of making streets safer is to build them so people drive more carefully (often including more slowly) and to separate people using different modes. Improving the design of bicycle facilities to include additional protection reduces the number and severity of crashes involving people on bikes and scooters. One study found that installing protected bike lanes decreases injury collisions for people biking by 90%, compared to a 50% reduction in injuries when standard bike lanes are installed.³

As a result of the COVID-19 pandemic, many more community members are walking and biking for short trips around town and physically-distanced exercise. Santa Monica can help to create safer and more inviting outdoor spaces that everyone can enjoy without fearing the possibility of being involved in a crash. Protected bicycle lanes are one tool to help accomplish this.

How does bicycling help fight climate change?

Santa Monica's Bicycle Action Plan has served the community well, guiding the installation of over 100 miles of bicycle facilities. As Santa Monica works to make progress in meeting sustainability goals, it is important to facilitate access to active transportation modes that reduce carbon emissions and congestion. Vehicle transportation contributes 64% of Santa Monica's total carbon emissions.⁴ However, the travel habits of Santa Monica residents show potential for a shift away from driving alone. About 45% of Santa Monica residents say they already bike at least once a month, and over half of driving trips are less than three miles, which is a comfortable riding distance for many people.⁵

Protected bicycle lanes provide an environment that encourages individuals of all ages and abilities to bike more often or take up bicycling for the first time, especially for those shorter trips. By inviting new community members to ride their bicycles to go to school, parks, local businesses, transit stations, and other destinations, Santa Monica can reduce vehicle trips and the associated environmental and public health impacts.

How does bicycling relate to community health and economic recovery?

The ongoing COVID-19 pandemic has emphasized the need for attractive and safer travel options that allow for physical distancing. Urban areas have seen a 21% increase in bicycle ridership during the pandemic.⁶ Protected bicycle lanes are a critical investment to help Santa Monica recover from the public health crisis and prevent an increase in drive-alone trips as schools and workplaces reopen.

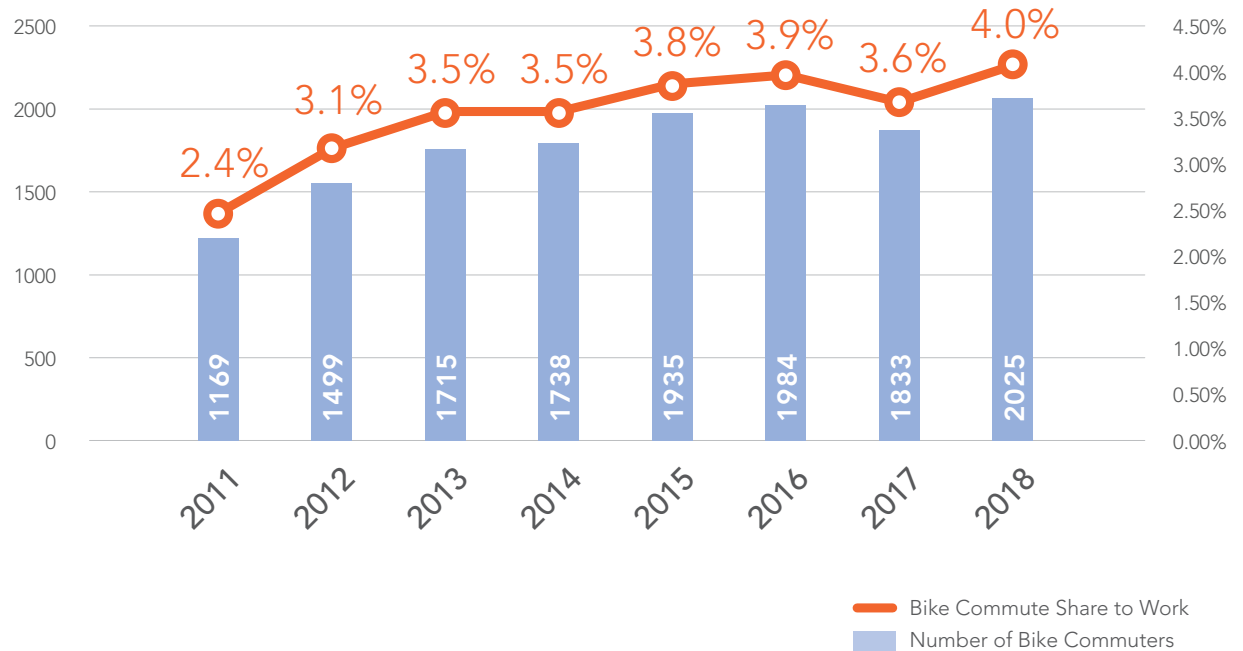
Bicycling supports economic recovery as well. Comfortable bike and scooter connections will bring residents and visitors to local businesses, supporting the goals of [Buy Local Santa Monica](#) and attracting further investment. Studies have found that protected bike lanes in other cities have significant economic benefits.⁷

Is Santa Monica ready for protected bike lanes?

Protected bike lanes are not completely new to Santa Monica, and they have met with success. The esplanade on Colorado Avenue between the Downtown Expo Line Metro Station and the Santa Monica Pier features a two-way protected bicycle lane that has been very popular, and other small segments exist throughout the City, such as Broadway between 16th Street and 20th Street. Broadway has the highest bike ridership of any continuous east-west corridor in the city.

Protected bikeways are a logical next step in the continued evolution of bicycle facilities in Santa Monica. Over the last decade, Santa Monica has progressed from simple bicycle lanes and sharrows to today's buffered bicycle lanes. These bicycle improvements correlate with a 67% increase in people bicycling to work from 2011 to 2018 in addition to observable increases in activity. Protected bicycle lanes are the next step in creating a safer and comfortable environment for bicycling, and making bicycling a preferred choice for community members.

Bike commuters in Santa Monica since the adoption of the Bike Action Plan



Source: American Community Survey 5-year Estimates.



CONNECTING OUR COMMUNITY

CORRIDOR EVALUATION

The Bicycle Action Plan Amendment is a technical update to the 2011 Bike Action Plan that refines the existing network to a targeted set of priority protected bikeway corridors through a qualitative and quantitative benefits analysis.

Seventeen corridors were selected for feasibility consideration based on existing levels of bicycle and scooter activity, an assessment of the level of traffic stress on the existing and planned bicycle network, and stakeholder input. Typical sections within each of the 17 corridors were screened using the following criteria:

Needs and Benefits

1. Destinations: Connections to major destinations and population and employment centers.
2. Network connectivity: Extending the network by closing key gaps.

3. Safety: Addressing locations with high concentrations of bicycle collisions.
4. Demand: High activity based on shared bike and scooter counts.

Design Considerations

1. On-street parking impact: Number of parking spaces potentially removed.
2. Travel lanes: Opportunity to reconfigure travel lanes based on traffic volumes.
3. Density of driveways: Number and activity-level of driveways and alleyways.
4. Emergency services access: Maintenance of a 22' curb-to-curb width.
5. Waste management: Impact on garbage and recycling pick-up.
6. Transit: Support opportunities for existing or planned transit service.

Corridors with high benefit and limited design drawbacks (i.e., more feasible to be delivered with fewer losses to other facilities) were advanced for near term project development.

High benefit corridors with complex design considerations were examined to see if they could be advanced with a combination of different facility types or in a longer time frame. This Bike Action Plan Amendment includes conceptual designs for recommended five-year protected bikeways, with explanations of the considerations that will be explored during detailed design.

The final design for each corridor will be determined through a design process that includes additional input, operational analysis, design iterations and communication with the public.

CITYWIDE NETWORK

The evaluation process resulted in a network of protected bike lanes for priority implementation in the next five years, and clarified where these corridors fit within the larger context of the 2011 Bike Action Plan.

The proposed protected bikeway network will integrate with existing bike facilities in Santa Monica to give people of all ages and abilities comfortable routes to schools, parks, business districts, and other places people want to go. Protected bike lanes expand mobility options to people who are not confident riding on the street immediately adjacent to traffic.

In the near-term, protected bikeways are strategically employed in the most stressful and high-activity areas. On several corridors, the Bike Action Plan Amendment proposes replacing existing bike lanes with protected facilities. Where continuing the PBL would require more extensive parking removal or a detailed traffic study, they transition to other facility types such as Class II bike lanes or neighborhood greenways.

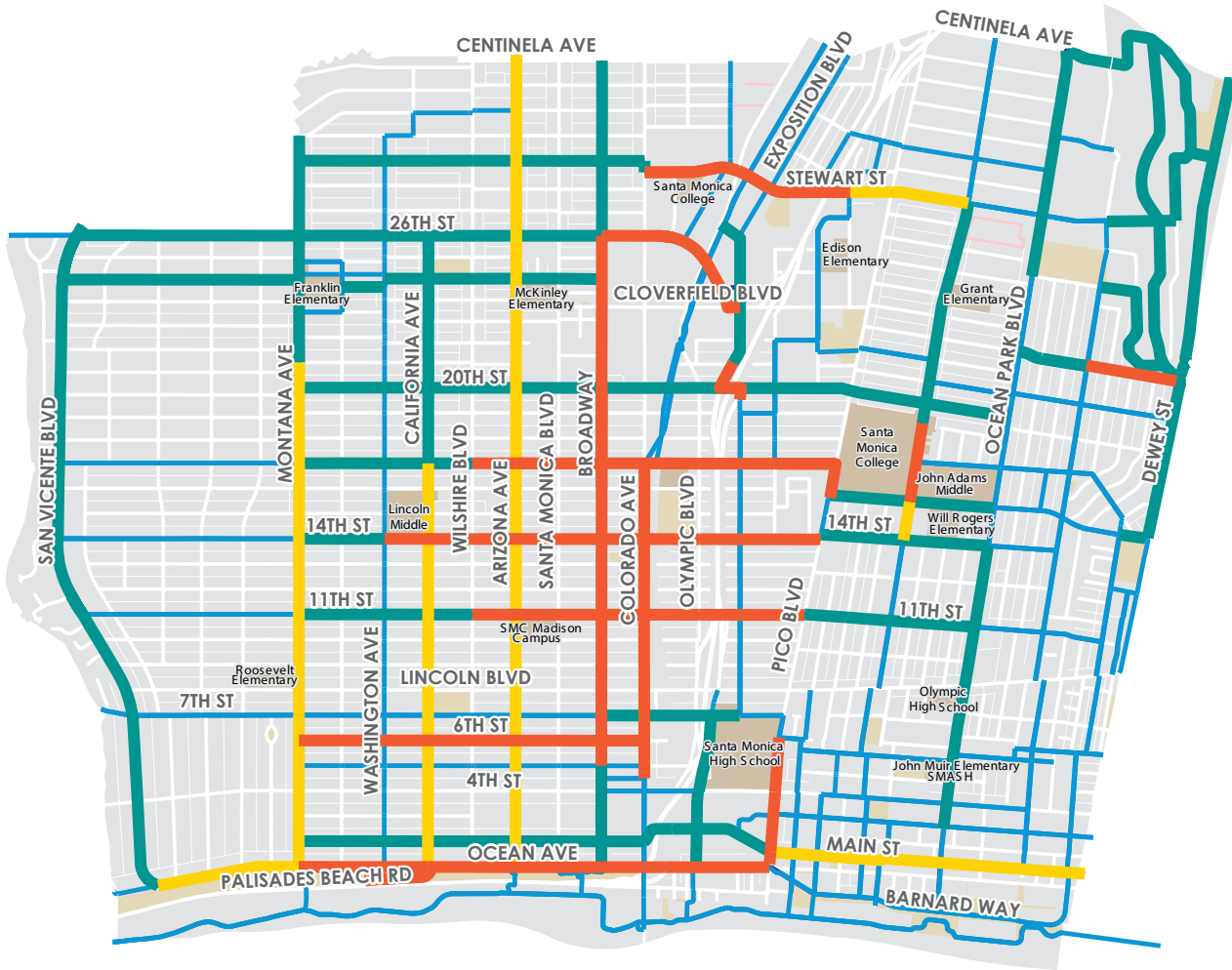
The **five-year protected bikeway vision** is a connected network of bikeways that serves a high level of demand and destinations, and opens up access for more types of people on bikes. They are typically located where protected bikeways will fit between the existing curbs and the impact to parking and travel lanes is minimal. Five-year vision corridors are centered around downtown and connect to the Expo bike path and existing protected bikeway segments on Colorado Avenue, Broadway, and Pico Boulevard. The vision seeks to build momentum by focusing on corridors with minimal design constraints and maximized safety considerations.

The **longer-term protected bikeway vision** is made up of streets where protected bikeways are desired but implementation is more complex due to the characteristics of the roadway. These corridors require more tradeoffs than those in the five-year vision. The longer-term vision includes streets with heavy parking utilization or high traffic volumes, which will require future analysis and be more challenging to implement.

The **future priority connections** shown on the map are important links in Santa Monica’s bike network that could benefit from safety enhancements, but PBLs may be unneeded or impractical, and further study is needed. Some are in more residential areas of Santa Monica, where a different facility type, like a Neighborhood Greenway, would be more suitable than a protected bikeway for expanding a safer and more inviting bike network on these corridors.

Mileage by facility type: existing, five-year vision, and longer-term vision

Facility Type	Existing	Five Year	Longer Term
PROTECTED BIKE LANES AND OFF-STREET PATHS	20 lane miles	39 lane miles	53 lane miles
BIKE LANES	61 lane miles	44 lane miles	31 lane miles
BIKE BOULEVARDS AND ROUTES	55 lane miles	54 lane miles	53 lane miles



Santa Monica Protected Bikeway Vision

Protected Bikeways

- Five-Year Vision
- Longer-Term Vision

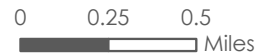
Priority Connections

- Future Priority Connection

Existing & Planned Bike Network

- Existing or Planned Bike Facility

Notes: The Colorado Avenue protected bikeway is westbound only.



Data obtained from the City of Santa Monica Map created June, 2020

OUTREACH

The engagement process for the Bike Action Plan Amendment was modified due to COVID-19 pandemic emergency orders requiring physical distancing and a ban on group gatherings. The process relied heavily on web-based engagement including teleconferencing, a web-based map, web-enabled presentations, social media postings, and web-enabled Q&A forums.

Advocacy Workshops

The project team held two meetings with representatives from Santa Monica College, the Pico Neighborhood Association, Calbike, Safe Streets Alliance, and Spoke. The meetings provided an opportunity to review and critique the approach of focusing on a five year protected bikeway vision, without diminishing the overall importance of the Bike Action Plan and other strategies to increase the network with other bikeway facility types. Attendees brought valuable perspectives representing the experiences and priorities of the bike advocacy community, as well as of Santa Monica's lowest-income neighborhood, Pico. Thanks to their insights, the team refined the five-year, longer-term, and future priority networks.

Interdepartmental Meetings

A series of meeting with representatives from Public Works Engineering, Resource Recovery and Recycling, Sustainability, Street Services, Big Blue Bus, Fire, and Police informed this Amendment's content.

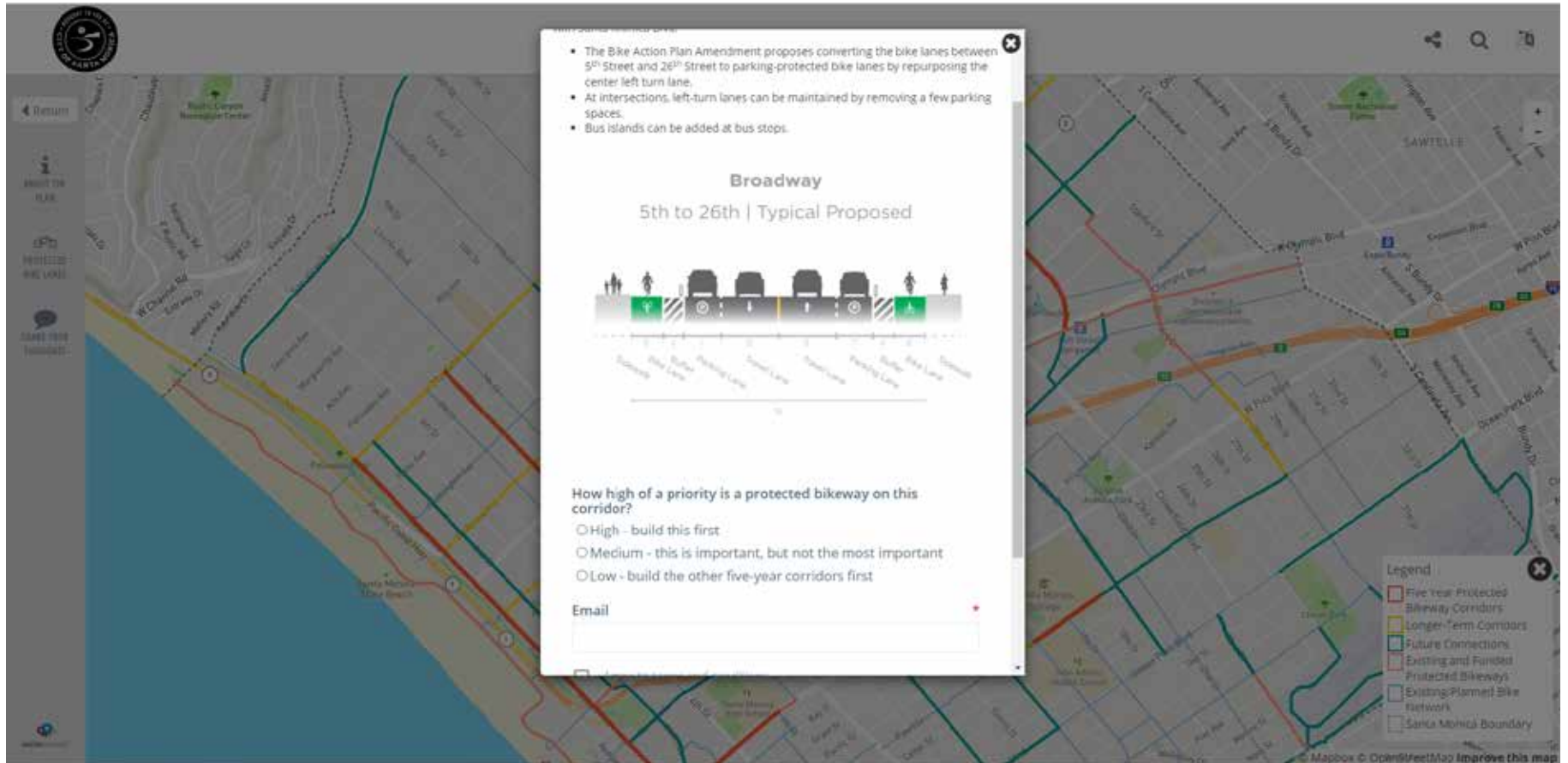
At each meeting Mobility Staff reviewed the purpose and need for the project, anticipated goals and outcomes, and prioritization criteria. The interdepartmental meetings resulted in a greater shared understanding of departmental priorities related to design, a general concurrence on the five-year priority projects, and documentation of opportunities and needs related to future design, operations, and maintenance.

Community Input

In order to reach the broader Santa Monica community, the Mobility Division posted an informational presentation on the City's YouTube channel, promoted through various social media outlets. The video was widely dispersed throughout the community. Through social media the city was able to create 2,695 impressions of the postings and received 12 comments.

The website was widely distributed along with an interactive web-based map that was visited 323 times and generated eight comments. People visiting the map could click on each five-year corridor to get more detailed information, leave comments, and give their opinion of which protected bikeways are most important to build first.

Interactive map to collect feedback on the Bike Action Plan Amendment



ACTING ON A FIVE-YEAR VISION

Fitting protected bikeways into our streets requires design savvy, flexibility and creativity. After so many years of dedicating all street space to cars, it can feel daunting to redesign and repurpose street space. However, there are good examples from other cities and guidance from reputable agencies that Santa Monica can build upon. This chapter provides tools for implementing protected bikeways in Santa Monica. It outlines next steps, describes general design considerations for protected bikeways, and provides details about benefits, impacts, and conceptual design of each five-year vision corridor.

As described in Chapter 2, the five-year protected bikeway vision is made up of locations with a high level of existing ridership and destinations, where designs can be advanced quickly due to minimal impact to parking and travel lanes. The map on this page shows the five-year vision proposed in this Amendment, as well as existing, funded, and planned protected bikeways that will be in place within the next five years.

Santa Monica's five-year protected bikeway network



When possible, costs will be minimized by aligning work with Public Works' roadway resurfacing. Additionally, there may be opportunities for demonstration on interim PBL projects. Such projects help get improvements implemented fast, with immediate results for

mobility and safety, and allow the community to gain comfort with a new facility while City staff analyze the benefits and impacts. Interim installations can bridge the gap until funding becomes available for permanent treatments.

DESIGN CONSIDERATIONS

Each protected bikeway corridor will go through a thorough design, public engagement, and vetting process. Typical milestones in the corridor design and implementation process include:

- ▶ Include project in Santa Monica’s Capital Improvement Program
- ▶ Secure funding
- ▶ Conduct outreach to stakeholders and the community
- ▶ Refine the design (30%, 60%, 90%, Final)

This section describes key considerations for design that will be taken into account as each corridor advances through these steps.

Street Level Separation

Protection is the key to protected bike lanes. Separation can be built in with posts, bollards or concrete curbs. Bollards provide the most flexibility in that they are less costly and can be moved, if needed. Bollards do not provide as much protection because they can be run over by most vehicles. A greater level of safety is provided by vertical separation, but bollards work well when there is limited space.



Raised curb protection on Colorado Ave Esplanade.



Flexible posts and striped buffer protection.



Raised protected bike lane.

Vertical Separation

Separation on protected bike lanes can be achieved by adding a raised median at street level, raising a bikeway to sidewalk level, or somewhere in between. When the bikeway is ramped above the level of the street, it is referred to as a “raised” protected bikeway. The raised protected bike lane is typically marked with the same pavement markings as street-level bike lanes, and is distinguished from the sidewalk by a different paving material and or/color. A vertical curb of 3 inches or more is another way to keep the two zones separate.⁸

Temporary Installations

The design of a temporary facility depends on the time frame. “Pop up” demonstration projects last from one to a few days, and use low-cost materials such as traffic cones, construction barricades, and chalk or washable paint.

Longer-term demonstration or interim facilities use more durable materials such as plastic bollards and planters, that can turn into a permanent solution or be replaced by a more durable material like concrete.

Parking Separation

A typical bike lane is located between the parking lane and the travel lane, while protected bike lanes are always adjacent to a curb or sidewalk. Moving a bike lane to the curbside where it is more protected can pose a few challenges.

- ▶ The area next to the curb includes the two-foot gutter and often includes grates that may be dangerous for bikes.
- ▶ Additional space is needed between protected bikeways and parking lanes, so that people can open their passenger car doors without risk of hitting someone biking.
- ▶ Best practice solutions for maintaining ADA accessibility to parked cars include:
 - A five-foot buffer to act as a passenger unloading area and walkway.
 - ADA spaces or loading zones located at the end of blocks in close proximity to marked crosswalks.
 - Clearly marked crossings of the bike lane to mitigate conflicts with people getting from their cars to the sidewalk. ⁹

Parking provides an additional layer of protection between people biking and moving traffic, so these facilities are often referred to as “parking-protected bike lanes.”



Parking protected bike lanes use a wider buffer to prevent “dooring.”
Source: NACTO

Parking Supply

The intent of the Bike Action Plan Amendment is to create additional safer access for people using the street, without unnecessarily removing other access. With that in mind, it seeks to maintain on-street parking and to find solutions where adjustment is needed. Retrofitting existing city streets will require tradeoffs, and some parking loss may be needed to create safer conditions.

Two-Way Protected Bikeways

Two-way protected bikeways require less space than one-way lanes because only one side of the street requires separation from the parking or travel lane.

The Bike Action Plan Amendment proposes two-way facilities in a few corridor segments where the roadway is not very wide and/or the parking and travel lanes cannot accommodate the extra space needed for one-way lanes.

A two-way protected bikeway requires some special design considerations.

- ▶ New intersection traffic controls (stop signs and traffic signals) must be installed so that they are visible to people biking in the contra-flow direction.
- ▶ Visibility at driveways and minor streets can be improved by: ensuring clear sight lines, clearly marking the conflict zone, installing “yield to bikes” signs, and constraining the width of the driveway or travel lane so that people driving must reduce their speed.
- ▶ Dedicated bike signal phases or protected intersections may be required at intersections to separate conflicting bicycle and vehicle movements.



Above: Two-way protected bikeways require only one buffer zone.

Left: Directional protected bikeways provide a buffer on each side of the street, which takes up more space.

Source: Nelson\Nygaard

Transit

The average speed of buses and people on bicycles is about the same, and it is very common for bikes and buses to share a curbside lane and leapfrog each other at bus stops. Protected bike lanes require special design considerations to maintain universal access to transit stops, since buses typically require a raised curb to pick up and drop off passengers. There are two recommended options for designing protected bikeways at bus stops.

- ▶ The protective barrier can be eliminated a sufficient distance before and after the bus stop, and a shared bus/bike area can be designated in front of the stop.
- ▶ A bus island or curb extension can be created at the bus stop, and the bike lane can go behind it, either at sidewalk or street level. Clearly marked curb-height crossings should be provided for people walking or using mobility devices to get from the bus island to the sidewalk.¹⁰

Trash and Recycling Pickup

Most properties in Santa Monica have alley access for garbage and recycling bins. In cases where curbside pickup is required on a protected bikeway corridor, the city has designs for refuse access islands that can be adapted as necessary.

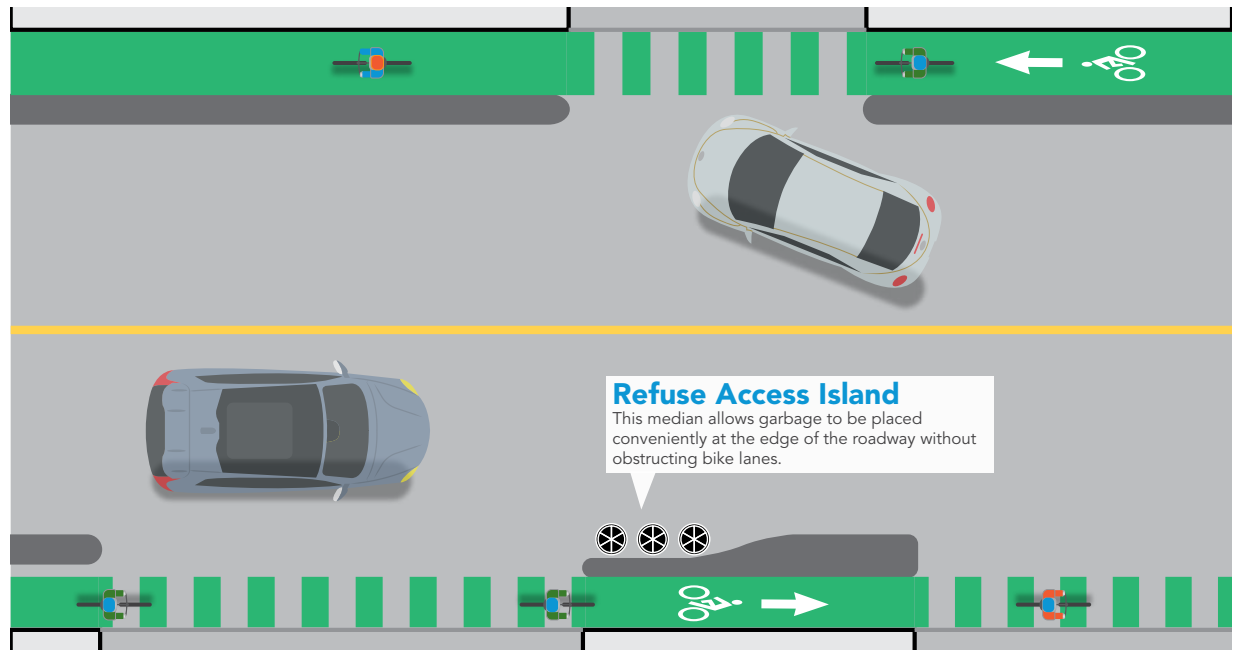


Bus/bike mixing zone at a bus stop on the Cass Avenue protected bikeway in Detroit.
Source: Nelson\Nygaard



A protected bikeway with a bus island in Seattle.
Source: Nelson\Nygaard

Example Design for Refuse Access Island



Emergency Vehicle Access

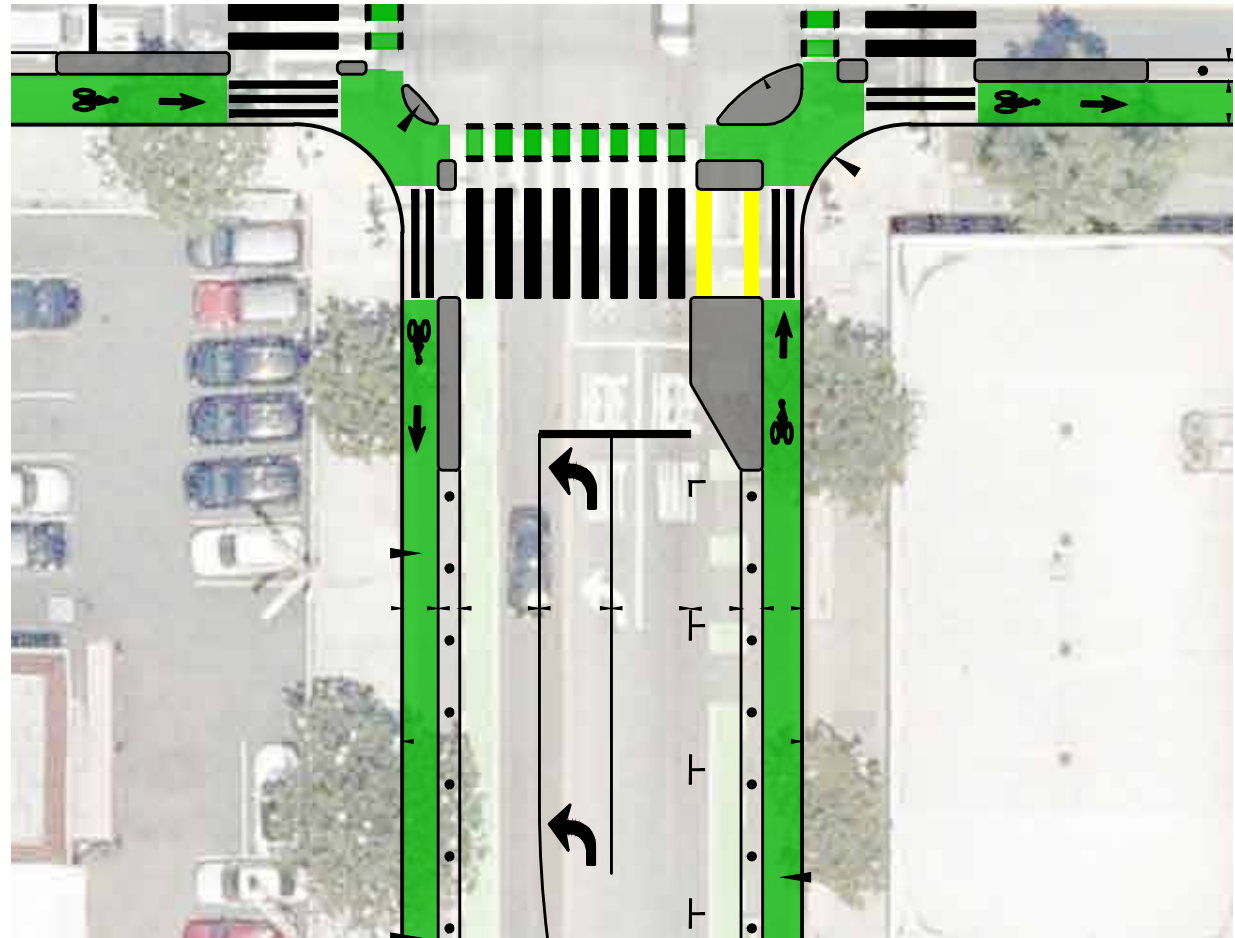
Once projects are funded for design, the fire and police departments will be consulted to establish project clear widths based on street function and adjacent land use.

Street Sweeping

Protected bike lanes buffered with curbs require cleaning of a defined and more narrow area. The addition of protected bike lanes buffered with curbs will require additional sweeps and more staff time. Depending upon the width, these lanes can be swept by standard street sweepers already in use by Resource Recovery and Recycling, or using new equipment designed for smaller spaces.

Intersection Capacity

Street space is often allocated differently at intersections than in the middle of the block. Turn lanes are added to prioritize the movement of automobiles turning left or right. Typically, a left-turn lane starts at least 60 feet back from the intersection. On protected bikeway corridors where turn lanes are anticipated to be needed in the future, design of a specific location can respond by removing three or more parking spaces. Further evaluation can help to determine whether the turn lane or on-street parking lane is most important to maintain.



At intersections where a turn-lane is needed, a few parking spaces can be removed on one side of the street.

Maintaining Bike Connectivity Through Intersections

The majority of collisions involving people bicycling occur at intersections, and most people will only consider using a bike facility if it provides low-stress connections leading up to and across intersections. In the past, common practice to accommodate turning vehicles has been to replace bike lanes with turn pockets, in other words, to eliminate the protection at the point where most people will feel the most need. There are a number of strategies for making intersections safer for everyone using the road, including people walking, people riding scooters, and all types of cyclists. The National Association of Transportation Officials (NACTO)'s "Don't Give Up at the Intersection" provides detailed guidance on reducing the probability of conflict for all road users at intersections.

Improvements at intersections have three main goals:

- ▶ **Reduce turning speed:** People driving are more likely to yield to people walking and bicycling when motor vehicle speeds are low. Low speeds give people driving more time to see others on the road, and when collisions do occur, they are less severe.
- ▶ **Make bikes visible:** Crossings set back from the intersection and green paint help make dedicated bike areas more apparent to people driving, while also providing a space for a turning driver to wait out of the way of through traffic.
- ▶ **Give bikes the right-of-way:** Protected intersection design, prohibiting right turns on red, and giving bikes their own signal phase are strategies for reducing conflicts.



Example of a Bike Box at a Signalized Intersection with a Bike Lane Approach
Source: NACTO

Protected Intersection

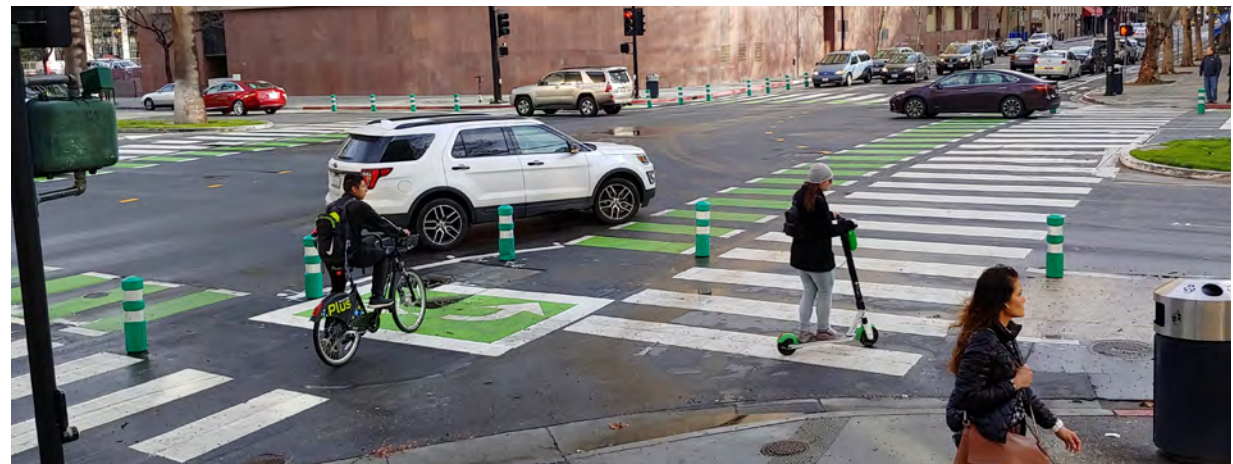
The safest intersection design is a “protected intersection,” which uses concrete islands and pavement markings to keep different modes physically separate and eliminate conflicts. They are typically applied where two streets with protected bike lanes intersect. In a protected intersection, corner islands extend protection of the bike lane into the intersection and create a waiting area for cars that are turning right and people on bikes who are waiting at a signal. Pedestrian islands shorten the crossing distance for people walking or using mobility devices, and high-visibility crosswalks and bike crossing markings clearly delineate the path of travel for people walking and biking.



Protected Intersection Design in Chicago, IL
Source: CDOT

Dedicated Intersection

A dedicated intersection uses some of the same design elements as a protected intersection, but is easier to implement on streets with space constraints or where the cost of a protected intersection is prohibitive. Rather than concrete islands, delineator posts are used to discourage vehicles from entering into the bike lane when turning right, and a corner wedge speed bump helps prevent high speeds. Posts or a curb on the centerline discourage high-speed left turns. High visibility crossings are used, and turn queue boxes can be added for bicyclists who need to turn left.



Dedicated Intersection Design in San Jose, CA
Source: NACTO

Paint (Thermoplastic)

Painted intersection treatments, such as green bike boxes, turn lanes, and driveway crossings, help alert drivers to the presence of people on bikes and direct cyclists through an intersection. Green paint can be incorporated into protected and dedicated intersection design, or applied where a protected bike lane intersects with a driveway, minor street or a street that is not on the bike network.

Bike Signals

Bicycle-specific traffic signals clearly define time and space for bike movements, eliminating conflicting movements with general purpose traffic. Bike signals are particularly important for two-way protected bike lanes and where transitioning a protected bike lane from one side of the street to another. In most cases, in the absence of heavy turning movements, bicyclists can proceed on the same green phase as cars.



A bicycle traffic signal in Long Beach
Source: Nelson\Nygaard

FIVE-YEAR VISION CORRIDOR PROFILES

The following pages profile each corridor in the five-year protected bikeway vision. The five-year vision network is made up of high-demand locations, where the existing right of way will accommodate protected bikeways with minimal impact to parking and travel lanes. The profiles provide diagrams of the existing street layout and the proposed bikeway design, summarize the benefits of adding a protected bikeway to the corridor, and identify applicable design considerations for next steps.

The needs and benefits described for each corridor on the following pages include:

▶ **Major destinations and connections.**

Which schools, parks, neighborhoods and commercial areas are better connected with the facility?

▶ **Safety.** How many crashes have happened on the corridor in recent years?

▶ **Comfort.** How comfortable is the corridor now and how much more comfortable will it be, as measured by “level of traffic stress?” (LTS - see next page)

▶ **Demand.** How many people are relying on the corridor now, as a measure of need and network value?

Key design considerations will be addressed in the next steps of project design. These include:

- ▶ **Parking impacts.** Some streets are not wide enough to keep all the on-street parking spaces and make room for a protected bikeway.
- ▶ **Travel lane impacts.** Adding a protected bikeway might mean repurposing the center left-turn lane for entire blocks, removing a turn-lane at a few intersections, or reducing the number of general purpose travel lanes.
- ▶ **Transit stops.** On bus routes, the design of the protected bikeway must allow for buses to pull up to bus stops with accessible landings for passengers to board and disembark.
- ▶ **Driveways.** Protected bikeways can be designed to allow driveway access while maintaining comfort and visibility for people cycling.
- ▶ **Intersection design.** Protection at intersections is key to the overall comfort and safety of a corridor. Transitions from one type of bike facility to another require special consideration at intersections.
- ▶ **Emergency vehicle access.** Coordination with the Fire Department is required to ensure emergency vehicles have sufficient access on narrower streets or streets with a raised median.

LEVEL OF TRAFFIC STRESS

Level of Traffic Stress (LTS)¹¹ is a way of measuring how comfortable (or uncomfortable) it is to ride a bike on a street. Locations are rated from 1 (most comfortable) to 4 (least comfortable) based on existing bike facilities, number of motor vehicle lanes, presence of parking lanes, speed limit, and average daily traffic volumes. LTS scores help to understand how a street design encourages or discourages certain types of activity and types of people riding a bike. LTS can also help identify where there are network “gaps” or areas where a pathway isn’t usable because it is too uncomfortable or frightening for people. In order to link people of all ages and abilities to their destinations, such as a school or park, the pathways need to be continuous at a tolerable level of stress for that user.

**1**

An LTS score of 1 is the most comfortable experience, suitable for all ages and abilities including children. Paths and protected bikeways such as the Colorado Esplanade or Marvin Braude Beach Bike Path are rated LTS 1.

**2**

A score of LTS 2 indicates that the street is comfortable for people who are “interested but concerned” about bicycling. Bike lanes on local streets and bike routes or bike boulevards on quiet neighborhood streets usually have an LTS 2 rating. For example, the bike lanes on Arizona Avenue are rated LTS 2.

**3**

LTS 3 indicates a street that is appropriate for “enthused and confident” bicyclists. It usually means riding in mixed traffic on local streets, or in bike lanes on busy roads. Main Street south of Pico Boulevard is an example of conditions rated LTS 3.

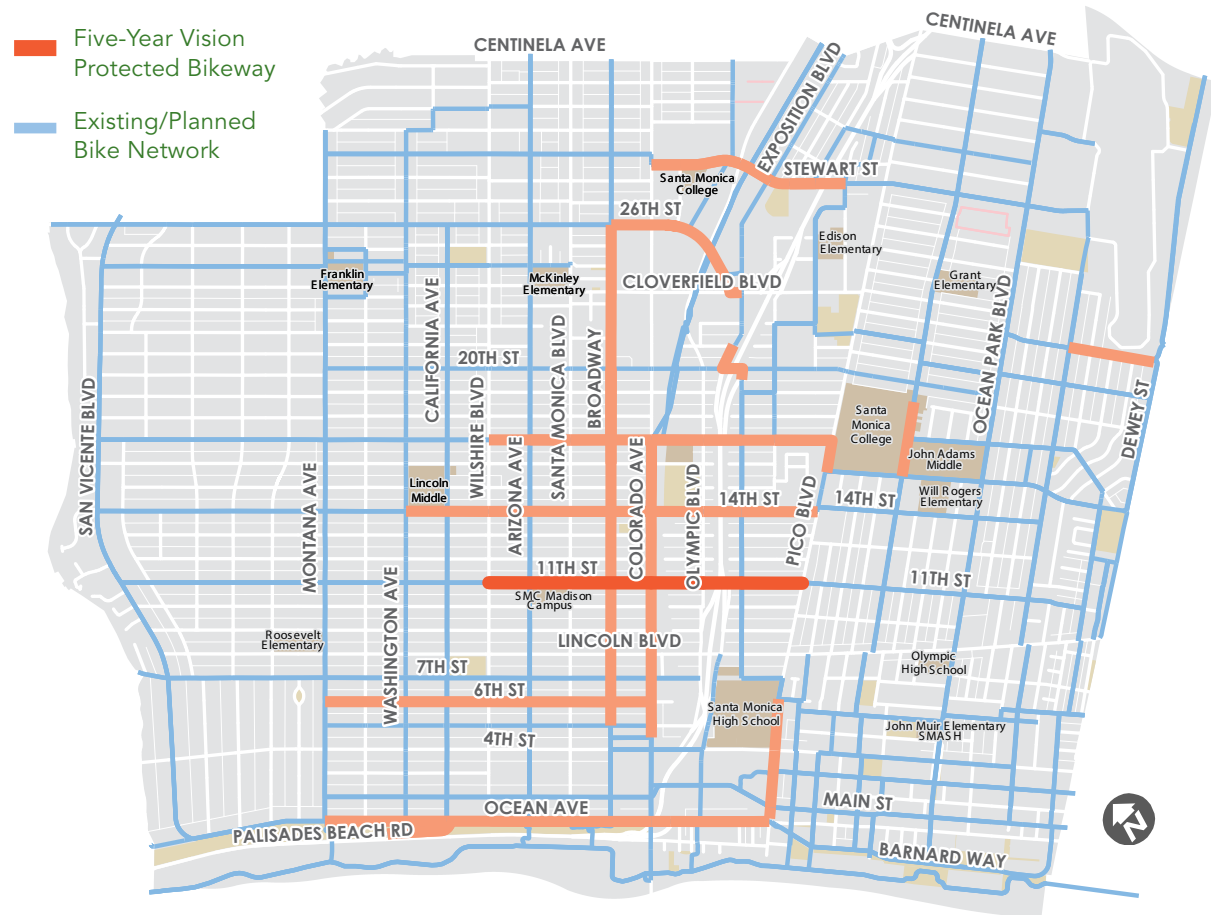
**4**

LTS 4 is the least comfortable experience, likely to be unappealing to all but the “strong and fearless” bicyclists. LTS 4 streets such as Lincoln Boulevard and other regional streets are generally very large and busy.

11TH STREET | WILSHIRE BLVD TO PICO BLVD

The 11th Street protected bikeway adds protection to an existing north-south bikeway that connects Santa Monica College and the Michigan Avenue Neighborhood Greenway (MANGo). The experience of biking on 11th Street today is stressful due to prevailing speeds over 30 mph, large intersections at Santa Monica and Olympic Boulevards, and several intersections with a history of collisions involving someone bicycling. The Bike Action Plan Amendment proposes five-foot parking-protected bikeways between Wilshire Boulevard and Michigan Avenue. A few parking spaces or turn lanes may need to be removed at intersections, and the design will need to accommodate driveways.

Corridor Location Map



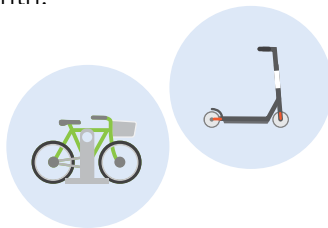
Needs and Benefits

DESTINATIONS & CONNECTIONS

- ▶ Santa Monica College Performing Arts Center
- ▶ Michigan Avenue Neighborhood Greenway
- ▶ Broadway Bikeway

EXISTING DEMAND

In the **top 25 busiest bikeways** in Santa Monica with **over 1,350 shared bike and scooter trips** per month.²



SAFETY

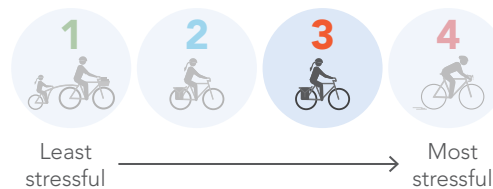
13 collisions involving people bicycling

from 2014 through 2018.¹



COMFORT

The existing bike lanes on 11th Street have a level-of-traffic stress score of 3—suitable only for confident bicyclists. The design will achieve a level of traffic stress score of 1, suitable for **all ages and abilities.**



Design Considerations

PARKING

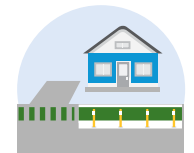
Existing on-street parking will remain,

a few spaces may need to be removed at intersections to increase visibility and safety.



KEY DESIGN ELEMENTS

Driveways, specifically the extensive driveway aprons for multiple properties concentrated on the east side of 11th just north of Olympic, will be incorporated into bikeway design.

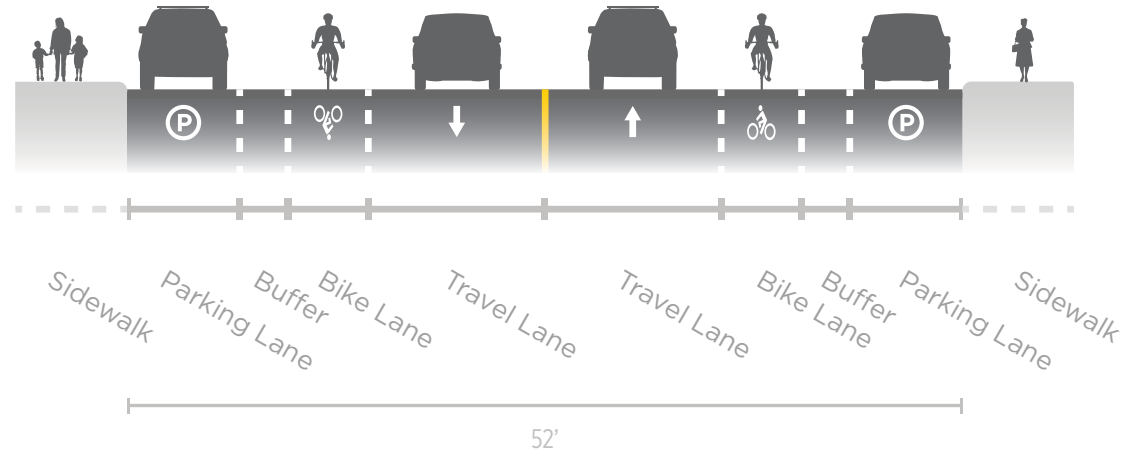


1. Data acquired from Transportation Injury Mapping System (TIMS), Safe Transportation Research and Education Center, University of California, Berkeley. 2020.

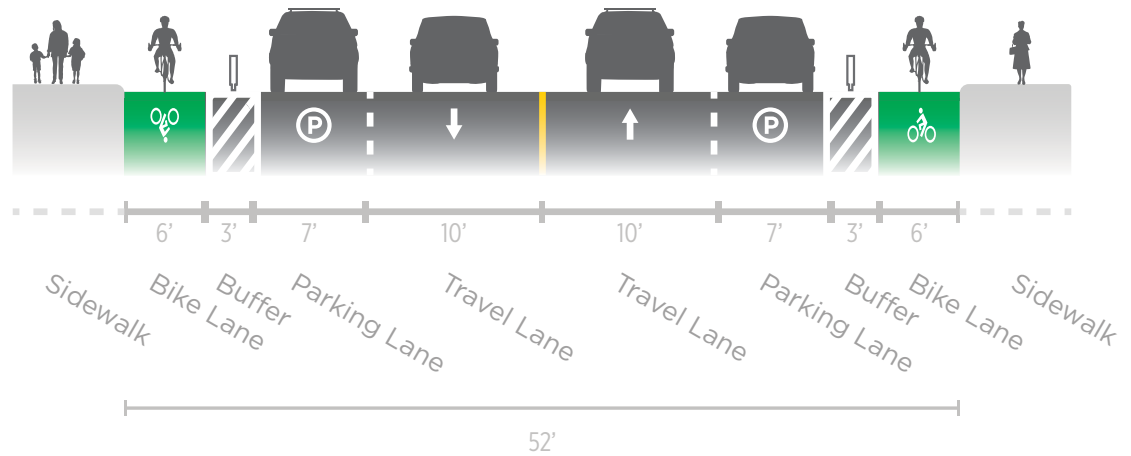
2. Monthly average of shared bike and scooter trips on the highest activity segment of the corridor during the October 2018 - January 2020 pilot

11TH STREET

Existing Cross-Section WILSHIRE TO OLYMPIC

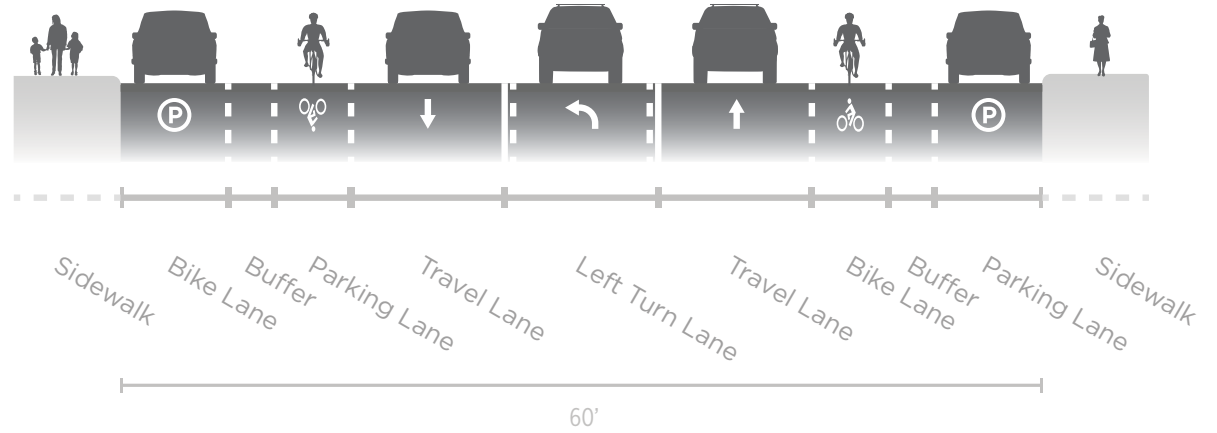


Proposed Cross-Section WILSHIRE TO OLYMPIC

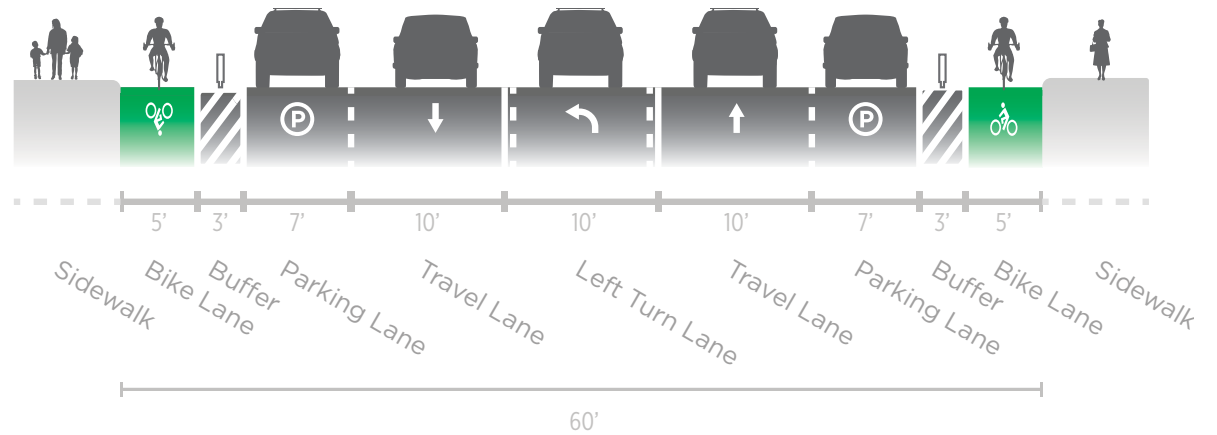


11TH STREET

Existing Cross-Section OLYMPIC TO MICHIGAN



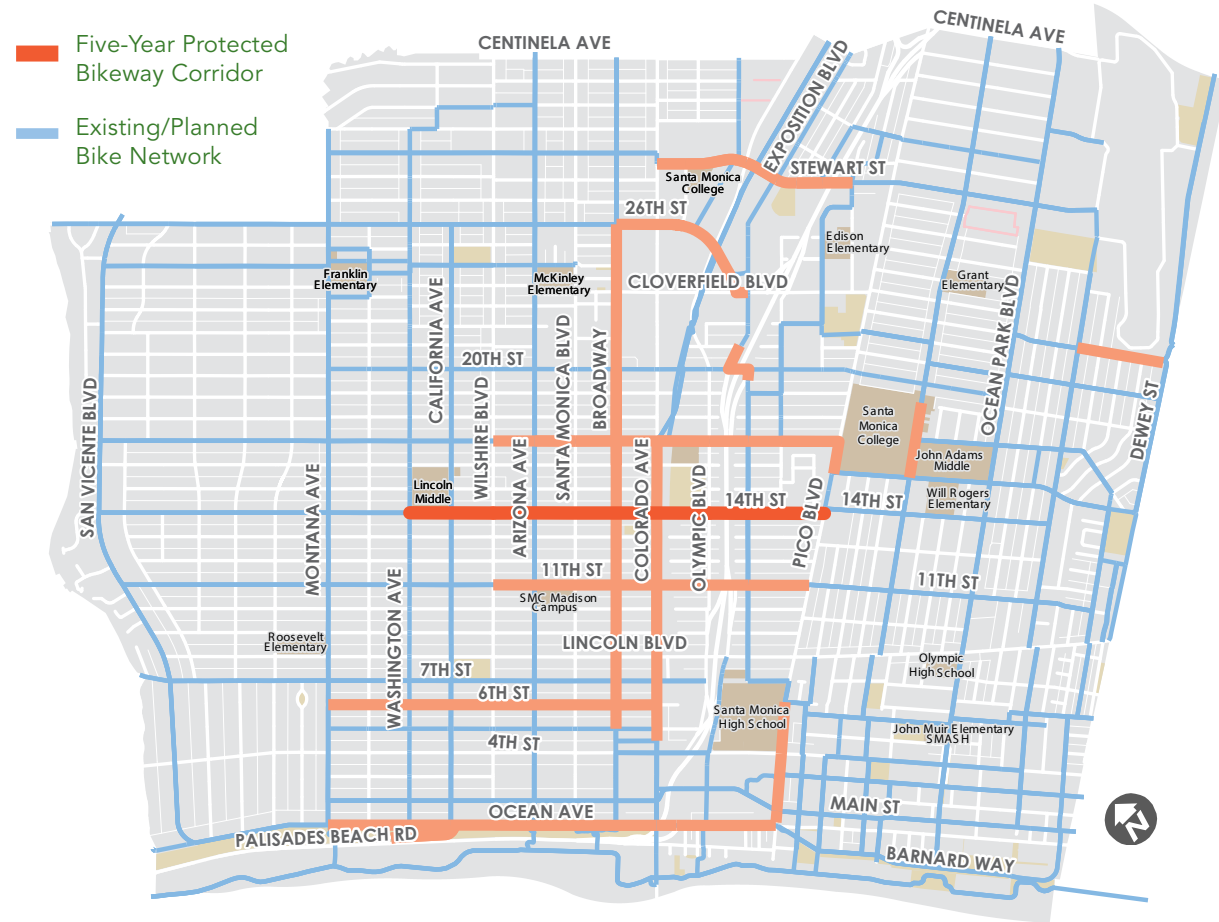
Proposed Cross-Section OLYMPIC TO MICHIGAN



14TH STREET | WASHINGTON AVE TO PICO BLVD

The 14th Street protected bikeway modifies an existing north-south bike corridor, connecting to Lincoln Middle School, Memorial Park and the Michigan Avenue Neighborhood Greenway (MANGo). The Bike Action Plan Amendment proposes parking-protected bikeways between Washington Avenue and Pico Boulevard by re-purposing the center turn lane. 14th Street is a transit route, and design treatments such as bus islands and bike/pedestrian mixing zones should be introduced at bus stops. The pick-up/drop-off zone in front of Lincoln Middle School will require special consideration during design as well.

Corridor Location Map



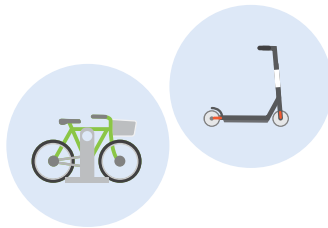
Needs and Benefits

DESTINATIONS & CONNECTIONS

- ▶ Memorial Park
- ▶ Lincoln Middle School
- ▶ Santa Monica College
- ▶ Michigan Avenue Neighborhood Greenway
- ▶ Broadway Bikeway

EXISTING DEMAND

In the **top 30 busiest bikeways** in Santa Monica with over **1,050 shared bike and scooter trips** per month.²



SAFETY

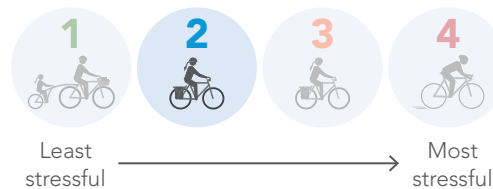
7 collisions involving people bicycling

from 2014 through 2018.¹



COMFORT

The existing bike lanes on 14th Street have a level-of-traffic stress score of 2—suitable for interested but concerned bicyclists. The design will achieve a level of traffic stress score of 1, suitable for **all ages and abilities.**



Design Considerations

PARKING

Existing on-street parking will remain,

a few spaces may need to be removed at intersections to increase visibility and safety.



KEY DESIGN ELEMENTS

Bus stops and **pickup/dropoff** at Lincoln Middle School will be incorporated into protected bikeway design.



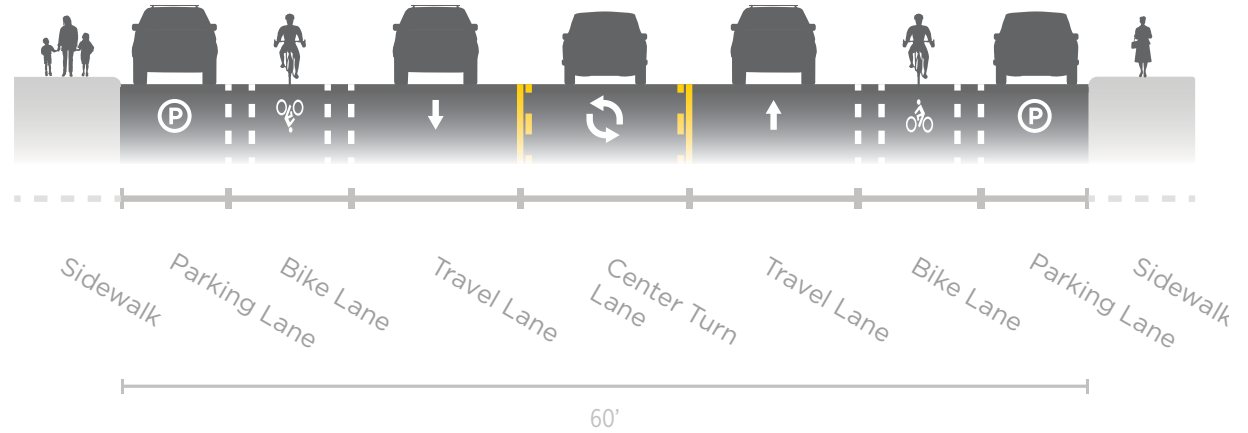
1. Data acquired from Transportation Injury Mapping System (TIMS), Safe Transportation Research and Education Center, University of California, Berkeley. 2020.

2. Monthly average of shared bike and scooter trips on the highest activity segment of the corridor during the October 2018 - January 2020 pilot

14TH STREET

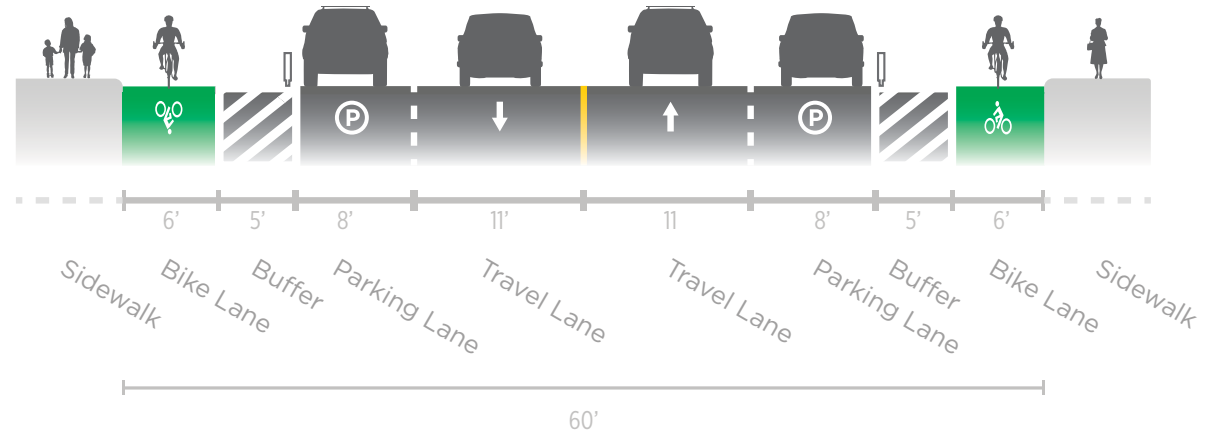
Existing Cross-Section

WASHINGTON TO WILSHIRE
AND OLYMPIC TO MICHIGAN



Proposed Cross-Section

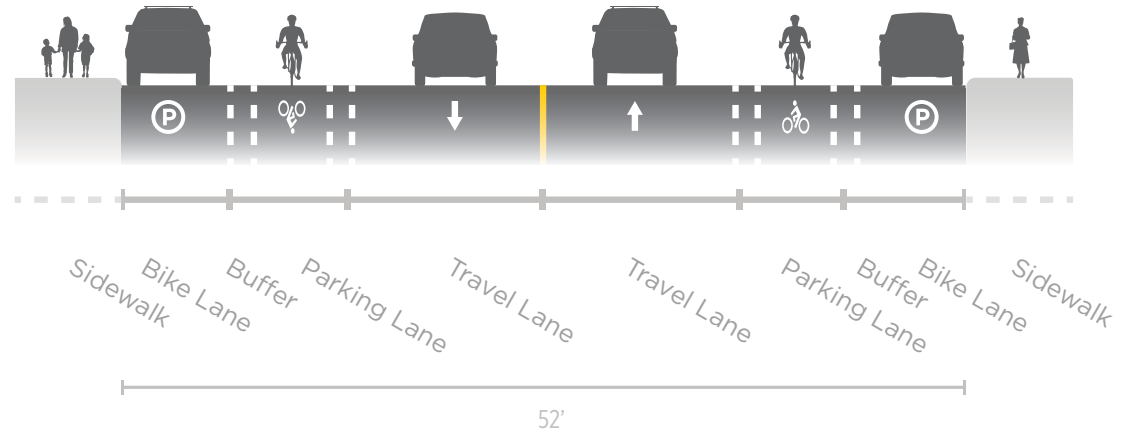
WASHINGTON TO WILSHIRE
AND OLYMPIC TO MICHIGAN



14TH STREET

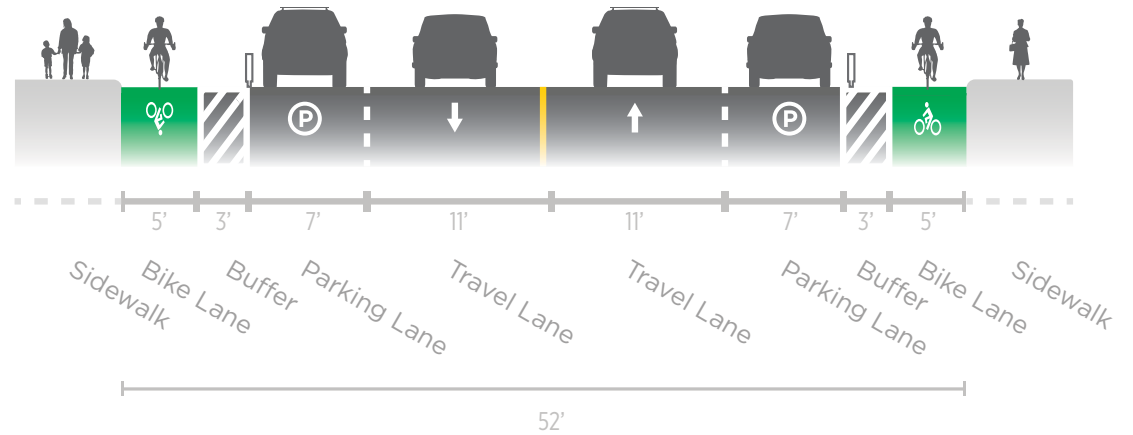
Existing Cross-Section

WILSHIRE TO OLYMPIC
AND MICHIGAN TO PICO



Proposed Cross-Section

WILSHIRE TO OLYMPIC
AND MICHIGAN TO PICO

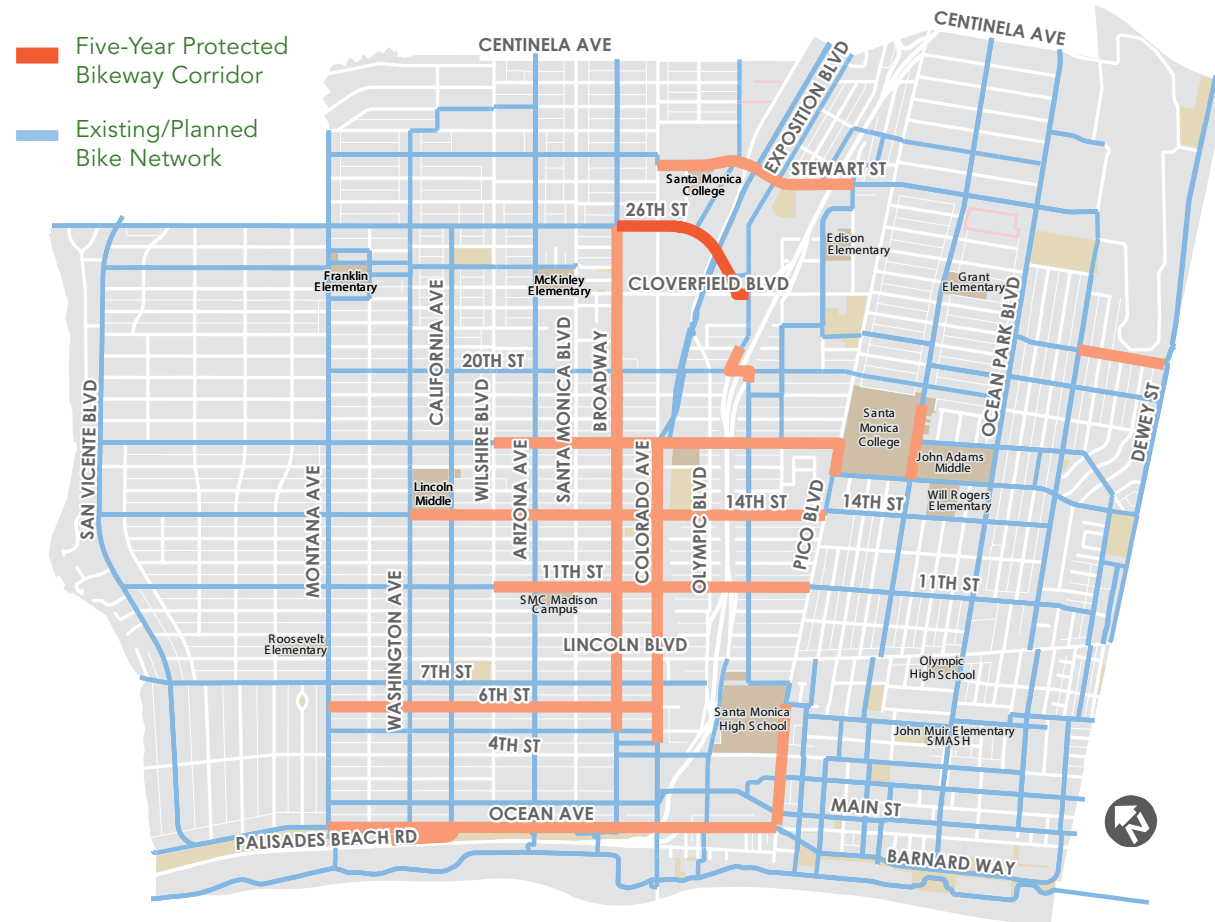


26TH STREET | BROADWAY TO OLYMPIC BLVD

The 26th Street protected bikeway provides a key connection between the 26th Street/ Bergamot Expo station, the Expo Corridor Bike Path, and the bikeway on Broadway. Existing bike lanes and shared lane markings on 26th Street are not comfortable for people of all ages and abilities, due to the width and traffic volumes of the street and the large intersection at Olympic Boulevard where southbound traffic ends.

The cross-section of 26th Street varies from block to block. Between Broadway and Colorado Avenue, the center turn lane is eliminated to make space for protected bike lanes. Between Colorado Avenue and Olympic Boulevard the project repurposes one northbound travel lane/right-turn lane. Between Olympic Blvd and Cloverfield Blvd/Michigan Ave, 26th Street is one-way northbound for motor vehicle traffic—the protected bike lane will likely be one-way as well and repurpose the parking lane.*

Corridor Location Map



*The segment of 26th Street between Olympic Blvd and Cloverfield Blvd was added to the five-year corridor in the direction of City Council and is not reflected in the data points on the next page

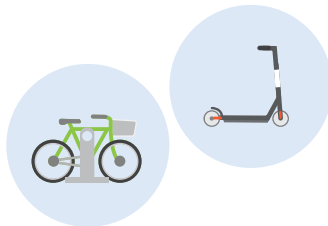
Needs and Benefits

DESTINATIONS & CONNECTIONS

- ▶ 26th St/Bergamot Expo Station and Expo Bike Path
- ▶ Colorado Center Park
- ▶ Water Garden
- ▶ Broadway Bikeway

EXISTING DEMAND

In the **top 30 busiest bikeways** in Santa Monica with **over 1,100 shared bike and scooter trips** per month.²



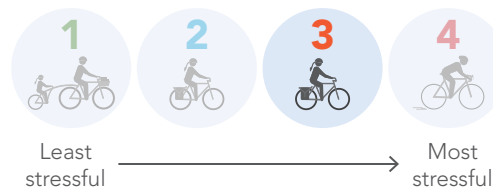
SAFETY

Includes identified high priority vision zero intersection 26th and Olympic which has had **1 fatality and 3 severe injuries**.¹



COMFORT

The existing bike lanes on 26th Street have a level-of-traffic stress score of 3, suitable only for confident bicyclists. The design will achieve a level of traffic stress score of 1, suitable for **all ages and abilities**.



Design Considerations

PARKING

Existing on-street parking is minimal, and will remain.



KEY DESIGN ELEMENTS

Bus stops will be incorporated into protected bikeway design.



Turn lanes are repurposed to make room for the protected bikeway.

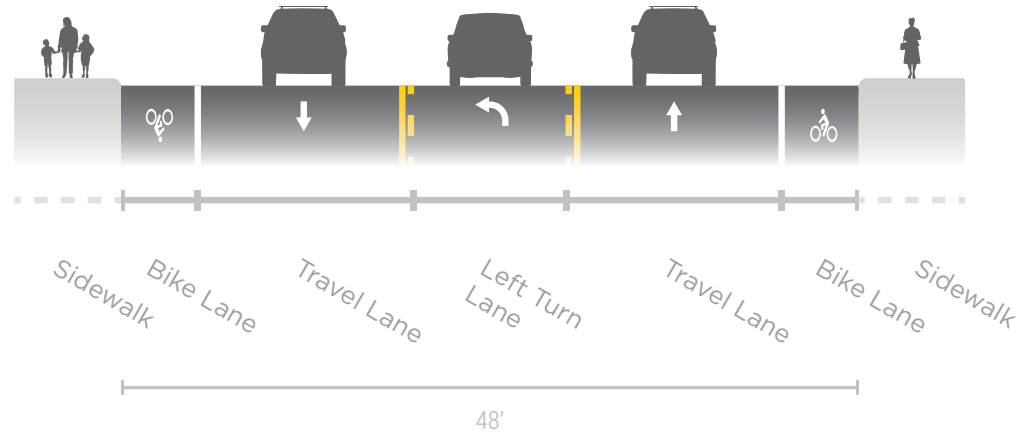
Intersection design at 26th and Olympic may require innovative treatments.

1. Data acquired from Transportation Injury Mapping System (TIMS), Safe Transportation Research and Education Center, University of California, Berkeley. 2020.

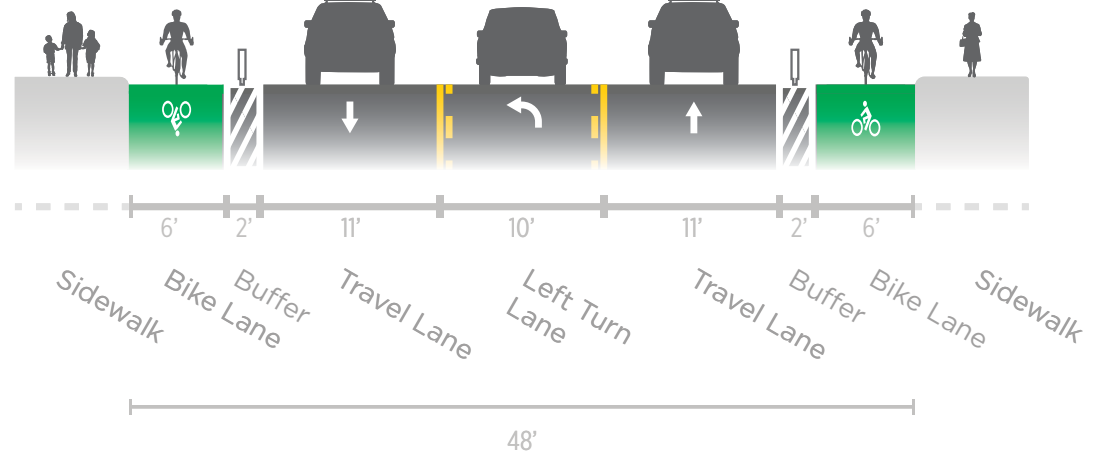
2. Monthly average of shared bike and scooter trips on the highest activity segment of the corridor during the October 2018 - January 2020 pilot

26TH STREET

Existing Cross-Section BROADWAY TO COLORADO

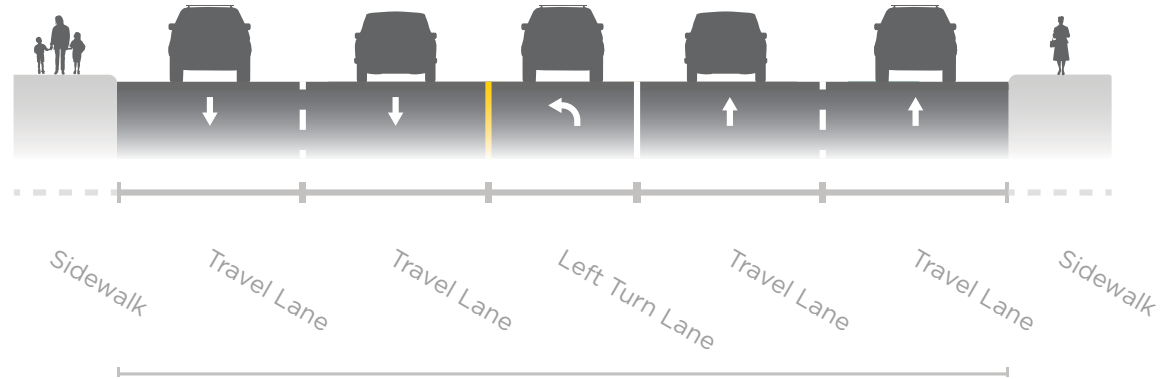


Proposed Cross-Section BROADWAY TO COLORADO

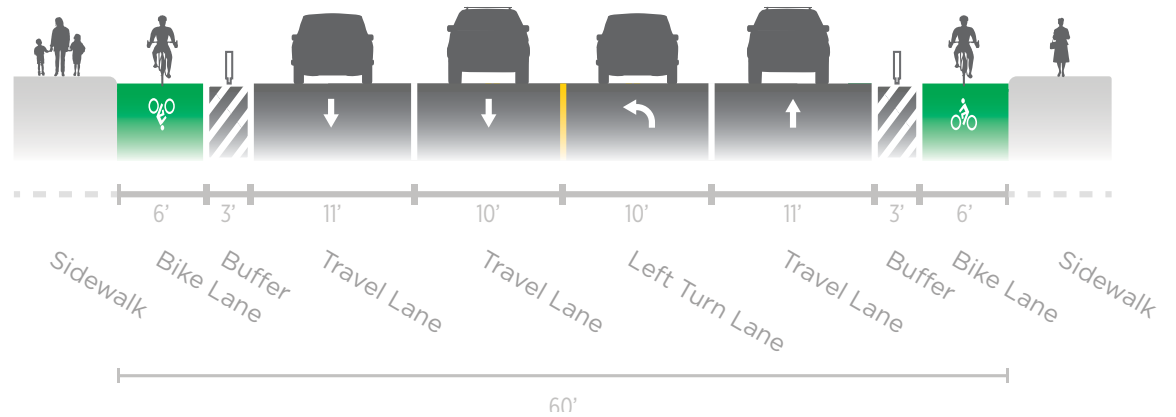


26TH STREET

Existing Cross-Section COLORADO TO OLYMPIC



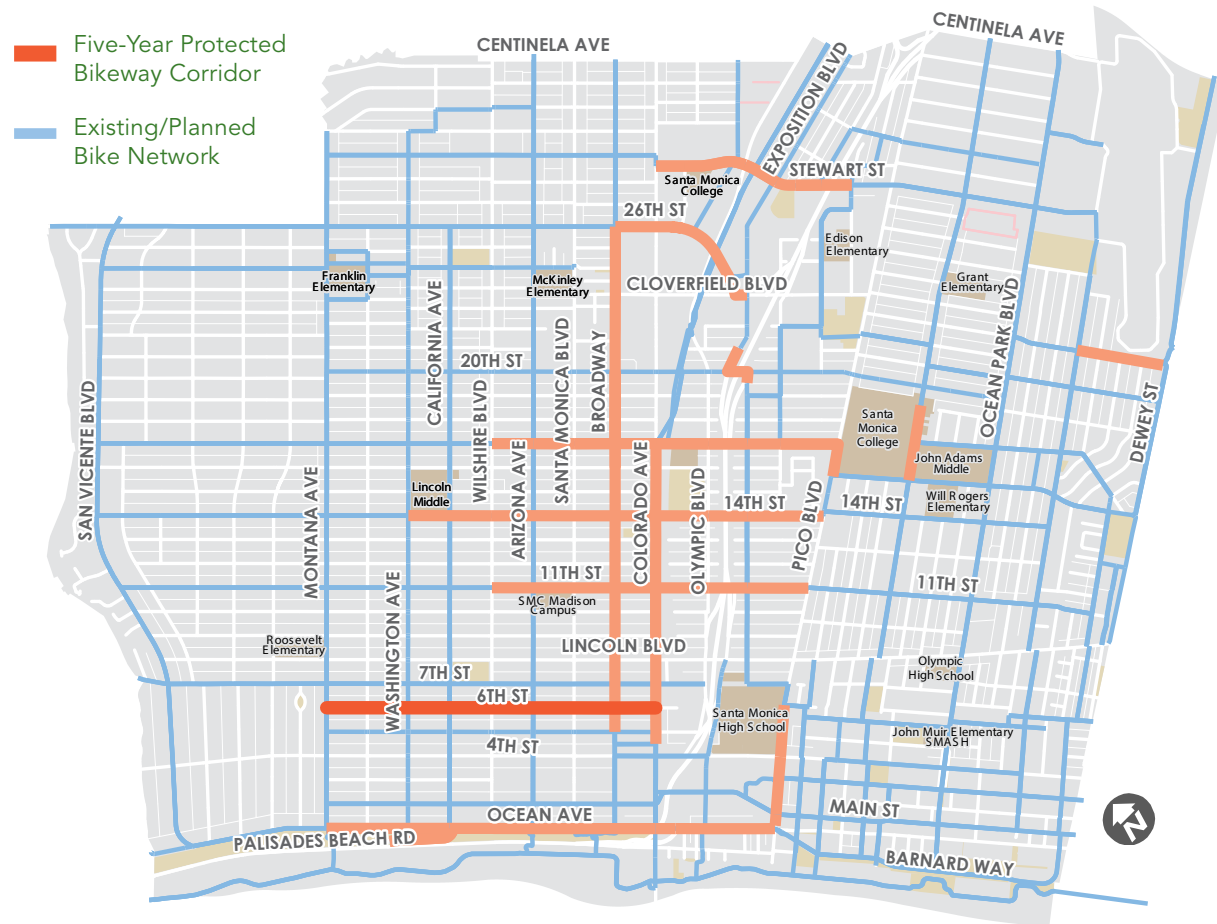
Proposed Cross-Section COLORADO TO OLYMPIC



6TH STREET | MONTANA AVE TO COLORADO AVE

Protected bike lanes on 6th Street create a low-stress connection to and through downtown Santa Monica, serving many businesses, apartment buildings, and the Main Public Library. 6th Street sees a high volume of bike and scooter trips in the existing buffered bike lanes that run from Montana Avenue to Colorado Avenue. Parking-protected bike lanes will not impact general purpose traffic lanes or on-street parking. One turn lane may need to be removed at the intersection with Wilshire Boulevard.

Corridor Location Map



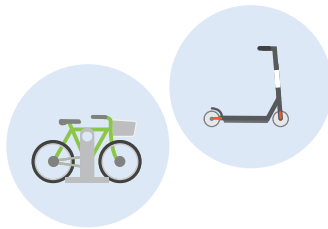
Needs and Benefits

DESTINATIONS & CONNECTIONS

- ▶ Downtown Santa Monica
- ▶ Public Library
- ▶ Reed Park
- ▶ Expo 4th St/Downtown Station
- ▶ Montana Avenue

EXISTING DEMAND

In the **top 20 busiest bikeways** in Santa Monica with **over 1,850 shared bike and scooter trips** per month.²



SAFETY

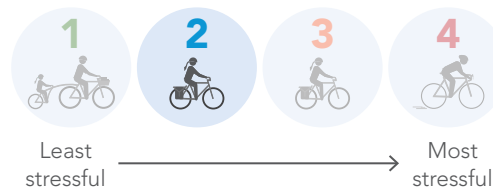
8 collisions involving people bicycling

from 2014 through 2018.¹



COMFORT

The existing bike lanes on 6th Street have a level-of-traffic stress score of 2—suitable for interested but concerned bicyclists. The design will achieve a level of traffic stress score of 1, suitable for **all ages and abilities.**

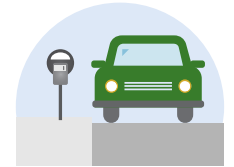


Design Considerations

PARKING

Existing on-street parking will remain,

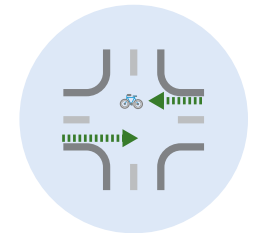
a few spaces may need to be removed at intersections.



KEY DESIGN ELEMENTS

Intersection design and balancing emergency access needs

with the need for sufficiently wide bike lanes that include two-foot gutters.

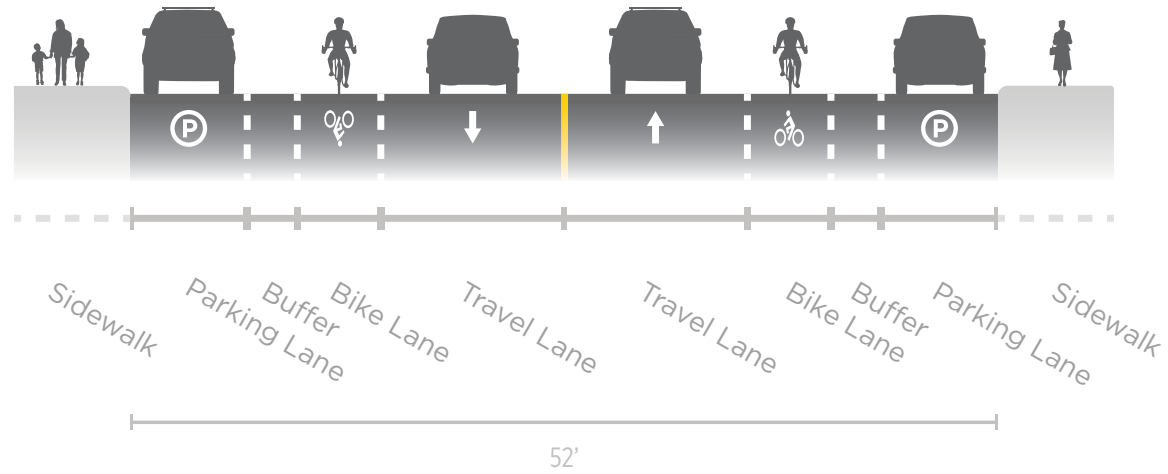


1. Data acquired from Transportation Injury Mapping System (TIMS), Safe Transportation Research and Education Center, University of California, Berkeley. 2020.

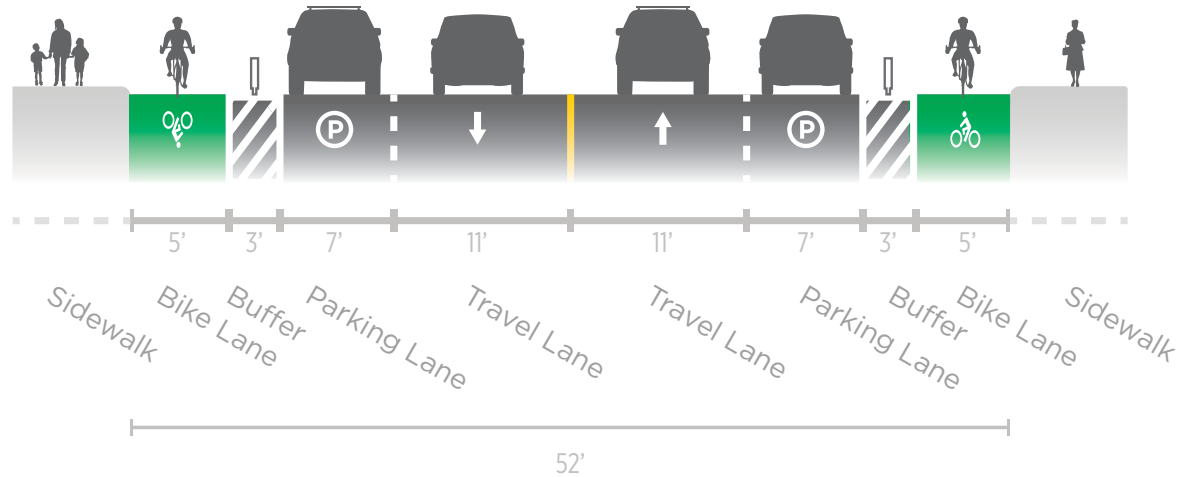
2. Monthly average of shared bike and scooter trips on the highest activity segment of the corridor during the October 2018 - January 2020 pilot

6TH STREET

Existing Cross-Section MONTANA TO COLORADO



Proposed Cross-Section MONTANA TO COLORADO



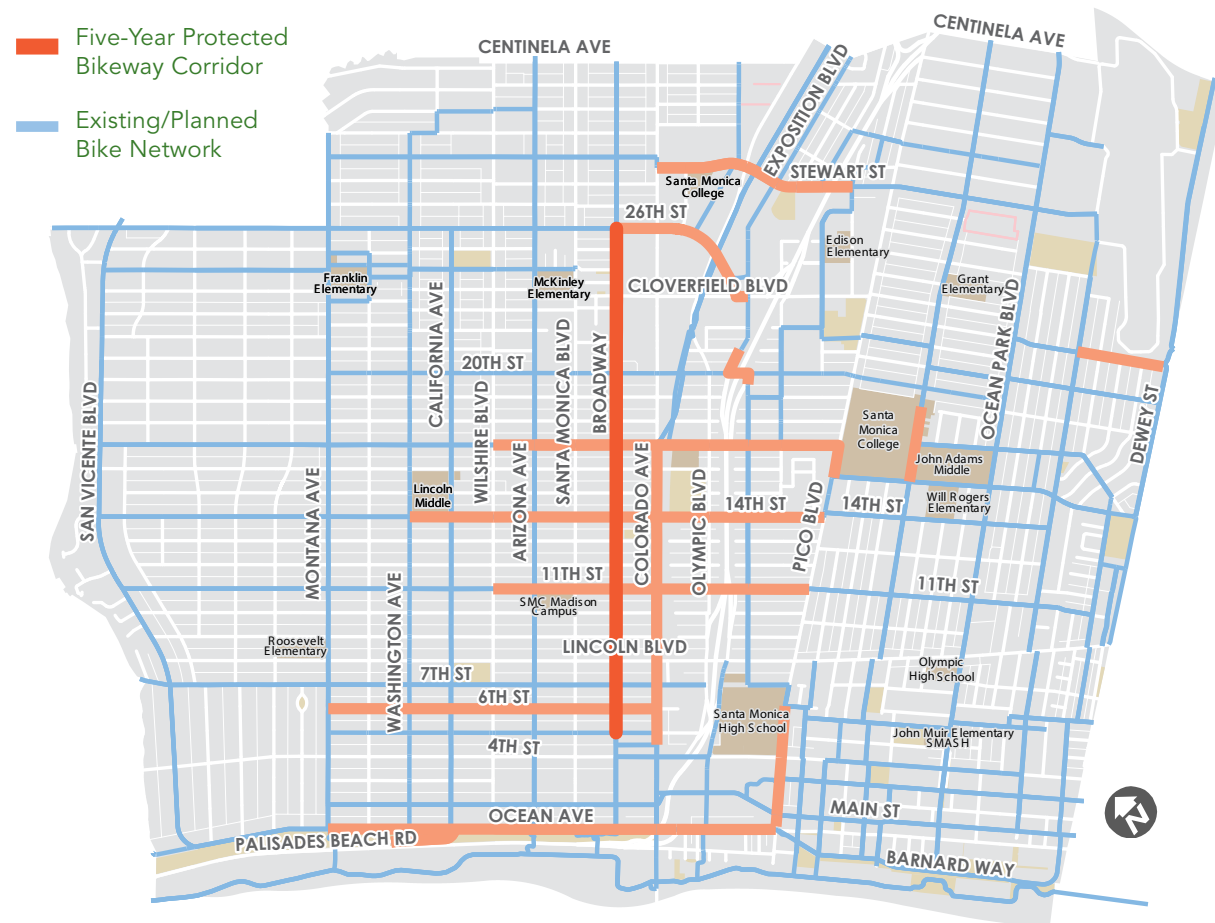
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BROADWAY | 5TH ST TO 26TH ST

Broadway is Santa Monica’s east-west backbone corridor through the middle of the city. Because it is an essential facility, it is one of the busiest bike and scooter corridors and is an essential connection to downtown. Of all the corridors analyzed for this Amendment, Broadway had the highest incidence of collisions involving people on bikes, which is related to the high level of activity.

Existing bike lanes begin at 5th Street and extend east of the city limits to the intersection with Santa Monica Boulevard. A segment of protected bike lanes is already in place between 16th Street and 20th Street. The Bike Action Plan Amendment proposes converting the bike lanes between 5th Street and 26th Street to parking-protected bike lanes by repurposing the center left turn lane. At intersections, left-turn lanes can be maintained by removing a few parking spaces. Bus islands can be added at bus stops.

Corridor Location Map



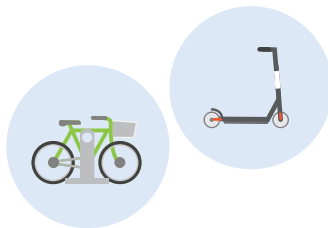
Needs and Benefits

DESTINATIONS & CONNECTIONS

- ▶ Downtown Santa Monica
- ▶ Colorado Center Park
- ▶ 11th, 14th, and 17th Street Bikeways
- ▶ PS1 Pluralistic School

EXISTING DEMAND

In the **top 15 busiest bikeways** in Santa Monica with **over 5,600 shared bike and scooter trips** per month.²



SAFETY

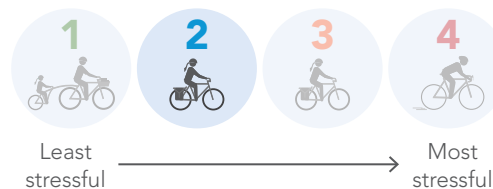
38 collisions involving people bicycling

from 2014 through 2018.¹



COMFORT

The existing bike lanes on Broadway have a level-of-traffic stress score of 2—suitable for interested but concerned bicyclists. The design will achieve a level of traffic stress score of 1, suitable for **all ages and abilities.**



Design Considerations

PARKING

Existing on-street parking will remain,

a few spaces will be removed at intersections where left-turn lanes are needed.



KEY DESIGN ELEMENTS

Bus stops at 5th Street and between 18th Street and 20th Street will be incorporated into protected bikeway design.



The center turn lane is repurposed to make room for the protected bikeway.

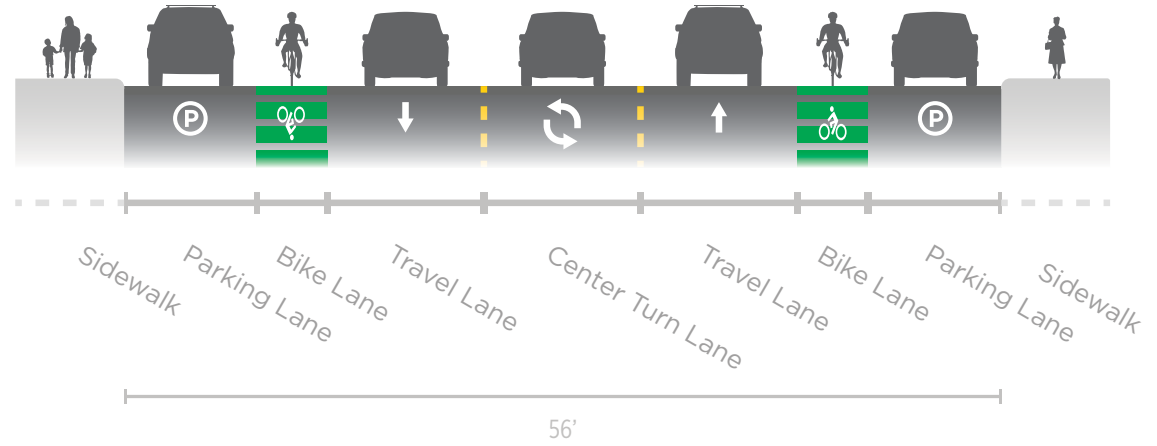
1. Data acquired from Transportation Injury Mapping System (TIMS), Safe Transportation Research and Education Center, University of California, Berkeley. 2020.

2. Monthly average of shared bike and scooter trips on the highest activity segment of the corridor during the October 2018 - January 2020 pilot

BROADWAY

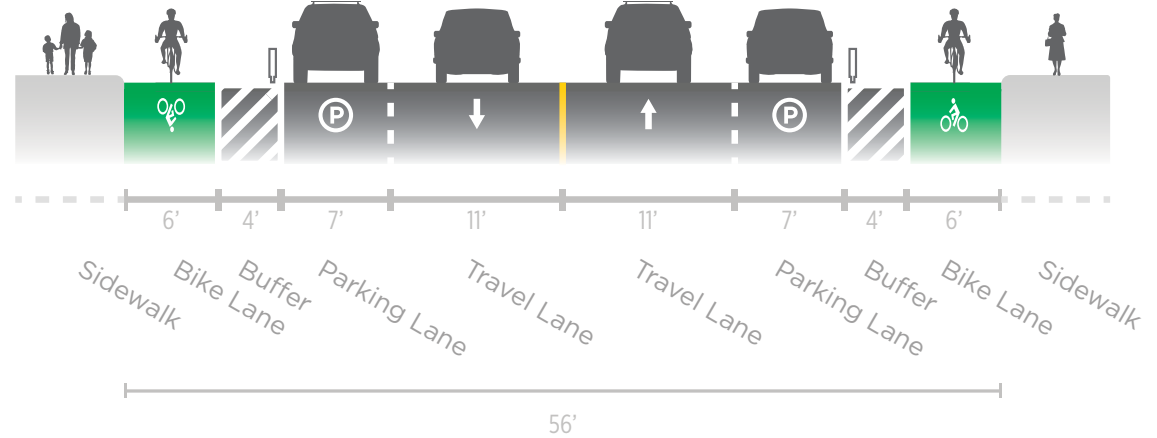
Existing Cross-Section

5TH TO 26TH



Proposed Cross-Section

5TH TO 26TH

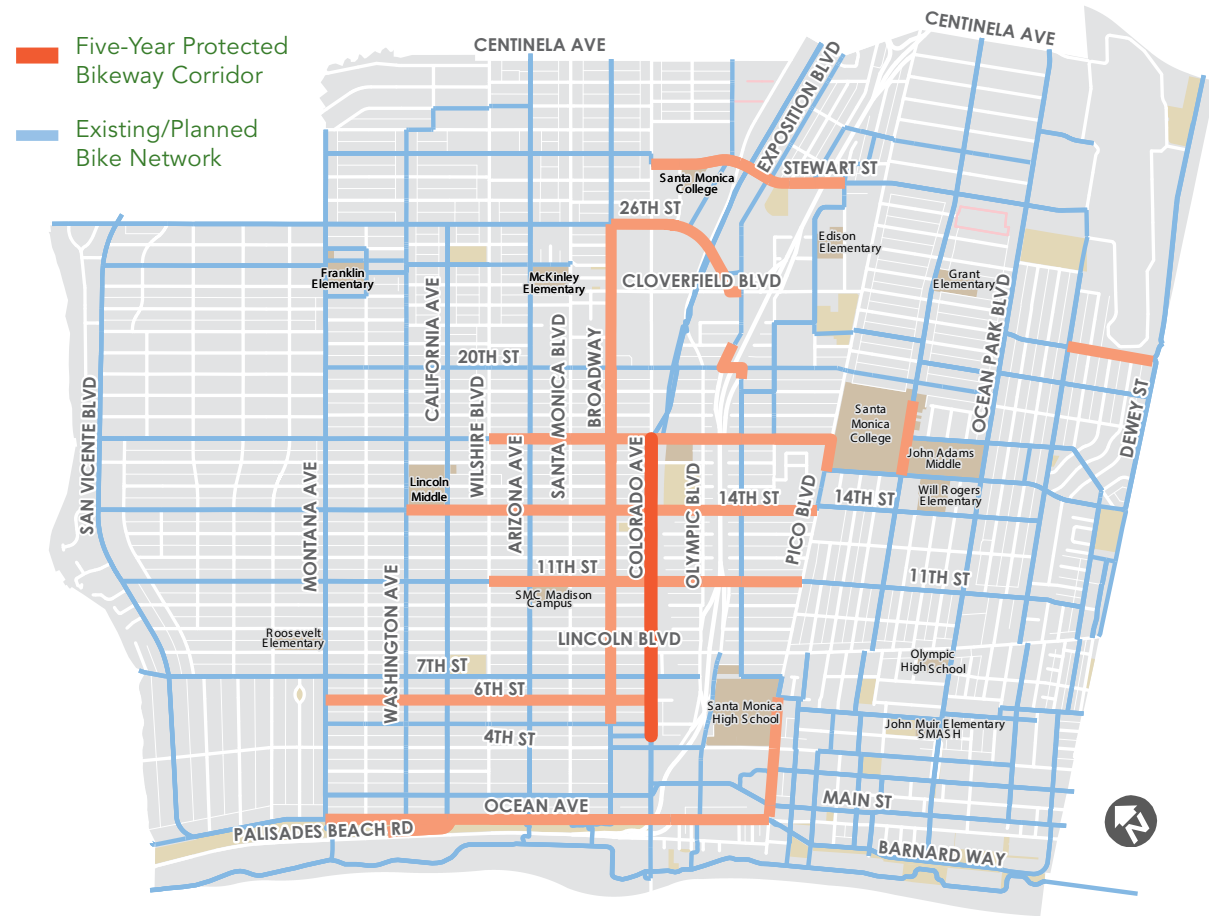


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COLORADO AVENUE | 5TH ST TO 17TH ST

A protected bikeway on Colorado Avenue will connect to the existing two-way protected bikeway on the Esplanade, which runs from the Santa Monica Pier entrance to the Downtown Expo station. The Expo light rail line runs down the center of Colorado to 17th. Vehicle travel lane width on the south side prohibits a protected bike lane. However, by removing parking on the north side of the street, a westbound protected bike lane can be installed, serving as an extension of the Expo corridor bike path into downtown and connecting to the protected bike lanes on 17th. The narrower south side of Colorado would have shared lane markings.

Corridor Location Map



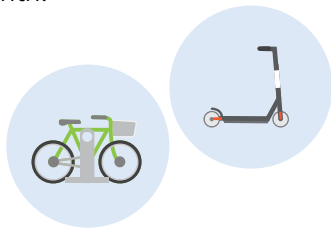
Needs and Benefits

DESTINATIONS & CONNECTIONS

- ▶ Downtown Santa Monica Expo Station
- ▶ 17th St Expo Station and Expo Bike Path
- ▶ Memorial Park
- ▶ Crossroads Elementary School

EXISTING DEMAND

In the **top 15 busiest bikeways** in Santa Monica with **over 3,500 shared bike and scooter trips** per month.²



SAFETY

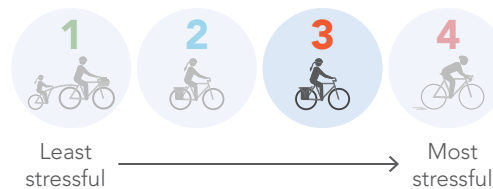
7 collisions involving people bicycling

from 2014 through 2018.¹



COMFORT

The existing bike facilities on Colorado have a level-of-traffic stress score of 3, suitable only for confident bicyclists. The design will achieve a level of traffic stress score of 1, suitable for **all ages and abilities.**



Design Considerations

PARKING

Removes existing parking on the **north side of the street.**



KEY DESIGN ELEMENTS

Intersection design is crucial at both termini—at 17th St to accommodate cyclists accessing the planned protected bikeway on 17th and the Expo bike path and at 5th St to transition cyclists smoothly from the two-way protected bikeway.

Bus stops will be accommodated into design.



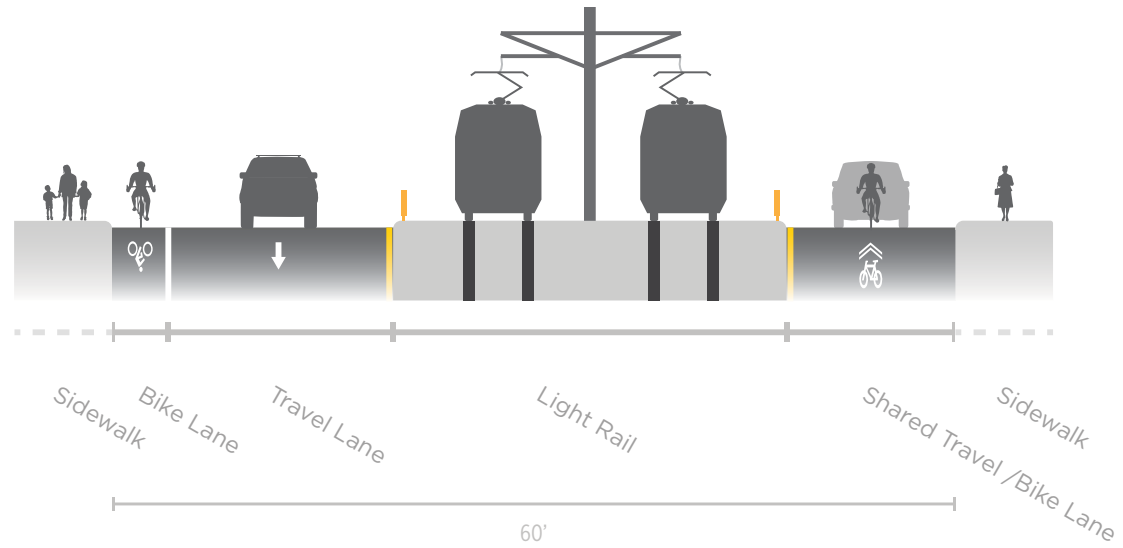
1. Data acquired from Transportation Injury Mapping System (TIMS), Safe Transportation Research and Education Center, University of California, Berkeley. 2020.

2. Monthly average of shared bike and scooter trips on the highest activity segment of the corridor during the October 2018 - January 2020 pilot

COLORADO AVENUE

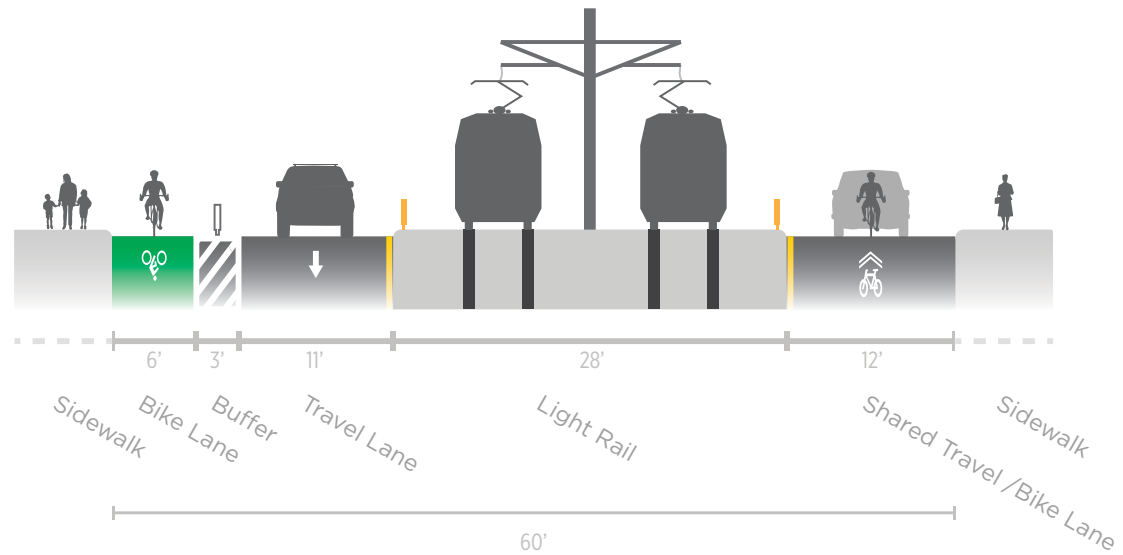
Existing Cross-Section

5TH TO 7TH



Proposed Cross-Section

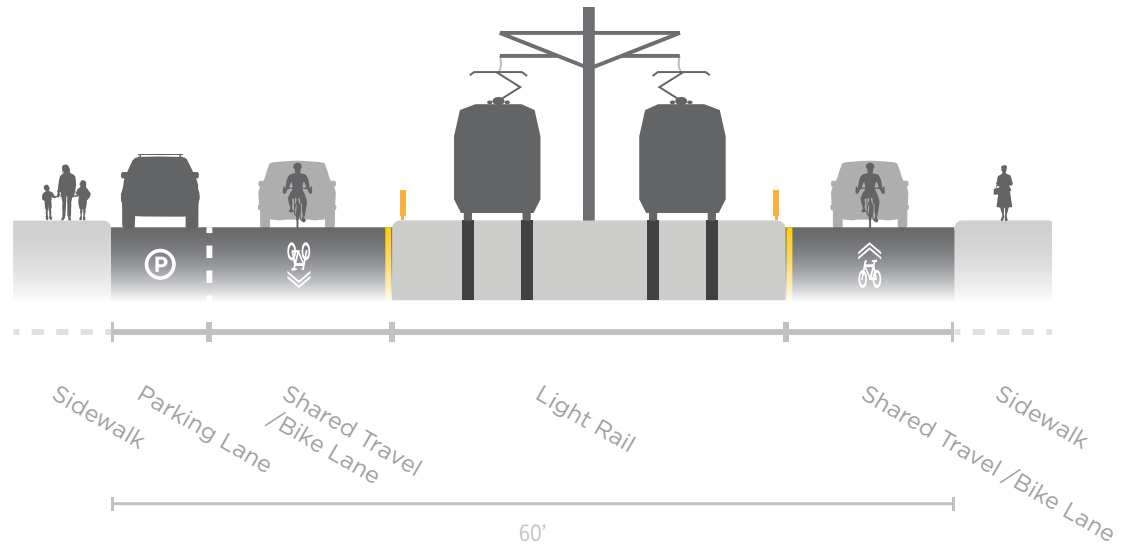
5TH TO 7TH



COLORADO AVENUE

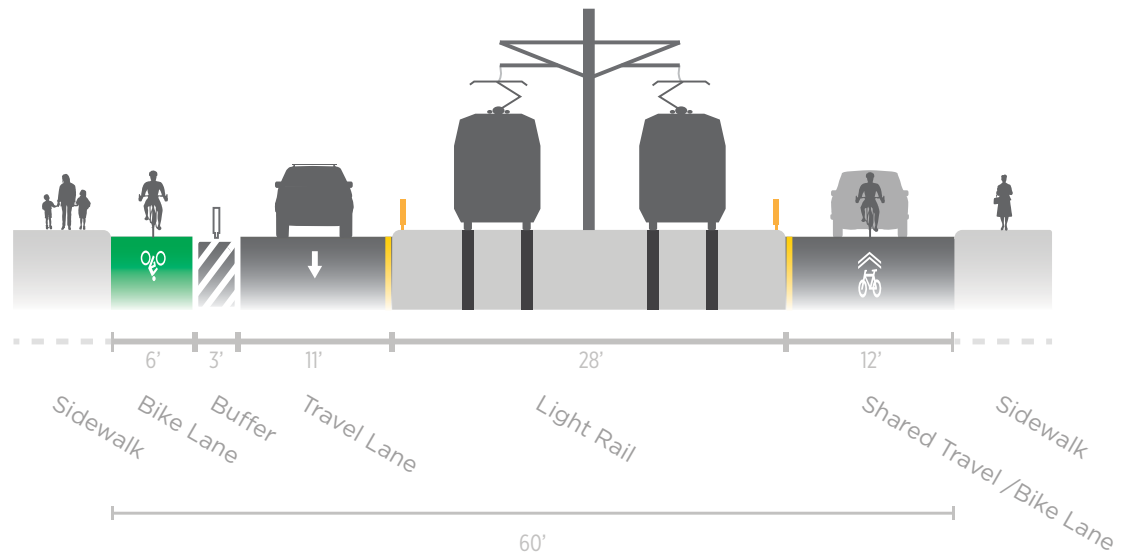
Existing Cross-Section

7TH TO 17TH



Proposed Cross-Section

7TH TO 17TH

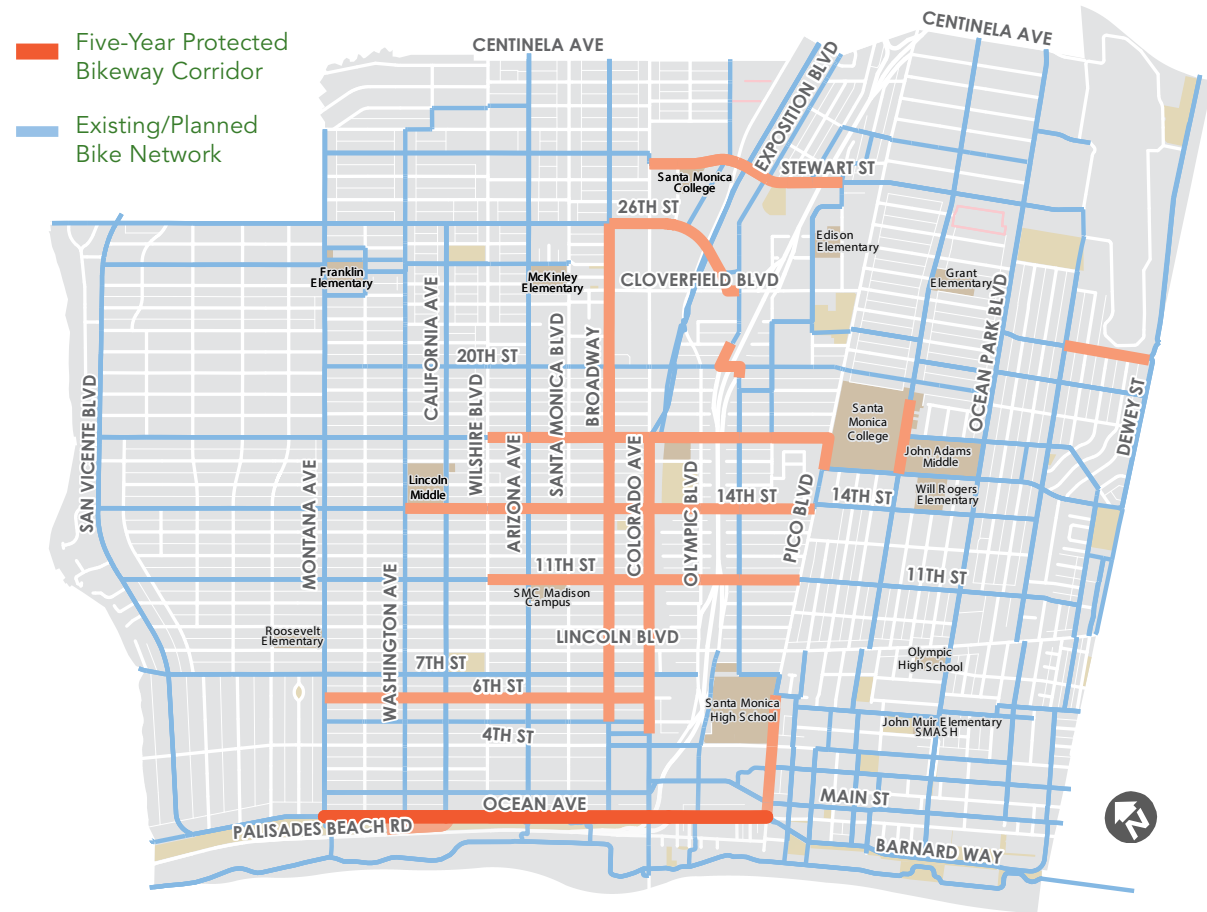


OCEAN AVENUE | MONTANA AVE TO PICO BLVD

Ocean Avenue gives residents and visitors access to parks, the beach, the Santa Monica Pier, and numerous hotels and dining options. It is by far the most heavily visited corridor by people riding scooters and Breeze bikeshare, but conditions are very uncomfortable (LTS 4), and it has a high incidence of collisions. The nature of the street changes a few times between Montana Avenue and Pico Boulevard. There are currently bike lanes the entire way, and multiple bus routes use Ocean Avenue.

The Bike Action Plan Amendment proposes a two-way cycle track on the west side of the street from California Avenue to Pico Boulevard. North of California, a two-way cycle track along the park could potentially replace the interim design of a protected bike lane on the east side and buffered bike lane on the west side.

Corridor Location Map



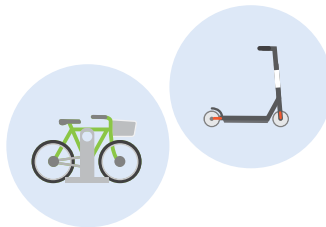
Needs and Benefits

DESTINATIONS & CONNECTIONS

- ▶ Tongva Park
- ▶ Palisades Park
- ▶ Santa Monica Pier
- ▶ Downtown
- ▶ Montana Ave Bikeway

EXISTING DEMAND

Busiest bikeway in Santa Monica with **over 15,000 shared bike and scooter trips** per month.²



SAFETY

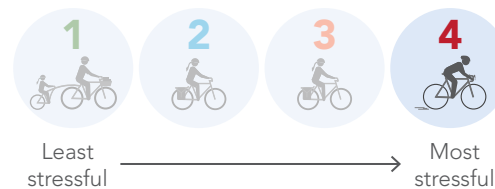
7 collisions involving people bicycling

from 2014 through 2018.¹



COMFORT

The existing bike lanes on Ocean Ave have a level-of-traffic stress score of 4, suitable only for strong and fearless bicyclists. The design will achieve a level of traffic stress score of 1, suitable for **all ages and abilities.**



Design Considerations

PARKING

Removes existing parking on the **west side of the street** between California Ave and Pico Blvd.



KEY DESIGN ELEMENTS

Intersection design will need to accommodate cyclists accessing the **two-way cycle track** from directional bike lanes at California Avenue.

Bus stops will be accommodated into design.

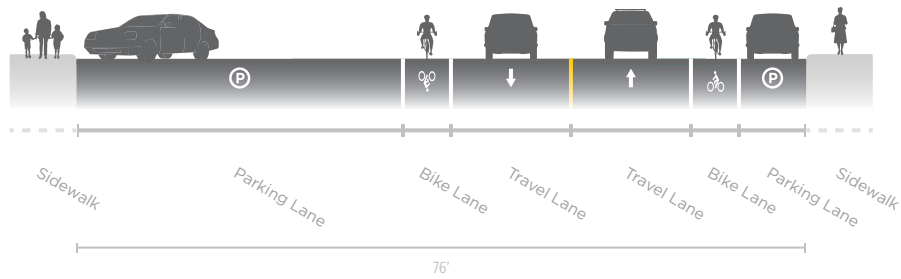


1. Data acquired from Transportation Injury Mapping System (TIMS), Safe Transportation Research and Education Center, University of California, Berkeley. 2020.

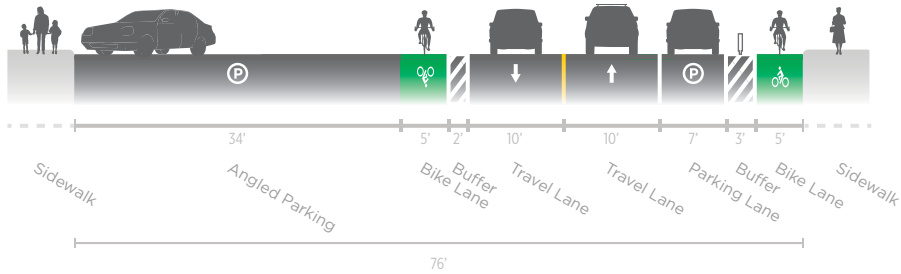
2. Monthly average of shared bike and scooter trips on the highest activity segment of the corridor during the October 2018 - January 2020 pilot

OCEAN AVENUE

Existing Cross-Section MONTANA TO CALIFORNIA

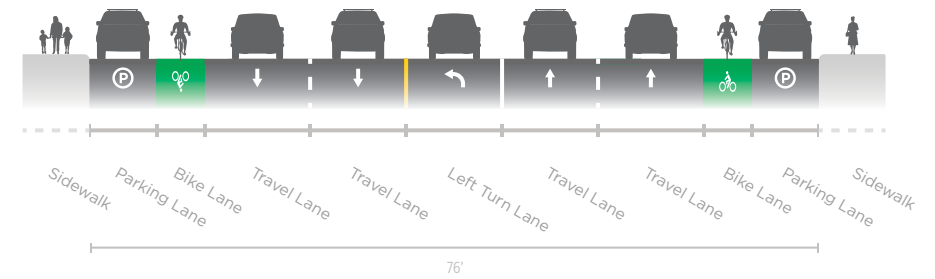


Proposed Cross-Section MONTANA TO CALIFORNIA

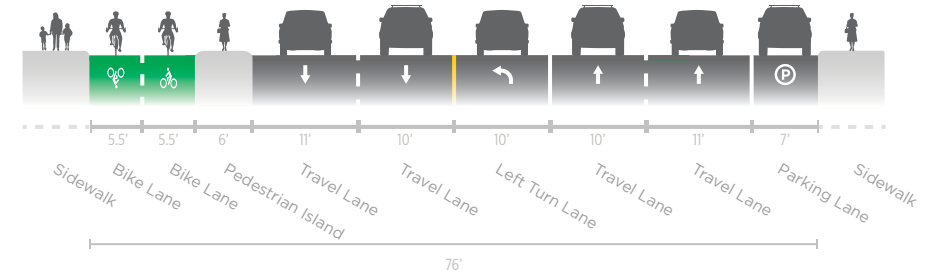


OCEAN AVENUE

Existing Cross-Section CALIFORNIA TO OLYMPIC

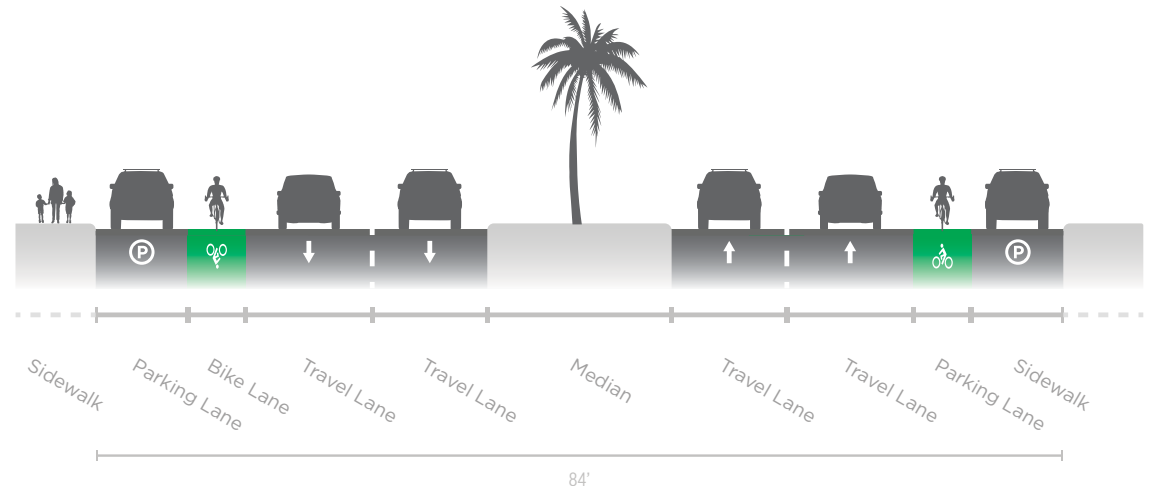


Proposed Cross-Section CALIFORNIA TO OLYMPIC

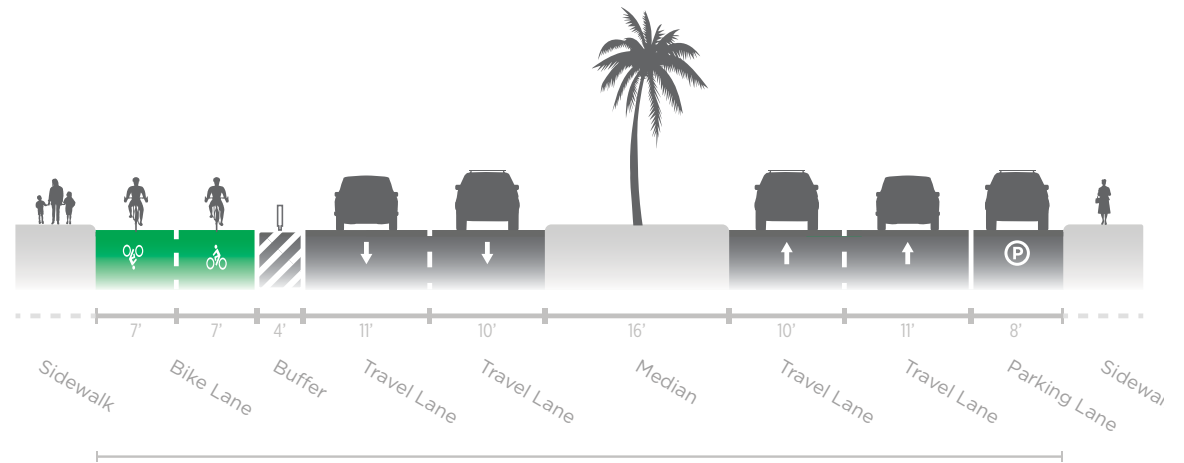


OCEAN AVENUE

Existing Cross-Section OLYMPIC TO PICO



Proposed Cross-Section OLYMPIC TO PICO

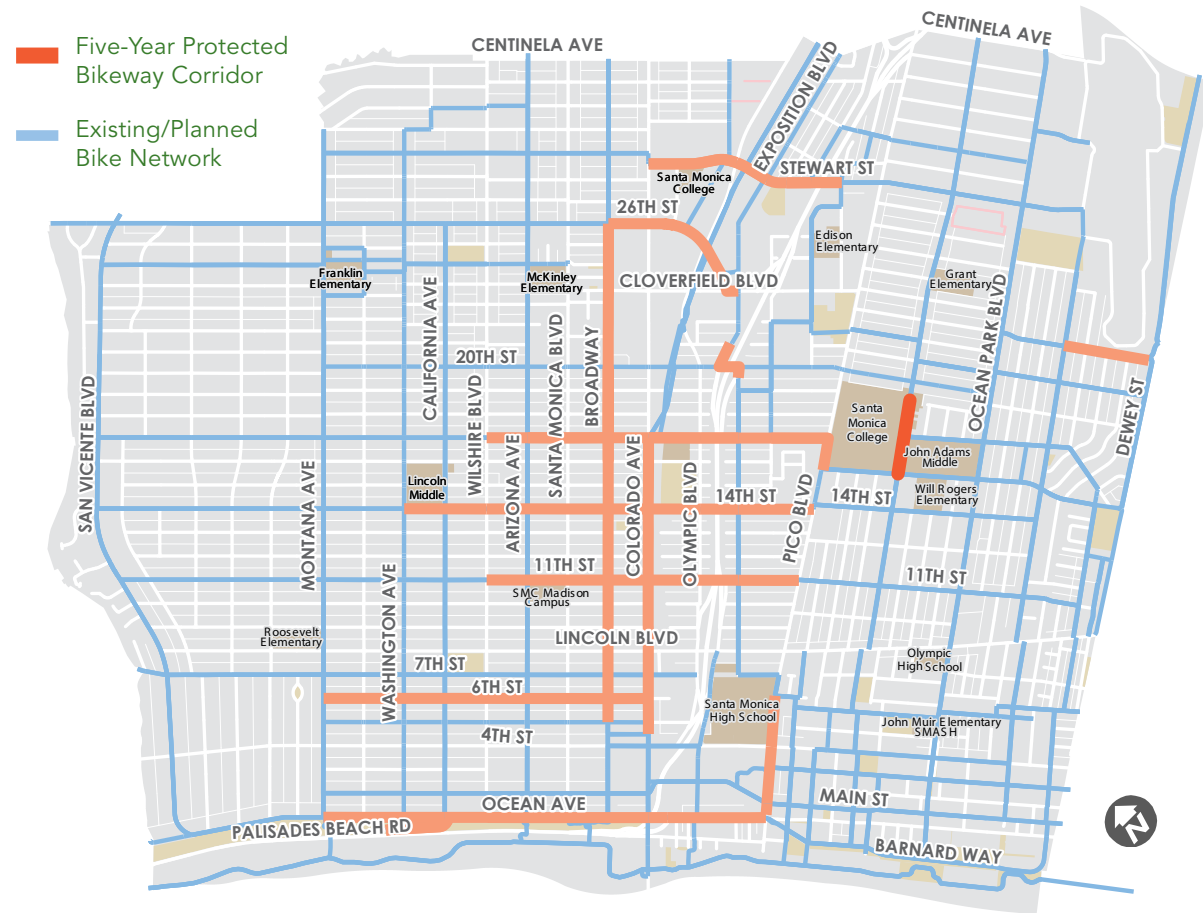


PEARL STREET | 16TH ST TO 20TH ST

The Pearl Street protected bikeway provides access to two key destinations: Santa Monica College and John Adams Middle School. Currently there are bike lanes on Pearl Street from east of Lincoln Boulevard to Centinela Avenue. The busy section in front of the college, between 16th Street and 20th Street, is the focus for an upgrade to a protected bikeway that will connect to existing lower-stress facilities on Pearl and 16th, where there is less automobile traffic. Perpendicular parking in front of Santa Monica College limits drivers' sight lines and is therefore an uncomfortable and threatening location to bike as people back out of parking spaces.

The Bike Action Plan Amendment proposes a two-way cycle track, maintaining perpendicular parking on one side and replacing it with parallel parking on the other. Parking needs and advanced design should be assessed in collaboration with Santa Monica college.

Corridor Location Map



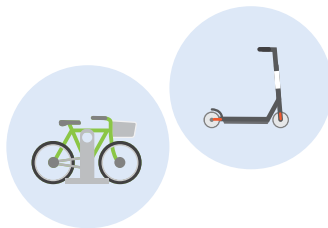
Needs and Benefits

DESTINATIONS & CONNECTIONS

- ▶ Santa Monica College
- ▶ John Adams Middle School
- ▶ Existing bike lanes on Pearl and 16th Streets

EXISTING DEMAND

In the **top 35 busiest bikeways** in Santa Monica with **over 850 shared bike and scooter trips** per month.²



SAFETY

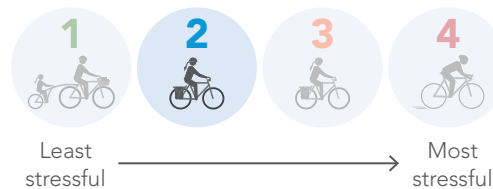
1 collision involving a person bicycling

from 2014 through 2018.¹



COMFORT

The existing bike lanes on Pearl Street have a level-of-traffic stress score of 2—suitable for interested but concerned bicyclists. The design will achieve a level of traffic stress score of 1, suitable for **all ages and abilities.**

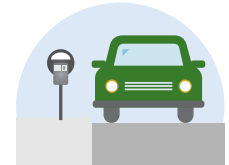


Design Considerations

PARKING

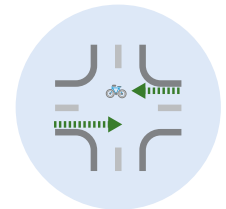
Replaces perpendicular parking with parallel parking on one side of the street

—off-street parking lots nearby may be able to meet the demand.



KEY DESIGN ELEMENTS

Intersection design will need to transition cyclists smoothly from the two-way cycle track to directional bike lanes.



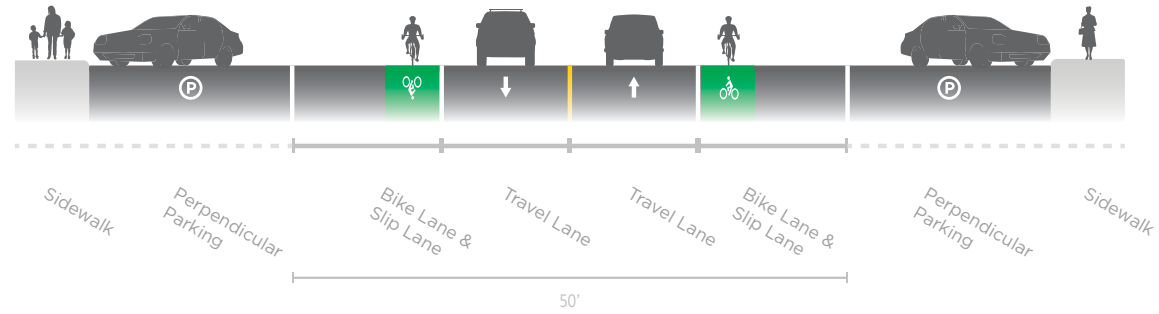
1. Data acquired from Transportation Injury Mapping System (TIMS), Safe Transportation Research and Education Center, University of California, Berkeley. 2020.

2. Monthly average of shared bike and scooter trips on the highest activity segment of the corridor during the October 2018 - January 2020 pilot

PEARL STREET

Existing Cross-Section

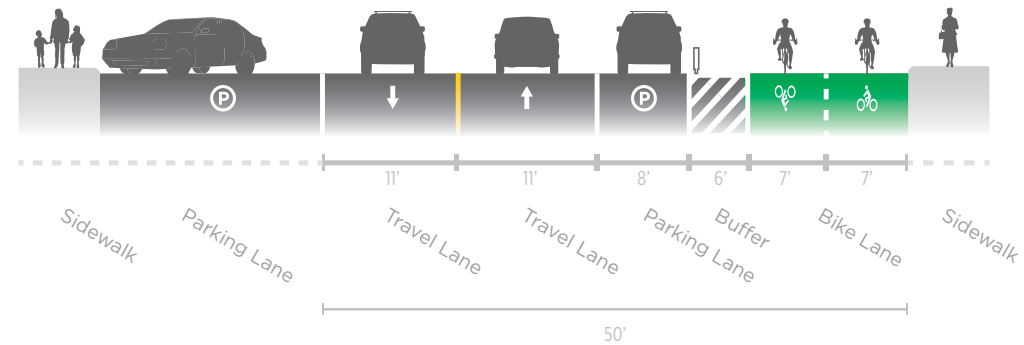
16TH TO 18TH*



*Existing cross-section between 17th Street and 18th Street differs from the above in that there is parallel parking on the south side in place of perpendicular parking.

Proposed Cross-Section

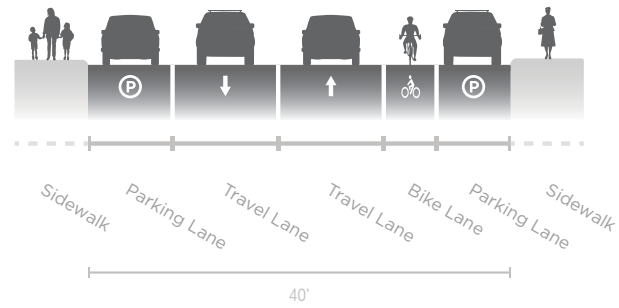
16TH TO 18TH



PEARL STREET

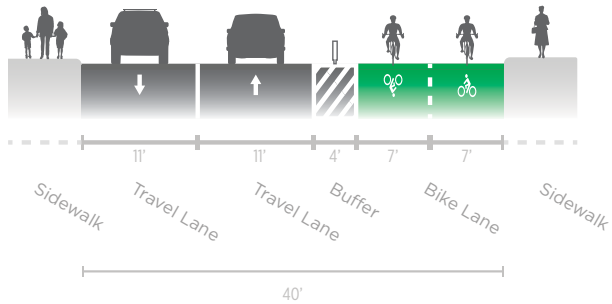
Existing Cross-Section

18TH TO 20TH



Proposed Cross-Section

18TH TO 20TH

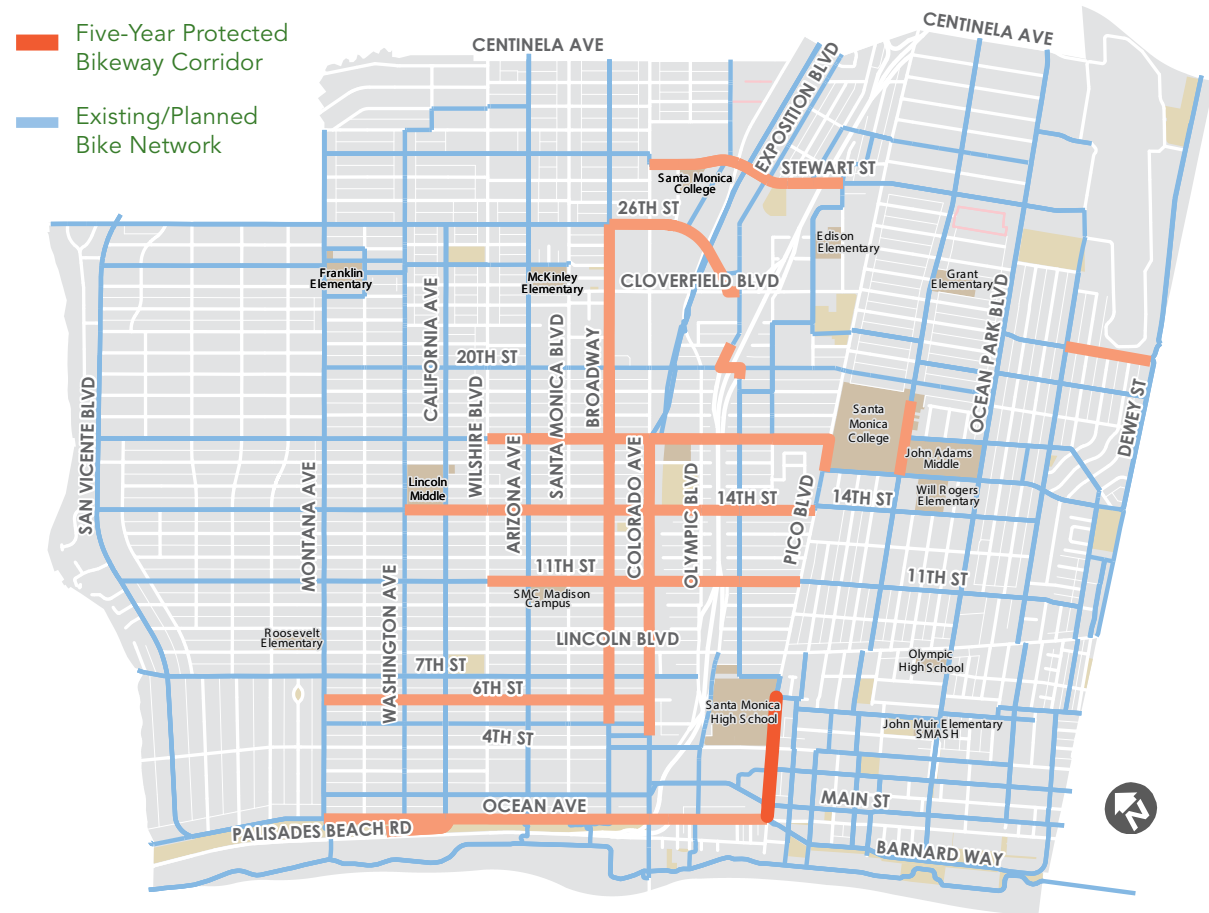


PICO BOULEVARD | OCEAN AVE TO 6TH ST

A protected bikeway on Pico Boulevard from Ocean Avenue to 6th Street closes a major gap in the low-stress network, providing the Pico Neighborhood with more direct access to the beach and serving Santa Monica High School. Pico is a busy arterial with no existing bike facilities except for a block-long segment of two-way cycle track that provides a key link along the Michigan Avenue Neighborhood Greenway (MANGo) westward to the beach and southward via the 6th Street neighborhood greenway.

The Bike Action Plan Amendment proposes a protected bike lane connection from Ocean Avenue to MANGo by removing one travel lane in each direction in the segments where vehicle volumes on Pico Boulevard are much lower. Design considerations include bus stops, a central landscaped median from 4th Street to 6th Street, and the need to transition to the two-way cycle track at 6th Street.

Corridor Location Map



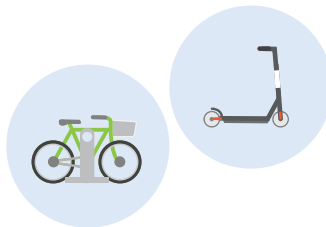
Needs and Benefits

DESTINATIONS & CONNECTIONS

- ▶ Santa Monica High School
- ▶ Civic Center
- ▶ Beach
- ▶ 6th Street Neighborhood Greenway

EXISTING DEMAND

In the **top 20 busiest bikeways** in Santa Monica with **over 2,100 shared bike and scooter trips** per month.²



SAFETY

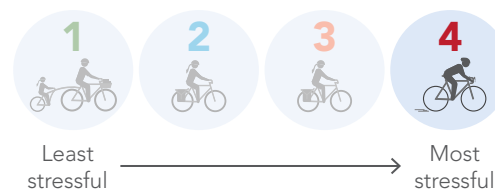
17 collisions involving people bicycling

from 2014 through 2018. Includes identified high priority Vision Zero intersection 4th and Pico which has had 1 fatality and 2 severe injuries.¹



COMFORT

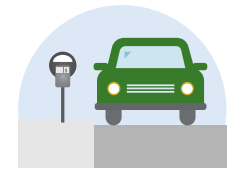
There is no bike facility on Pico today. Pico has a level-of-traffic stress score of 4, suitable only for strong and fearless bicyclists. The design will achieve a level of traffic stress score of 1, suitable for **all ages and abilities.**



Design Considerations

PARKING

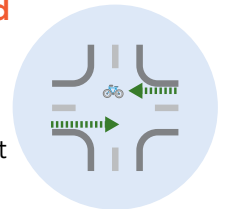
Does not impact on-street parking and may provide opportunities to add parking or loading spaces.



KEY DESIGN ELEMENTS

Intersection design will need to transition cyclists smoothly from the **directional protected bikeway** to MANGo.

Design will have to work with the Fire Department to ensure there is sufficient **emergency vehicle access** between 4th and 6th where there is a raised median.



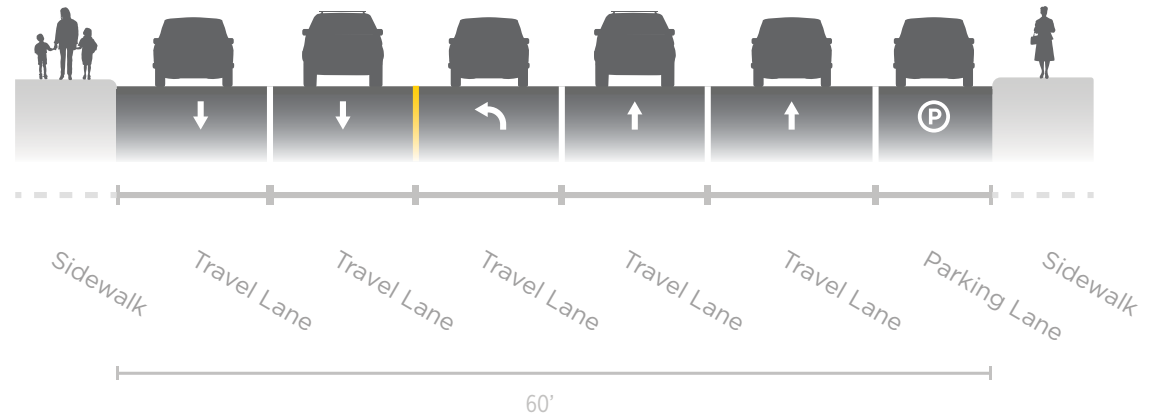
1. Data acquired from Transportation Injury Mapping System (TIMS), Safe Transportation Research and Education Center, University of California, Berkeley. 2020.

2. Monthly average of shared bike and scooter trips on the highest activity segment of the corridor during the October 2018 - January 2020 pilot

PICO BOULEVARD

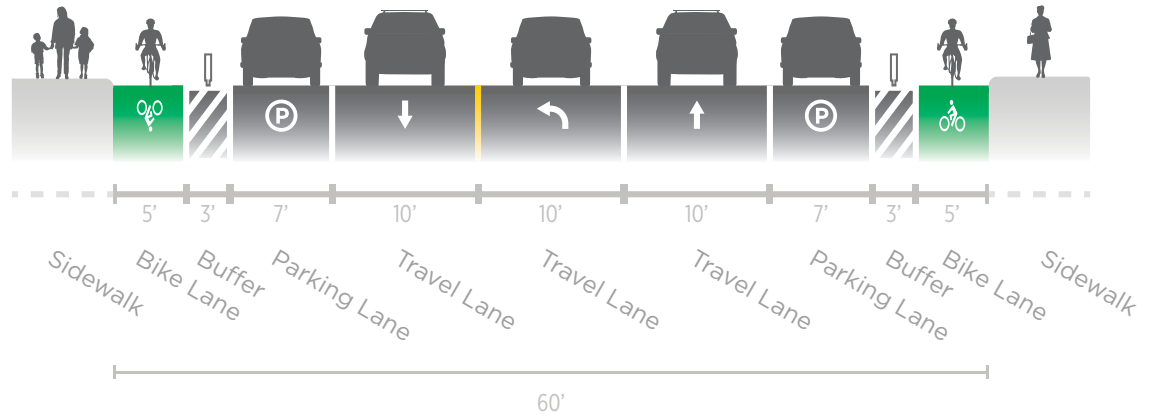
Existing Cross-Section

OCEAN TO 4TH



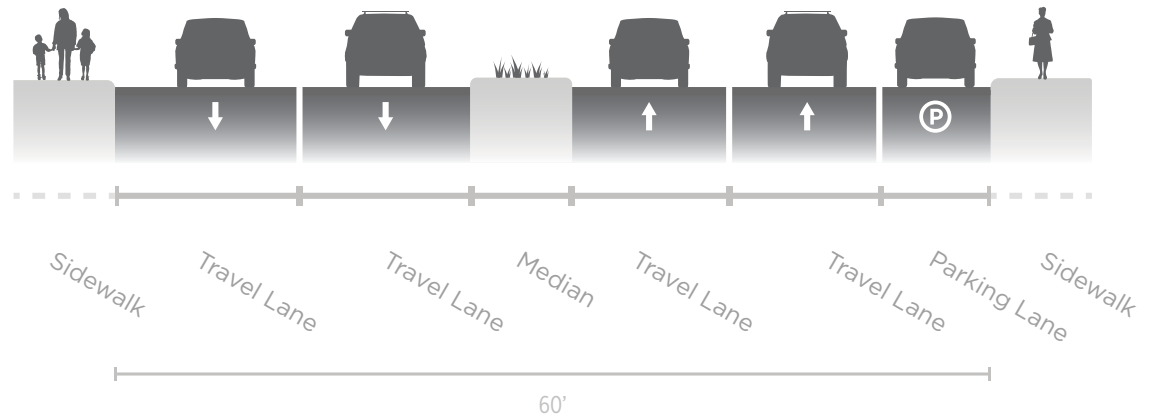
Proposed Cross-Section

OCEAN TO 4TH

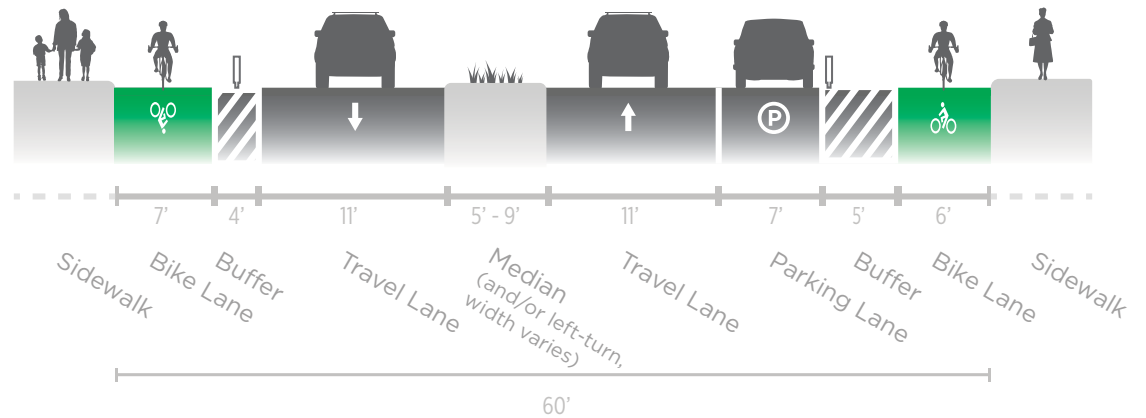


PICO BOULEVARD

Existing Cross-Section 4TH TO 6TH



Proposed Cross-Section 4TH TO 6TH



LONGER-TERM VISION

Projects beyond the five-year horizon are also critical to achieving a holistic citywide safe and low-stress bicycle network. A combination of different bikeway types and interim design solutions were explored to advance more corridors into the five-year protected bikeway vision. Ultimately, corridors with significantly more complex design constraints were identified for the longer-term bikeway vision or future priority connections. This section profiles the five longer-term PBL corridors, which total 14 lane miles.

Longer-term corridors are critical components of the citywide protected bikeway network, but require significantly more trade-offs, such as parking or travel lane loss, and will require more planning, design, and community engagement than the five-year time horizon would allow. Like the five-year vision, the longer-term protected bikeway network vision is made up of streets where protected bikeways are desired as critical connections between schools, parks, and employment centers. The corridors provide connections between local commercial areas and adjacent neighborhoods such as Montana Avenue and Main Street.

The primarily east-west longer-term corridors combine with the primarily north-south five-year corridors to create a holistic protected bikeway network citywide. While this Bike Action Plan Amendment will guide Santa Monica's bicycle infrastructure work over the next five years, implementation of longer-term corridors within the Santa Monica Bikeway Network Vision can also be advanced if opportunities arise.

Santa Monica's five-year and longer-term protected bikeway network



Santa Monica Bikeway Network Vision

- Protected Bikeways
- Five-Year Vision
- Longer-Term Vision



Data obtained from the City of Santa Monica
Map created June, 2020

ARIZONA AVENUE | OCEAN AVE TO CENTINELA AVE

The Arizona Avenue protected bikeway would enhance the existing east-west bicycle lane, connecting from Palisades Park to Centinela Avenue. The Bike Action Plan Amendment proposes two-way protected bikeway from Ocean Avenue to Centinela Avenue by utilizing existing right-of-way and removing parking on one side of the street between 26th Street and Centinela Avenue. Arizona Avenue serves transit in Downtown Santa Monica, and design considerations will be made to support loading and ensure safe interactions between people walking and bicycling. The corridor will provide access to local schools and medical centers.

Corridor Location Map

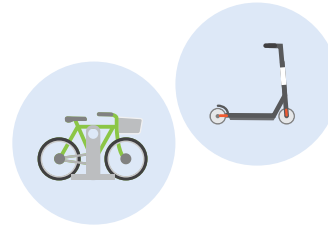


- Five-Year Protected Bikeway Corridor
- Longer-Term Protected Bikeway Corridor

Needs and Benefits

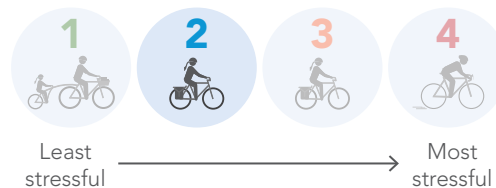
EXISTING DEMAND

In the **top 15 busiest bikeways** in Santa Monica with **over 3,700 shared bike and scooter trips** per month.



COMFORT

The existing bike lanes on Arizona Ave have a level-of-traffic stress score of 2—suitable for interested but concerned bicyclists. The design will achieve a level of traffic stress score of 1, suitable for **all ages and abilities**.

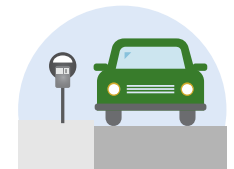


Design Considerations

PARKING

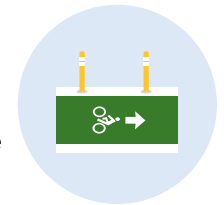
Existing parking on one-side of the street will remain.

Parking on one side of the street will be removed from 26th Street to Centinela Ave.



KEY DESIGN ELEMENTS

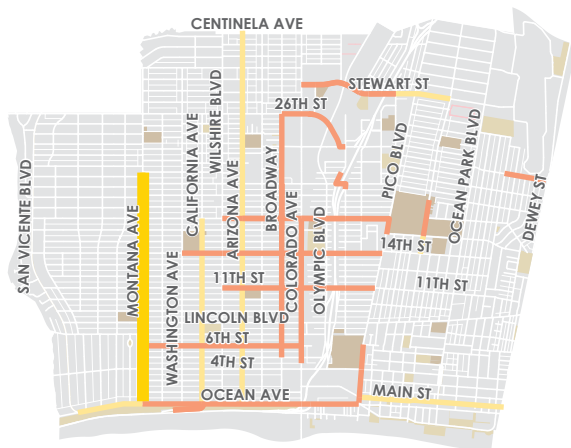
A two-way protected bicycle lane provides safe facilities in a compact fashion to balance other needs along the street.



MONTANA AVENUE | FROM OCEAN AVE TO 21ST ST

The Montana Avenue protected bikeway would enhance the existing east-west bicycle lane along Montana’s commercial corridor from Palisades Park to 21st Street. The Bike Action Plan Amendment proposes a two-way protected bikeway from Ocean Avenue to 21st Street by utilizing existing right-of-way and removing parking from one side of the street between Ocean Avenue and 7th Street. In addition to the protected bikeway, design considerations will be made to ensure pedestrian connectivity and loading zones continue to support the vibrant neighborhood-scale commercial activity.

Corridor Location Map

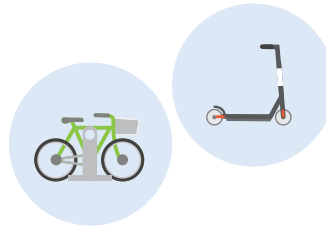


- Five-Year Protected Bikeway Corridor
- Longer-Term Protected Bikeway Corridor

Needs and Benefits

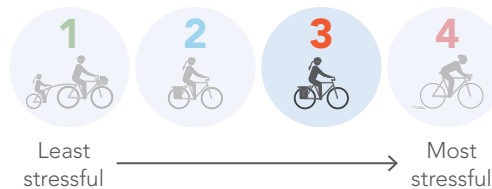
EXISTING DEMAND

In the **top 20 busiest bikeways** in Santa Monica with **over 2,000 shared bike and scooter trips** per month.



COMFORT

The existing bike lanes on Montana Ave have a level-of-traffic stress score of 3—suitable only for confident bicyclists. The design will achieve a level of traffic stress score of 1, suitable for **all ages and abilities**.



Design Considerations

PARKING

Parking would be removed on one side of the street.



KEY DESIGN ELEMENTS

Bus stops and loadings zones will be accommodated in the redesign of the corridor as well.

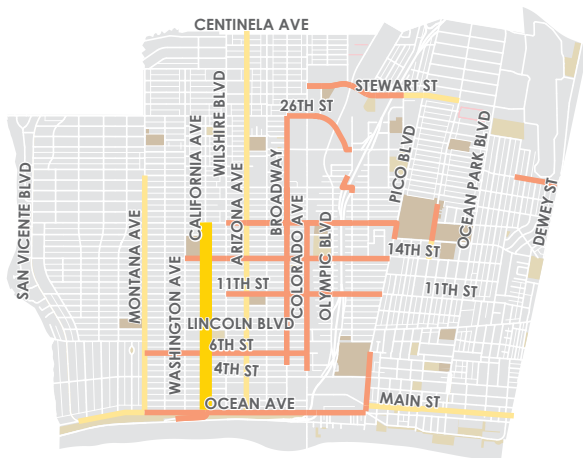


Curb extensions may need to be removed at some locations.

CALIFORNIA AVENUE | OCEAN AVE TO 17TH ST

The California Avenue protected bikeway would enhance the existing east-west bicycle lane from Palisades Park to 17th Street, including access to Lincoln Middle School and St. Monica High School. The Bike Action Plan Amendment proposes two-way protected bikeway from Ocean Avenue to 17th Street by utilizing existing right-of-way and removing parking. This enhanced facility will support neighborhood connectivity, providing access to local schools and parks.

Corridor Location Map

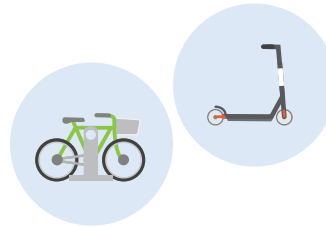


- Five-Year Protected Bikeway Corridor
- Longer-Term Protected Bikeway Corridor

Needs and Benefits

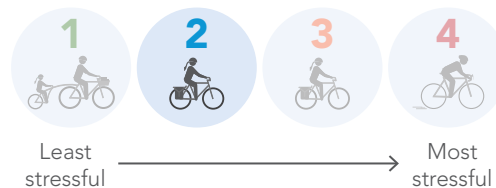
EXISTING DEMAND

In the **top 25 busiest bikeways** in Santa Monica with **over 1,650 shared bike and scooter trips** per month.



COMFORT

The existing bike lanes on California Ave have a level-of-traffic stress score of 2—suitable for interested but concerned bicyclists. The design will achieve a level of traffic stress score of 1, suitable for **all ages and abilities**.



Design Considerations

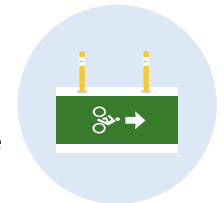
PARKING

Parking would be removed on one side of the street.



KEY DESIGN ELEMENTS

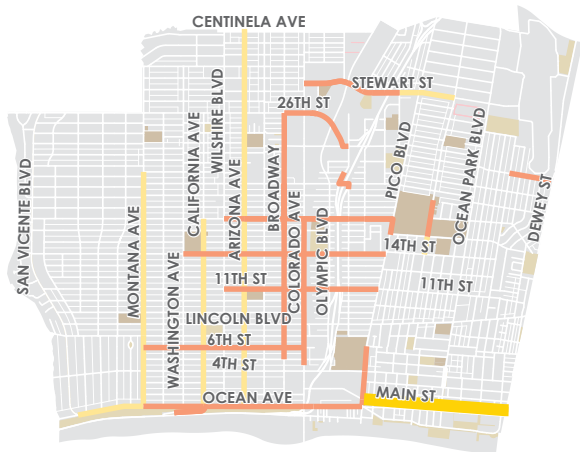
A two-way protected bicycle lane provides safe facilities in a compact fashion to balance other needs along the street.



MAIN | PICO BLVD TO DEWEY ST

Main Street is one of Santa Monica's key commercial corridors, providing destinations for local residents and visitors along the beach, and connecting Santa Monica to Venice Beach. The Bike Action Plan Amendment proposes a protected bikeway to enhance existing bicycle lanes from Pico Boulevard to Marine by removing a parking lane or a center turn lane. This project contributes to the designation of the corridor as a Zero Emissions Zone, and builds off of the successful Al Fresco reconfiguration of Main Street that expanded Parklet space for businesses with a future design that adds a protected bikeway and maintains expanded space for merchants.

Corridor Location Map

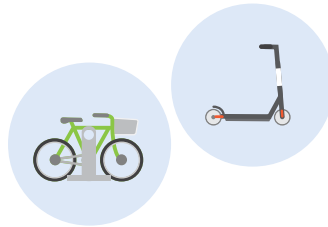


- Five-Year Protected Bikeway Corridor
- Longer-Term Protected Bikeway Corridor

Needs and Benefits

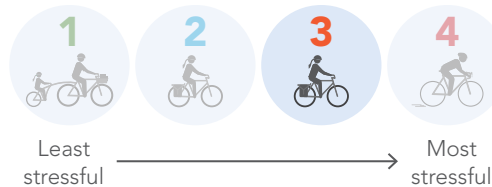
EXISTING DEMAND

In the **top ten busiest bikeways** in Santa Monica with **over 6,800 shared bike and scooter trips** per month.



COMFORT

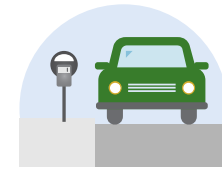
The existing bike lanes on Main St have a level-of-traffic stress score of 3—suitable only for confident bicyclists. The design will achieve a level of traffic stress score of 1, suitable for **all ages and abilities.**



Design Considerations

PARKING

Design would build off of the **Al Fresco Main Street Configuration** which removed the center turn lane and expanded Parklet space in the parking lane for outside merchant use.



KEY DESIGN ELEMENTS

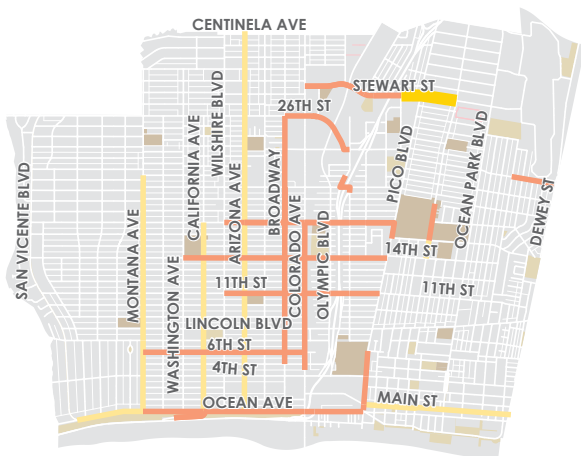
Zero Emissions Zone would be enhanced by creating a safer and more inviting facility to people to bicycle on. **Bus stops and loading zones** would be accommodated through a redesign of the corridor.



STEWART | OLYMPIC BLVD TO PEARL ST

Protected bike lanes on Stewart Street will support north-south connectivity in eastern Santa Monica. The Bike Action Plan Amendment proposes enhancing existing bicycle lanes into protected bikeways across two residential blocks by removing parking on both sides of the street. This facility would continue a planned protected bikeway along Stewart Street north of Kansas Avenue.

Corridor Location Map

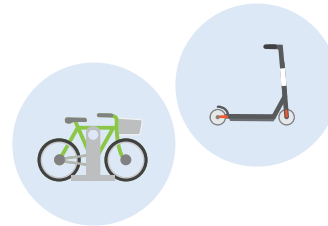


- Five-Year Protected Bikeway Corridor
- Longer-Term Protected Bikeway Corridor

Needs and Benefits

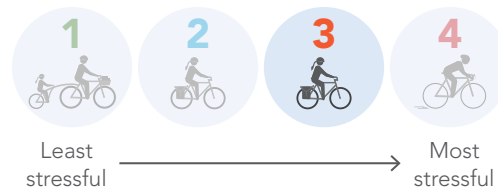
EXISTING DEMAND

In the **top 35 busiest bikeways** in Santa Monica with **over 750 shared bike and scooter trips** per month.



COMFORT

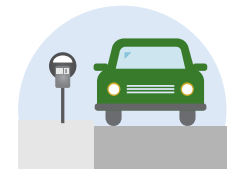
The existing bike lanes on Stewart St have a level-of-traffic stress score of 3—suitable only for confident bicyclists. The design will achieve a level of traffic stress score of 1, suitable for **all ages and abilities.**



Design Considerations

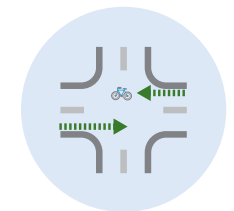
PARKING

Parking would be removed on both sides of the street from Kansas Avenue to Pearl Street.



KEY DESIGN ELEMENTS

Turn lanes may need to be removed at intersections.



FUTURE PRIORITY CONNECTIONS

Future Priority Connections are important links that complement the Five-Year and Longer-Term vision projects. Many of them are a high priority for community members. They are labeled as “future priority connections” not because they are less important than the five-year and longer-term networks, but because their implementation could require large scale changes in motor vehicle routes or curb management to prioritize people bicycling. The Future Priority Connections will require more resources, more extensive planning and design, and deeper community conversations to explore the potential for reallocating street space for protected bike lanes or choosing a different facility type.

Future Priority Connections are located in areas dominated by single and multi-family residential land uses, and feature roadways that are constrained to the point that a protected bikeway may not be feasible at all. This means the future priority network falls into two main categories: protected bike lanes on neighborhood streets and neighborhood greenways.

- ▶ Protected bike lanes on neighborhood streets are in areas where the street is not wide enough to accommodate a protected bikeway and maintain the existing parking and may require substantial parking removal.
- ▶ Neighborhood greenways accommodate all modes of travel and parking on smaller local streets by using intensified traffic calming, enhanced signage, and landscaping to reduce motor-vehicle volume or speed. These design elements improve rider comfort and provide a low-stress condition that is conducive and suitable for local neighborhood travel.

Major changes in curb management or motor vehicle routes require data collection, localized evaluation, and proactive community engagement. Additionally, some locations are dependent upon additional inter- and intra-agency coordination. For example, coordination with other City departments will be crucial for the Santa Monica Airport Park. Community groups have emphasized that the future park should include a micro-network of protected bikeways that provide safe and comfortable access to and through the park. Streets like Dewey and San Vicente Boulevard will require additional coordination with the City of Los Angeles to fully implement a low-stress network.

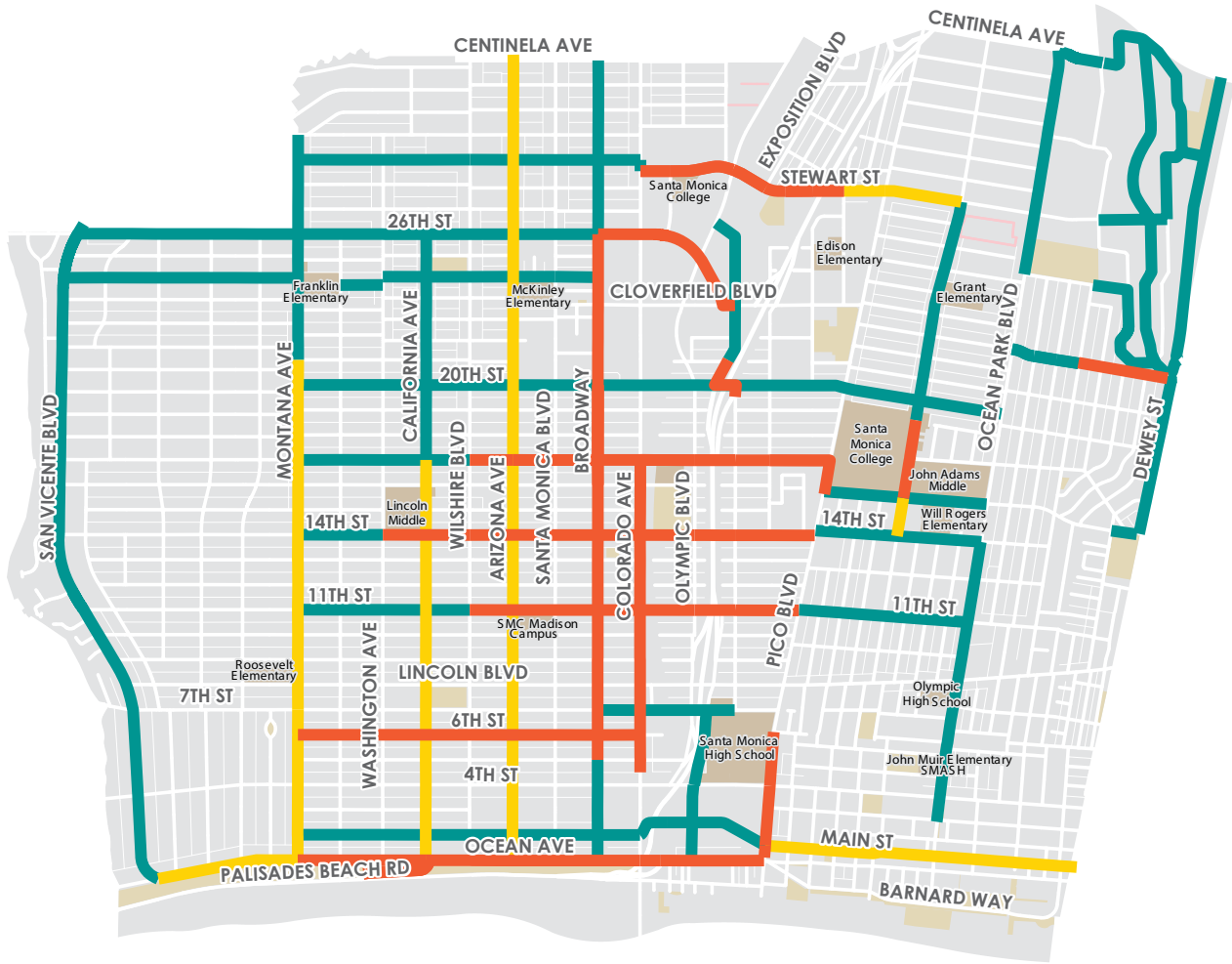


A neighborhood greenway with a traffic diverter.
Source: Nelson\Nygaard



A protected bike lane in a residential setting in Cambridge, MA.
Source: Nelson\Nygaard

Santa Monica's five-year and longer-term protected bikeway network with future priority connections



Santa Monica Protected Bikeway Vision

Protected Bikeways

Five-Year Vision

Longer-Term Vision

Priority Connections

Future Priority Connection

Notes: The Colorado Avenue protected bikeway is westbound only.



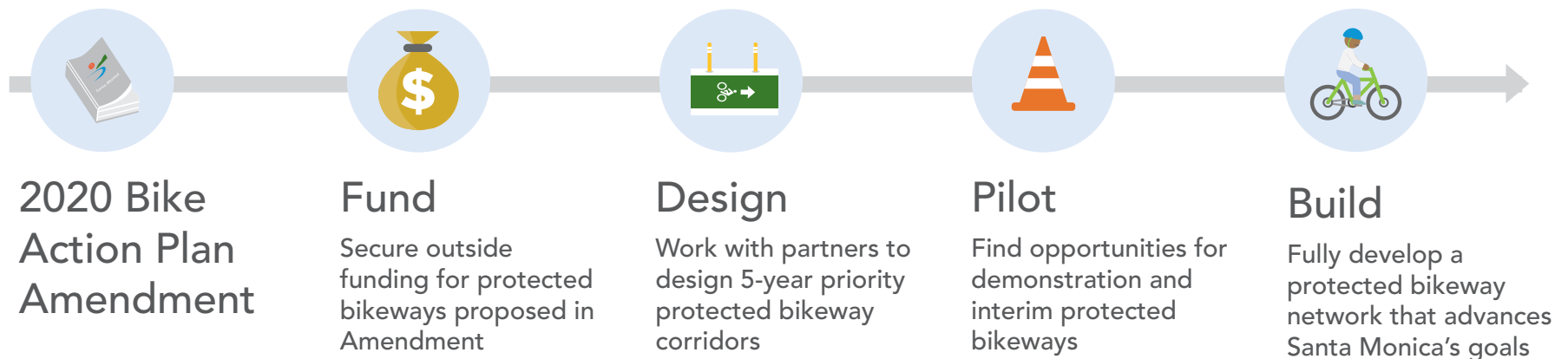
Data obtained from the City of Santa Monica Map created June, 2020

TAKING THE NEXT STEPS

The Bike Action Plan Amendment creates an implementation strategy for the bikeway network that advances a citywide protected bike lane network in the next five years, elevates the City's possibilities for successfully obtaining outside grant funding, and continues progress towards the community's climate, safety, and mobility goals. Importantly, it builds in resilience in these uncertain economic times by providing safer bikeways to connect people with the places they need to go.

The five-year vision was developed to be easily implemented within a short time frame. The detailed design process will involve a higher degree of community engagement subsequent to realizing funding. The longer term vision will require additional technical and feasibility analyses to determine the specifics of the projects that best meet the community's needs.

Bike Action Plan Amendment next steps



Project sequencing and implementation of the five-year vision continue to be guided by the planning, design, and engagement actions of the 2011 plan, with the following additions:

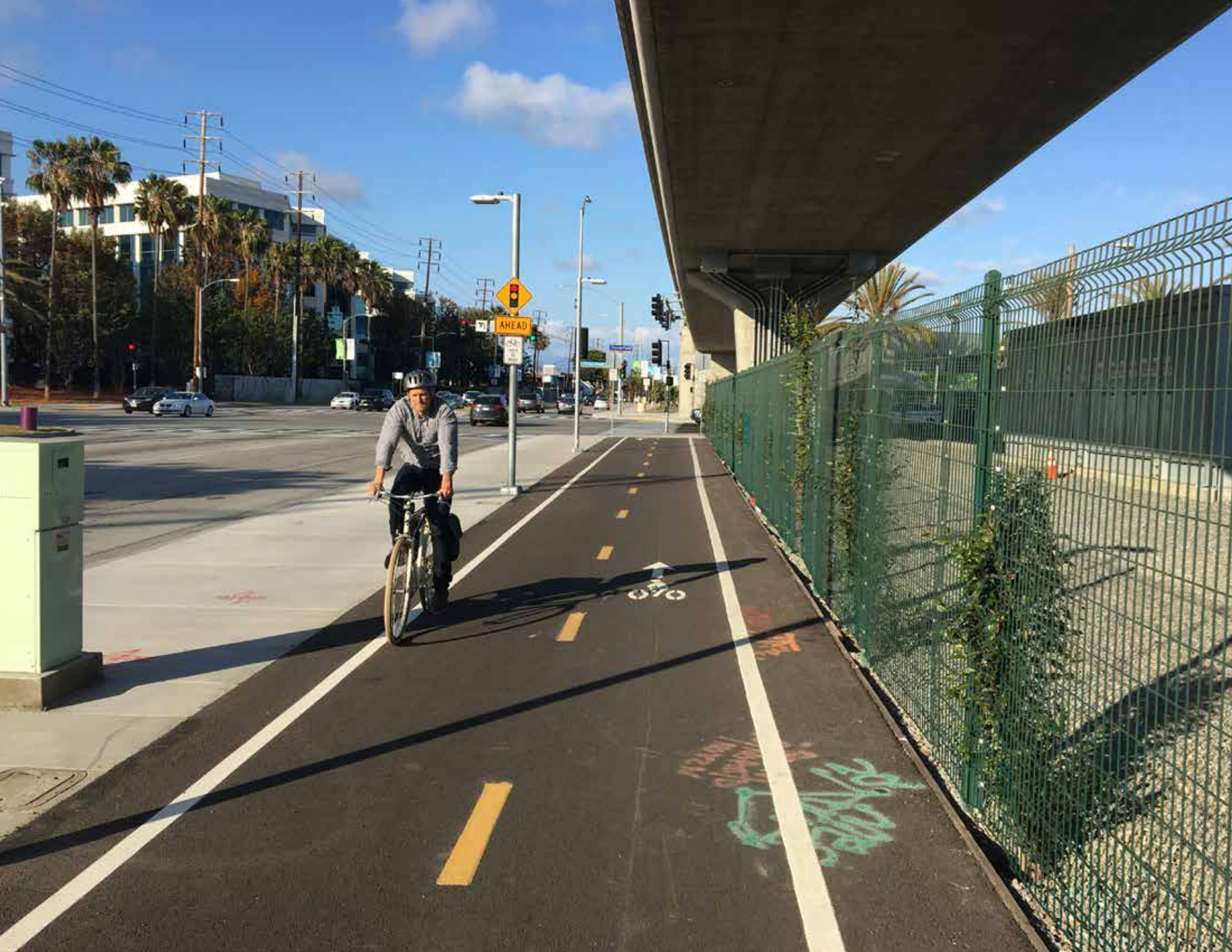
- ▶ Prioritize design and construction of the five year protected bikeway vision.
- ▶ Seek creative funding sources including innovative funding sources to advance the network rapidly.
- ▶ Use low-cost interim improvements to advance projects and inform final design before final construction funding is secured.
- ▶ Proactively involve community members in the planning and design of on-street and other amenities that will be vital to creating safer and secure bikeways for all people living, working and visiting Santa Monica.
- ▶ Aim to implement intersecting north/south and east/west corridors simultaneously to amplify the network benefits and streamline outreach and design.
- ▶ Prioritize and coordinate protected bikeway implementation as part of pavement management, wastewater main, and stormwater planning.
- ▶ Document roles and responsibilities for the cleaning, sweeping, and maintenance of protected bike lanes and associated micro-mobility parking during initial project development.
- ▶ Include representatives from Fire, Big Blue Bus, Police, and RRR in planning and design.
- ▶ Explore respacing bus stops and general improvements to operations during corridor design with Big Blue Bus.
- ▶ Continue to explore slower streets and traffic diverters to implement neighborhood greenways as part of the future vision.
- ▶ Amend policy and legal challenges to enable bus-bike shared lanes.
- ▶ Continue to use the 2011 Bike Action Plan to take to implement other facilities as the opportunity arises.

Existing, funded, planned, and five-year vision lane miles

Status	Lane Miles
EXISTING PBL	1.8
FUNDED PBL	3.2
PLANNED PBL	1.3
FIVE-YEAR VISION PBL	15.3
TOTAL IN 2025	21.6

Five-year vision lane miles and facility types

Street	Lane Miles	BAP Facility Type	Existing Facility Type	BAPA Facility Type
11TH ST – WILSHIRE BLVD TO PICO BLVD	2.0	Buffered Bike Lane	Buffered Bike Lane	Protected Bike Lane
14TH ST – WASHINGTON AVE TO PICO BLVD	2.6	Buffered Bike Lane	Buffered Bike Lane	Protected Bike Lane
26TH ST – BROADWAY TO OLYMPIC BLVD	0.7	Shared Lanes	Bike Lane	Protected Bike Lane
6TH ST - MONTANA AVE TO COLORADO AVE	2.1	Buffered Bike Lane	Bike Lane	Protected Bike Lane
BROADWAY – 5TH ST TO 26TH ST	3.2	Buffered Bike Lane	Buffered Bike Lane	Protected Bike Lane
COLORADO AVE – 5TH ST TO 17TH ST	0.9	Shared Lanes/None	Shared Lanes	Protected Bike Lane WB, Shared Lane EB
OCEAN AVE – MONTANA AVE TO PICO BLVD	2.5	Buffered Bike Lane	Bike Lane	Two-way Protected Bike Lane (Pico to California), NB Protected Bike Lane/SB Buffered Bike Lane (California to Montana)
PEARL ST – 16TH ST TO 18TH ST	0.5	Bike Lane	Bike Lane	Two-Way Protected Bike Lane
PICO BLVD – OCEAN AVE TO 6TH ST	0.8	None	None	Protected Bike Lane
TOTAL TO BUILD	15.3			



AHEAD

BIKE

ARTWORK

Endnotes

- 1 Based on PM peak hour counts taken in September 2013 and October 2017 at the intersections of 2nd Street and Colorado Avenue and 4th Street and Colorado Avenue.
- 2 City of Santa Monica Transportation Survey (2017). <https://www.smgov.net/departments/pcd/agendas/Planning-Commission/2017/20170301/s2017030108AA.pdf>
- 3 Route Infrastructure and the Risk of Injuries to Bicyclists: A Case-Crossover Study – American Journal of public Health <https://ajph.aphapublications.org/doi/abs/10.2105/AJPH.2012.300762?journalCode=ajph>
- 4 City of Santa Monica Climate Action and Adaptation Plan (2019).
- 5 City of Santa Monica Transportation Survey (2017). <https://www.smgov.net/departments/pcd/agendas/Planning-Commission/2017/20170301/s2017030108AA.pdf>
- 6 Rust, Susan (June 25, 2020). “Bicycles have enjoyed a boom during the pandemic. Will it last as car traffic resumes?” Los Angeles Times. <https://www.latimes.com/california/story/2020-06-25/bicycle-business-is-exploding-during-covid-19-will-it-last>
- 7 Economic Influence of Bicycle and Pedestrian Street Improvement (2020). <https://wsd-pfb-sparkinfluence.s3.amazonaws.com/uploads/2020/03/Economic-Impacts-of-Street-Improvements-summary-report.pdf>
- Mekuria, Furth, and Nixon (2012). Low-Stress Bicycling and Network Connectivity.” <<http://transweb.sjsu.edu/PDFs/research/1005-low-stress-bicycling-network-connectivity.pdf>>
- 8 NACTO. Urban Bikeway Design Guide. <https://nacto.org/publication/urban-bikeway-design-guide/cycle-tracks/raised-cycle-tracks/>
- 9 Walk SF (2019). Getting to the Curb. <https://walksf.org/wp-content/uploads/2019/12/getting-to-the-curb-report-final-walk-sf-2019.pdf>
- 10 *ibid.*
- Wolfson, H. (2011). Memorandum on Bike Lanes, City of New York, Office of the Mayor, 21 March 2011. http://www.nyc.gov/html/om/pdf/bike_lanes_memo.pdf
- 11 Furth, Peter. Criteria for Level of Traffic Stress. <http://www.northeastern.edu/peter.furth/criteria-for-level-of-traffic-stress/>

