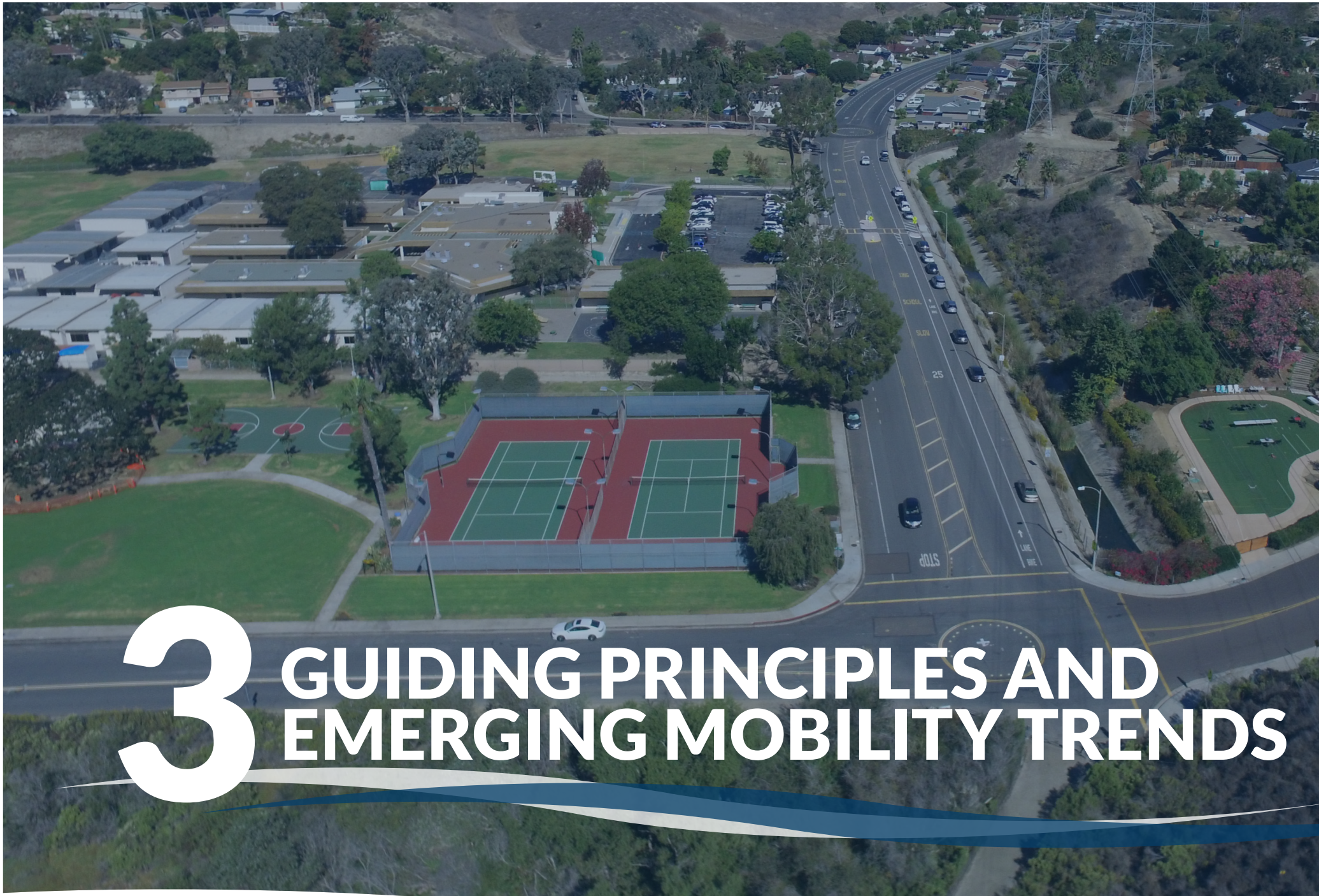


3 GUIDING PRINCIPLES AND EMERGING MOBILITY TRENDS

3

GUIDING PRINCIPLES AND EMERGING MOBILITY TRENDS

This chapter sets forth guiding principles for the SMP's recommendations. These principles are largely focused on ensuring equitable access and safely to all modes of travelers regardless of age or physical ability. Key principles embraced in the SMP's recommendations include the "8 to 80" Network, Safe Walking and Cycling Routes and Moving Beyond Planning for Commute Trips. In addition to these guiding principles, it was important during the SMP planning process to integrate consideration of several important emerging mobility trends.

IN THIS CHAPTER

- Summary of guiding planning principles and emerging mobility concepts to consider when developing future mobility networks for the City of Carlsbad

GUIDING PRINCIPLES

"8-to-80" Networks

An "8-to-80" city reflects the potentially specialized needs of eight- and eighty-year-old members of the community when planning. The intent of this approach is to produce planning outcomes that ensure a city functions properly and equitably for everyone's ability. Generally, the past 50 years has produced planning outcomes for North American cities that prioritize driver-based mobility.

Car-centric planning oftentimes neglects mobility for those who may be not be able to operate a motor vehicle, such as seniors and children. Among other outcomes, this approach can result in a reduction of much of life's daily physical activity. The 8-to-80 approach shifts the focus back to people, and aims to create healthier and more equitable cities supported by safe mobility infrastructure that accommodates all modes of travel.

The City of Carlsbad has taken strides to ensure that all ages and abilities have access to what the city has to offer, particularly with respect to recreation. Moving forward, it will be beneficial to ensure that portions of the city characterized by typical twentieth-century suburban patterns of development are properly considered for retrofits that encourage and accommodate non-vehicular mobility. Maintaining a frame of reference for users limited to certain types of personal mobility, such as children and seniors, works toward fostering an inclusiveness to all who live, play or work in the City of Carlsbad.

An "8-to-80" city focuses on making its city more engaging and vibrant for its residents. This includes creating public spaces, building safe and connected walking and bicycling infrastructure, lowering traffic speeds, mixing land uses and investing in public transportation. Specifically this includes ensuring that the sidewalk network is in good condition and continuous, that there are ADA-compliant curb ramps which allow for residents in wheelchairs or other mobility devices to easily cross the street and get back on the sidewalk, as well as placing curb extensions at intersections to shorten the crossing distance. The focus of "8-to-80" cities was on creating a welcoming public realm by including street trees and comfortable seating, in addition to other amenities.

Additional detail on the features of an "8-to-80" network can be found in the Design Guidelines of this Plan.

Safe Walking and Cycling Routes

The Safe Routes to School Program concept began in Denmark in the 1970s. Since that time, cities across the U.S. have developed

"8 to 80" friendly environment, street trees in a walkable neighborhood of Carlsbad (the Village)

and implemented programmatic and infrastructure changes to facilitate children walking and cycling to and from school. Safe Route programs have also sprung up for seniors, for transit stops and for parks.

Safe Routes to School

Helping children walk and bicycle to school is good for children's health and can reduce congestion, traffic dangers and air pollution caused by parents driving children to school. Robust Safe Routes to School programs address the six E's(Engineering, Education, Encouragement, Enforcement, and Evaluation and Equity). Chapter Six includes more information about Safe Route programs.

Safe Routes for Seniors

A Safe Routes for Seniors program targets pedestrian improvements in areas with senior centers, a large number of senior residences and other facilities such as hospitals and clinics. The benefits of creating a Safe Routes for Seniors programs include allowing seniors to remain independent by giving them the option to get around on foot and creating a safer walking environment for everyone using the streets.

Safe Routes to Parks

Safe Routes to Parks aims to increase the number of people who have safe access to parks. By creating the opportunity for safe walking and biking trips to the park, motorized trips are decreased. The result of this switch is a reduction in carbon emissions throughout the city.

Moving Beyond Commuting Trips

The typical single-family household in the San Diego region generates approximately 10 trips per day for work, school, errands, recreation and other uses. Historically, the focus of planning efforts has been on improving conditions for only about 20% of those trips, or those occurring between home and work during the traditional peak periods.

This was done in large part because planners were unable to evaluate usage rates, patterns and distribution of the remaining 80% of trips due to poor reporting and counting methodologies.

New perspectives on travel choices, as noted in the section on "8-to-80" networks above, are more inclusive and acknowledge that a typical household makes many types of trips each day. The City of Carlsbad's Climate Action Plan identifies a number of trip reduction strategies designed to mitigate climate impacts from vehicle trips, amounting to a roughly five percent reduction from

Table 3-1 Total Daily Trips by Land Use Type in the City of Carlsbad

Land Use	Daily Trips	Percent of Total
Single Family	207,629	24.1%
Neighborhood Commercial	117,898	13.7%
Street-Front Commercial	104,546	12.1%
Multi-Family	76,981	8.9%
Industrial Park	72,796	8.4%
Community Commercial	64,896	7.5%
Low-Rise Office	37,658	4.4%
Service Station	27,580	3.2%
Elementary School	15,080	1.7%
Auto Commercial	12,818	1.5%
Active Park	12,144	1.4%
Government Office or Center	11,140	1.3%
Senior High School	10,593	1.2%
Junior High or Middle School	10,214	1.2%
Light Industry	8,812	1.0%
Mobile Home Park	8,359	1.0%
Other Recreation-High	5,994	0.7%
Low-Rise Hotel or Motel	5,985	0.7%
Other Health Care	5,224	0.6%
Post Office	5,088	0.6%
Resort	4,651	0.5%
Church	4,237	0.5%
Other Commercial	3,816	0.4%
Regional Commercial	3,407	0.4%

The neighborhood in this photo produces over 100 daily trips. Strategies for trip reduction should consider all of the places residents travel to and from.

Table 3-1 Total Daily Trips by Land Use Type in the City of Carlsbad (continued)

Land Use	Daily Trips	Percent of Total
Passive Beach	3,228	0.4%
Active Beach	3,196	0.4%
Other Public Service	2,967	0.3%
Other Transportation	2,290	0.3%
Fire or Police Station	1,905	0.2%
Junkyard/Dump/Landfill	1,572	0.2%
Other School	1,384	0.2%
Warehousing	1,335	0.2%
Golf Club House	996	0.1%
Other Recreation-Low	854	0.1%
Public Storage	730	0.1%
School District Office	683	0.1%
Communication or Utility	623	0.1%
Under Construction	504	0.1%
Other Group Quarters	475	0.1%
Wholesale Trade	462	0.1%
Field Crops	321	0.0%
Intensive Agriculture	226	0.0%
Parking	170	0.0%
Right-Of-Way	120	0.0%
Orchards Or Vineyard	100	0.0%
Extractive Industry	54	0.0%
Inactive Use	40	0.0%
Golf Course	14	0.0%
Residential Recreation	6	0.0%
Cemetery	3	0.0%
Grand Total	861,804	100%

current estimates.

Using trip generation rates for city land uses developed by the San Diego Association of Governments (SANDAG) as part of their regional modeling efforts (Series 13), the following estimates of trips by each category of land use in the City of Carlsbad was developed. (See Table 3-1)

Furthermore, analyses have shown that roughly 40% to 50% of all trips originating in the City of Carlsbad are less than two miles in length. These short trips could very well be made by bike.

In order to help the City of Carlsbad meet its Climate Action Plan goals, a focus on trip-reduction and trip-replacement strategies specific to respective land uses, particularly schools, housing and key destinations such as beach and park access points rather than simply focusing on general work trips is a strategy worth exploring — chiefly through the emphasis on providing safe and competitive alternatives to driving.

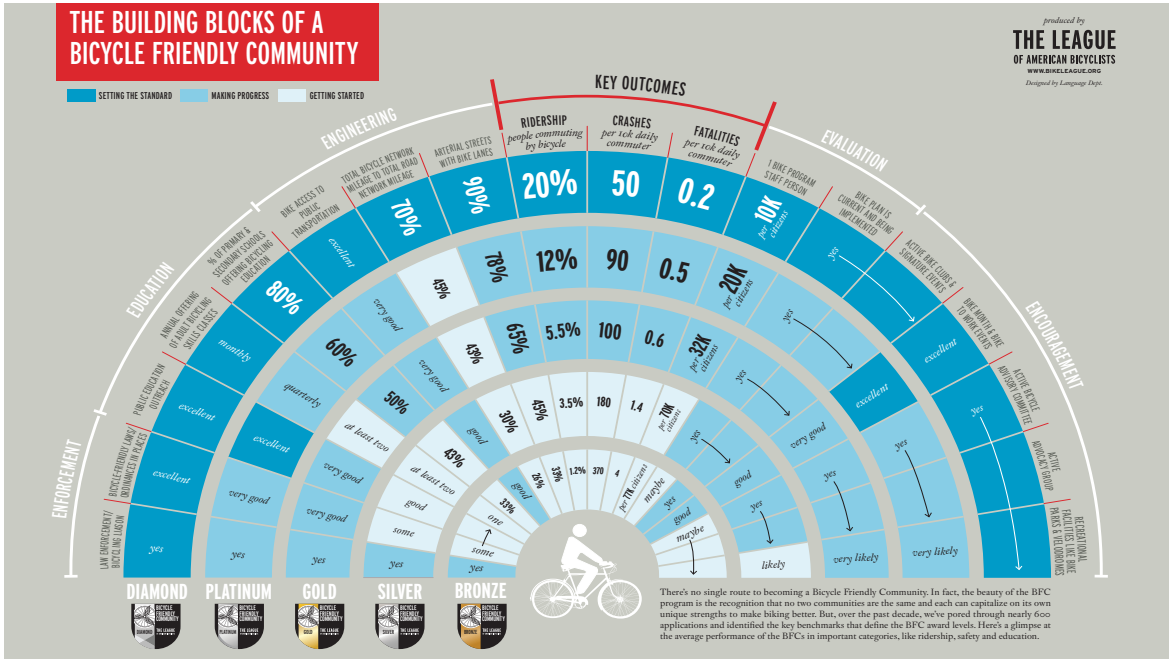
Bicycle Friendly Community Designation

In spring 2015, the City of Carlsbad applied to be recognized as a "Bicycle Friendly Community (BFC)" by the League of American Bicyclists. This designation indicates a community's commitment to bicycling infrastructure, programs and other initiatives designed to increase the safety, comfort and transportation options for people on bicycles.

While not selected for BFC status at that time, the following recommendations were provided. As shown below, the City of Carlsbad has made strides in several categories since 2015:

Engineering

- Adopt a Complete Streets policy and offer implementation guidance. **Completed**
- Adopt bicycle facility selection criteria that increases separation and protection of bicyclists based on levels of motor vehicle speed and volume. **Underway**
- Develop a design manual that meets current NACTO standards or endorse the NACTO Urban Bikeway Design Guide. **Underway**
- Adopt standards for bike parking that conform to APBP guidelines. **Underway**
- Continue to expand the bike network, especially along arterials, through the use of different types of bicycle facilities. On roads where automobile speeds regularly exceed 35 mph, it is recommended to provide separated bicycle infrastructure such as cycle tracks, buffered bike lanes or parallel



10ft wide shared-use paths (in low density areas). **Underway**

Education

- Continue to expand the public education Bike+Walk Carlsbad campaign. **Underway**
- Work with the local bicycle groups or interested parents to develop and implement a Safe Routes to School program for all schools. **Underway**
- Offer regular bicycling skills training opportunities for adults **Underway**
- Expand encouragement efforts during Bike Month. **Underway**
- Encourage local businesses, agencies, and organizations to promote cycling to their employees and customers and to seek recognition through the Bicycle Friendly Business program. **Underway**
- City government should be the model employer for local businesses, and the Chamber of Commerce or local business association can help promote the program and its benefits. **Underway**

Enforcement

- Police officers should be initially and repeatedly educated on traffic law as it applies to bicyclists and motorists. **Underway**
- Adopt fair and equitable traffic laws. **Underway**

Evaluation & Planning

- Appoint an official Bicycle Advisory Committee (BAC) to create a systematic method for ongoing citizen input into the development of important policies, plans and projects. **Underway**
- Ensure the ongoing implementation of the bicycle master plan. **Underway**
- Expand efforts to decrease the number of crashes involving a bicyclist. **Underway**

The City of Carlsbad has taken several key actions that would support another BFC application. This should be a priority action as the application itself can help guide the City of Carlsbad to focus on proven methods for enhancing its image as a safe and desirable place to cycle.

EMERGING MOBILITY TRENDS

Mobility Hubs

Mobility hubs are places of connectivity where different modes of travel – walking, biking, transit and shared mobility – converge and where there is a concentration of employment, housing, shopping and/or recreation. They provide an integrated suite of mobility services, amenities and technologies to bridge the distance between high-frequency transit and an individual's origin or destination. They also serve as a destination in their own right, where many trips may end or where errands may take place.

Sample mobility hub services, amenities and technologies include bikeshare, carshare, neighborhood electric vehicles, bike parking, dynamic parking management strategies, real-time traveler information, ridesharing, microtransit services, bike and pedestrian improvements, wayfinding and urban design enhancements. These features help travelers connect to regional transit services and make short trips within the neighborhood and beyond. Integration of information technology helps travelers find, access and pay for transit and on-demand shared mobility services. In the future, automated and connected transportation services may enhance mobility for travelers of all ages and abilities while fostering a safer environment for all mobility hub users.

As part of the fulfillment of San Diego Forward: The Regional Plan, SANDAG has developed a Regional Mobility Hub Strategy to demonstrate how transportation services, amenities and supporting technologies can work together to make it easier for communities to access transit and other shared mobility choices.

Four potential locations for mobility hubs have been identified in the City of Carlsbad: the existing Poinsettia and Village Coaster stations, the Shoppes at Carlsbad/Plaza Camino Real shopping center and in the business park area adjacent to Palomar Airport Road.

Additional detail on this topic, as well as an evaluation of each site's suitability and potential

Example Mobility Hub Services (source: SANDAG)

features, is found later in Chapter Five.

Emerging Mobility Analysis Tools

The practice of evaluating vehicle traffic operations has existed more or less since the invention of the automobile. Known as "level of service," the evaluation centers primarily on the functional capacity of an existing roadway to move vehicles efficiently.

In the 21st century, traffic engineers nationwide, as well as in the City of Carlsbad, have developed a number of additional criteria to comprehensively evaluate the public right-of-way for all users.

Brief descriptions of these techniques can be found below, and additional analyses conducted within the City of Carlsbad can be found in the draft Existing Conditions Report and provided in Appendix A.

Examples of these methodologies include:

- ***Multi-Modal Level of Service (MMLOS), City of Carlsbad:*** Aims to determine level of service for all users, not just vehicles. A high score indicates a balance between drivers, pedestrians, bicyclists and transit options. A low score tips the scale in favor of the traditional vehicle-centric roadway environment.
- ***Pedestrian Level of Service (PLOS), City of Carlsbad:*** Quantifies sidewalk dimensions and traffic volumes. This method values wide and comfortable sidewalk conditions favorably; and values constricted, high traffic conditions less favorably. A wide sidewalk on a residential street receives a high score, whereas a busy roadway with no sidewalks receives a low score.
- ***Pedestrian Environment Quality Evaluation (PEQE), Chen Ryan Associates:*** Examines pedestrian conditions qualitatively. This method takes into consideration such factors as pedestrian obstructions, lighting, vehicle speeds and vehicle/pedestrian separation. Sidewalks that are comfortable to walk on for all people and times of day receive high scores, and sidewalks that are difficult to walk on comfortably receive low scores.
- ***Bicycle Level of Service (BLOS) and Roadway Dimensions, City of Carlsbad:*** Quantifies the quality of bikeways based upon roadway dimensions and traffic volumes. This method values greater physical separation between bikes and vehicles, and values close, high traffic conditions less favorably. Bikeways that have more space from less vehicles maintain higher scores, whereas bikeways with little to no separation from high vehicle volumes maintain lower scores.
- ***Level of Traffic Stress (LTS), Chen Ryan Associates:*** Qualitatively examines the comfort of bicycling for all users. This method scores roadways based on suitability for different types of cyclists. A low traffic stress score (LTS 1) is a comfortable roadway condition for all users. A high traffic stress score (LTS 4) is only suitable for confident and experienced cyclists.
- ***Walkability Index:*** The Walkability Index is a quantitative tool used to measure the pedestrian environment within a geographic area to determine the degree to which it may be considered safe, comfortable, accommodating or useful to the pedestrian.

These indexes can be used to promote walkable neighborhoods by creating the ability for one to identify the degree to which certain features, such as sidewalk

installation, gap closure, amenities, or access to services, would improve "pedestrian-ism" in a community. Walkability Indexes often utilize a 0-100 scale, ranking locations or nodes from being highly car-dependent at the low end, to allowing full independence on foot at the high end. Scores are determined through distance to amenities using the roadway network, whereby increased distance yields a lower score.

A popular Walkability Index is WalkScore (www.walkscore.com), which is commonly used in real estate listings, and has been used in wayfinding signage for pedestrian-oriented districts, including the City of Pasadena's Old Town District.

Example shipping truck services used in the city

Future Updates to the City's Multi-Modal Level of Service Methodology

The General Plan Mobility Element calls for the use of a MMLOS methodology to provide a metric for evaluating bicycle, pedestrian and transit modes of travel. In 2015, a method for evaluating bicycle and pedestrian LOS was first developed as part of the General Plan Environmental Impact Report (EIR); this EIR method was applied on a broad, program level to evaluate service to pedestrian, bicycle and transit users. When consultants applied the original method during the preparation of impact studies of proposed development projects, limitations were discovered in terms of the study area, directional travel and potential inconsistent interpretations of how the method should be applied.

Accordingly, a more robust method was developed in 2018 to calculate MMLOS for each mode and to identify a broader range of improvements that could be implemented to ensure the minimum operating standard would be met. As noted in General Plan Mobility Element Policy 3-P.3, the purpose of the MMLOS methodology is to provide a means for evaluating impacts of individual development projects, as well as monitoring the LOS for individual streets to ensure that they are meeting the specified standard by street type. Ultimately the MMLOS methodology was revised to accomplish these goals and a spreadsheet-based MMLOS Tool was developed to provide an easy-to-use way of calculating points for a specified location.

The MMLOS Tool generates a letter grade (A through F) to reflect the quality of service provided to a user of that mode of travel. This grade is based on the applicable attributes of the associated pedestrian, bicycle or transit mode. Examples of the attributes used to develop the MMLOS grade for bicycle travel include pavement condition, posted speed limit, on-street parking and buffered bike lanes. Each attribute contributes to a point system that corresponds to a MMLOS letter grade, when the total points for all attributes are added together. A LOS D score indicates that the existing attributes provide the minimum acceptable service for that mode. The MMLOS grades are determined using field data related to each attribute used in the scoring criteria.

The FY2018-19 Growth Management Plan Monitoring report was the first time that bicycle and pedestrian travel modes were monitored using the MMLOS Tool. Through the GMP monitoring analysis, the city

Walkability Score

identified several concerns with the initial results and underlying MMLOS methodologies. The city intends to reevaluate the methodologies and make refinements to the MMLOS Tool, in coordination with the Traffic and Mobility Commission. The transit travel mode methodology will also be revisited for possible incorporation into the MMLOS Tool. The MMLOS methodology update will produce a tool that will be consistent with the goals and policies of the city's General Plan Mobility Element and effectively evaluate impacts of individual development projects, amendments to the General Plan, and be utilized as part of the City's annual Growth Management Plan monitoring program.

Rideshare and Transportation Network Companies (TNC's)

Transportation Network Companies (TNCs) such as Uber and Lyft use online platforms to connect passengers with drivers. Drivers for TNCs use their own personal vehicles. TNCs are one of the most recognized forms of shared mobility. Ridesharing involves adding additional passengers to a trip that will already take place. Types of ridesharing include carpooling, vanpooling and real-time or dynamic online ridesharing services.

Uber Pool and Lyft Line allow TNC drivers to add additional passengers to a trip in real time. This type of service is known as "ride-splitting" since it allows the passengers to split the cost of the trip. This is an area of continued innovation as companies experiment with other services.

Due to the nature of these trips – the driver drops passengers off at the curb – there is a need to manage high-volume pick-up and drop off locations, as well as manage high-volume pick-up and drop off periods. Examples of this include defining areas where passengers can be picked-up and/or dropped off at the beach or curbside in front of a concert venue before and after a concert.

Shared Mobility Devices (bikeshare and e-scooters)

Bikeshare and electric scooter share are components of the increasingly diverse shared mobility landscape. Bikeshare companies provide a pool of bicycles that are available for short-term rental. Bikeshare comes in a variety of forms, including dock-based and dockless systems, as well systems which are available to anyone who downloads the online application or restricted to

A typical TNC service used for a variety of different trips

members of the service. The fees for use are assessed either on a membership basis, on the length of time the bicycle has been used, the distance the bicycle was ridden or any combination thereof. Bikeshare systems can be comprised of traditional bicycles or electric bicycles.

A scooter sharing system is a service, similar to a bikeshare service, in which scooters are made available for short-term rental. Usually scooter share systems are available to anyone who downloads the online application, and has an initial unlocking fee and then charges based on the length of time the scooter is used.

As of 2019, the City of Carlsbad has elected not to participate in a regional bikeshare program, but will be monitoring the effort for potential implementation in the future.

"Shared Use Cities" and Flexible Curb Space

Ridesharing via Transportation Network Companies ("TNC"s such as Uber, Lyft, etc.) and shared mobility devices are increasing the need for safe and efficient curbside access for passengers and drivers. In response to the growing competition for space, some cities are calling the curbside "flex space" and starting to be more intentional about defining curbside uses. Cities are attempting to increase the efficiency of curb space, including for those arriving by TNC, taxi, transit, private car drop-off, parked car or another mode that requires curbside access (e.g., bikeshare, motorcycle, etc.).

In future mobility considerations, the curb space can serve a variety of functions and users, including commercial loading which can be as important to users as often as passenger loading. Many cities and agencies are developing policies and frameworks in response to the changing needs and uses of curb space.

People with example Shared Mobility services

A brief discussion of potential flexible curb space locations and policy framework can be found in the Carlsbad SMP Complete Streets Design Guidelines in Appendix C.

Mobile Technology and "Big Data"

Perhaps no technology will have a greater role in the development of safe, efficient and adaptable transportation systems than the smartphone. Throughout the country, cities are embracing the innovation and ability to present, retrieve and collect information regarding how people move throughout their cities with the support of a smartphone.

While most people realize they can access real-time information on vehicle traffic conditions through smartphone applications, innovative cities are supplementing this information with comprehensive information for people walking and biking, including preferred routes to school, trail network connections, safety or bicycle maintenance tips, custom route maps and many other elements that have traditionally been paper-based or static exhibits lacking the location-specific benefits found in modern smartphones.

In addition to the benefits for residents and visitors, cities have begun to utilize anonymous location data provided by third-party providers in bulk to help evaluate trip patterns and maximize the efficiency of public spaces. These datasets can take the form of GPS-enabled e-scooter and bikeshare trip logs, heavy truck trip data, as well as passive, location-based service metrics such as location, time of day, trip start and trip end "hot spots" and trip speed. Using this data, cities can more effectively manage existing right-of-way to improve decision-making and increase the efficiency of transportation networks without incurring unnecessary and significant impacts such as roadway widening or other capital investments until absolutely necessary.

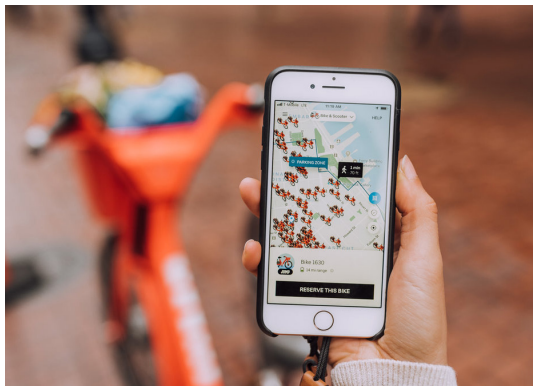
Electric scooters and e-bikes curb space

E-Bikes

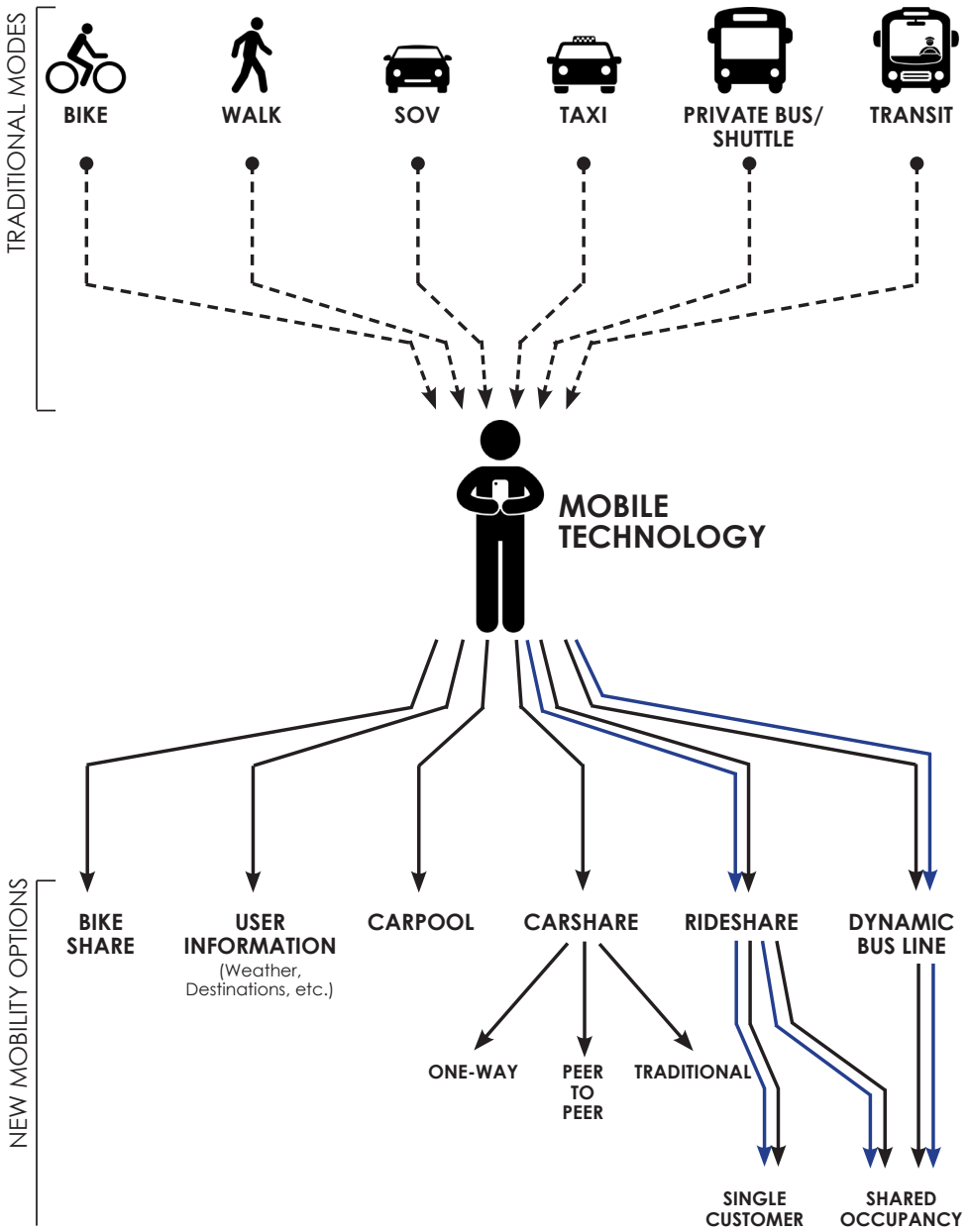
E-bikes are bicycles equipped with electric motors that can either provide additional power to the user pedaling or move the bike without human assistance. Bicycle style e-bikes can be categorized into two types: powered bike (engine can generate thrust without the user pedaling) and electric assist bicycles (engine will only generate additional thrust when someone is pedaling).

In California, E-bikes have been divided into three classes:

- Class 1 electric bicycles: A low-speed pedal-assisted electric e-bike. These bikes are equipped with a motor that provides assistance only when the rider is pedaling and ceases to provide assistance when the bicycle reaches 20 MPH.
- Class 2 electric bicycle: A low-speed throttle-assisted electric bicycle. These bikes are equipped with a motor that may be used exclusively to propel the bicycle and that is not capable of providing assistance when the bicycle reaches 20 MPH.
- Class 3 electric bicycle: A speed pedal-assisted electric bicycle. These are equipped with a motor that provides assistance only when the rider is pedaling and that ceases to provide



Smartphone using a Bikeshare app



Source: Chen Ryan Associates, 2019

assistance when the bicycle reaches 28 MPH and is equipped with a speedometer. Class 3 electric bicycles shall not be operated on a bicycle path or trail, bikeway, bicycle lane, (more names for essentially the same thing), UNLESS it is adjacent to a roadway or the local authority permits them by ordinance.

Conceptual guidance is provided in the graphic from the League of American Bicyclists below.

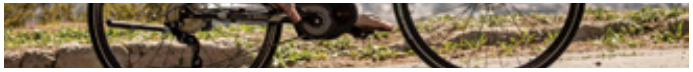
only had access to public streets and roads. E-bikes are much closer in performance and usage to bicycles, so the new e-bike law grants riders access to other California bikeways (see page 2).

» WILL ALL E-BIKES BE REGULATED IN THE SAME WAY?

No. The California e-bike law defines three types of electric bicycles based on speed and power control.

- » **TYPE 1** Bikes with a top assisted speed of 20 mph that must be pedaled to operate.
- » **TYPE 2** Bikes with a top assisted speed of 20 mph that can be operated without pedaling by using a handlebar-mounted throttle.
- » **TYPE 3** Bikes with a top assisted speed of 28 mph that must be pedaled to operate.

Because of their speed and power control differences, their access to bike infrastructure is also different. The table on page 2 demonstrates where each type of e-bike can be ridden and other user requirements.



» DO THE SAME BICYCLE "RULES OF THE ROAD" APPLY TO E-BIKE RIDERS?

Yes. E-bike riders are subject to the same rules and legal requirements that apply to people riding traditional bicycles when it comes to speed, proper passing, following local traffic laws, obeying posted speed limits, and other state and local ordinances. Motorists are required to give electric bicycles at least three feet of clearance when passing. All bicycle and electric bicycle riders 17 and under in California must wear a helmet. Like bicyclists, e-bike riders don't require a license, and their e-bikes don't need to be registered.

Neighborhood Electric Vehicles (NEVs)

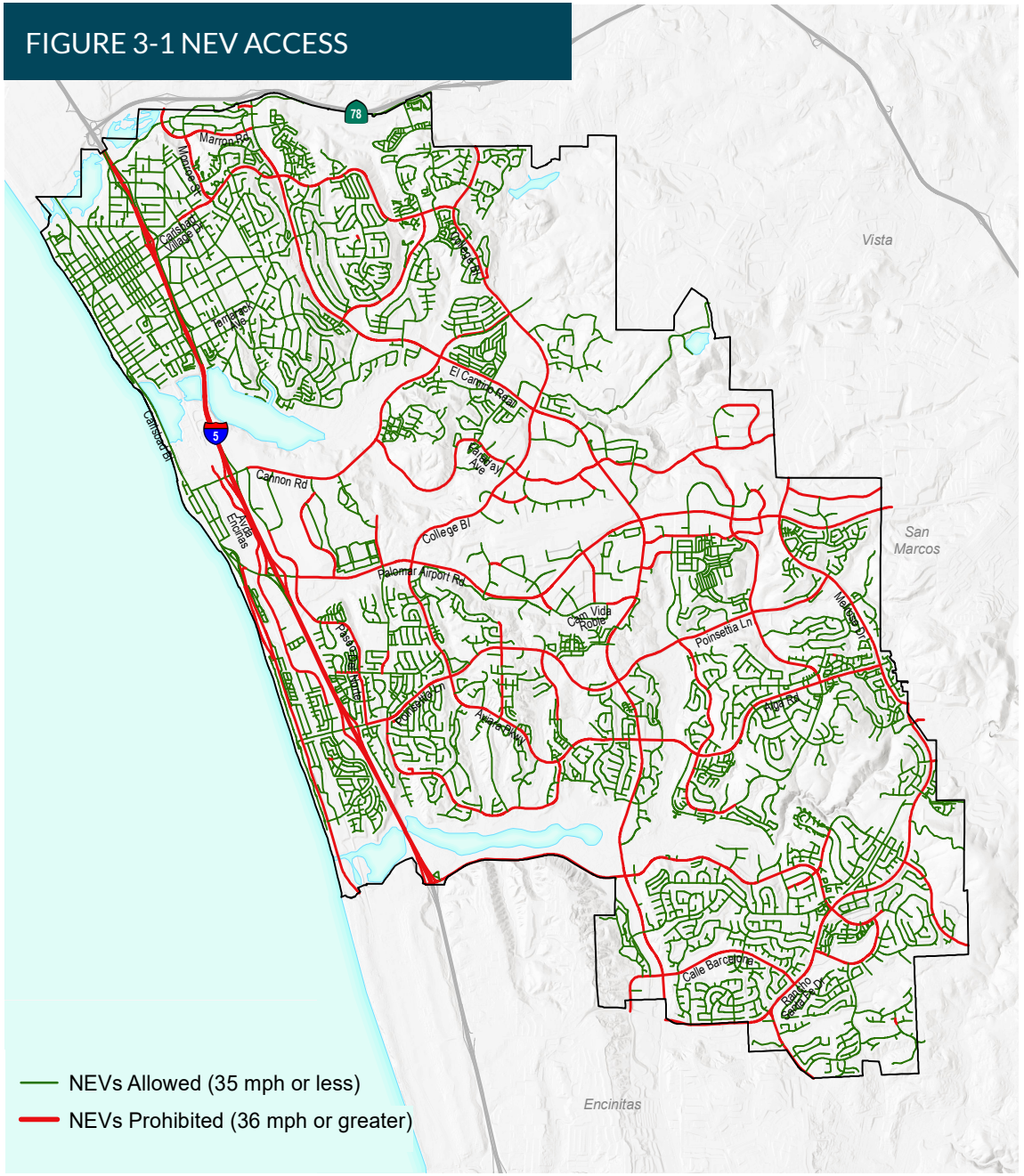
Beginning in 2019, cities like the City of Carlsbad can develop specific NEV plans designed to optimize the use of NEVs as a viable mode of transportation. Because of the slow speed of NEVs and lack of safety features, routes of travel for NEVs are identified or designated that will make access in NEVs convenient, while protecting them from automobile traffic.

Neighborhood Electric Vehicles (NEVs) present unique opportunities and challenges to policy and infrastructure, as they often share space infrastructure with cars, and sometimes with bikes and other slow modes such as e-bikes and scooters. NEVs are a type with slow-speed, lightweight electric Local Use Vehicle (LUV). NEVs are limited to speeds up to 25 mph and may drive only on streets with speed limits up to 35 mph, as per the California Vehicle Code. NEVs can cross roads of speed limits greater than 35 mph if the crossing, controlled or uncontrolled, begins and ends on a street with speed limits less than 35 mph.

California Regulatory Context

The California Vehicle Code defines NEVs as a type of Low Speed Vehicle (LSV). The driver of an NEV must have a driver's license,

FIGURE 3-1 NEV ACCESS



be insured in the same way as a driver of a full speed vehicle, and the vehicle has to be registered with the DMV and have a VIN number. Dealers of NEVs are required to warn buyers of the risks associated with driving a vehicle without safety features. NEVs need to conform to the safety standards set forth in the Federal Motor Vehicle Safety Standards governing the requirement for features such as seat belts and headlamps. If an NEV is modified to travel at a speed greater than 35 mph, then it is required to have all the safety equipment of a full speed vehicle.

Barring the few cases where a jurisdiction's NEV Plan is adopted as the result of an action by the state legislature, an NEV cannot travel on roads with speed limits above 35 mph. NEVs can cross roadways with a speed limit in excess of 35 miles per hour if the crossing begins and ends on a roadway with a speed limit of 35 miles per hour or less and occurs at an intersection of approximately 90 degrees. An NEV shall not traverse intersections without traffic controls (e.g. traffic lights, stop signs) with any state highway, unless that intersection has been approved and authorized by the agency having primary traffic enforcement responsibilities for that crossing.

Conceptual alignment of a slow-speed NEV lane
(Source: LA Metro)

A local police department with primary traffic enforcing responsibility, or the CHP, may prohibit the use of NEVs on any roads under their jurisdiction in the interest of public safety. Any such prohibition is made effective through signs upon the roadway.

NEV Plans and Space Requirements

Safe NEV routes can be established through a network of designated slow speed paths, lanes and routes on streets with speed limits up to 35 mph. Consideration of safe

crossings is key to ensuring connectivity of the network. Specific signage is necessary for ensuring mobility and safety for NEV routes so drivers of NEVs understand where they should and should not go, and other drivers are also aware of the presence of NEVs.

Cities throughout California are adapting the Streets and Highway Code definitions of bicycle facilities to include provisions for NEVs as "Slow Speed" networks. Typically, this can be done within the design considerations of existing bikeways, although occasionally additional lane width is required to accommodate NEVs. Typical considerations are as follows:

- Class I Slow Speed Path - Off street multi-use path, shared by all slow modes (recommended 14' width, 7' in each direction)
- Class II Slow Speed Lane - Striped, dedicated on-street lane on 35+mph roads shared by on-street slow modes (recommended minimum of 7' width using existing bicycle lanes)
- Class III Slow Speed Route - Shared by all on-street modes (recommend using existing 10-12' general purpose travel lanes). Segments would ideally run on roads with posted speed limits of 25 mph that also meet the city's definition of a low-stress roadway as identified in Chapter Two of the SMP
- Class IV - Physically separated lane for bikes and non-NEV on-street slow modes; 35 mph roadway shared by cars and NEVs (recommended 5' minimum in each direction)

In cases where speed limits are over 35 mph, current California law would require lowering the spped limit to accommodate NEVs. NEVs cannot travel on roads with a speed limit of over 35 mph.

By preparing an NEV Plan, cities have been granted exemptions from the California Vehicle Code rule that restricts NEVs to roads with speed limits of 35 mph and under. NEV Plans lay out the design and engineering for NEV networks - including striped lanes and crossings shared by NEVs on specific roads with speed limits higher than 35 mph.

These planning and engineering proposals require buy-in from law enforcement and Caltrans, and then are submitted by cities and Council of Governments to the state legislature so lawmakers can make the necessary additions to the California Vehicle Code granting exemptions. The final steps would be the local adoption of the NEV Plan by the city Council, and, five years later, a report back to the legislature on the safety performance of the network.