

Envision Carlsbad
Existing Conditions and Issues Exploration



Working Paper **5**
**Walking, Biking,
Public Transportation
and Connectivity**

Working Paper 1

Sustainability

Working Paper 2

The Local Economy, Business Diversity and Tourism

Working Paper 3

Open Space and the Natural Environment;
Access to Recreation and Active, Healthy Lifestyles

Working Paper 4

History, the Arts and Cultural Resources;
High Quality Education and Community Services

Working Paper 5

Walking, Biking, Public Transportation and Connectivity

Working Paper 6

Small Town Feel, Beach Community Character and Connectedness;
Neighborhood Revitalization, Community Design and Livability

City Council

Matt Hall, *Mayor*
Ann J. Kulchin, *Mayor Pro Tem*
Mark Packard, *Council Member*
Keith Blackburn, *Council Member*
Farrah Douglas, *Council Member*

City Staff

Lisa Hildabrand, *City Manager*
Gary Barberio, *Community and Economic Development Director*
Don Neu, *Planning Director*
David de Cordova, *Principal Planner (Project Manager)*
Chris DeCerbo, *Principal Planner*
Jennifer Jesser, *Senior Planner (Project Manager)*
Kristina Ray, *Communications Manager*
Rachel McGuire, *Communications Coordinator*
Barbara Nedros, *Administrative Secretary*

Consultants

DYETT & BHATIA
Urban and Regional Planners

Dudek, *Environmental Consultants*
Fehr & Peers, *Transportation Consultants*
Rosenow Spevacek Group, Inc., *Economic and Fiscal Consultants*
BW Research Partnership, Inc., *Public Opinion Surveyors*

This working paper prepared by Fehr & Peers and Dyett & Bhatia

Envision Carlsbad Citizens' Committee

EC³ Primary Member

Mike Howes
Fred Sandquist
Barbara Hamilton
Jim Farley
Jim Comstock
Hap L'Heureux
Gina McBride
Julie Baker
Eric Larson
Allen Sweet
Greg Nelson
Kirk Cowles
Diane Proulx
Robert Gates
Jeff Segall
John O'Reilly
Jeannie Sprague-Bentley
–
Sean Bentley

EC³ Alternate Member

Dr. Anne Spacie
–
–
–
Jack Cumming
Robert Nielsen
–
–
–
–
Guy Roney
Glen Etherington
–
–
–
Jim Bradley
Tina Schmidt
Sean Sexton
Chris Korogi



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1 Introduction



1.1 Background and Purpose

In January 2010, the Carlsbad City Council adopted the Carlsbad Community Vision, representing the community's most important values, priorities and aspirations for the future. The community's vision guides the second phase of the Envision Carlsbad process, which entails an update of the city's General Plan, Local Coastal Program and Zoning Ordinance.

As the first task in this second phase of Envision Carlsbad, existing conditions and issues are evaluated. This evaluation is presented in six working papers, structured around the core values identified in the Carlsbad Community Vision. The working papers provide background information and technical analysis that will be useful for subsequent tasks, and raise policy issues (presented at the end of each working paper) to help the EC³ brainstorm about conclusions and findings, in terms of how these may shape potential alternatives or policies. Importantly, these working papers are discussion tools, rather than final documents to be critiqued or refined. While the primary review and brainstorming group for the working papers will be the EC³, some papers will be appropriate for review and discussion by the city's various commissions and boards.

The six working papers are:

1. Sustainability
2. The Local Economy, Business Diversity and Tourism
3. Open Space and the Natural Environment, Access to Recreation and Active, Healthy Lifestyles
4. History, the Arts, Cultural Resources; High Quality Education and Community Services
5. Walking, Biking, Public Transportation and Connectivity
6. Small Town Feel, Beach Community Character, and Connectedness; Neighborhood Revitalization, Community Design and Livability

1.2 This Working Paper

Working Paper #5: Walking, Biking, Public Transportation and Connectivity evaluates the current infrastructure in place to support walking, bicycling, using public transit and driving in Carlsbad. It explores the Vision core value related to mobility:

Increase travel options through enhanced walking, bicycling, and public transportation systems. Enhance mobility through increased connectivity and intelligent transportation management.

This working paper summarizes current conditions and planning issues for the key components of the city's mobility system and their usage in Carlsbad, including the pedestrian and bicycle networks, public transit and roadways. Following this introductory chapter, chapters in this working paper include:

- Pedestrian Movement
- Bicycle Movement
- Transit
- Traffic Circulation
- McClellan-Palomar Airport
- Planning Issues and Implications

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2 Pedestrian Movement



Improving the walking environment in Carlsbad was a recurring theme during the Envision Carlsbad Phase I visioning process, and is important to Carlsbad's future as it addresses several interrelated challenges, including traffic, air quality, public health and overall quality of life. By planning a city that is more walkable, the city can have a profound influence on the quality of life in Carlsbad.

Carlsbad has adopted several programs and plans related to improving the walking environment. For example, the city adopted an award winning Pedestrian Master Plan in 2008, which guides the future development and enhancement of pedestrian facilities to ensure that walking becomes an integral mode of transportation in Carlsbad. The city launched the Carlsbad Traffic Management Program in 2001, which provides a mechanism for community members to report issues relating to speeding and excessive volumes on residential roadways.

In the following sections, various aspects of the pedestrian environment are discussed with an emphasis on describing current conditions and highlighting potential issues to consider as the General Plan update process progresses.

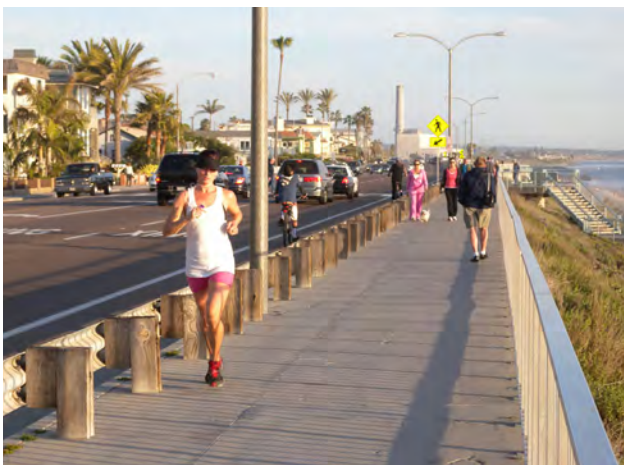
2.1 Connectivity

Assessing connectivity in the pedestrian environment necessitates understanding the locations and types of uses likely to attract walking trips, as well as features in the environment that present barriers to walking.

Pedestrian Facilities and Pedestrian-Attracting Land Uses

Several land use types are of particular focus when planning for pedestrians. These land use types include uses that attract a large proportion of trips made by people who do not drive, such as youth, elderly and the transit dependent. In addition, land uses that generate healthful outdoor experiences and physical activity, such as the beaches, regional and local parks, the lagoons, open space areas, and trails, should also be a focus in pedestrian planning.

Figure 2-1 displays the existing pedestrian environment in Carlsbad, including pedestrian attracting land uses, existing sidewalks, missing sidewalks, and trails. Attracting land uses include schools, libraries, parks, and the coastline. Other relatively high density areas of the city, such as the Carlsbad Village, also generate pedestrian activity. In general, pedestrian attracting land uses are fairly evenly distributed across the city, with the exception of the Village which shows a concentration of such land uses. Other notable features in Carlsbad, in relation to pedestrian activity, include the city's coastline, three lagoons, and major open space areas. These natural resource features should be given very careful consideration when planning for the pedestrian environment.



Pedestrian-attracting land uses include lagoons (top), Village commercial areas (center), and the coastline (bottom).

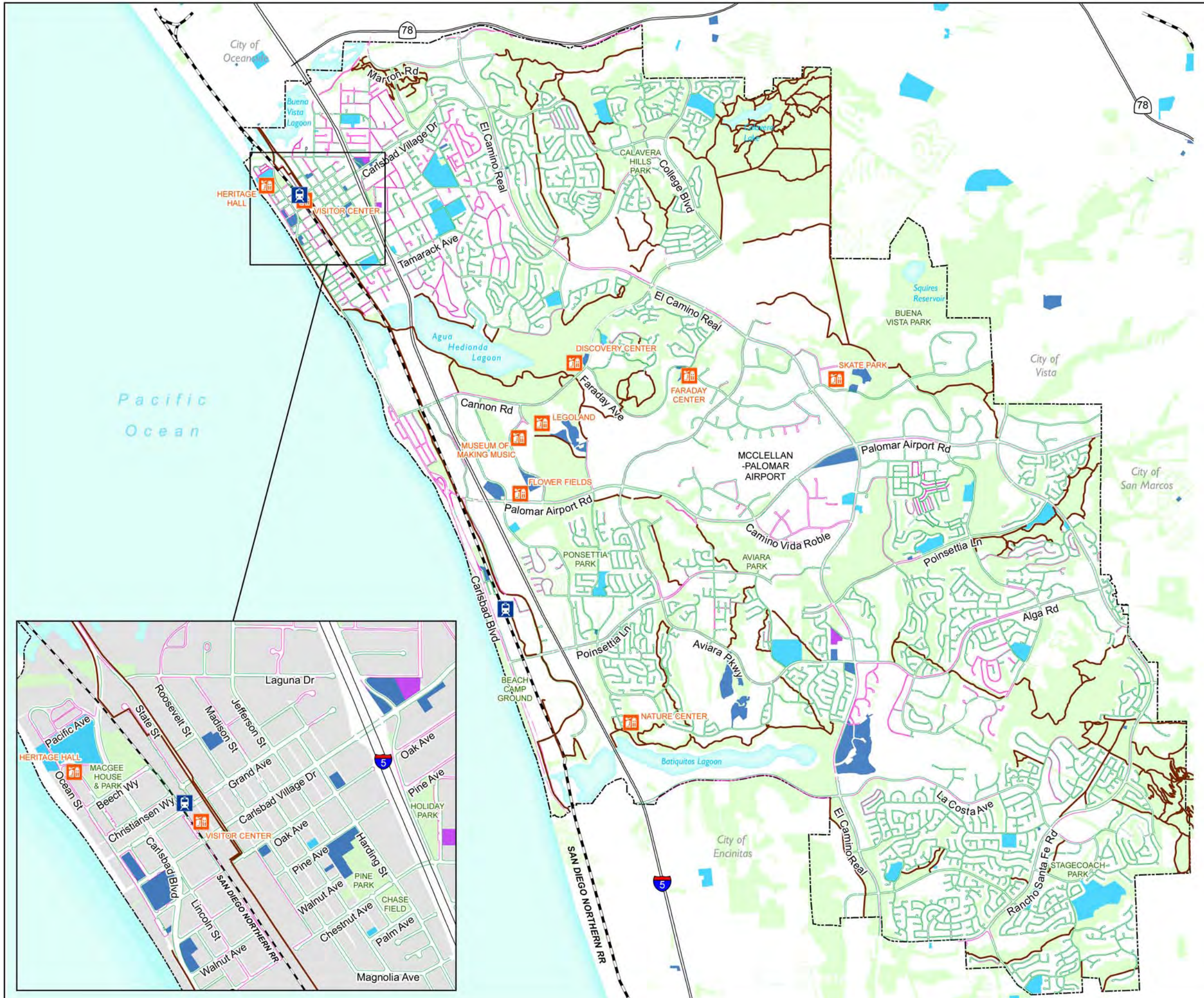
Pedestrian Barriers

Several features of the built environment also can function as pedestrian barriers. Major types of barriers include gaps in sidewalks that cause pedestrians to walk in travel lanes; high volume, high speed roadways that expose pedestrians to large numbers of high-speed vehicles, diminished air quality, and excessive noise; and regional infrastructure such as interstate freeways, freeway ramps and rail rights-of-way. Uncompleted or missing road segments (i.e. College Boulevard and Cannon Road) and topography can constrain pedestrian access. There can also be psychological barriers to walking related to an individual's perception of safety. If a street environment does not "seem" safe to community members, and there is a perception that nobody walks in a particular location, regardless of the actual safety, then community members may avoid those locations.

Figure 2-1 also displays roadways with missing sidewalks on one or both sides. As shown, there are several roadways in the Carlsbad Village area without sidewalks on both sides. There are also several major roadways, such as Cannon Road, Palomar Airport Road, Poinsettia Lane, El Camino Real, College Boulevard, Aviara Parkway and Alga Road, lacking continuous sidewalks on both sides. The absence of sidewalks on both sides of the roadway, especially on the high speed-high volumes roadways, can cause pedestrians to make unnecessary crossings at wide arterial intersections. It is estimated that there are approximately 106 miles of missing sidewalks on one or both sides of key roadways within the City of Carlsbad.

There are several other significant infrastructure barriers in Carlsbad, such as the Interstate 5 freeway and the COASTER/Amtrak rail right-of-way, that tend to sever most neighborhoods from the coast. Within the city, there are six interstate freeway interchanges (at Carlsbad Village Drive, Tamarack Avenue, Cannon Road, Palomar Airport Road, Poinsettia Lane and La Costa Avenue) and two other roadway under/over crossings (at Chestnut Avenue and Chiquapin Avenue) of Interstate 5. Each of these locations, while allowing for east-west pedestrian access across the freeway, serves as a

Working Paper 5
 Figure 2-1: Existing Pedestrian Facilities



LEGEND

Base Layers

- Highways
- Major Roads
- Railroad
- City Limits

Sidewalks and Trails

- Existing Sidewalk
- No Sidewalk
- Trail

Pedestrian Attracting Land Use

- Library
- Civic Uses
- Schools
- Parks and Open Space

Other Facilities

- Carlsbad Coaster Station
- Public Attractions

100 Acres
 50 Acres
 10 Acres

0 0.5 1 2
 Miles

Source: City of Carlsbad, 2009; SANDAG, 2008; Dyett & Bhatia, 2009; Fehr & Peers, 2010

potential barrier for pedestrian travel in that the pedestrian must either negotiate interchange intersections with very high vehicular speeds and/or narrow sidewalks (approximately five to six feet wide). The overpass at Chinquapin Avenue, in particular, only provides sidewalk on the north side of the roadway.

2.2 Usage

As a means of assessing pedestrian demands within Carlsbad, the city's Pedestrian Master Plan provided a pedestrian need map comprised of three raster models reflecting pedestrian attractors, pedestrian generators and pedestrian barriers. To understand pedestrian demands in support of this planning process, the pedestrian attractors and generators were summed in order to create a "pedestrian demand" model.

Figure 2-2 displays the pedestrian demands as reflected by the combination of attractors and generators from the Pedestrian Master Plan. As shown, there are relatively high potential pedestrian demands in several key locations across the city, including the Carlsbad Village, the areas directly east of the Carlsbad Village and west of El Camino Real, as well as some pockets north of Poinsettia Lane and south of La Costa Avenue.

As part of a recent Caltrans project, called the Caltrans Seamless Travel Study, two-hour peak period pedestrian counts were conducted at two locations in Carlsbad during the weekday morning (7 to 9 A.M.) and weekend midday (noon to 2 P.M.) peak periods in 2007 and 2008. In total, the Caltrans' Seamless Travel Study involved collecting bicycle and pedestrian counts at 80 locations across the County with the goal of developing predictive models to estimate the peak period demand for bicycle and pedestrian travel based upon a series of built environment characteristics in the vicinity of intersections where the counts were conducted. The two-year average of these counts shows peak period pedestrian volumes ranging from 26 pedestrians at the Poinsettia Lane/Carlsbad Boulevard intersection during the A.M. peak period to 252 pedestrians at the Grand Avenue/State Street intersection during the weekend midday peak period.



Pedestrian barriers include high-volume roadways with many lanes (top), dark and unpleasant underpasses (middle), and long stretches of unprotected roadway with discontinuous sidewalks (bottom).

The 2000 Census is another source of walking rates and reports the number of residents who commuted to work by foot. In the year 2000, approximately 775 Carlsbad residents, or 0.8 percent of the total working population, reported regularly walking to work. This is lower than the year 2000 countywide rate of walking commuters, estimated at 3.4 percent of the total working population.

2.3 Safety

In order for community members to engage in walking for recreational and even for more utilitarian purposes, there must be a sense of safety and comfort. This section discusses two key components of pedestrian safety and comfort, namely the local history of pedestrian-vehicular collisions and safety from crime.

Pedestrian Collisions

Assessing pedestrian collisions can provide an overall indicator of pedestrian safety in Carlsbad, as well as providing a focus to recommendations that will be made in upcoming stages of the planning process. Between the years 2001 and 2006, there were approximately 123 pedestrian-involved collisions in the City of Carlsbad. In general, the Carlsbad Village area shows a relatively higher incidence of pedestrian collisions than other parts of the city, with about 49 collisions (or 40 percent of total collisions) occurring in the area bound by Laguna Drive to the north, Interstate 5, and Tamarack Avenue to the south. This finding reflects the relatively higher overall pedestrian activity levels in the Village, compared with other areas of the city. Figure 2-3 shows the distribution of pedestrian collisions across the City of Carlsbad between 2001 and 2006.

“Eyes on the Street”

Neighborhoods in which people walk for day-to-day activities offer more opportunities for chance meetings than do areas where daily travel is primarily by automobile. Such serendipitous encounters help neighbors get better acquainted

and provide eyes on the street, which can make an area feel and be safer.^{1,2,3} Carlsbad’s street environments are more likely to be perceived as safe when the street is active and well-used, such as when residents regularly walk, as opposed to a condition where streets appear to be deserted or are without activity. Carlsbad residents’ sense of living in a cohesive community can be greatly enhanced with a focus on residential growth in compact, walkable communities, the creation of shopping districts that cater to those on foot, and providing facilities that enhance the overall pedestrian experience.

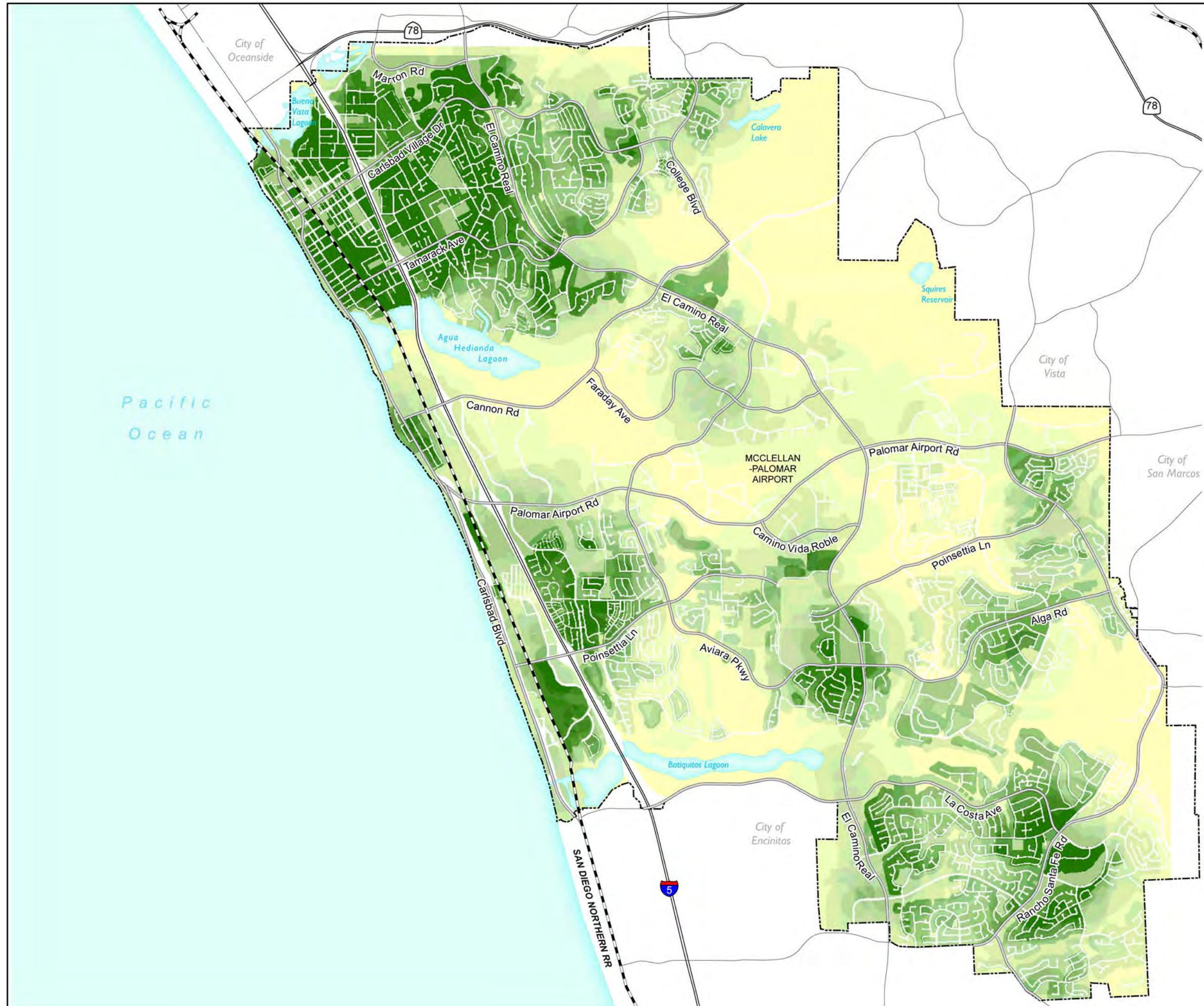
2.4 Accessibility

The Americans with Disabilities Act (ADA) of 1990 is a civil rights statute that prohibits discrimination against people with disabilities. One of the titles of the act specifically addresses the subject of making public services and public transportation accessible to those with disabilities. With the advent of the ADA, designing and constructing facilities for public use that are not accessible by people with disabilities constitutes discrimination. The act applies to all facilities, including facilities built both before and after 1990. Some of the key requirements triggered by this law include elimination of obstructions in the public right-of-way, such as sidewalks that are impassable in a wheel chair and intersection corners without curb ramps to allow wheel chair access to the sidewalk.

The City of Carlsbad maintains two key databases that include the identification of obstructions for disabled populations, namely missing sidewalks and curb ramps. Figure 2-1 shows missing sidewalks, while Figure 2-4 shows the distribution of curb ramps and their respective condition throughout the city.

- 1 R. Taylor and A. Harrell, Physical Environment and Crime, presented to the National Justice Institute (1996)
- 2 O. Newman, Creating Defensible Space, US Department of Housing and Urban Development, Office of Policy Development and Research (1996)
- 3 A. Zelinka and D. Brennan, Safescape: Creating Safer, More Livable Communities Through Planning and Design, American Planning Association (Chicago), at 42 (2001)

Figure 2-2: Potential Pedestrian Demand



LEGEND

Base Layers

- Highways
- Major Roads
- Railroad
- City Limits

Pedestrian Demand Model

High

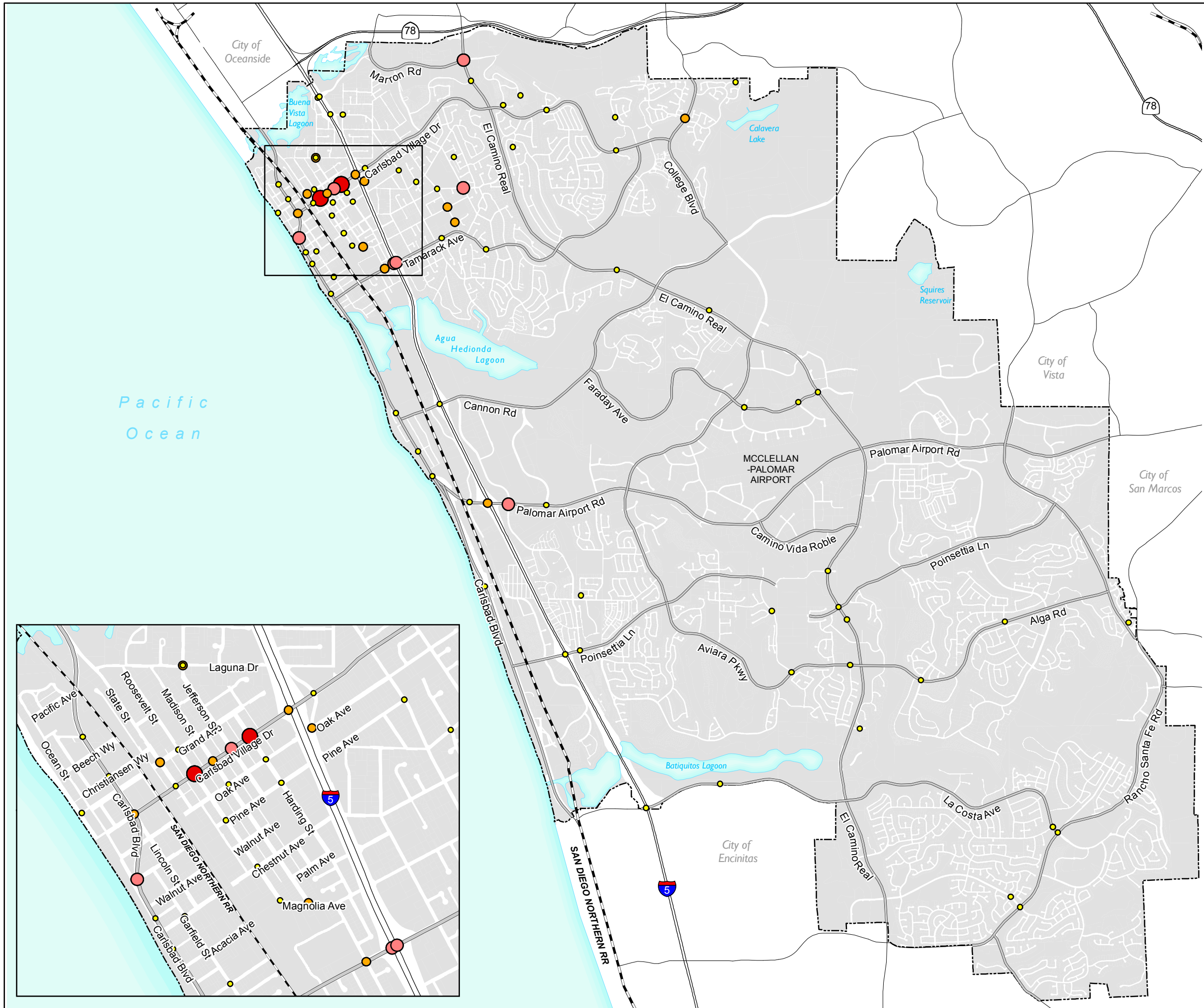
Low

100 Acres
50 Acres
10 Acres

0 0.5 1 2
Miles

Source: City of Carlsbad, 2009; SANDAG, 2008; Dyett & Bhatia, 2009; Fehr & Peers, 2010

Figure 2-3: Pedestrian Collision (2001-2006)



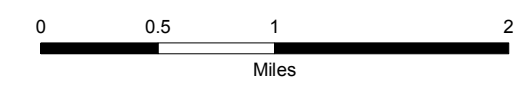
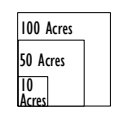
LEGEND

Base Layers

- Highways
- Major Roads
- Railroad
- City Limits

Number of Pedestrian Collisions

- 1
- 2
- 3 - 4
- 5 - 6



Source: City of Carlsbad, 2009; SANDAG, 2008; SWITRS, 2001-2006; Dyett & Bhatia, 2009; Fehr & Peers, 2010

At the current time, there are approximately 4,564 total curb ramps within the City of Carlsbad, with about 4,559 in fair or good condition, and only five curb ramps in poor condition.

2.5 Pedestrian Improvement Opportunities

Figure 2-5 displays a summary of the pedestrian needs including the pedestrian generators, attractors and barriers, as discussed previously in this section. These pedestrian needs can guide development of pedestrian facility improvement projects. There are four significant concentrations of high pedestrian needs across the City of Carlsbad, including the following locations:

- The entire northwest quadrant, especially the Carlsbad Village area;
- The southern coastal area of the city, between Cannon Road and the Batiquitos Lagoon;
- Several locations along El Camino Real, near Camino Vida Roble, Aviara Parkway/Alga Road and La Costa Avenue; and
- The southeastern portion of the city, stemming from the intersection of La Costa Avenue and Rancho Santa Fe Road.

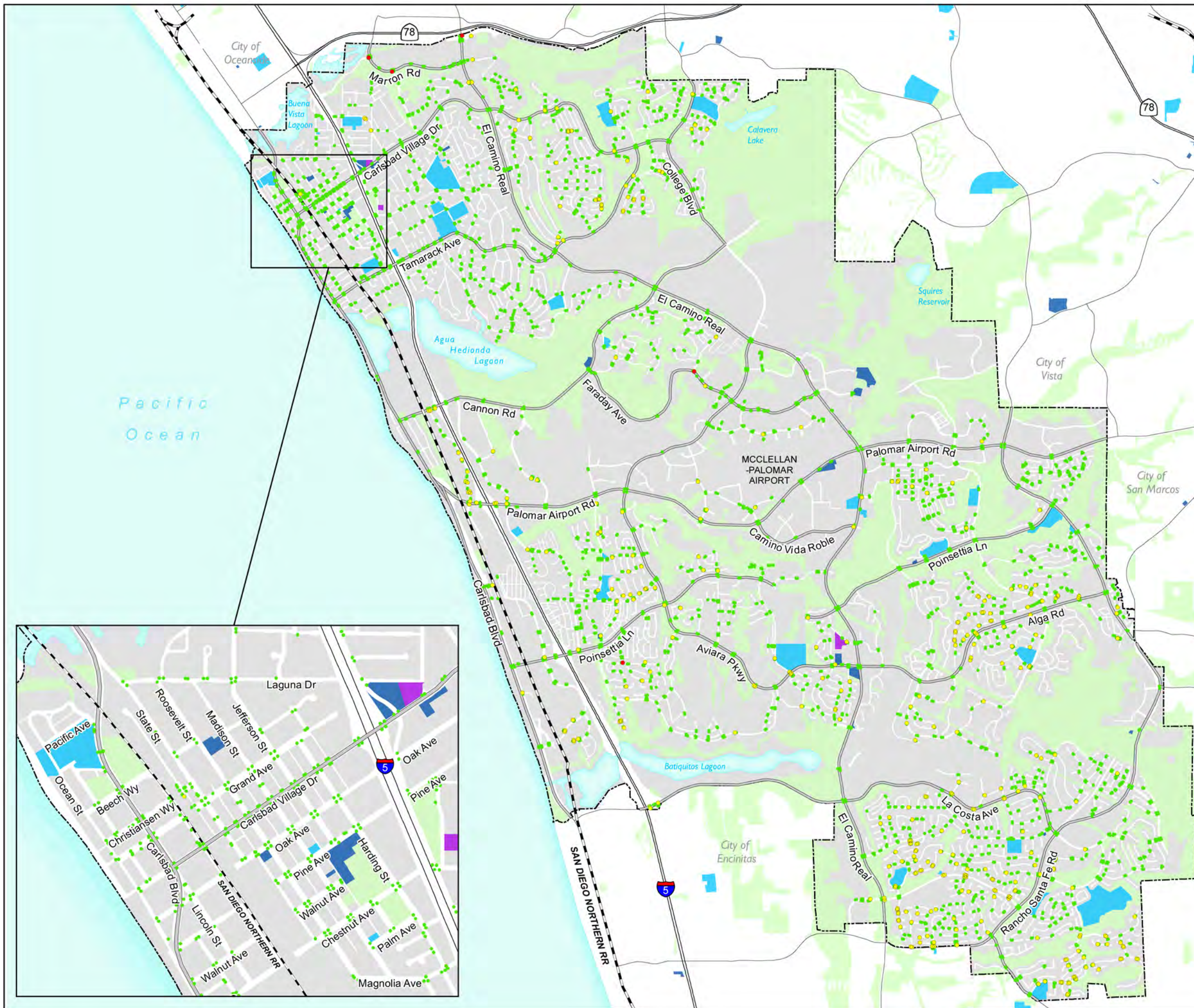
A range of potential improvement projects exist to enhance pedestrian mobility and specifically local connectivity, usage, safety and accessibility. These improvements include infill of sidewalk gaps, sidewalk widenings, new connections to pedestrian attracting designations, safe routes to school, enhanced crosswalks, pedestrian countdown signals, improved signage and markings and provision of Americans with Disabilities Act (ADA) improvements.



Carlsbad has worked hard to ensure provision of curb ramps in good condition throughout the city (top); completion of sidewalks, particularly in residential areas, requires ongoing investment (bottom).

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Figure 2-4: Curb Ramp Inventory



LEGEND

Base Layers

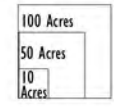
- Highways
- Major Roads
- Railroad
- City Limits

Curb Ramps

- Good
- Fair
- Poor

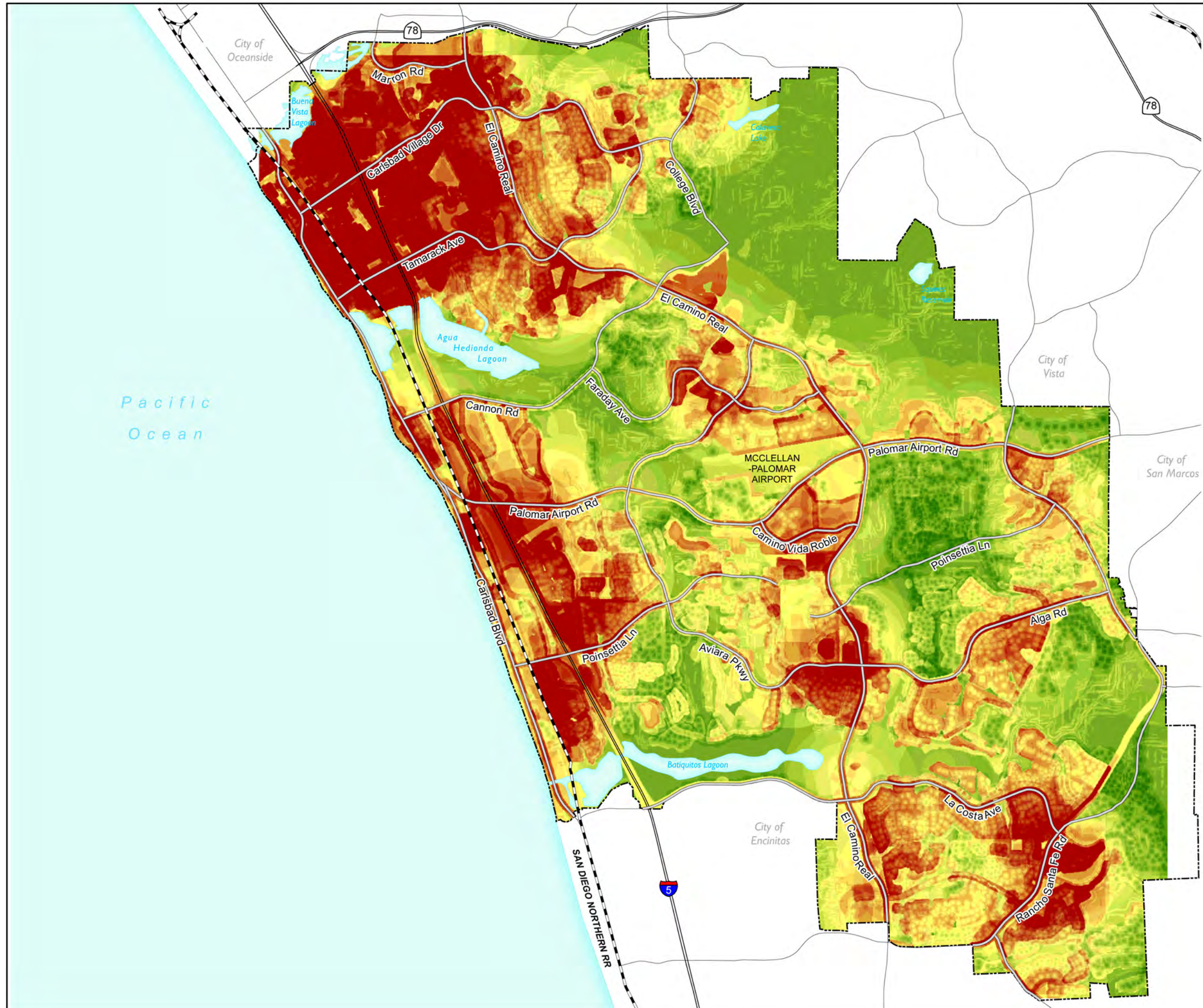
Land Use

- Library
- Civic Uses
- Schools
- Parks and Open Space



Source: City of Carlsbad, 2009; SANDAG, 2008; Dyett & Bhatia, 2009; Fehr & Peers, 2010

Figure 2-5: Pedestrian Needs



LEGEND

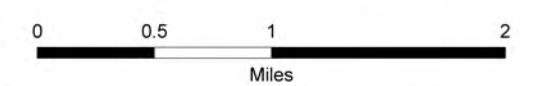
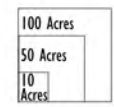
Base Layers

- Highways
- Major Roads
- Railroad
- City Limits

Pedestrian Need Model

High

Low



Source: City of Carlsbad, 2009; SANDAG, 2008; Dyett & Bhatia, 2009; Fehr & Peers, 2010

3 Bicycle Movement



The bicycle is a low-cost and effective mode of travel; in addition to being quiet, nonpolluting, energy-efficient, versatile, healthy, and fun. Bicycle travel offers an alternative to the more expensive investment necessary for automobile travel. Bicycling is growing in popularity as many communities work to create more balanced transportation systems that equally support motorized and non-motorized travel within the roadway right-of-way. Recent national surveys find that more people would be willing to cycle more frequently if better bicycle facilities were provided.⁴ The City of Carlsbad is in a unique position to capitalize on its bicycle-friendly features, such as temperate climate, scenic vistas, and ample recreational amenities, to increase the number of residents and visitors who see and traverse Carlsbad by bicycle. Carlsbad's traditional downtown, beautiful stretches of beaches and open spaces are all conducive to cycling for both utility and recreational reasons. However, the city's rolling topography in the east can be a deterrent to some.

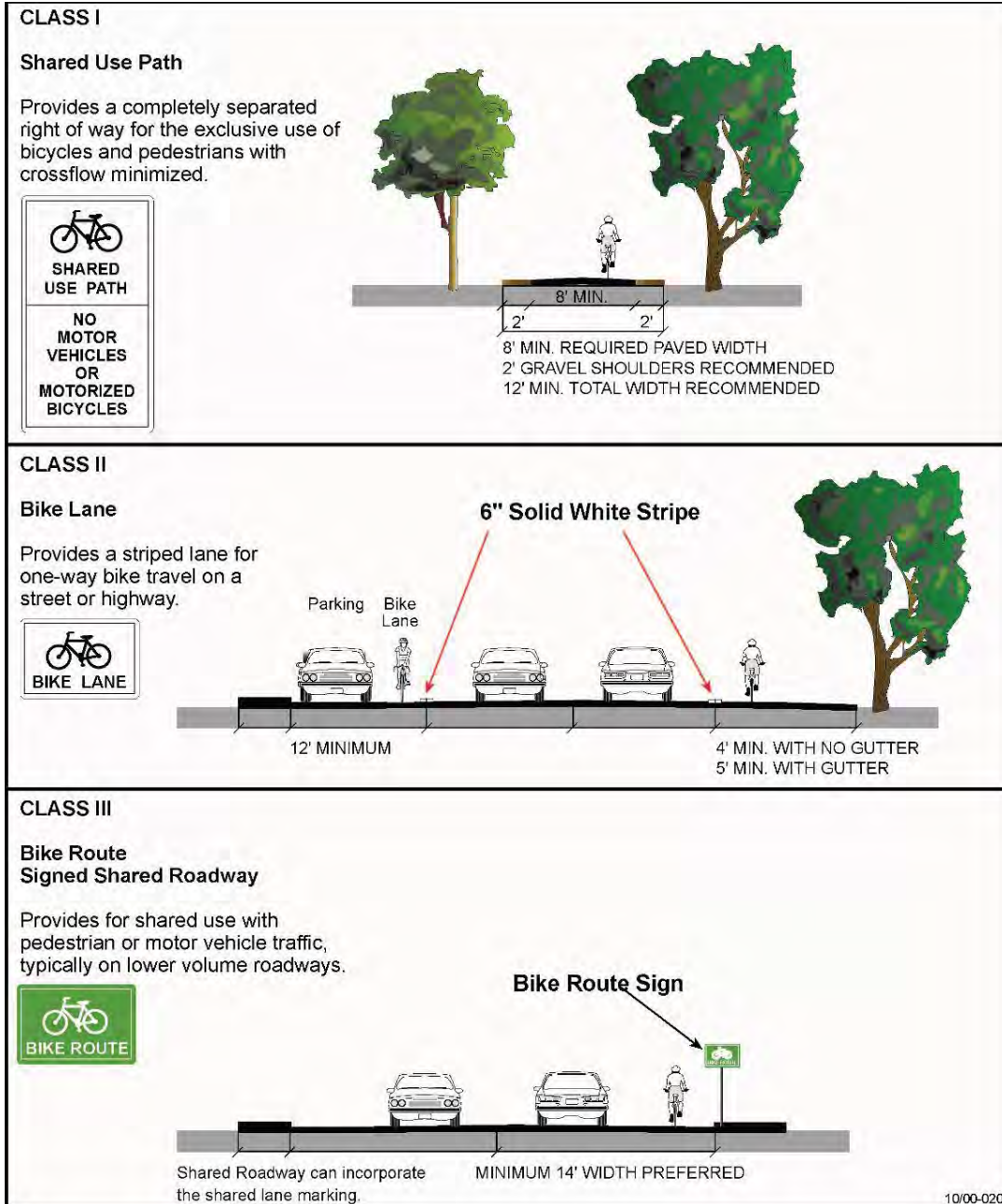
The City of Carlsbad adopted a Bikeway Master Plan in 2007, which guides the future development of bikeways and enhancement of the city's existing bikeway network.

3.1 Connectivity

There are currently bicycle facilities on most major arterial roadways within the City of Carlsbad, including Carlsbad Boulevard, Carlsbad Village Drive, El Camino Real, Palomar Airport Road and La Costa Avenue. Although these facilities provide direct routes for experienced cyclists comfortable with riding on relatively high volume roadways, the degree of success in encouraging new cyclists will depend on meeting the needs of the less experienced riders who are less comfortable on such roadways, as well as the promotion of land use patterns that decrease distances between destinations. In addition to incorporating more alternative routes into the existing bikeway network, support facilities such as clear directional / wayfinding signage and secure bicycle parking at schools, employment centers and transit stops will encourage more people to ride bicycles and enhance the level of comfort for all.

Caltrans has defined three bikeway facility types in Chapter 1000 of the *Highway Design Manual*. These three facility types are described on the following page, as well as in the City of Carlsbad Bicycle Master Plan.

⁴ National Bicycling and Walking Study: Ten Year Status Report, 2004



Source: City of Carlsbad Bicycle Master Plan, 2007

Figure 3-1 displays the existing and proposed bicycle facilities in Carlsbad, while Table 3.1 summarizes the existing miles by type of bicycle facility.

TABLE 3-1: EXISTING MILES OF BICYCLE FACILITY BY TYPE	
FACILITY TYPE	EXISTING MILES
Class I Bike Path	1.6 miles
Class II Bike Lane	92.0 miles
Class III Bike Route	4.7 miles
TOTAL	98.3 miles

A majority of the circulation element roadways within the city currently include a bicycle facility of some type within its right-of-way. There are, however, several bicycle facility gaps at critical locations within the City of Carlsbad. In particular, bicycle lanes are discontinued along both Cannon Road and Palomar Airport Road, just east of Carlsbad Boulevard. These gaps greatly diminish connectivity to the coastline for cyclists.

The city’s Bicycle Master Plan indicates a number of planned bicycle facilities, including the Coastal Rail Trail, the Carlsbad Boulevard Bike Path at Ponto, two Class II Bike Lane projects at Hillside Drive and Avenida Encinas, and five Class III Bike Route projects in the northwest quadrant of the city.

As with pedestrian movements, bicyclists face several significant barriers in Carlsbad, especially related to major regional infrastructure like Interstate 5, interchange on/off ramps, and the rail right-of-way. Figure 3-2 shows a bicycle barrier model that was developed by SANDAG as part of the San Diego Regional Bicycle Plan process, and includes factors such as regional infrastructure, bicycle collisions, topography, and high speed/high volumes arterials. As shown, major roadways (higher speed and volumes) such as Carlsbad Boulevard, El Camino Real, Carlsbad Village Drive, Tamarack Avenue and Palomar Airport Road can function as barriers for bicyclists.

3.2 Usage

As part of the San Diego Regional Bicycle Plan planning process, a bicycle “demand” model was developed to estimate bicycle demands across the region, including within the City of Carlsbad. The model identifies locations in relatively closer proximity to bicycle trip attracting land uses with higher rates of bicycling, and locations with higher rates of certain subpopulations—such as youth and low-income—that are associated with higher rates of cycling activity. The SANDAG bicycle demand model included major universities, beaches and coastal parks, tourist attractions, other parks and recreational facilities, retail facilities, schools, and civic facilities as the key bicycle trip attracting land uses.

As shown in Figure 3-3, the bicycle demand model depicts relatively higher potential demands in the western portions of the city along the coastline, as compared with the eastern portions of the city where the topography results in steeper slopes.

As part of a recent Caltrans project, called the Caltrans Seamless Travel Study, peak period bicycle counts were conducted in three locations in Carlsbad during the weekday morning (7 to 9 A.M.) and weekend Midday (noon to 2 P.M.) peak periods in 2007 and in 2008. In total, the Caltrans’ Seamless Travel Study collected bicycle and pedestrian counts at 80 locations across the County with the goal of developing predictive models to estimate the peak period demand for bicycle and pedestrian travel based upon a series of built environment characteristics in the vicinity of intersections where the counts were conducted. The counts showed that peak period bicycle volumes ranged from 28 bicyclists during the A.M. peak period at the Grand Avenue / State Street intersection to 196 bicyclists during the weekend Midday peak period at the Poinsettia Lane / Carlsbad Boulevard intersection.

The 2000 Census is another source of bicycle usage and reports the number of residents who commute to work by bicycle. In the year 2000, approximately 0.3 percent of Carlsbad residents reported regularly cycling to work. This is lower than the countywide average of 0.6 percent, and lower than the statewide average of 0.8 percent. These relatively lower rates of commuter cycling may be due to longer work

commute distances and lack of comfortable bicycle facilities in the more suburban areas of the city.

3.3 Safety

Bicycle collisions provide an overall indicator of safety, as well as a focus for developing recommendations in the upcoming stages of the planning process. Between the years 2002 and 2007, there were approximately 158 bicycle-vehicular collisions in Carlsbad. Figure 3-4 shows the distribution of those collisions by nearest intersection location. As shown, bicycle collisions appear to follow a north-south pattern, especially along Carlsbad Boulevard. Compared with pedestrian collisions, bicycle collisions are less concentrated in the Carlsbad Village area. In particular, several of the locations where bicycle facility gaps occur are also locations with relatively higher numbers of bicycle collisions, such as near the Cannon Road / Carlsbad Boulevard and Palomar Airport Road / Carlsbad Boulevard intersections.

3.4 Bicycle Improvement Opportunities

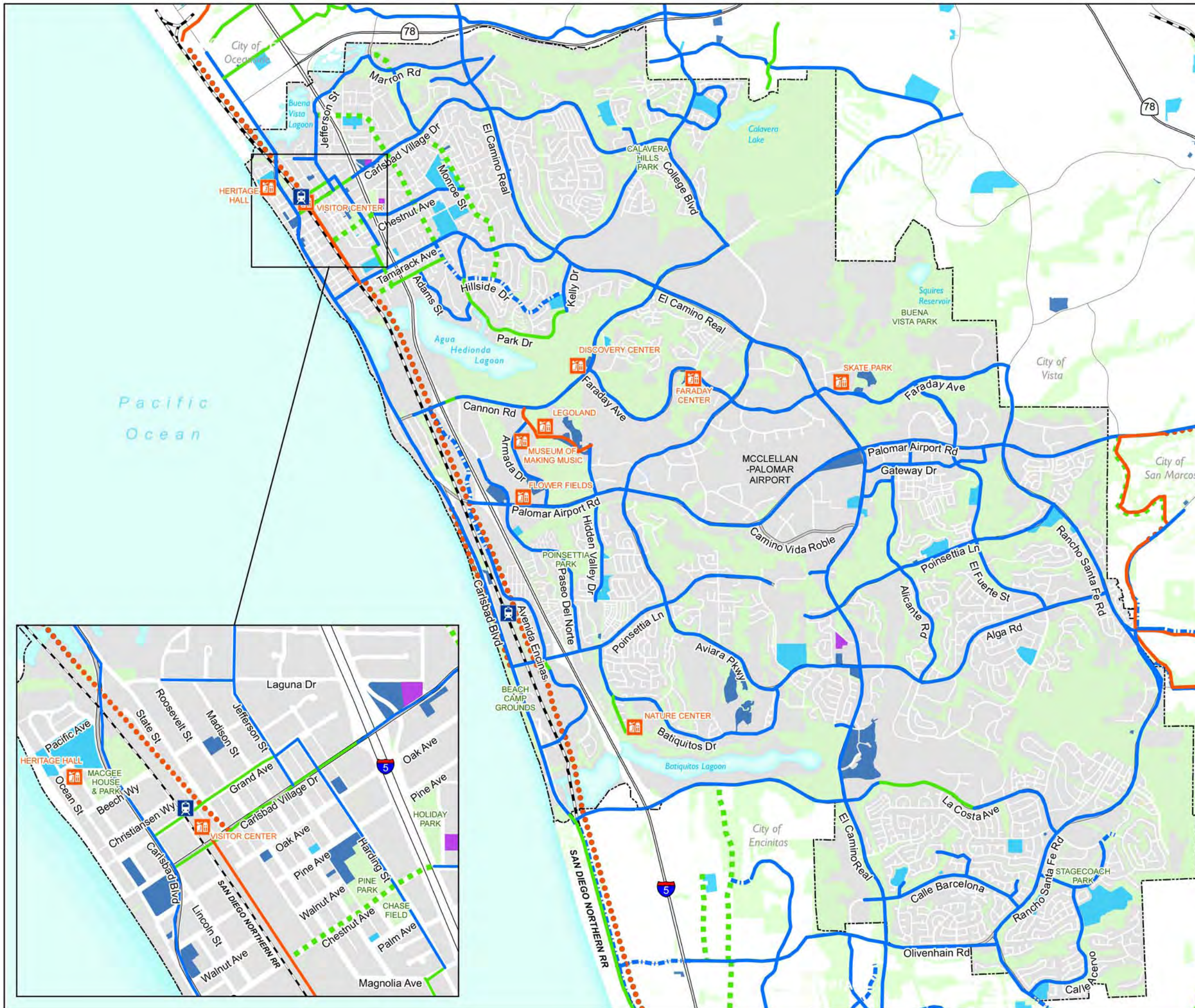
Figure 3-5 displays a summary of bicycle needs, which is defined here as a combination of high potential bicycle demands based upon locations of various populations and land uses, and high barriers related to such factors as topography, traffic volumes and speeds, and bicycle collisions. In general, the western half of the city shows the need for improved bicycle facilities, given the combined high demands and high barriers in those areas.

The proposed Coastal Rail Trail (30+ miles) located in the North County Transit District's (NCTD) right-of-way will provide great opportunities for biking of all purposes. This trail will run along the eastern side of the railroad tracks through the coastal cities of Oceanside, Carlsbad, Encinitas, and Solana Beach in San Diego's North County. A ¼-mile segment of the Coastal Rail Trail in Carlsbad was completed in 2005, connecting Tamarack Avenue with Oak Avenue.

In addition, the Carlsbad Boulevard Bike Path at Ponto located on the western side of Carlsbad Boulevard (along the coast) between Palomar Airport Road and Poinsettia Lane, will provide residents of Carlsbad and visitors to South Carlsbad State Beach with a separated bike path.

Other potential improvement opportunities include extending the current bike lanes along Cannon Road and Palomar Airport Road to Carlsbad Boulevard to create better and continuous bicycling connections to the coast.

Figure 3-1: Existing and Proposed Bicycle Network



LEGEND

Base Layers

- Highways
- Major Roads
- Railroad
- - - City Limits

Existing Bikeways

- Bike Path - Class I
- Bike Lane - Class II
- Bike Route - Class III

Proposed Bikeways

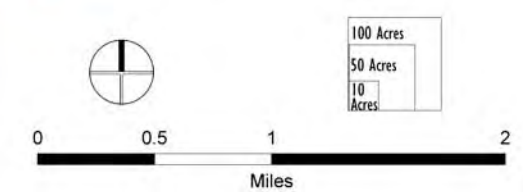
- Bike Path - Class I
- - - Bike Lane - Class II
- - - Bike Route - Class III

Land Use

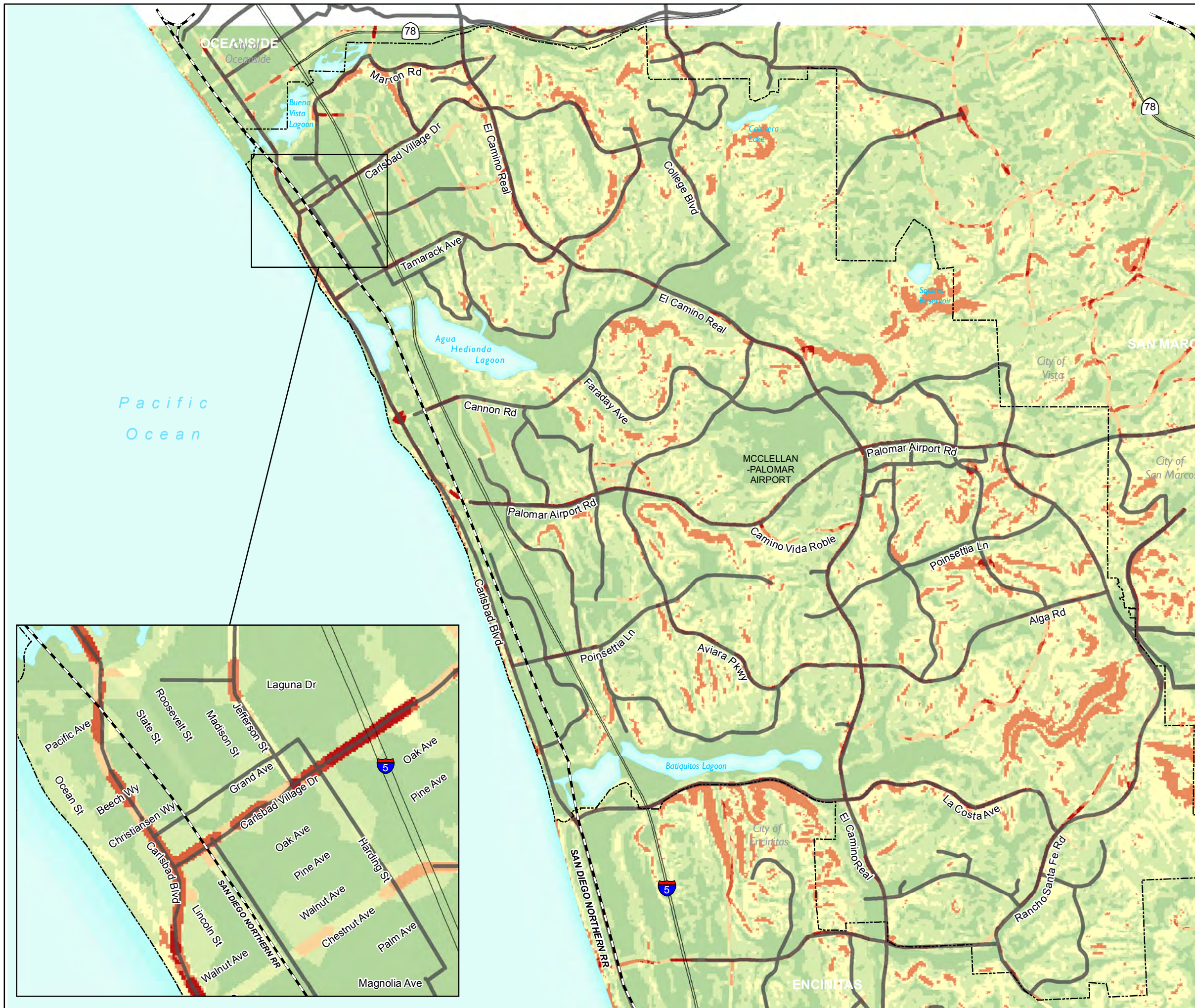
- Library
- Civic Uses
- Schools
- Parks and Open Space

Other Facilities

- Carlsbad Coaster Station
- Public Attractions



Source: City of Carlsbad, 2009; SANDAG, 2008; Dyett & Bhatia, 2009; Fehr & Peers, 2010



LEGEND

Base Layers

- Highways
- Railroad
- City Limits

Bicycle Detractor Model

- High
- Low

Existing Bikeways

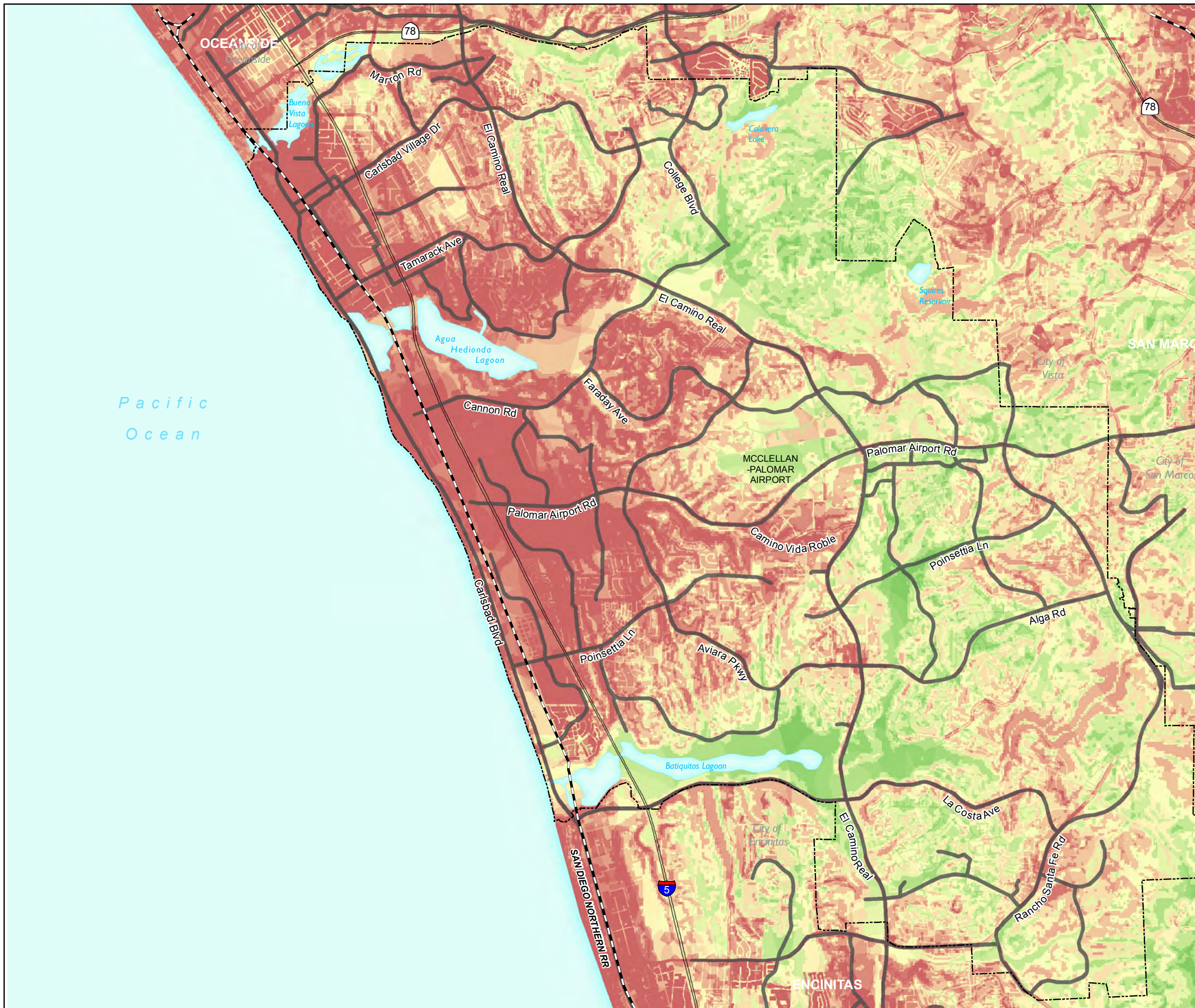
- Existing Bikeways

Scale: 0, 0.5, 1, 2 Miles

Area Scale: 100 Acres, 50 Acres, 10 Acres

Source: City of Carlsbad, 2009; SANDAG, 2008; Dyett & Bhatia, 2009; Fehr & Peers, 2010

Figure 3-3: High Potential Bicycle Demand (Regional Propensity Model)



LEGEND

Base Layers

- Highways
- Railroad
- City Limits

Bicycle Demand Model

High

Low

Existing Bikeways

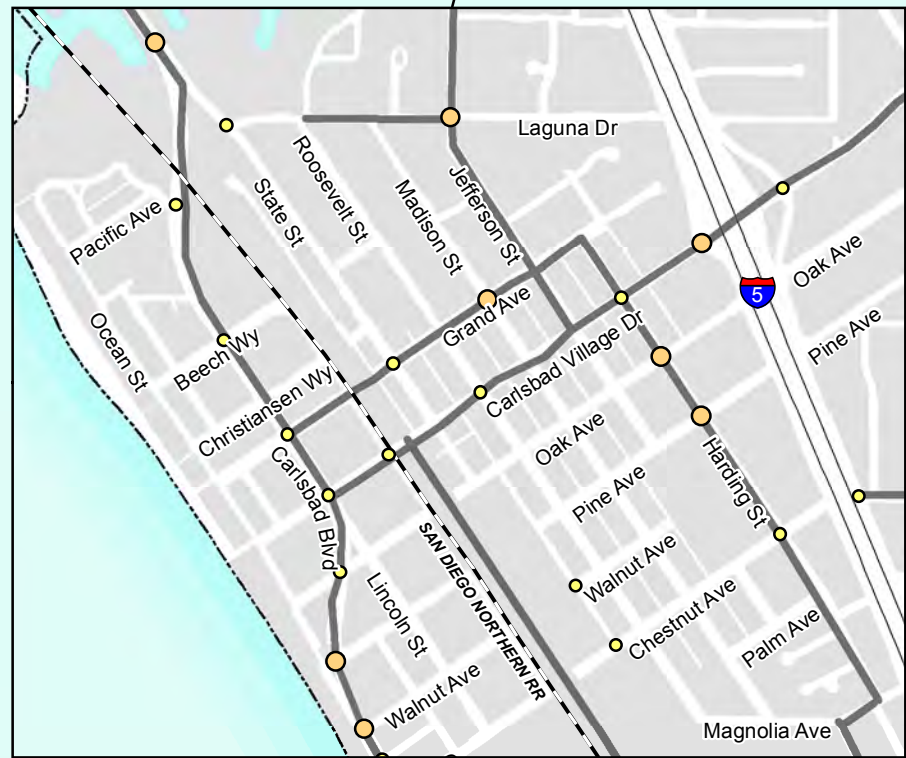
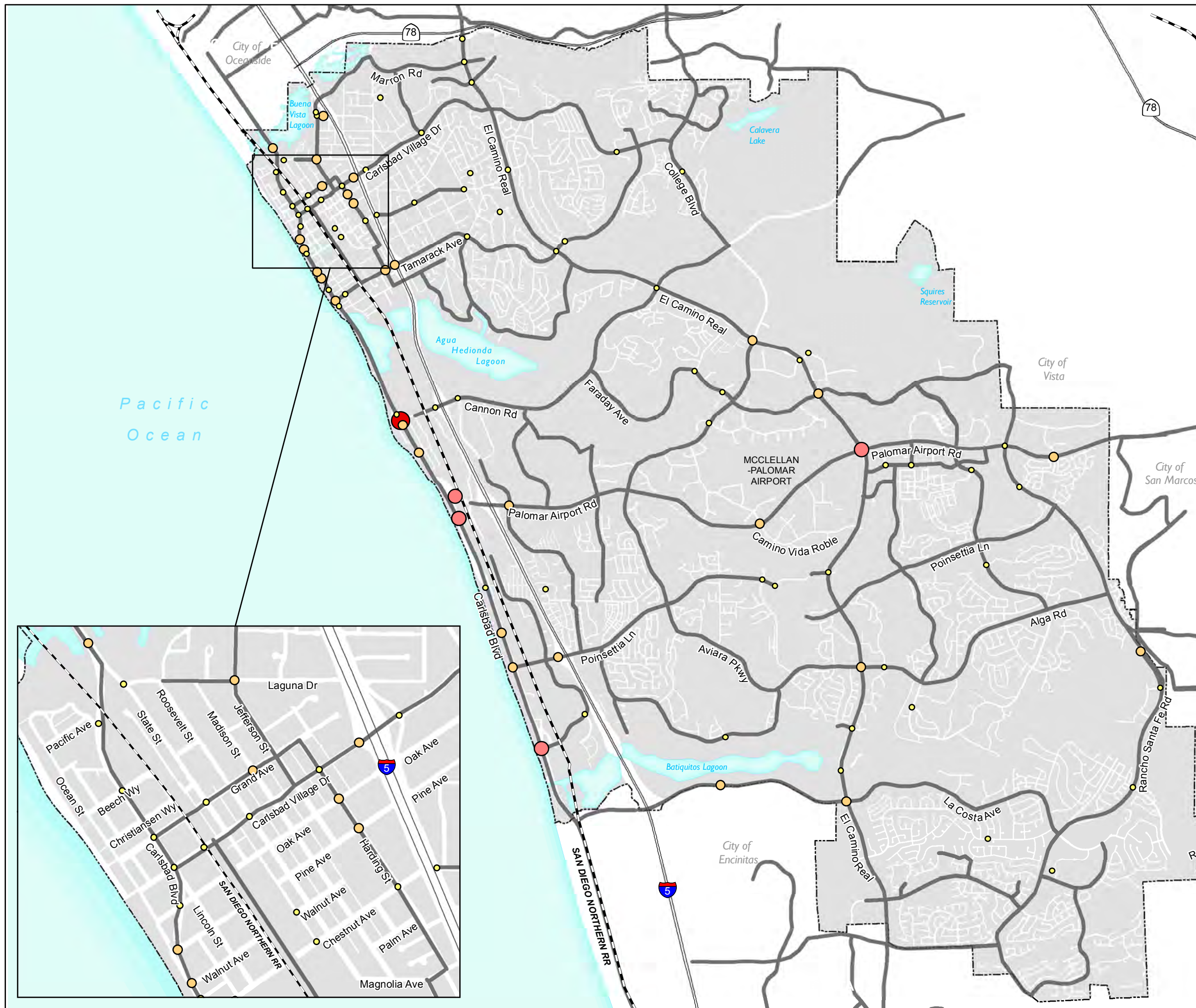
- Existing Bikeways

0 0.5 1 2
Miles

100 Acres
50 Acres
10 Acres

Source: City of Carlsbad, 2009; SANDAG, 2008; Dyett & Bhatia, 2009; Fehr & Peers, 2010

Figure 3-4: Bicycle Collisions (2002-2007)



LEGEND

Base Layers

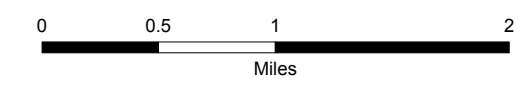
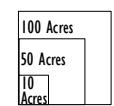
- Highways
- Railroad
- City Limits

Number of Bicycle Collisions

- 1
- 2 - 3
- 4 - 5
- 6 - 8

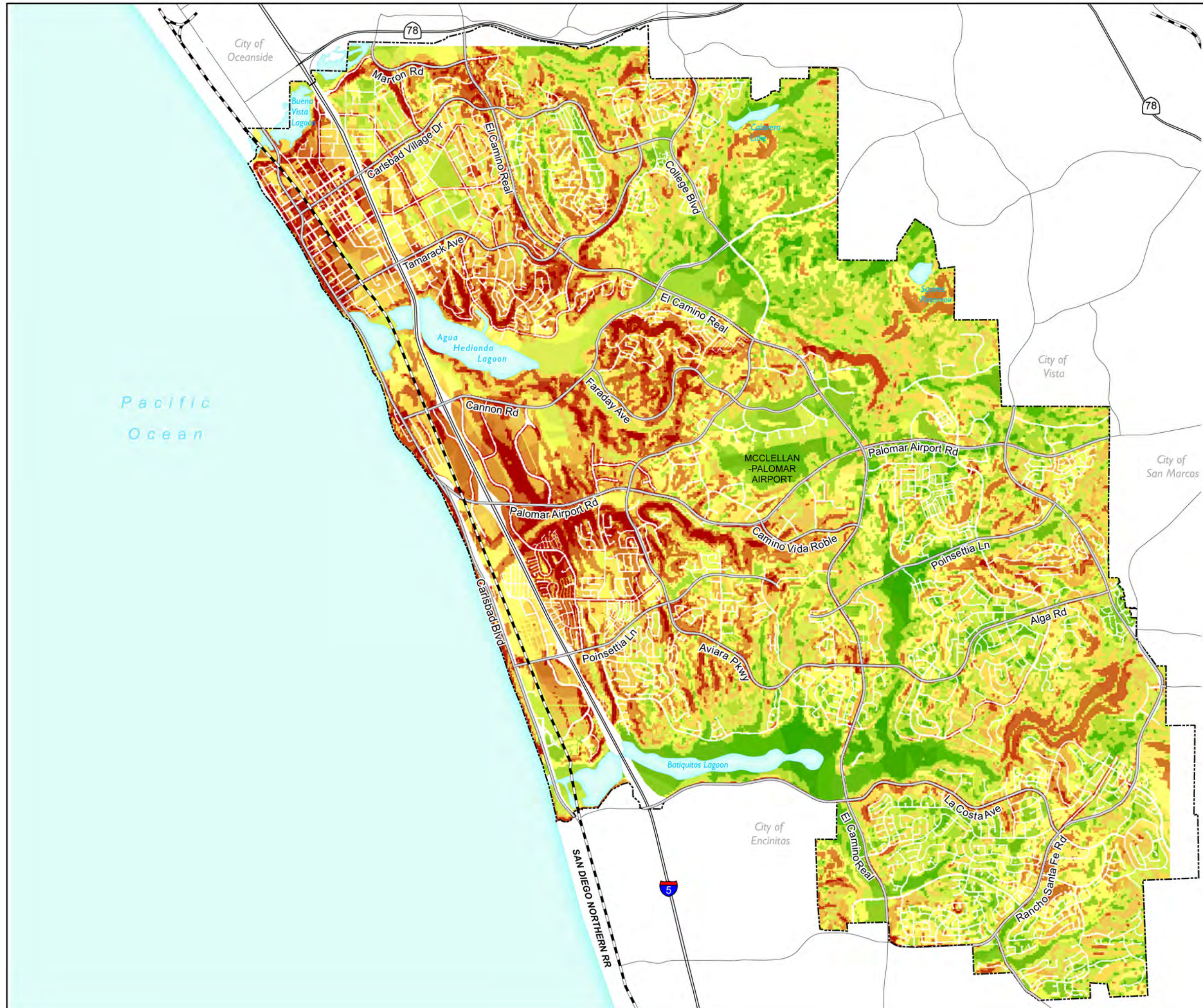
Existing Bikeways

- Existing Bikeways



Source: City of Carlsbad, 2009; SANDAG, 2008; SWITRS, 2002-2007; Dyett & Bhatia, 2009; Fehr & Peers, 2010

Working Paper 5
Figure 3-5: Bicycle Needs



LEGEND

Base Layers

- Highways
- Major Roads
- Railroad
- - - City Limits

Bicycle Need Model

- High Need
- Low Need

100 Acres
 50 Acres
 10 Acres

Miles

Source: City of Carlsbad, 2009; SANDAG, 2008; Dyett & Bhatia, 2009; Fehr & Peers, 2010

4 Transit



The Carlsbad Community Vision emphasizes a desire for increased travel options and connectivity between travel modes. Increased mobility through additional travel options can help reduce dependence on automobiles and has the potential to promote physical activity, economic vitality, air quality, and accessibility. According to the 2009 American Community Survey estimates, the commute mode share for transit by Carlsbad residents is less than two percent, while driving alone accounted for approximately 80 percent of commute trips. This disparity in travel mode share presents an opportunity to strengthen the role of transit serving the communities in Carlsbad.

4.1 System and Operations

Fixed-route public transportation service in Carlsbad, consisting of bus and rail, is provided by the North County Transit District (NCTD). Figure 4-1 illustrates the existing public transit routes serving Carlsbad.

North County Transit District BREEZE (Bus Service)

The NCTD BREEZE serves the City of Carlsbad with nine bus routes, of which three are express routes and six are local routes. A brief description of each bus route, including the terminus of each route and service frequency (also known as “headway”) is provided below:

- **NCTD Route 101.** This local bus route travels between University Towne Center in the City of San Diego and Oceanside seven days a week. This bus route travels north-south, along Carlsbad Boulevard. Weekday peak and non-peak hour service frequency is 30 minutes.
- **NCTD Route 302.** This local bus route travels between the Vista Transit Center and Oceanside seven days a week. This bus route travels east-west, along Marron Road within Carlsbad. Weekday peak and non-peak hour service frequency is 30 minutes.
- **NCTD Routes 304/404.** These local bus routes travel between Encinitas and San Marcos five days a week, with route variations south of Carlsbad. Within Carlsbad, these routes run north-south along Rancho Santa Fe Road. Weekday peak-hour service frequency is 30 minutes and one hour during non peak periods.
- **NCTD Route 309.** This local bus route travels between Encinitas and Oceanside seven days a week. This bus route travels north-south, along El Camino Real within Carlsbad. Weekday peak and non-peak hour service frequency is 30 minutes.
- **NCTD Route 321.** This express bus route travels between the Carlsbad Village and Palomar College in San Marcos five days a week. Within Carlsbad, this bus route generally travels east-west along College Boulevard and Palomar Airport Road. Weekday peak hour service frequency is one hour. This route does not operate during off-peak hours.
- **NCTD Route 325.** This local bus route travels between the Carlsbad Village and Town Center North six days a week. Within Carlsbad, this bus route generally travels east-west, along Carlsbad Village Drive. Weekday peak and non-peak hour service frequency is one hour.

- **NCTD Route 444.** This express bus route, known as the COASTER Connection, travels between the COASTER Poinsettia Station and eastern Carlsbad five days a week. Within Carlsbad, this bus route travels east-west along Cannon Road, Faraday Avenue, and Rutherford Road. Weekday peak hour service frequencies vary from 40 minutes to 80 minutes. This route does not operate during off-peak hours.
- **NCTD Route 445.** This express bus service route, known as the COASTER Connection, travels between the COASTER Poinsettia Station and eastern Carlsbad five days a week. Within Carlsbad, this bus route travels east-west, along Palomar Airport Road. Weekday peak hour service frequency is 80 minutes in the morning and 40 minutes in the evening. This route does not operate during off-peak hours.

Figure 4-1 also displays existing daily transit boardings and alightings for bus stop locations in Carlsbad. As shown, the bus stop locations with the highest number of boardings and alightings include:

- The Carlsbad Village (Routes 101, 321, 325)
- Plaza Camino Real (Routes 302, 309, 325)
- Marron Road at El Camino Real (Routes 302, 309, 325)
- Monroe Street at Chestnut Avenue (Route 325)
- Monroe Street at the Carlsbad Cultural Arts Center (Route 325)
- El Camino Real at Alga Road (Route 309)

At the bus stop locations identified above, daily boardings and alightings typically range from approximately 40 to 230 persons, and are predominantly served by the NCTD Routes 302, 309 and 325. A majority of the high volume bus stop locations noted above lack covered shelters, with benches provided at only a couple of the locations. The Plaza Camino Real and the Carlsbad Village locations are BREEZE Transit Centers, as discussed below.

System-wide, NCTD operates a total of eight BREEZE Transit Centers, with two located in Carlsbad: Carlsbad Village Station and Plaza Camino Real. The Carlsbad Village Station Transit Center includes six bus bays and serves three NCTD routes (Routes 101, 321, and 325). The Plaza Camino Real Transit Center is located at the Plaza Camino Real shopping center and includes eight bus bays and serves three NCTD routes (Routes 302, 309, and 325). Both transit centers provide sheltered seating and information on transit services through informational signs and posters.

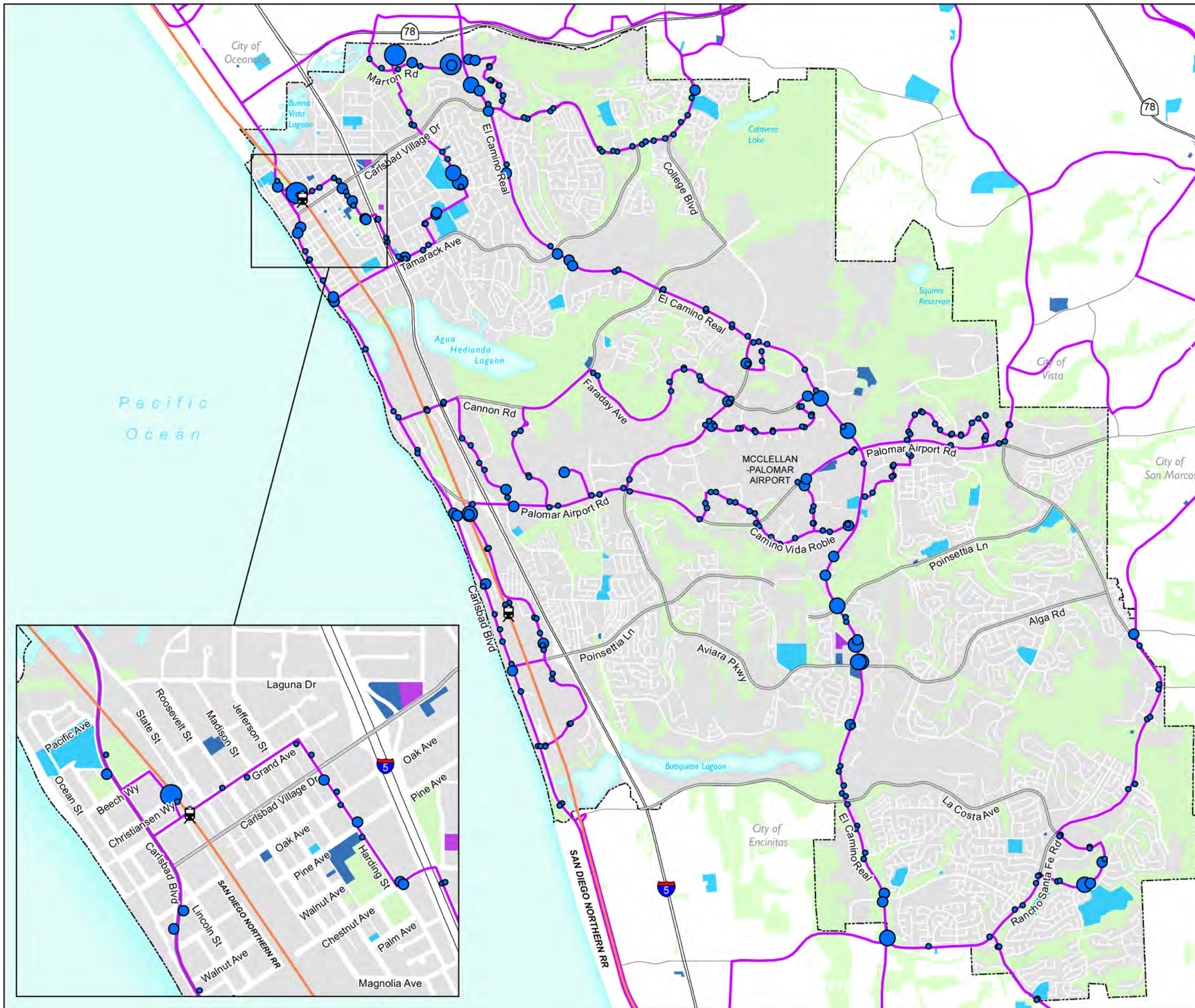
NCTD is preparing a Mobility Plan which includes a comprehensive study of their service, with the objective of developing an improved transit network in partnership with local communities. Specific elements of this study include examination of resident and rider demographics, major origins, destinations, connections, and evaluation of existing bus route performance. Potential changes to NCTD service such as route or fair restructuring would result in an enhanced NCTD experience for all users. For more information on this Mobility Plan, please visit: www.nctdmp.tmdinc.net/info01.htm.

An enhanced transit system that better serves travel patterns and area residents with improved system efficiency and service, would likely increase the viability of utilizing transit for a wider variety of trip purposes. NCTD has stated an objective of achieving greater coordination in municipal planning efforts such as bus routing and local land use decisions. The General Plan update provides an opportunity to develop and implement transit goals that can work in concert with the efforts underway at NCTD to better serve residents of Carlsbad.

NCTD ADA Paratransit Service

NCTD also offers LIFT, a curb-to-curb service for the disabled who are unable to use BREEZE buses and have been certified for eligibility as required by the ADA. This service is available for trips within three-quarters of a mile of the fixed bus routes.

Figure 4-1: Existing Regional and Local Transit Routes



LEGEND

Base Layers

- Highways
- Major Roads
- City Limits

Existing Routes

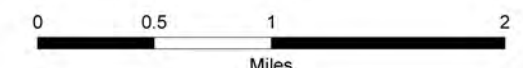
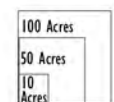
- Coaster Commuter Rail
- NCTD Local Bus - Breeze
- Coaster Commuter Station

Land Use

- Library
- Civic Uses
- Schools
- Parks and Open Space

Ridership (number of daily boardings and alightings by bus stop)

- 0 - 10
- 11 - 25
- 26 - 60
- 61 - 225



Source: City of Carlsbad, 2009; SANDAG, 2008; Dyett & Bhatia, 2009; Fehr & Peers, 2010

COASTER Commuter Rail

The COASTER is a north-south commuter rail transit service connecting San Diego with North County six days a week. Each COASTER train has a capacity exceeding 1,000 passengers and provides access to a number of regional coastal destinations including downtown San Diego, Old Town San Diego, Sorrento Valley, Solana Beach, Encinitas, and Oceanside. Systemwide, the COASTER currently serves approximately 4,700 passengers on a typical weekday, and 1,800 passengers on a typical Saturday. Weekday peak period service frequencies are approximately 30 minutes, with mid-day service frequencies of approximately 90 minutes. Carlsbad is served by two COASTER stations, one located north of Poinsettia Lane and the other located at Carlsbad Village Drive, as shown on Figure 4-1.

Each COASTER station includes parking, platform boarding areas, ticketing machines, sheltered seating, and other amenities such as shade and trash receptacles.

Poinsettia Station

The Poinsettia COASTER Station is located on Avenida Encinas, north of Poinsettia Lane. This station is predominantly surrounded by residential and open space land uses. The Poinsettia Station is served by NCTD Routes 444 and 445, and includes several bus bays. Another bus stop is located on Carlsbad Boulevard, approximately one-quarter mile walking distance. The Poinsettia Station includes approximately 320 parking spaces.

The Poinsettia Station currently serves approximately 420 COASTER passengers on a typical weekday and 95 passengers on a typical Saturday.

Carlsbad Village Station

The Carlsbad Village COASTER Station is located on State Street, north of Grand Avenue. This station is surrounded by a variety of land uses including residential, shopping centers, restaurants and bars, hotels, offices, and open space. The Carlsbad Village Station is served by NCTD Routes 101, 321 and 325, and includes six bus bays with a bus stop located immediately west of the tracks along Washington

Street. Another bus stop is located along Grand Avenue, at Roosevelt Street, within one-quarter mile walking distance. The Carlsbad Village Station includes approximately 420 parking spaces.

The Carlsbad Station currently serves approximately 510 COASTER passengers on a typical weekday and 180 passengers on a typical Saturday. With similar amenities at each station, the higher ridership at the Carlsbad Village Station is indicative of the greater accessibility of the street network, along with the density and diversity of the surrounding land uses.

Amtrak

Amtrak is a national passenger rail service, with the Pacific Surfliner traveling through Carlsbad, connecting San Diego and San Luis Obispo. The nearest Amtrak station is located in Oceanside, just north of Carlsbad.

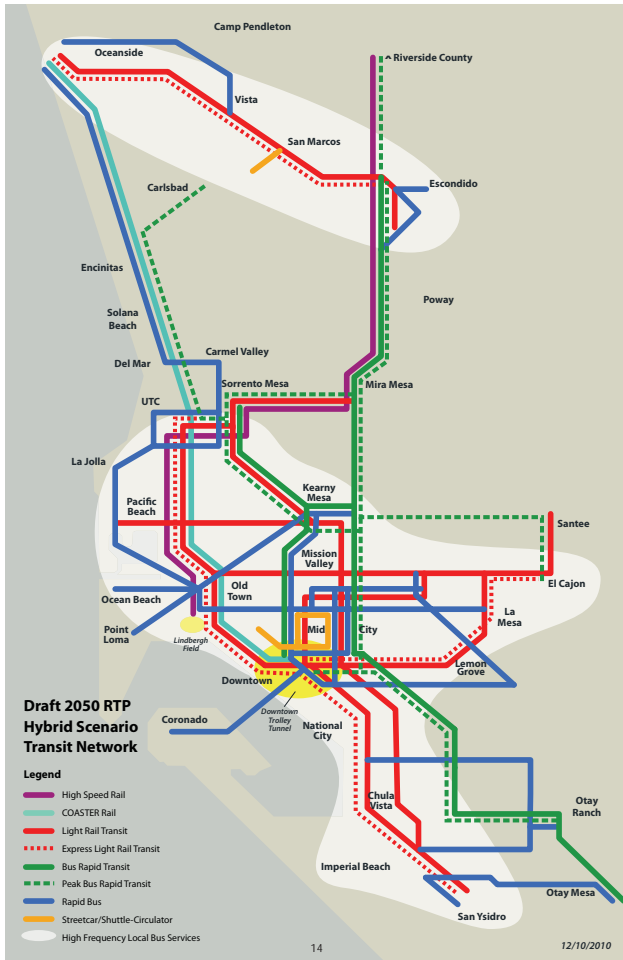
Metrolink

Metrolink is a commuter rail service operating in Orange, Los Angeles, Riverside and San Bernardino counties. The Metrolink Orange County Line has a southern terminus at the Oceanside Transit Center, thus connecting to the COASTER at its northern terminus and providing a commuter rail connection between the greater Los Angeles region and San Diego County.

Planned Public Transit Improvements

The SANDAG 2030 Regional Transportation Plan (RTP) contains information regarding a number of proposed improvements to the transit network within Carlsbad. The “reasonably expected revenue scenario” of the SANDAG 2030 RTP includes the following planned public transit improvements within Carlsbad:

- Coastal rail improvements are proposed for the tracks serving the COASTER and Surfliner trains in San Diego County along the Los Angeles to San Diego (LOSSAN) Rail Corridor. These proposed improvements include double tracking, bridge replacements, and station



SANDAG’s Draft 2050 Regional Transportation Plan Hybrid Scenario Transit Network map.

improvements. Improvements to the COASTER service (2020 and 2030) are also proposed and would increase service and reduce headways.

- Route 471 (2020) is a proposed rapid bus providing frequent service between Carlsbad and San Marcos via Palomar Airport Road. This route will operate with ten minute headways during peak and off-peak hours.

SANDAG is currently in the process of updating the RTP for a forecast year of 2050. It is anticipated that this expanded horizon year will allow for inclusion of a variety of new planned/enhanced transit services in the North County area of San Diego, such as COASTER Rail, Rapid Bus, and Peak Bus Rapid Transit.

As part of this process, the SANDAG Board of Directors recently approved the Hybrid Scenario (recommendation of the Transportation Committee) as the preferred Revenue Constrained Transportation Network Scenario for the Draft 2050 RTP. This transportation network scenario is designed to maximize transit system enhancements, integrate biking and walking elements, promote Transportation Demand Management and Transportation System Management, and meet greenhouse gas emissions reduction targets. The figure to the left displays the Draft 2050 RTP Hybrid Scenario Transit Network.

4.2 Connectivity

In order to truly provide an alternative to driving, a viable transit network should be easily accessible to patrons and provide convenient connectivity to major trip generators and attractions. Many of the major destinations within the city are currently served by the NCTD BREEZE routes. Additionally, these bus routes provide connections to regional transportation facilities such as the COASTER, the SPRINTER, and McClellan-Palomar Airport. Enhancing the efficiency and connectivity of the public transit system will help make transit more attractive to potential patrons that might otherwise use their automobiles.

System Coverage and Gaps

For the most part, existing transit services within Carlsbad are more highly concentrated in the central and northwestern areas, with a focus on the older more established residential areas, major shopping centers, and emerging employment centers. The bus routes reflect the underlying roadway network, with a denser grid of roadways and corresponding transit service in the western portions of the city. Route 101 travels between the northern and southern city limits via Carlsbad Boulevard. The COASTER stations within the city are served by BREEZE routes providing both east-west and north south connections.

Land uses east of El Camino Real and south of Palomar Airport Road are largely comprised of single-family housing with neighborhood destinations along major streets or at major intersections. While common, this development pattern typically signals densities that are generally not high enough to sustain frequent bus service. Furthermore, the ubiquity of the meandering and cul-de-sac street network in these areas does not typically lend itself to transit.

4.3 Transit Improvement Opportunities

Based on the extent of service to major destinations and the potential to connect areas with little or no transit service to other routes and major destinations, a number of opportunities exist to enhance transit coverage and connectivity within Carlsbad.

Hotel Resort Shuttles

Legoland is a theme park resort destination drawing local and regional visitors. For non-local visitors who may have hotel accommodations without a vehicle, reaching Legoland could be difficult given existing transit routes. A circulator shuttle route could be employed to connect local hotels with Legoland, providing patrons the option to forego use of their vehicle. For instance, such a route could run in a clockwise route from Legoland to hotels east near McClellan-Palomar Airport via Palomar

Airport Road, connecting with hotels along Avenida Encinas, continuing north to hotels near Cannon Road, and loop back into the theme park. Compared with existing bus routes, such a service would operate on a shorter route with fewer stops, making it a more attractive alternative.

While this shuttle route is discussed in the context of Legoland, this concept would also be applicable to other major destinations such as the airport, beach and lagoon areas, and the Carlsbad Village.

Expanded COASTER Connections

The COASTER stations are served relatively well by local bus routes. However, access via transit to the COASTER from some areas of the city, such as the southern and eastern areas where many commuters reside, is not direct or convenient. The connections to the COASTER from these areas could be enhanced by providing additional shuttle services with limited stops between the single-family communities and the COASTER stations. This service could be focused on commuters during peak hour service or run throughout the day.

Village/Barrio Enhanced Connections

The Village/Barrio area, generally bounded by Carlsbad Village Drive to the north, the ocean to the west, Tamarack Avenue to the south, and Interstate 5 to the east, contains various commercial destinations and relatively high population densities. As an older neighborhood this is one of the few areas in Carlsbad that generally has a grid street system. The area is bisected by the rail corridor that presents a significant barrier to east-west movements within this neighborhood. A pedestrian connection across the rail right-of-way, along with additional east-west transit connections, would allow for greater mobility and connectivity for the area.

Commuter Oriented Services

This concept is similar to the COASTER connections, except that instead of focusing on the COASTER stations, the focus would be on serving areas of high employment density, such as the area

surrounding McClellan-Palomar Airport, and providing connectivity with residential areas both to the east and west. The transit routes serving this area generally follow indirect routings with many stops. Service to this area could resemble a bus rapid transit (BRT) service focused around the peak commute hours. BRT is a type of bus service with frequent service, reduced stops, potentially dedicated lanes, and improved travel times through signal priority. For instance, unlike existing routes which serve multiple stops along Palomar Oaks Way and Camino Vida Roble near the airport, such a route could travel between the Poinsettia Station and the airport via Palomar Airport Road and Avenida Encinas. The planned Route 471 is an example of a similar type of bus service.

Additional community circulators focused on employees could provide accessible bus service connecting major employment, retail, and residential

centers in Carlsbad and other selected locations. All routes could serve COASTER stations and link residential areas with major employment destinations. Similar systems focused on serving area employees have been successfully funded by Business Improvement Districts (BIDs) in other communities.

Additional Parking at COASTER Stations

Complimentary parking is available at both COASTER stations in Carlsbad and utilization can often approach full capacity during peak travel times. The lack of parking can easily discourage transit ridership. Providing additional parking spaces at the COASTER stations has the potential to increase ridership by making transit more convenient and accessible to a greater number of Carlsbad residents.

TRANSPORTATION SUCCESS STORY: EMERY GO ROUND

Emeryville is one of the smallest Bay Area cities, with a land area of 1.2 square miles, located at the foot of the Bay Bridge, between Oakland and Berkeley. The city's current population is about 10,100, and there are 18,610 jobs, including headquarters of major companies such as Pixar (now part of Disney) and Novartis.

The Emery Go Round shuttle is a free shuttle service linking major shopping areas, businesses, schools, and some larger residential buildings in Emeryville with the Emeryville Amtrak station and the proximate Macarthur Bay Area Rapid Transit station (located in Oakland). Thirteen buses, including four hybrids, provide service, along seven lines. The service runs seven days a week, and ridership in 2009 was 1.3 million.

The shuttle is a private transportation service, funded solely by commercial property owners in the citywide transportation business improvement district, and is run by the non-profit Emeryville Transportation Management Association. The city's recently-adopted General Plan calls for all new development (including residential) to be part of the transportation district, with service extended to residential areas as well, which should boost ridership further. The General Plan also creates shuttle/bus only lanes along key routes during peak hours by eliminating parking lanes to speed up shuttle trips.

The full cost per passenger trip averages \$1.52. All buses are NextBus-equipped for real-time passenger information (which can be viewed in real-time at shuttle stops or on the Internet), and include amenities such as bike racks for easy inter-modal transfers.

Pedestrian, Bikeway and Transit Integration



Achieving the goal set forth in the Carlsbad mobility vision statement (“Increase travel options through enhanced walking, bicycling, and public transportation systems”) will require that the various transportation systems accommodating pedestrians, bicyclists and transit users have high levels of interconnectivity and integration. The realization of significant modal shifts away from single-occupant driving will require providing a superior quality of travel for those that chose to walk, bike, or use transit for access to key destinations. To the extent that other modes can duplicate or even exceed the comfort, ease, convenience and speed of auto travel, their viability as alternatives to the automobile will be enhanced.

The alternatives to use of the automobile depend on creating comfortable pedestrian environments at the origin and destination of all trips as incentives to walking, biking and riding transit. Better integration of pedestrian, bikeway, and transit facilities is one way to enhance the convenience of their use. Better integration involves enhancing intermodal connectivity and accessibility.

Assessing the level of intermodal integration considers such factors as the accessibility of transit stops/centers via pedestrian and bicycle facilities, the safety of such facilities, and their overall accessibility to key residential and employment locations within Carlsbad.

5.1 Bicycle and Pedestrian Access to Transit

It has been shown that a higher percentage of people are likely to use transit if they can walk to the station or bus stop, rather than getting into their cars to drive to a “park and ride” lot. Good pedestrian and bicycle access is a key parameter in measuring the accessibility of the local transit facilities. Figure 5-1 displays locations of existing and missing sidewalks, existing and proposed bicycle facilities, and the various bus stop locations falling within the top 20 percent of current ridership activity within Carlsbad.

As shown, the busiest transit stops are located along the major streets with good pedestrian connectivity via sidewalks. While missing and incomplete sidewalks are problematic, it is the lack of a well-connected underlying roadway grid network that tends to form the most significant barrier to pedestrians. Missing sidewalks tend to be more common along smaller streets often within lower density residential areas which also lack through street connectivity. Pedestrian access along major roadways is generally good with adjacent sidewalks and crossing connections provided via marked crossings at signalized intersections. Some of the potential barriers to pedestrians accessing local transit facilities include:

- Missing sidewalks near bus stops, schools and parks
- Long distances between marked pedestrian crossings discourage pedestrians who must go out of their way to utilize a marked crossing

The major transit stops in Carlsbad are generally well served by existing bicycle facilities. All but a handful of the busiest transit stops are located on roadways with existing bicycle facilities. A number of bus stop locations in the northwest area of Carlsbad are along roadways currently without bicycle facilities. Bicycle facilities, however, are proposed for several streets in this area as per the city's adopted Bicycle Master Plan, including:

- Chestnut Avenue
- Highland Drive
- Monroe Street
- Coastal Rail Trail

Bicycle storage and/or the capacity to accommodate bicycles on board transit vehicles (COASTER commuter rail and BREEZE buses) are integral to the accessibility and mobility of bicyclists who use transit. On the COASTER, bicycles may be brought on board and bicycle lockers are available at COASTER Stations. Bicycle lockers must be reserved in advance by calling RideLink at 511. COASTER cars can accommodate up to six bicycles on the lower level in each car. All BREEZE buses have a bike rack that will carry two bicycles. Bicycles are not allowed inside buses and space on all buses and trains is available on a first come, first served basis.

The availability of bicycle parking at non-residential destinations is another factor impacting the accessibility of bicyclists. Both customers and employees of non-residential uses such as parks, stores, restaurants, offices, warehouses, and hotels who utilize bicycles for transport create demand for bicycle parking facilities. The lack of available safe and secure bicycle parking spaces can discourage bicycle travel. The 2010 California Green Building Standards require all non-residential land-uses to provide short-term and long-term bicycle parking facilities.

While NCTD does allow bicycles to be brought on the BREEZE buses and the COASTER, bicycle access to transit stops would be further enhanced with provision of bicycle storage facilities at key stop locations. With the exception of COASTER

stations, adequate bicycle storage facilities are generally lacking throughout the transit system.

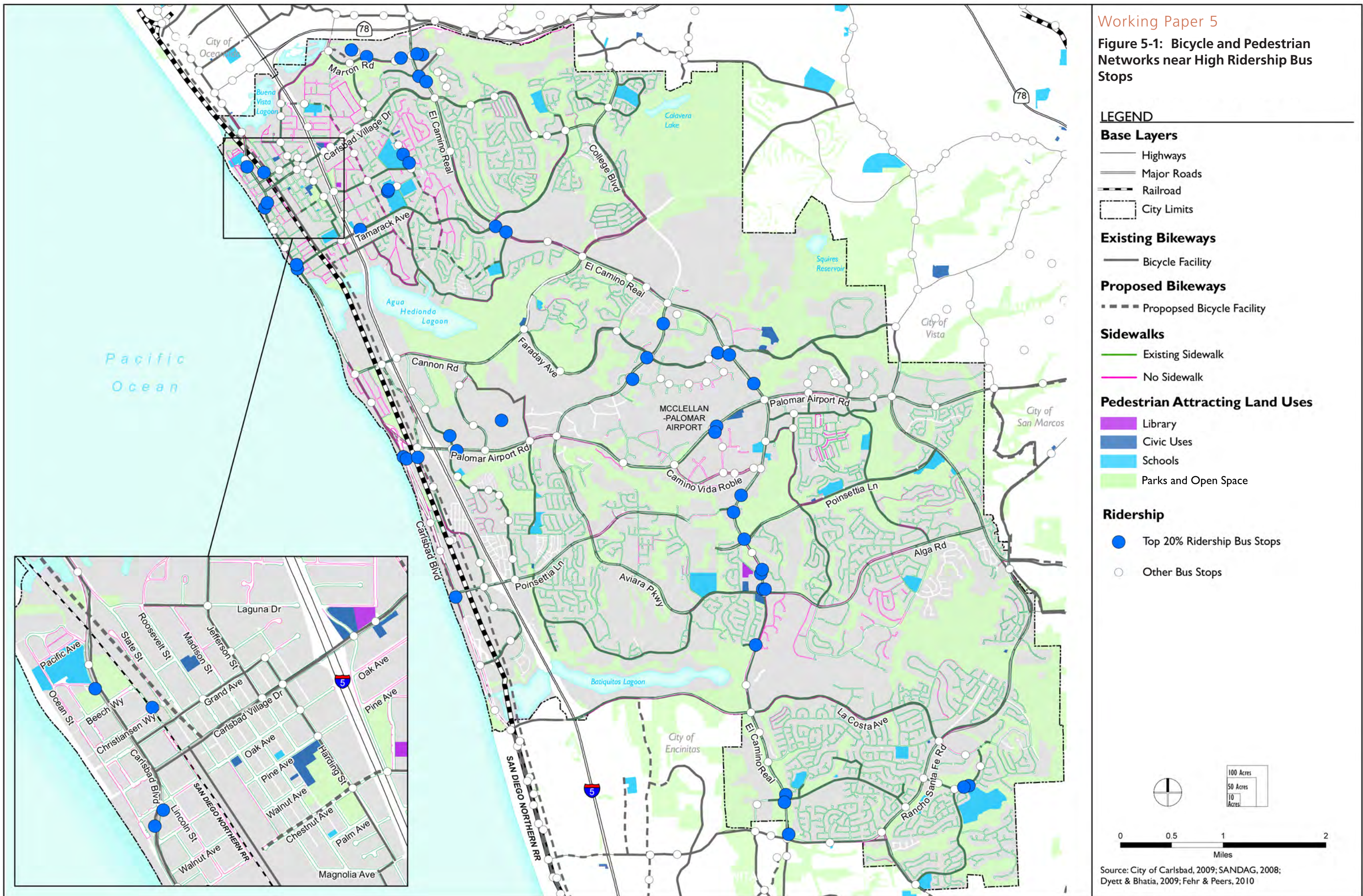
5.2 Safe Bicycle and Pedestrian Access to Transit

Perceptions that transit is unsafe or uncomfortable have often been cited as reasons for lower ridership levels. Transit system safety can be measured a number of ways. Bus stops located in areas experiencing a high incidence of bicycle or pedestrian collisions can be viewed as indicators of inadequate and unsafe access, therefore discouraging the use of transit because potential patrons do not feel safe either accessing or utilizing these facilities. Another useful measure for safety at bus-stops includes crime statistics; however, that information is not readily available.

A review of bicycle and pedestrian collisions near transit stops can help provide an indicator of transit safety in Carlsbad as well as inform recommendations for future stages of the planning process. Figure 5-2 displays existing bus stops in Carlsbad along with the number of nearby bicycle and pedestrian collisions. The larger circles indicate a higher number of bicycle or pedestrian collisions within the immediate vicinity of a bus stop. Bus stops with six or more bicycle or pedestrian collisions in the immediate vicinity were identified for further review related to safe access. It should be noted that while the collisions that are shown occurred at or near the bus-stop it is unknown if the pedestrians or bicyclists involved were transit patrons.

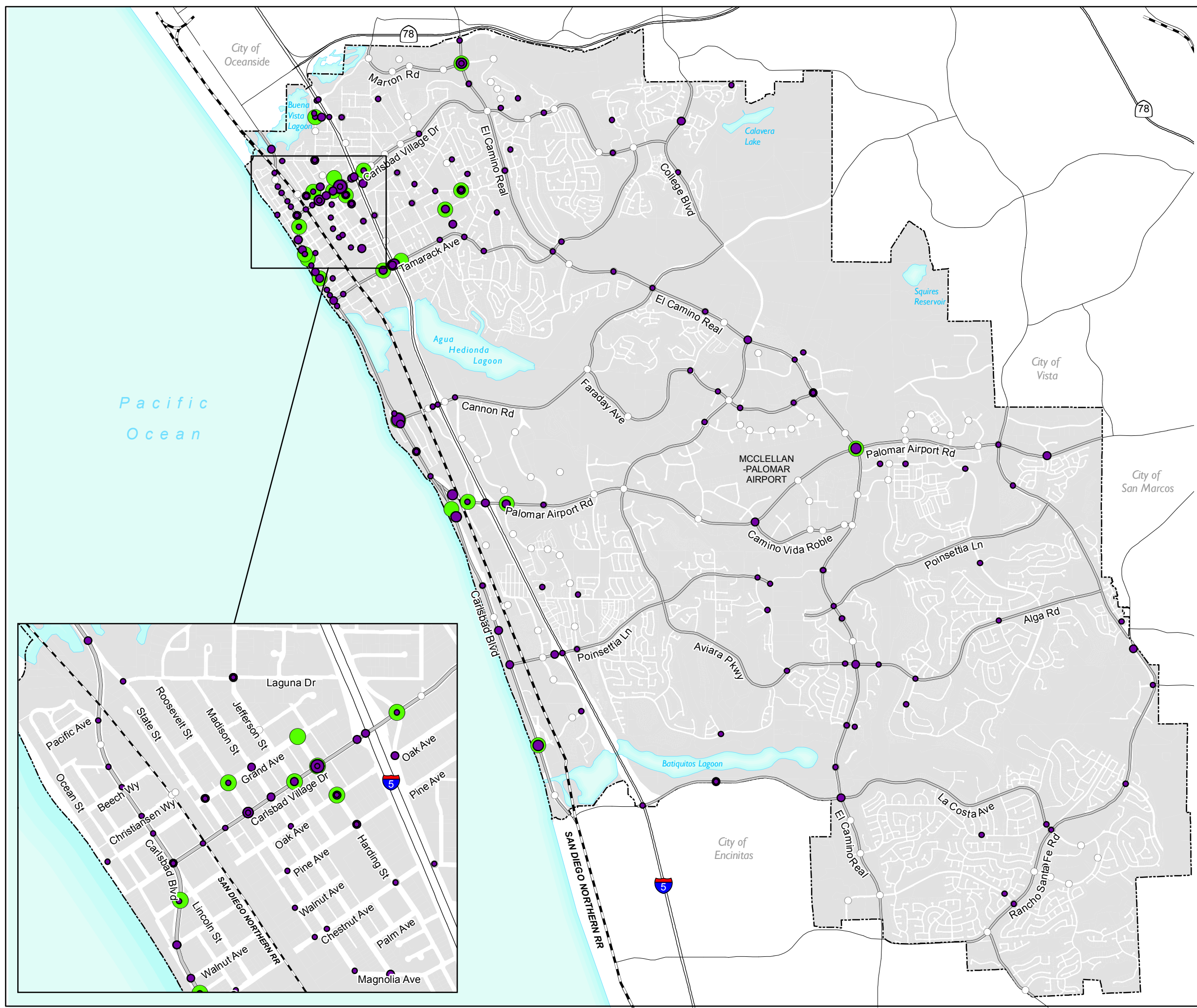
Between the years 2001 and 2007, approximately 410 total bicycle or pedestrian collisions occurred near bus stops, including stops located in the Carlsbad Village and Barrio areas, as well as along Carlsbad Boulevard, El Camino Real, and the western segments of Palomar Airport Road. A total of 20 bus stops were identified as having potential safety issues related to pedestrian and bicycle access. Fifteen of these locations are found in the northwest area of Carlsbad.

Figure 5-1: Bicycle and Pedestrian Networks near High Ridership Bus Stops



Source: City of Carlsbad, 2009; SANDAG, 2008; Dyett & Bhatia, 2009; Fehr & Peers, 2010

Figure 5-2: Bus Stops with Nearby Pedestrian or Bicycle Collisions (SWTTRS 2001-2007)



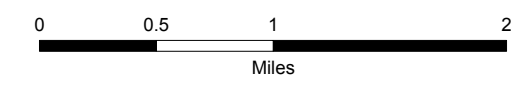
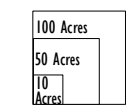
LEGEND

Base Layers

- Highways
- Major Roads
- Railroad
- City Limits

Number of Bicycle and Pedestrian Collisions

- 1
- 2 - 3
- 4 - 5
- 6 - 8
- Bus Stops with Potential Safe Access Issues



Source: City of Carlsbad, 2009; SANDAG, 2008; SWTTRS, 2002-2007; SWTTRS, 2001-2006; Dyett & Bhatia, 2009; Fehr & Peers, 2010

5.3 Linking Land Use and Multi-modal Opportunities

The previous chapters have discussed some of the more significant barriers to transit, bicycle and pedestrian connectivity, many of which are common and typically associated with suburban development patterns. As noted, transit, bicycle and pedestrian accessibility is often constrained by the lack of direct connections, long travel times and the associated costs and inconveniences. Hence, the large proportion of trips via the automobile, not only in Carlsbad, but throughout the San Diego region and Southern California.

Local access to transit, bicycle and pedestrian facilities can also be enhanced through a number of means focused on good land use design and the principles of “smart growth”. Smart growth is characterized by more compact, higher-density development in that is walkable, near transit and promotes good community design. Smart growth focuses future growth and in-fill development close to jobs, services and public facilities to maximize the use of existing infrastructure and preserve open space and natural resources. The objective is to provide more housing and transportation choices for those who live and work in these areas. At the regional level, SANDAG is promoting the concept

of smart growth as a means of reducing automobile dependence, promoting the use of alternative travel modes, and reducing greenhouse gas emissions. Within Carlsbad, SANDAG has identified four Smart Growth Opportunity Areas including:

- Plaza Camino Real at State Route 78 (SR 78) and El Camino Real;
- Quarry Creek Area at Marron Road, west of College Blvd and south of SR 78;
- Carlsbad Village COASTER Station, including Village Redevelopment and Barrio areas at Grand Avenue and State Street; and
- Ponto Beachfront at Avenida Encinas and Ponto Drive at Carlsbad Boulevard.

Linking land use and multi-modal opportunities through well planned transportation systems can improve personal mobility and accessibility while encouraging healthy physical activity and providing high levels of safety, comfort and convenience. Concepts such as context sensitive design, complete streets, multi-modal level of service goals, and interconnected pedestrian and bicycle systems will be key components of alternative circulation scenarios to be evaluated in subsequent phases of the General Plan update process.

TRANSPORTATION SUCCESS STORY: SANDAG AWARDS LOCAL COMPANIES FOR THEIR TRANSPORTATION DEMAND MANAGEMENT PROGRAMS

The San Diego Association of Governments iCommute Program awards local firms for their outstanding contributions to relieving traffic congestion, reducing greenhouse gas emissions, and improving mobility in the San Diego region. Recent winners of SANDAG's Diamond Award include Genentech, San Diego Naval, and SAIC.

Genentech

Genentech is a biotechnology and pharmaceutical company with 484 employees based in Oceanside. Started in 2005, the company's commuter program currently includes 18 percent of the staff, with 10 percent of those using transit. Genentech provides a \$115 monthly commuter assistance subsidy to employees who take transit. The company also provides a free shuttle service from the College Boulevard Transit Station and Oceanside Transit Center to the Genentech campus. Genentech has created its own customized online commuter tool called gRide. This tool provides ridematching and a commute calendar. The calendar calculates employees' carbon dioxide emissions, vehicle miles traveled, and money and fuel savings. Employees can even update their commute calendar with an iPhone application.

In 2009, at the Genentech Oceanside office alone, employees:

- Eliminated 6,162 cars from the road
- Reduced vehicle miles traveled by 336,698
- Saved 12,987 gallons of gas and \$100,229 on car maintenance
- Reduced 251,955 lbs. of CO₂

Naval Base San Diego

Naval Base San Diego has the largest Department of Defense Transportation Incentive Program/Rideshare Program on the West Coast, with 2,300 employees participating. This innovative program is specifically designed for active duty military personnel and permanent full-time Department of Defense civilian employees. Participants receive their transit subsidy as a fringe benefit, up to \$230 per month. The Navy pays for the costs directly so the money is not included in taxable wages and compensation, putting more savings in the pockets of commuters. Naval Base San Diego maintains two Web sites dedicated to its Transportation Incentive Program's benefits and enrollment.

SAIC

Science Applications International Corporation (SAIC) originally launched a commuter program to address a parking deficit, and now offers financial incentives, free shuttles from main transportation hubs around the region to office locations, and on-site facilities like showers, bike lockers, and bike racks. Marketing tactics used include the Web, hosting events, and sponsorships. The Web site includes dedicated transportation pages featuring information on construction projects in the area, explanations of the commuter incentives offered, and links to various tools (such as a map of bike routes). SAIC also participates in regional events, such as sponsoring a pit stop on Bike to Work Day. In 2009, SAIC hosted an iCommute Rideshare Week fair and employer forum on its campus. Started in 1998, the SAIC commuter program—benefiting from continuous marketing efforts—now has more than 200 staff members participating.

6 Traffic Circulation



The majority of trips in Carlsbad are made by automobile. The conditions and operations on the roadway network affect the community's quality of life, as well as residents' ability to carry out day-to-day activities. As discussed in the previous chapter, stakeholder input signals a desire to reduce dependence on the automobile by promoting and utilizing alternative travel modes. While efforts are underway to balance use of the various transportation modes, the City of Carlsbad seeks to maintain an efficient roadway system for its residents.

6.1 Roadway System

The roadway network within Carlsbad is classified in the adopted Circulation Element by facility type into freeways, prime arterials, major arterials, secondary arterials and a network of collector and local streets. Figure 6-1 shows the classification of major roadways within the city.

Freeways

Freeway facilities are high-volume/high-speed roadways with access occurring only at grade-separated interchanges. Interstate 5 extends along a north-south alignment through the city and continuing through North County and Orange County. South of the city, Interstate 5 provides access to San Diego and the South Bay, reaching the Mexican border at the southern edge of San Diego County.

Interstate 5 currently includes eight travel lanes. Within Carlsbad there are six interchange locations with freeway on- and off-ramps. High occupancy vehicle (HOV) lanes, which are exclusively for vehicles with more than one occupant,

while recently implemented further to the south, are not currently provided on Interstate 5 through Carlsbad.

Caltrans is proposing to widen and add lanes in both directions on Interstate 5 as part of the North Coast Interstate 5 Improvement Project, including a direct access ramp at the Cannon Road interchange to the new managed HOV lanes. This project is discussed in greater detail under planned improvements.

Prime Arterials

Carlsbad contains a network of prime arterials traveling both north-south and east-west. These prime arterials generally have six travel lanes and are designed to carry very high volumes of traffic while providing access to adjacent properties when alternatives for access are unavailable. The prime arterials within the city include Palomar Airport Road, El Camino Real, Melrose Drive, Rancho Santa Fe Road and Olivenhain Road. A brief description of each of these key roadways is provided below:

- Palomar Airport Road is generally a six-lane east-west arterial with a raised median and bike lanes. Parking is prohibited and the posted speed limit is 55 miles per hour.
- El Camino Real is generally a six-lane north-south arterial with a raised median and bike lanes. Parking is prohibited and the posted speed limit is 55 miles per hour.
- Melrose Drive is generally a six-lane north-south arterial with a raised median and bike lanes. Parking is prohibited and the posted speed limit is 55 miles per hour.

- Rancho Santa Fe Road is generally a six-lane north-south arterial with a raised median and bike lanes. Parking is prohibited and the posted speed limit is 50 miles per hour.
- Olivenhain Road is generally a five-lane east-west arterial with painted and raised medians, and bike lanes. Parking is prohibited and the posted speed limit is 50 miles per hour.

Major Arterials

Major arterials are generally four-lane roadways that supplement the prime arterials. These roadways are designed to carry moderate to heavy traffic while also providing access to adjacent properties when alternatives are unavailable. Some of the major arterials in Carlsbad include Carlsbad Boulevard, Cannon Road, Poinsettia Lane, Alga Road, Camino Junipero and College Boulevard. Portions of Carlsbad Village Drive and La Costa Avenue are also classified as major arterials.

Secondary Arterials

Secondary arterials are generally two to four-lane roadways that supplement the prime and major arterials. These roadways are designed to carry moderate levels of traffic while also providing access to adjacent properties. Some of the secondary arterials in the city include Marron Road, Paseo Del Norte, Avenida Encinas, Aviara Parkway, Alicante Road, El Fuerte Street, Camino De Los Coches and Calle Barcelona. Portions of Carlsbad Village Drive, Faraday Avenue, Tamarack Avenue and La Costa Avenue are also classified as secondary arterials.

Collector Streets

Collector streets provide connections between the arterial system and local streets that generally provide direct access to adjacent properties. Examples of collector streets include portions of Tamarack and Faraday avenues.

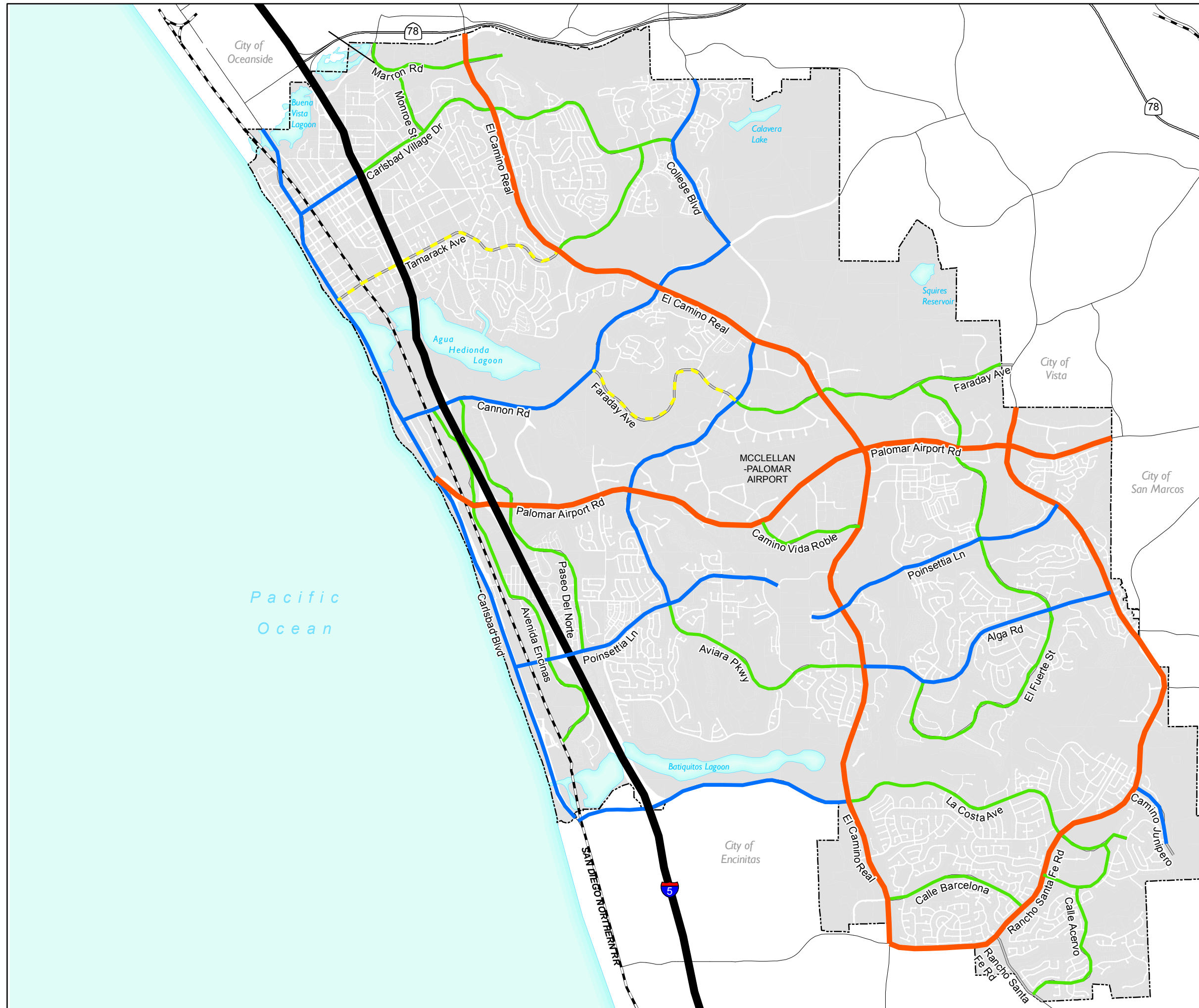
Compatibility of Roadway Classification, Design and Operation

The roadway classification system is intended to help ensure that vehicular operations on streets reflect the surrounding land uses and built environment. For example, arterials are wide, provide multiple lanes, carry high traffic volumes, and typically offer limited access to adjacent properties. Collectors on the other hand, are narrower, generally provide one lane in each direction, carry lower traffic volumes, and offer a significant degree of access to adjacent properties. Carlsbad may consider implementing changes to roadway design or reclassifying streets where street classifications and vehicular operations do not align. A location that may exemplify this situation is La Costa Avenue, classified a major arterial roadway, but where on-street parking is allowed and the predominant land use is single-family homes whose driveways access the avenue directly. Whether on La Costa Avenue or elsewhere, the incongruity of the street classification, traffic operations and the built environment may merit consideration of roadway reclassifications, narrowing of the paved right-of-way and associated traffic calming strategies.

Complete Streets

Assembly Bill 1358 is known as the California Complete Streets Act of 2008 and requires cities and counties to include complete streets policies as part of their general plans so that roadways are designed to safely accommodate all users, including bicyclists, pedestrians, transit riders, and the disabled, of all ages. A complementary Caltrans policy, updated in 2008, Deputy Directive 64 (DD 64) calls for the accommodation of non-motorized travel by integrating the transportation system with the goal of creating complete streets. A “Complete Street” is a transportation facility that is planned, designed, operated, and maintained to provide safe mobility for all users including bicyclists, pedestrians, transit riders, and motorists as appropriate for the function and context of the facility. For example, La Costa Avenue, Palomar Airport Road and Carlsbad Village Drive have different street classifications, accommodate different land uses, are intended to

Figure 6-1: Existing Road Classifications



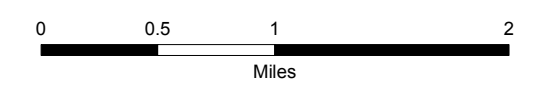
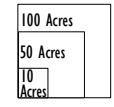
LEGEND

Base Layers

- Railroad
- City Limits

Road Classifications

- Freeway
- Prime Arterial
- Major Arterial
- Secondary Arterial
- Collector



Source: City of Carlsbad, 2009; SANDAG, 2008; Dyett & Bhatia, 2009; Fehr & Peers, 2010

serve different numbers of vehicles and speeds, and should be designed accordingly.

In some instances it may be appropriate to make accommodations for other users to balance the use of existing roadways given the context of each facility. For example, the design and operation of Carlsbad Village Drive might include more accommodations for pedestrians and an implicit acceptance of reduced vehicular mobility in favor of pedestrian and bicycle mobility. On the other hand, Palomar Airport Road would continue to serve as a major vehicular thoroughfare and prioritize vehicular mobility, with basic pedestrian and bicycle accommodations.

Traffic Calming

The Institute of Transportation Engineers defines traffic calming as a combination of mainly physical measures that reduce the negative effects of motor vehicle use, alter driver behavior, and improve conditions for non-motorized users. At locations where speeds or volumes are not consistent with the prevalence of pedestrian and bicycle activity or surrounding land uses, traffic calming can improve safety and livability. In 2001, Carlsbad adopted a Residential Traffic Management Program to address areas in which communities are adversely affected by high speeds and volumes. This program also sets forth the mechanisms in which communities may request the analysis and implementation of traffic management features, and evaluation of their effectiveness. Examples of traffic calming features in Carlsbad's traffic calming toolbox include:

- Enforcement
- Radar Trailers
- Narrowing Lanes
- Bulbouts
- Turn Restrictions
- Signage

6.2 Planned Roadway Improvements

Planned improvements to the city's roadway network were identified from a variety of sources, including:

- Circulation Element (City of Carlsbad, 2004)
- Capital Improvement Program (CIP) (City of Carlsbad, 2010)
- 2030 Regional Transportation Plan (RTP) (San Diego Association of Governments, 2003)

Future Circulation Element Improvements

The City of Carlsbad's currently adopted General Plan Circulation Element governs the city's circulation plans and policies and sets forth standards and a vision for the operation and composition of the roadway network. Based on the street classifications discussed previously, the Circulation Element identifies the classification of future roadway segments as necessary to support planned land uses and associated travel demands. The Circulation Element includes completion of the city's roadway network, with inclusion of the following new or improved roadway segments:

- **Cannon Road.** Cannon Road is an existing east-west major arterial running between Carlsbad Boulevard and College Boulevard, with an unconstructed segment east of College Boulevard. The Circulation Element proposes constructing and extending this major arterial to the eastern city limit.
- **College Boulevard.** College Boulevard is an existing north-south major arterial running between the northern city limit and Palomar Airport Road, with an unconstructed segment between Cannon Road and El Camino Real. The Circulation Element proposes constructing the segment of College Boulevard between Cannon Road and El Camino Real.
- **Poinsettia Lane.** Poinsettia Lane is an existing east-west major arterial running between Carlsbad Boulevard and Melrose Drive, with an

unconstructed segment west of El Camino Real. Additionally, the segment of Poinsettia Lane between Aviara Parkway and Black Rail Road is not constructed to its ultimate configuration. The Circulation Element proposes constructing the missing segment of Poinsettia Lane, west of El Camino Real.

- **Camino Junipero.** Camino Junipero is an existing east-west major arterial beginning at Rancho Santa Fe Road and nearly reaching the eastern city limit. The Circulation Element proposes constructing the remainder of this major arterial to the eastern city limit.
- **Marron Road.** Marron Road is an existing east-west secondary arterial running between Jefferson Street and Avenida De Anita, with an unconstructed segment between Avenida De Anita and the eastern city limit. The Circulation Element proposes constructing and extending this secondary arterial to the eastern city limit.

CIP Improvements

The City of Carlsbad's CIP identifies improvements and funding sources for programmed improvements within Carlsbad based on regular evaluation of needs and funding. The CIP includes a number of projects that increase capacity, improve operations, and enhance the transportation network such as the addition of turn lanes, streetscape improvements, repair work, traffic calming, sidewalk construction and signal upgrades or installation. Some of the more significant proposals such as road widening or extensions are discussed below (improvements in common with the Circulation Element are mentioned above; projects currently underway and/or substantially complete are not listed below):

- **Avenida Encinas.** Widen Avenida Encinas to full secondary arterial standards from Palomar Airport Road to just south of Embarcadero Lane.
- **Carlsbad Boulevard.** Widen Carlsbad Boulevard from two lanes to four lanes with a center raised median between Cannon Road and Manzano Drive, and widen Carlsbad Boulevard

to a modified Major Arterial roadway from Mountain View Drive to northerly city limits.

- **Carlsbad Village Drive.** Widen Carlsbad Village Drive in each direction between Pontiac Drive and Victoria Street.
- **El Camino Real.** Widen various segments of El Camino Real including: Cassia Road to Camino Vida Roble, Arenal Road to La Costa Avenue, Lisa Street to Crestview Drive and Tamarack Avenue to Chestnut Avenue.
- **Poinsettia Lane.** Widen Poinsettia Lane from Paseo Del Norte to Batiquitos Lane.

SANDAG 2030 RTP Roadway Improvements

As the Metropolitan Planning Organization (MPO), SANDAG prepares the Regional Transportation Plan (RTP), which identifies planned improvements for the regional transportation network. In addition to the improvements noted previously, the “reasonably expected revenue scenario” of the SANDAG 2030 RTP includes the following planned regional roadway improvement within Carlsbad:

- **Interstate 5 North Coast Corridor Project.** Interstate 5 is an eight-lane freeway through the City of Carlsbad. The proposed project improvements include one or two high-occupancy vehicle managed lanes in each direction, auxiliary lanes where needed, and possibly one additional general purpose lane in each direction. In addition to the freeway improvements, the project includes double tracking of existing rail lines, bridge improvements, and increases in the COASTER commuter rail service. The HOV managed lanes would be available to carpools, vanpools, and buses at no charge, and available to single-occupant vehicles for a fee when there is excess capacity. A Direct Access Ramp (DAR) is proposed at Cannon Road that would provide access to the proposed HOV managed lanes. A range of project alternatives developed and under consideration include various combinations of HOV managed lanes, general purpose lanes, and the option of barriers or

buffers between the general-purpose and HOV managed lanes, described as 10 + 4 with Barrier Alternative, 10 + 4 with Buffer Alternative, 8 + 4 with Barrier Alternative, 8 + 4 with Buffer Alternative, and the no build option.

This section discusses methodologies utilized by the City of Carlsbad for analyzing roadway and intersection operations, as well as the city’s LOS standards.

6.3 Performance and Operations

Level of Service Methodology and Standards

Level of Service (LOS) is a qualitative measure used to describe the condition of traffic flow ranging from excellent conditions at LOS A to overload conditions at LOS F. Table 6.1 displays general LOS definitions and ranges for roadways and intersections.

Intersections

For analysis of signalized intersections in future scenarios, the City of Carlsbad utilizes the operational analysis procedure as outlined in the 2000 Highway Capacity Manual (HCM), Transportation Research Board Special Report 209. The HCM methodology defines Level of Service in terms of delay, or more specifically, average stopped delay per vehicle. Delay is a measure of driver and/or passenger discomfort, frustration, fuel consumption and lost travel time.

TABLE 6-1: LEVEL OF SERVICE DEFINITIONS		
LOS	VOLUME/CAPACITY	DEFINITION
A	0 – 0.6	Describes primarily free-flow conditions at average travel speeds, usually about 90percent of the free-flow speed. Vehicles are completely unimpeded in their ability to maneuver within the traffic stream. Control delay at intersections is minimal.
B	0.6 – 0.7	Describes reasonably unimpeded operations at average travel speeds, usually about 70percent of free-flow speed. The ability to maneuver within the traffic stream is only slightly restricted, and control delays at intersections are not significant.
C	0.7 – 0.8	Describes stable operation; however, ability to maneuver and change lanes in mid-block locations may be more restricted than at LOS B, and longer queues, adverse signal coordination, or both may contribute to lower average travel speeds of about 50percent of free-flow speed.
D	0.8 – 0.9	Borders on a range in which small increases in flow may cause substantial increases in delay and decreases in travel speed. LOS D may be due to adverse signal progression, inappropriate signal timing, high volumes or a combination of these factors. Average travel speeds are about 40percent of free-flow speed.
E	0.9 – 1	Characterized by significant delays and average travel speeds of 33percent or less of free-flow speed. Such operations are caused by a combination of adverse progression, high signal density, high volumes, extensive delays at critical intersections, and inappropriate signal timing.
F	> 1	Characterized by urban street flow at extremely low speeds, typically one-third to one-fourth of the free-flow speed. Intersection congestion is likely at critical signalized locations, with high delays, high volumes, and extensive queuing.

Source: Chapter 10, Transportation Research Board, National Research Council “Highway Capacity Manual, 2000”

For analysis of current or existing scenarios, Carlsbad utilizes the Intersection Capacity Utilization (ICU) methodology. The ICU value is determined by summing the volume-to-capacity (V/C) ratio of the critical movements, plus a factor for yellow signal time.

Unsignalized intersections, including two-way and all-way stop controlled intersections are analyzed using the 2000 Highway Capacity Manual (Section 10) unsignalized intersection analysis methodology. The Level of Service for a two-way stop controlled intersection is determined by the computed control delay and is defined for each minor movement.

In Carlsbad the acceptable LOS for intersections is C for non-peak hours and D for peak hours.

The City of Carlsbad's Growth Management Plan includes an Annual Traffic Monitoring Program that included counts of A.M. and P.M. peak period counts at 67 intersections on a yearly basis, as well as documenting roadway performance in terms of intersection Level of Service results.⁵ All of the 67 analyzed intersections are currently operating at LOS D or better during the A.M. and P.M. peak hours.

Traffic Signal Operation/Coordination

All of the traffic signals in Carlsbad are traffic actuated controls (TAC): a control process that allows variable sequences and durations of signal displays depending on vehicle and pedestrian traffic demands. Approaching vehicles are detected by either loop detectors or video cameras and this information is used to determine how the traffic signal cycles through its phases. This is in contrast to non-actuated (or pre-timed) operation, which is based on a set time-of-day plan and does not utilize approaching vehicles as real-time data.

As traffic volumes on arterial streets increases, signal coordination may be used to offset the negative effects of congestion and delay and maximize traffic flow. Signal coordination

considers a group of signals along a corridor as a system and implements a coordinated timing plan for that system. The traffic signals in the system work together to allow traffic on the arterial to flow with increased efficiency. This improves travel time for the majority of drivers on the arterial but may come at the expense of increasing side street delay.

Currently, Palomar Airport Road, El Camino Real, Rancho Santa Fe Road, Cannon Road and Carlsbad Village Drive are operating under time-based coordination plans. Coordination plans are based on extensive traffic studies and periodically monitored to maintain optimum traffic efficiency.

The city's Traffic Division is currently evaluating the need to tie the city's traffic signal system into a communication network that will allow real-time monitoring of traffic signal system. Such a system would allow staff to implement real-time adjustments to traffic signal timing plans to account for incidents and daily changes to traffic patterns.

Roadway Segments

Roadway segment LOS standards and thresholds provide the basis for analysis of arterial roadway segment performance. In Carlsbad, the analysis of roadway segment LOS is based on the functional classification of the roadway, the maximum capacity, roadway geometrics, and existing or forecast Average Daily Traffic (ADT) volumes. The City of Carlsbad considers acceptable level of service for roadway segments as LOS C for non-peak hours and D for peak hours.

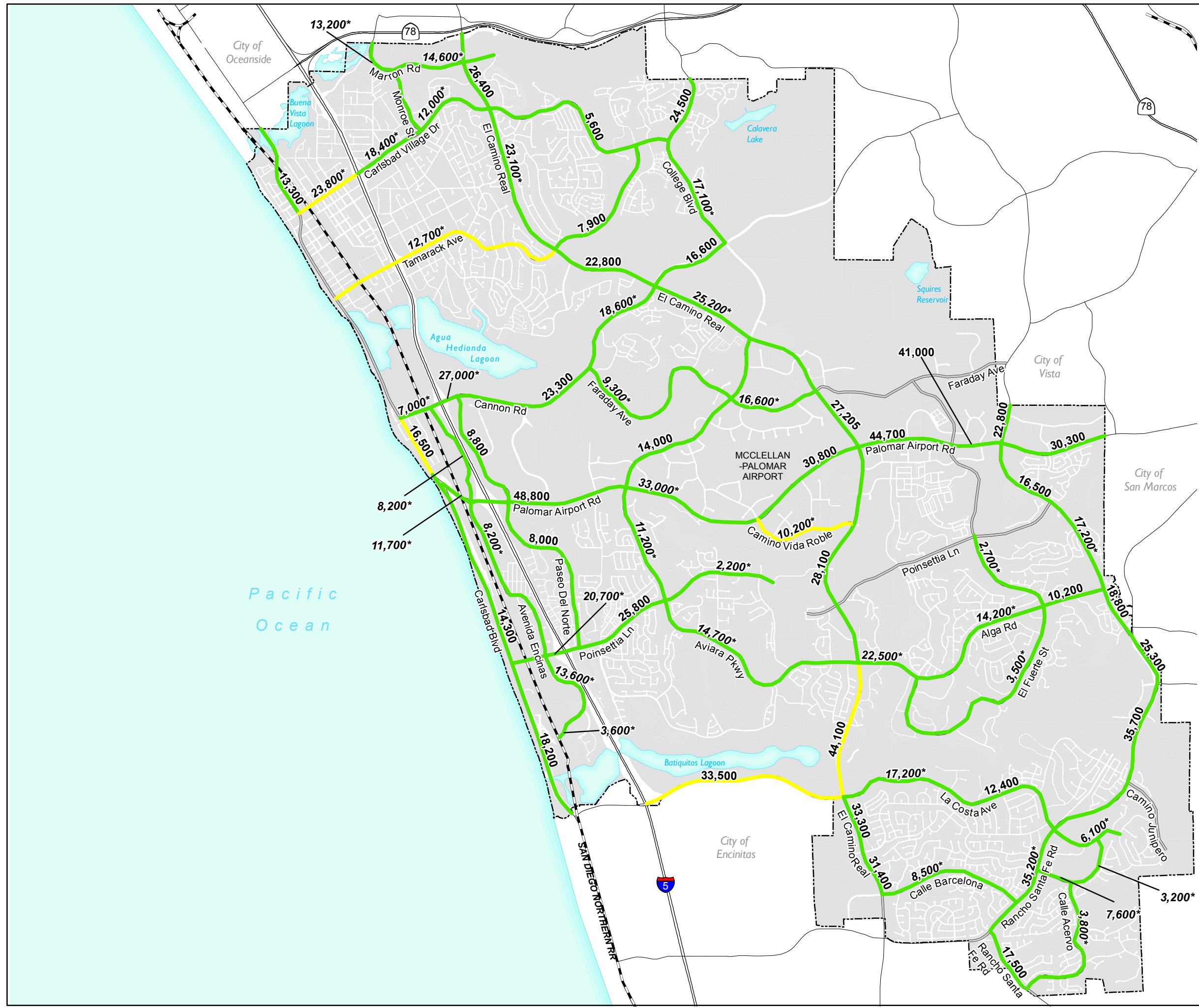
The City of Carlsbad's Growth Management Plan includes an Annual Traffic Monitoring Program that includes counts at 34 roadway segments on a yearly basis. All of the 34 roadway segments are currently operating at acceptable LOS D or better.⁶

In addition to the City's roadway segment counts, additional existing roadway volumes were obtained from the SANDAG Series 11 base year transportation model and utilized to derive a more complete understanding of current roadway LOS within

⁵ 2009 Traffic Monitoring Program, City of Carlsbad, 2009, www.carlsbadca.gov/services/traffic/operations/Documents/TMPSummaryReport.pdf

⁶ *Ibid.*

Figure 6-2: Existing Daily Roadway Volume and Level of Service



LEGEND

Base Layers

- Highways
- Major Roads
- Railroad
- City Limits

Level of Service (LOS)

- A-C
- D

X,XXX Average Daily Traffic Count, City of Carlsbad Count Monitoring Program

X,XXX* Average Daily Traffic Count, SANDAG Series II Base Year Traffic Forecast

100 Acres
50 Acres
10 Acres

0 0.5 1 2
Miles

Source: City of Carlsbad, 2009; SANDAG, 2008; Dyett & Bhatia, 2009; Fehr & Peers, 2010

Carlsbad. Figure 6-2 displays the daily roadway volumes and LOS results for existing conditions within Carlsbad. As shown, similar to previous findings, the results indicate that all the classified roadway segments throughout the city are currently operating at an acceptable LOS.

Truck Routes

Truck traffic in Carlsbad primarily consists of through traffic on Interstate 5 and vehicles originating from or destined to the industrial and commercial uses surrounding McClellan-Palomar Airport and other commercial entities in Carlsbad. Historically, Palomar Airport Road and El Camino Real, which provide access to the airport and surrounding area, have been the primary east-west and north-south truck routes within Carlsbad.

Section 10.32.091 of the Carlsbad Municipal Code enumerates the designated and established truck routes in Carlsbad as depicted in Figure 6-3 and listed below:

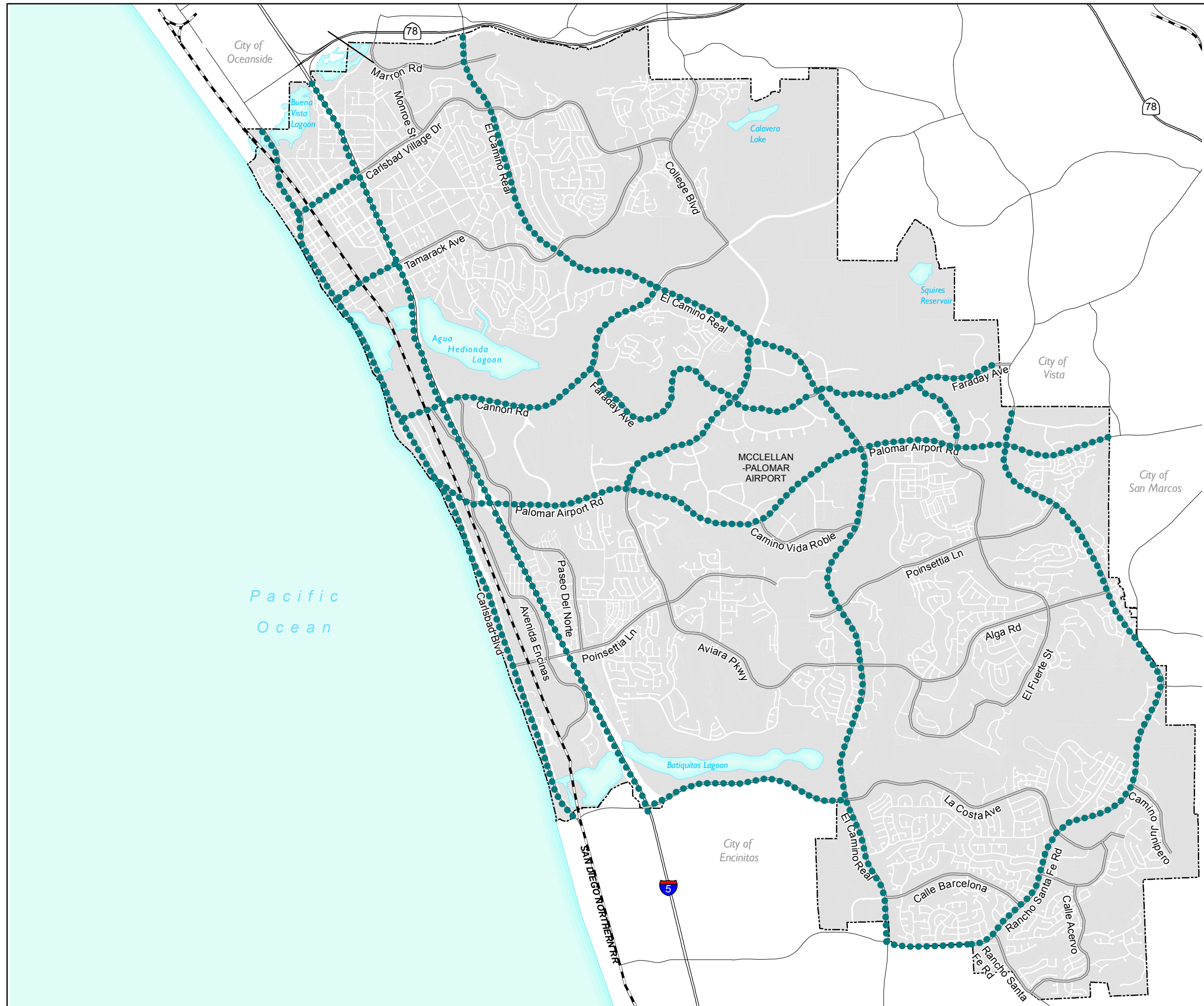
- **Interstate 5 Freeway**, between the northerly city limits and the southerly city limits;
- **Carlsbad Boulevard**, between the northerly city limits and the southerly city limits;
- **Carlsbad Village Drive**, between Carlsbad Boulevard and Interstate 5 Freeway;

- **Tamarack Avenue**, between Carlsbad Boulevard and Interstate 5 Freeway;
- **Cannon Road**, between Carlsbad Boulevard and El Camino Real;
- **Palomar Airport Road**, between Carlsbad Boulevard and the easterly city limits;
- **El Camino Real**, between the northerly city limits and the southerly city limits;
- **La Costa Avenue**, between the westerly city limits and El Camino Real;
- **Rancho Santa Fe Road**, between the southerly city limits and the northerly city limits;
- **Olivenhain Road**, between the westerly city limits and Rancho Santa Fe Road;
- **Melrose Drive**, between Palomar Airport Road and the northerly city limits;
- **Faraday Avenue**, between Cannon Road and the easterly city limits;
- **College Boulevard**, between Palomar Airport Road and El Camino Real; and
- **El Fuerte Street**, between Palomar Airport Road and Faraday Avenue.

The designated truck routes provide access from Interstate 5 to commercial areas, the Village, the McClellan-Palomar Airport and points beyond the city limits.

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Figure 6-3: Existing Regional and Local Transit Routes



LEGEND

- Truck Routes
- Highways
- Major Roads
- Railroad
- - - City Limits

0 0.5 1 2
Miles

100 Acres
50 Acres
10 Acres

Source: City of Carlsbad, 2009; Dyett & Bhatia, 2009; Fehr & Peers, 2010

McClellan-Palomar Airport



7.1 Facility Overview

The McClellan-Palomar Airport is located within the City of Carlsbad, off of Palomar Airport Road, approximately five miles southeast of the Carlsbad Village. Opened in 1959, the airport is owned and operated by the County of San Diego. It occupies about 466 acres of land, with about half the site separated from the airport itself by Palomar Airport Road and El Camino Real. The airport has one runway, Runway 6-24, which is 4,900 feet long by 150 feet wide. There is a parallel taxiway equal to the full length of the runway.

The Federal Aviation Administration (FAA) classifies the airport as a general utility facility, an airport mainly serving smaller aircraft with a maximum takeoff weight of 12,000 pounds or less. However, some aircraft larger than 12,500 pounds, but less than 60,000, do operate at the airport. McClellan-Palomar Airport is the only airport with an instrument landing system between Lindbergh Field and Santa Ana that can accommodate the majority of the business aircraft fleet of over 12,500 pounds. United Airlines operates service to Los Angeles from Carlsbad. Medevac and transient helicopters also operate at the heliport/helipad located east of the runway.

In 2008, the Airport served a total of 193,307 aircraft operations. The total number of aircraft operations is forecast to increase to 220,871 by 2025.⁷

McClellan-Palomar Airport recently completed a number of major improvements, among them renovation of the runway, a new 18,000-square

foot, state-of-the-art green terminal with new high-tech passenger and baggage screening areas, a spacious lobby and boarding lounge, and convenient passenger access via a new elevator and walkway from three new parking lots. A new restaurant called “The Landing” has also opened at the Airport.

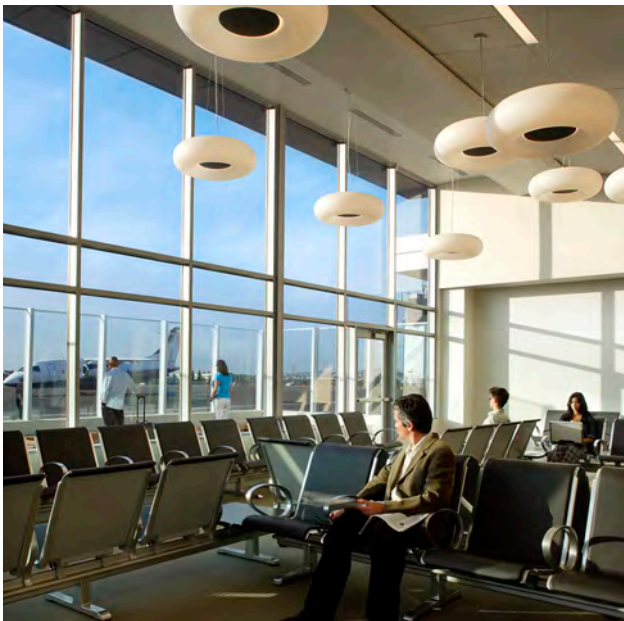
The Carlsbad Municipal Code requires voter approval for expansion of McClellan-Palomar Airport, given the potential for local impacts associated with increased aircraft and ancillary services. Expansion of the airport would generate additional traffic and further studies would be required to determine the extent of potential traffic impacts.

7.2 Airport Access

Access to the McClellan-Palomar Airport is provided via a single entry/exit driveway off of Palomar Airport Road via the signalized Aircraft Road/Yarrow Drive intersection. Secondary access to the long-term parking lots is also provided from Camino Vida Roble via Owens Avenue. The Airport area is also served by three NCTD bus routes (Routes 309, 321, and 445), via bus stops located along Palomar Airport Road, just north of the Aircraft Road/Yarrow Drive intersection. Figure 7-1 displays the location of the airport and key access points via the roadway network and the bus transit system.

A future rapid bus route (Route 471) along Palomar Airport Road with service to McClellan-Palomar Airport has been proposed as part of the SANDAG RTP.

⁷ 2009 Final Technical Report: Economic Vitality Analysis Study for McClellan-Palomar Airport



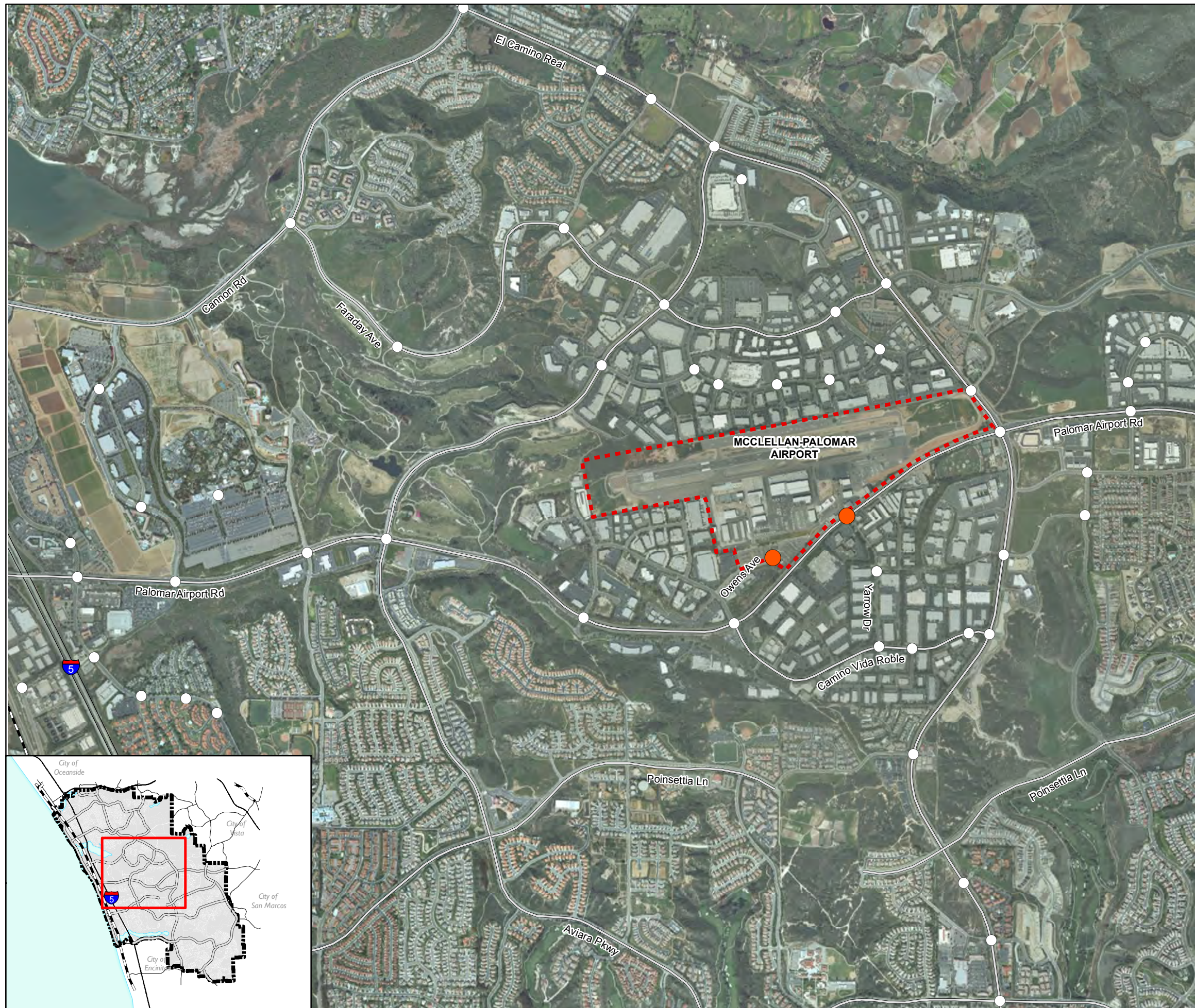
McClellan-Palomar Airport is a public use airport located in the center of Carlsbad. Changes in airport services and connectivity could have complex interactions with the local transportation system.

Senate Bill 10, authored by Senator Christine Kehoe and passed in 2007, mandates that the San Diego County Regional Airport Authority, in collaboration with SANDAG, prepare a Regional Aviation Strategic Plan (RASP) to evaluate ways to optimize the public use airports in the region. SB 10 also requires the development of an Airport Multimodal Accessibility Plan (AMAP), an effort led by SANDAG and coordinated with the Airport Authority. Where the RASP will identify the airport infrastructure needed to meet future aviation demand, the AMAP will identify surface transportation infrastructure needs associated with future airport expansion. Most relevant locally, enhanced commercial passenger service is under evaluation in the RASP for McClellan-Palomar Airport, and potential related AMAP recommendations include a new transit center with access from Palomar Airport Road, with associated arterial street improvements.

Working closely with the airport operators in the region, the RASP process identified 15 alternative scenarios to benefit and optimize the region's aviation system. To evaluate the alternative scenarios, the RASP team developed an econometric demand model, which took into consideration a number of factors and their complex interactions, including price of air service and the time required to reach airports associated with each scenario. The model estimated the effect each scenario would have on overall aviation capacity and passenger demand in the region.

As work on the RASP nears completion, the RASP team is preparing a Draft Report documenting the key findings. The report will be available on www.sdrasp.com, and will be presented to the Airport Authority Board in 2011. When complete, the RASP findings will be provided to SANDAG for incorporation into the Airport Multimodal Accessibility Plan, and the 2011 update of the Regional Transportation Plan.

Figure 7-1: Airport Access



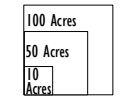
LEGEND

Base Layers

- Highways
- Major Roads
- Railroad
- City Limits

Airport Access

- Points of Airport Access via Roadway Network
- Bus Stops
- Airport Boundary



Source: City of Carlsbad, 2009; SANDAG, 2008; Dyett & Bhatia, 2009; Fehr & Peers, 2010

8 Planning Issues and Implications



The following questions flow from the various key issues identified through this existing conditions analysis of transportation systems and mobility within the City of Carlsbad. Each of these issue questions are intended to spur additional community discussion about the desired future for mobility in the City of Carlsbad.

1. How can Carlsbad’s transit services, which are provided by North County Transit District, be made more effective, and potentially expanded? What should the city’s role be in improving or expanding transit services? How can the city help facilitate or partner with transit agencies to improve or expand transit service?

Current transit facilities continue to serve a large share of trips for those with limited access to automobiles such as the elderly, youth and disabled population groups. Choice riders, however, tend to be a much smaller proportion of the whole, with the majority of those being commuters attracted to the ease and convenience of the COASTER. To be attractive, transit must provide a safe, convenient, and cost-effective alternative to the automobile, e.g. access should be convenient, fares should be competitive, travel times should be faster, and comfort should be superior. Proposed plans to implement east-west bus rapid transit (BRT) along Palomar Airport Road will provide a viable option for traveling within the city and adjacent communities. Increasing frequencies for the COASTER along with double tracking of the entire corridor will improve commuter travel times. Additional opportunities exist to improve transit access to the COASTER

stations through new shuttles, additional parking, and connector services focused on the needs of local neighborhoods. Additionally, affordable and convenient community circulators could provide improved access to key activity centers for a larger share of the city. The challenge is in designing competitive and attractive transit services for the choice rider and finding the revenue sources to implement and maintain that service over time. As the transportation success stories described in Chapter 5 illustrate, in some cases privately-operated transit services can work: leveraged to avoid larger businesses expenses associated with parking, for instance, or leveraging pre-tax dollars to motivate employees to change their behaviors. The city may wish to partner with large local employers to implement transportation demand management tools, include private transit/shuttle services, in ways that make economic sense to both the company and the city. Additionally, the city could facilitate/influence the use of transit by making it easier to walk or bike to transit stations, and /or by adopting policies that encourage or require business to provide shuttle service to transit stations.

2. How can regional freeway access be improved?

Caltrans is planning a significant upgrade of the Interstate 5 corridor throughout North County San Diego. The project proposes widening of the existing 8-lane freeway up to 10 general purpose lanes and 4 managed HOV lanes. A direct access ramp (DAR), providing direct carpool access to the HOV lanes, is proposed at the Cannon

interchange. The managed lanes will also serve potential BRT routes. The project also proposes a number of corridor enhancements, including improved bike/pedestrian/transit connections (east, west and to the coastline), lagoon revegetation, park-and-ride facilities, and sound walls to mitigate noise.

The purpose of the project is to reduce the significant levels of congestion that are forecast for the future. The average daily traffic volume along this portion of the freeway is more than 200,000 vehicles and is expected to reach more than 300,000 by the year 2030. Commute times could more than double without the freeway improvements. The direct access ramps at Cannon Road will provide access to the managed lanes, which will provide incentives for transit and carpooling use. A key challenge will be facilitating this level of freeway travel and access in a manner that does not degrade local travel options within the City of Carlsbad. One option for dealing with this challenge is for the city to use its freeway access agreement with Caltrans as a tool for negotiating freeway access improvements. Additional challenges Carlsbad faces from the proposed Interstate 5 North Coast Corridor project include mitigating some consequences of freeway expansion such as visual impacts, preserving sensitive habitats, and effects on community character.

3. How can pedestrian circulation be enhanced?

Several barriers to walking have been identified in this paper. In particular, Interstate 5 and the Amtrak/Coast rail line pose significant barriers to pedestrian mobility in the northwestern and southwestern portions of the city. These regional facilities also divide the city, east from west, and limit access to the Village and the coastline for eastern residents. The General Plan update should consider the viability of additional crossings over/under Interstate 5 and the rail line to enhance pedestrian circulation.

Large block sizes and wide arterials in the eastern suburban developments of Carlsbad also inhibit pedestrian movements. Potential new interior connections that avoid the wide arterials should be examined, especially in conjunction with development of the city's trail system, to not only improve access to the city's outstanding natural landscape, but also enhance opportunities for utilitarian connections across natural barriers such as lagoons. Recommendations from the Open Space Conservation Resource Management Plan (used primarily as a trails master plan), Pedestrian Master Plan and the Bicycle Master Plan should be considered when developing the core recommendations of the General Plan. These plans should also be updated following the General Plan update to be consistent with the updated pedestrian and bicycle circulation policies. Programs for promoting walking and cycling focused on the City of Carlsbad's youth should be pursued to initiate a long-term shift in travel culture and mind-set from motorized to active, non-motorized transportation.

4. How can bicycle circulation be enhanced?

The General Plan should place an increased emphasis on bicycle travel as a true alternative to vehicular travel. Carlsbad's relatively higher income, well-educated population fits the profile of communities with generally high potential for a strong bicycling culture. Similarly to walking, the city should focus its efforts on school-based education and enhancement programs to initiate long-term shifts in the way Carlsbad residents incorporate cycling in their everyday lives. Along with these types of programs, the General Plan update process provides an opportunity to examine and recommend the application of innovative bicycle facilities along the wide east-west and north-south arterials, including sidepaths, designed to provide for fully segregated and protected bicycle and pedestrian travel along the entire length of these arterials.

5. How can safety, particularly for bicyclists and pedestrians, be improved?

The General Plan update creates opportunities to prioritize transportation facility improvements, especially for pedestrians and cyclists. These types of improvements might include enhanced crosswalks, curb extensions, way-finding signage, bicycle signage and facilities. Expansion of the traffic calming program may be considered to encourage slowing vehicle speeds, thereby enhancing safety of non-motorized travelers. In addition, pursuit of complete street designs to balance usage of the roadway by multiple users traveling at varying speeds will help to make Carlsbad's transportation system safer.

6. How should transportation performance be measured?

As part of the General Plan update, the City of Carlsbad may wish to adopt specific performance measurement standards to evaluate implications of land use changes and development applications and determine appropriate improvements. The community vision recognizes that the automobile will remain the primary form of transportation in the foreseeable future, but seeks to balance this with promoting alternative modes. The issue is what specific standards should be used to determine the needs for future transportation improvements?

The city has a Growth Management Plan, which includes roadway operation standards. It is through roadway operations standards and monitoring that issues associated with signal timing could be addressed. As described in Chapter 6, the City of Carlsbad Traffic Division is currently evaluating the need to tie the city's traffic signal system into a communication network that will allow real-time monitoring of traffic signal system. This kind of performance improvement effort could be complemented, however, with new performance measures that track trade-offs between motorized and non-motorized modes of travel and the issues

associated with accepting reduced levels of service for vehicular flows in the name of enhanced walking and bicycling. The city could also consider data collection and monitoring programs necessary to support calculation of performance measures on an ongoing basis. The city could also look at land use character-based approaches, allowing variation or exemption from LOS standards for districts that are more pedestrian-oriented (such as the Village).

7. How should various travel modes be balanced on city streets to achieve "complete streets"? Should the city support regional transportation demand management efforts to reduce dependence on (and subsidy of) the private (single-occupant) vehicle?

The majority of roadway segments and intersections are currently operating at acceptable levels of service. There may be excess capacity, especially along the eastern suburban arterials that should be evaluated as part of future development conditions. If this capacity is not needed, some of the right-of-way could be shifted to non-motorized facilities, such as wider sidewalks, landscaping strips, or bicycle facilities, as well as to enhanced transit systems. Likewise, transportation demand management programs could make the excess capacity even less necessary in the future. Achieving balance between roadway users within the roadway right-of-way will necessitate more sophisticated analysis tools that take into account multiple roadway users and not just the single-occupant automobile.

8. How can land use / transit connections be fostered?

Land use policies adopted as part of the General Plan update could place an emphasis on incentives to focus development near existing and proposed transit facilities, such as the Carlsbad Village COASTER Station, the Poinsettia COASTER Station, and the Plaza Camino Real Transit Center. Carlsbad's strong village environment, combined with significant regional

and inter-city rail capacity, positions the city to capitalize on regional transit investments. The city's land development ordinances, especially including those that regulate parking requirements, can be a useful tool for promoting travel changes by allowing for reduced parking requirements where feasible. In addition, the city can also leverage its four Smart Growth Opportunity Areas to obtain funding to support transit-oriented development at these nodes. These long range planning approaches should be pursued not only for the housing benefits garnered, but also the quality of life and economic benefits gained from residents living in auto-independent environments.

DYETT & BHATIA
Urban and Regional Planners

755 Sansome Street, Suite 400
San Francisco, California 94111
☎ 415 956 4300 📠 415 956 7315