Chapter 1 Existing Conditions

The purpose of this Bicycle Master Plan is to identify improvements to the bicycling environment in the City of Bell by providing recommendations for bikeways and bicycle support facilities as well as education, encouragement, enforcement, and evaluation programs.

The implementation of bicycle facilities and programs proposed in this Bicycle Master Plan will create a bicycle-friendly environment and thereby encourage people who live, work, and play in Bell to bicycle more frequently, which will subsequently lower greenhouse gases (GHG) and create a healthier environment for residents and visitors.

This chapter evaluates existing land use, transportation networks, activity levels, collision patterns and benefits of bicycling. Topics include:

- Land Use and Settlement Patterns
- Existing Transportation Network
- Existing Bikeway Network
- Planned Bikeway Network
- Traffic Calming
- Current Activity Levels
- Future Activity Levels
- Health Benefits
- Environmental Benefits
- Transportation Benefits
- Bicycle-Involved Collision Analysis

Land Use and Settlement Patterns

The City of Bell is located within Los Angeles County, approximately 10 miles southeast of downtown Los Angeles. Bell is bordered by six neighboring cities: Maywood, Vernon, Huntington Park, Cudahy, Bell Gardens, and Commerce. Among these neighbors, only Huntington Park has adopted a Bicycle Master Plan.

The City of Bell is bisected by the Los Angeles River, a primary regional connection for active transportation. The segmentation created by the river forms two district areas: the Central City, containing the City's main residential and commercial areas, and the Cheli Industrial Area. Central City's land uses create a suitable built environment to accommodate bicycle

infrastructure, such as separated bikeways on commercial streets or local street bikeways on residential streets. The Cheli Industrial Area is developed exclusively with industrial uses.

As shown on Figure 1-1, Bell has a diverse land use mix and can be divided into three land use categories of roughly equal size: residential, business, and right-of-way. Thirty-four percent of land is dedicated to residential uses (of which 30 percent is multi-family and four percent is single-family). A further 30 percent of land is for business purposes (22 percent industrial and eight percent commercial). The remaining 36 percent of land consists of city streets, vacant lots, the I-710 Freeway, and the Los Angeles River. Figure 1-2 shows Bell land use as defined in the General Plan.

A large number of residential neighborhoods in the city are zoned for higher densities, which have been developed accordingly. In fact, Bell is one of the few the cities within Los Angeles County with a higher population density than the County average. The city has more than 14 thousand persons per square mile, almost six times the density of the County. The high density and consistent grid of the Central City create appropriate conditions for bicycling and walking.

Demographics and Access to Vehicles

Bell is a mid-sized city with an estimated population of 35,704[1] - down slightly from its 2000 population of 36,664.[2] Its median age is 30 years old. In 2010, the average household size in Bell was four persons and most households had at least one (37 percent) or two (35 percent) vehicles available. Only 11 percent of households reported having zero vehicles available.

[1] 2009-2013 American Community Survey five-year estimates.
[2] 2000 United States Census.

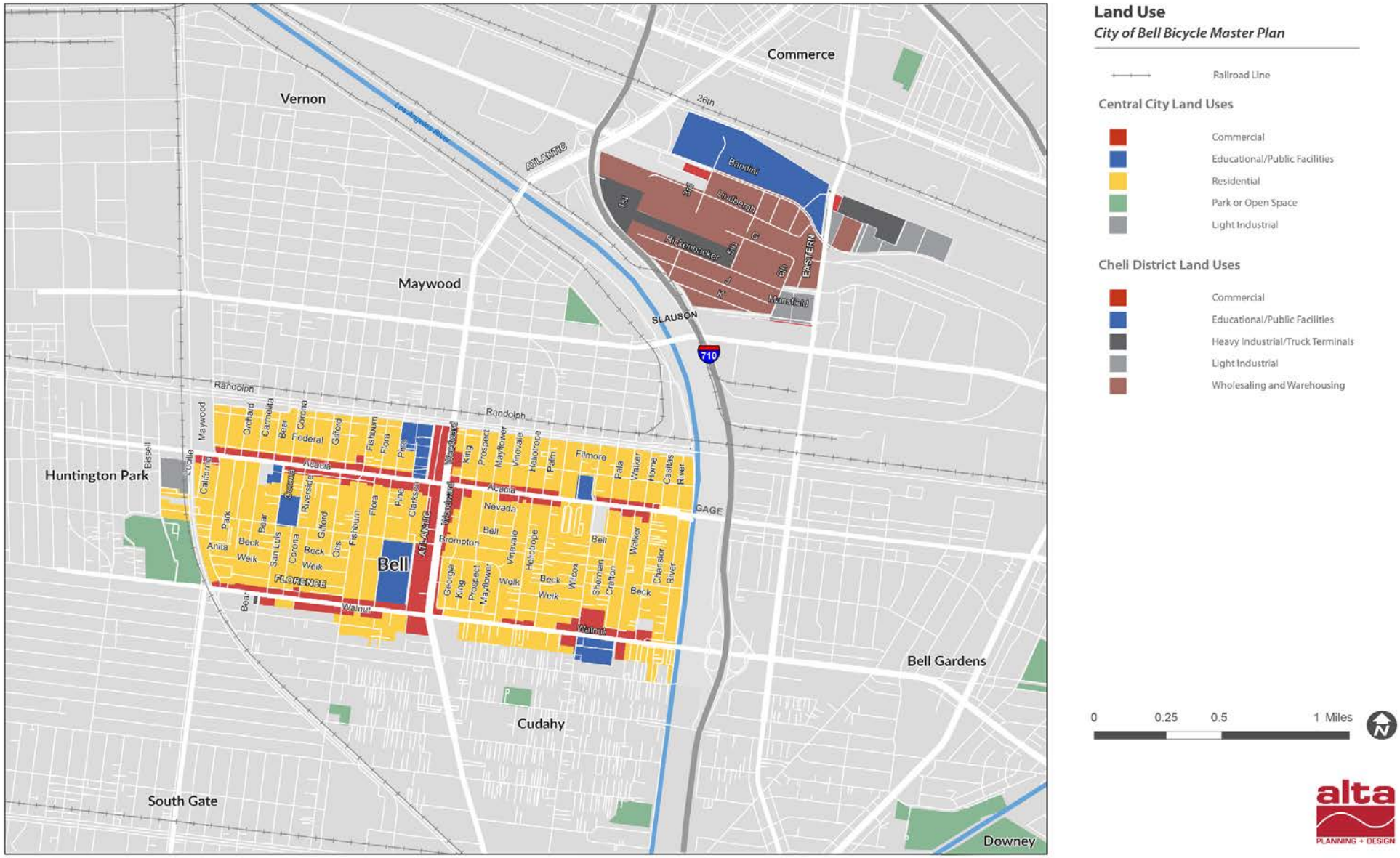

Figure 1-1: Bell Land Use

Attractors and Generators

The vast majority of attractors in Bell are located in the Central City. Commercial, institutional, and other public land uses are scattered throughout the Central City. These include the Bell High School, the Bell Library, the Bell Civic Center, six City parks, three elementary schools, and a number of churches.

Table 1-1 lists the public schools in Bell. Table 1-2 shows the public facilities in Bell. In both cases, these facilities tend to be located in the historic downtown, especially along Gage Avenue between Atlantic Avenue and Otis Avenue.

Table 1-1 Public Schools in Bell

School Name	Address
Bell High School	4328 Bell Avenue
Corona Avenue Elementary School	3825 Bell Avenue
Nueva Vista Elementary School	4412 Randolph Street
Woodlawn Avenue Elementary School	6314 Woodlawn Avenue
Magnolia Science Academy (Charter Middle)	6411 Orchard Avenue

Table 1-2 Public Facilities in Bell

Public Facility	Address
Bell Library	4411 E. Gage Avenue
Ernest Debs Park	3700 Gage Avenue
Technology Center	4357 E. Gage Avenue
Bell Police Department	6326 Pine Avenue
Los Angeles County Fire Department Station 163	6320 Pine Avenue
Bell City Hall	6330 Pine Avenue
Bell Community Center	6250 Pine Avenue
Veterans' Memorial Park	6500 Wilcox Avenue

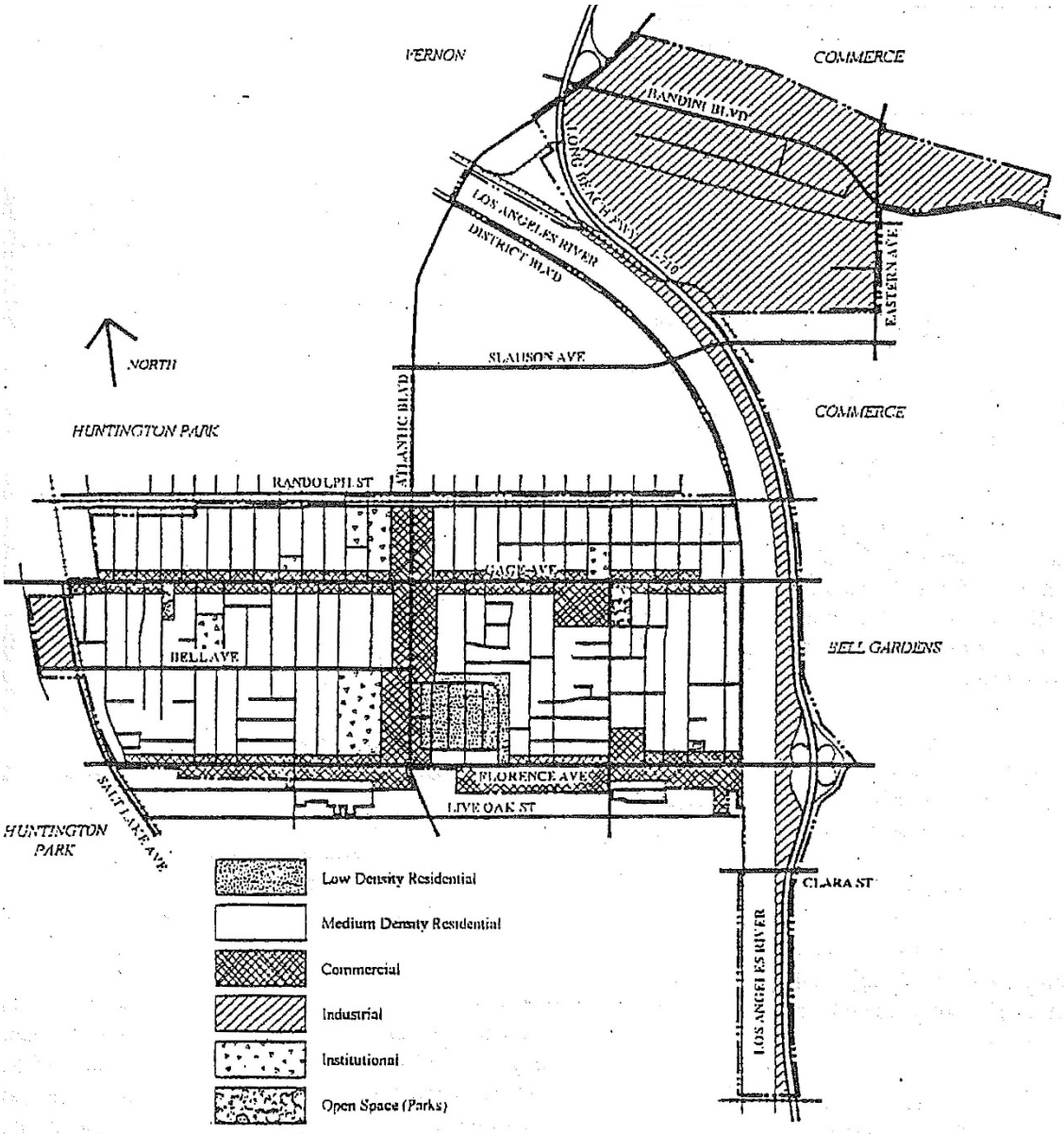

Figure 1-2: City of Bell Land Use Map (General Plan 2010)

Existing Transportation Network

The roadway system in the city has been defined in the General Plan using a classification system which describes a hierarchy of facility types. The categories are:

- Freeways
- Arterials
- Collectors
- Local Streets

Local Connections

The primary circulation system in the City of Bell consists of local streets and arterial roadways. Arterial roadways include Atlantic Boulevard, Gage Avenue, Florence Avenue, Slauson Avenue, Eastern Avenue, and Bandini Boulevard. Trucks are prohibited on Bell's residential streets and are restricted to major roadways. Three roadways cross the Los Angeles River: Florence Avenue, Randolph Street, and Slauson Avenue. There is a third river crossing, Gage Avenue, but it serves only rail traffic. Clara Street and Atlantic Boulevard are nearby crossings but they are not within the city.

Regional Connections

Bell's location near the population center of Los Angeles County lends itself to convenient access to regional transportation routes. Bell is proximate to the I-5 and I-710 Freeways, the Metrolink Orange County and Riverside Lines (Commerce and Montebello/Commerce Stations), and the Metro Blue Line (Slauson and Florence Stations). It is also served by the Metro Rapid 762 line, which runs along Atlantic Avenue with stops at Gage Avenue and Florence Avenue. Existing regional active transportation connections include bicycle paths on the Los Angeles River and the Rio Hondo.

Several routes on the countywide Regional Active Transportation Network, a spine network developed as part of the ongoing Metro Active Transportation Strategic Plan, serve Bell. These include the Los Angeles River bicycle path and Salt Lake Avenue/Union Pacific Right of Way. There are also routes currently under study as part of the Rail to River Active Transportation Corridor, Slauson Avenue and Randolph Street (Southern Pacific ROW).There are two more potential Rail to River alignments, but they are not in Bell.

Existing Transportation Services

The City of Bell is served by eight Metro Local bus lines. Seniors, people with disabilities, and students are eligible to purchase monthly passes for a subsidized rate. In addition, Bell offers one shuttle service, La Campana, to get around the City and major destinations in neighboring cities. The one-way cost of La Campana is 50 cents. Two other on-demand transportation services are also offered: Dial-A-Cab and Dial-A-Ride. Dial-A-Ride is a bus that takes registered participants to and from destinations within the City for free. Dial-A-Cab is a transportation program which takes senior citizens and persons with qualifying disabilities to and from medical facilities within the City of Bell.

Existing Bikeway Network

There has been no known public investment in bicycle facilities in the City of Bell. As shown in

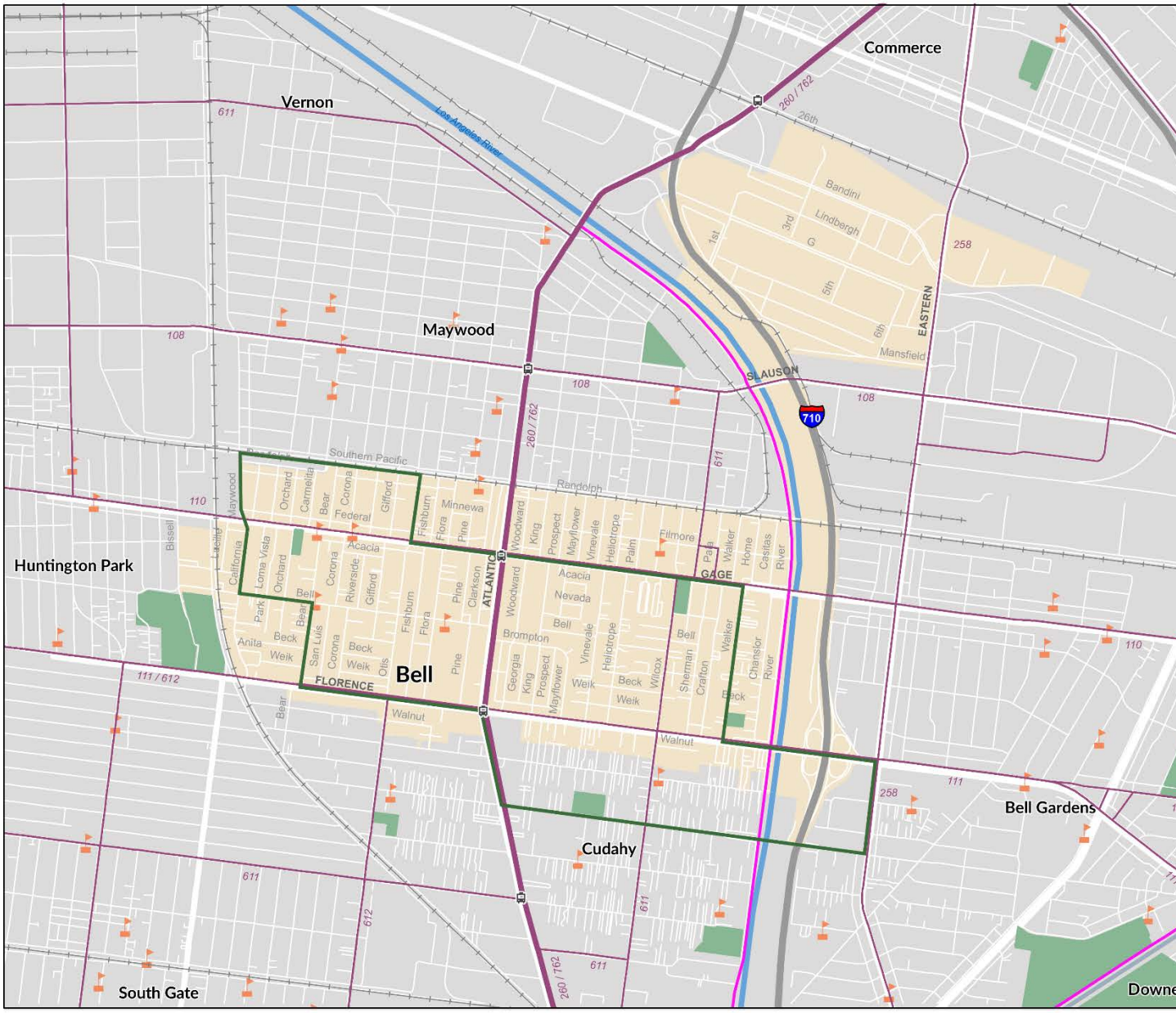

Figure 1-3, the only existing bikeway in Bell is the 1.8-mile Los Angeles River bicycle path. Running along the west side of the Los Angeles River, the path spans the entire length of the channel within the City of Bell, from just south of Heliotrope Avenue to just south of Florence Avenue. The path originates approximately one half-mile north of Bell city limits at Atlantic Boulevard. On the south end, the path continues as far as Long Beach. The City of Bell maintains the Los Angeles River path and contracts out a daily maintenance and graffiti removal service.

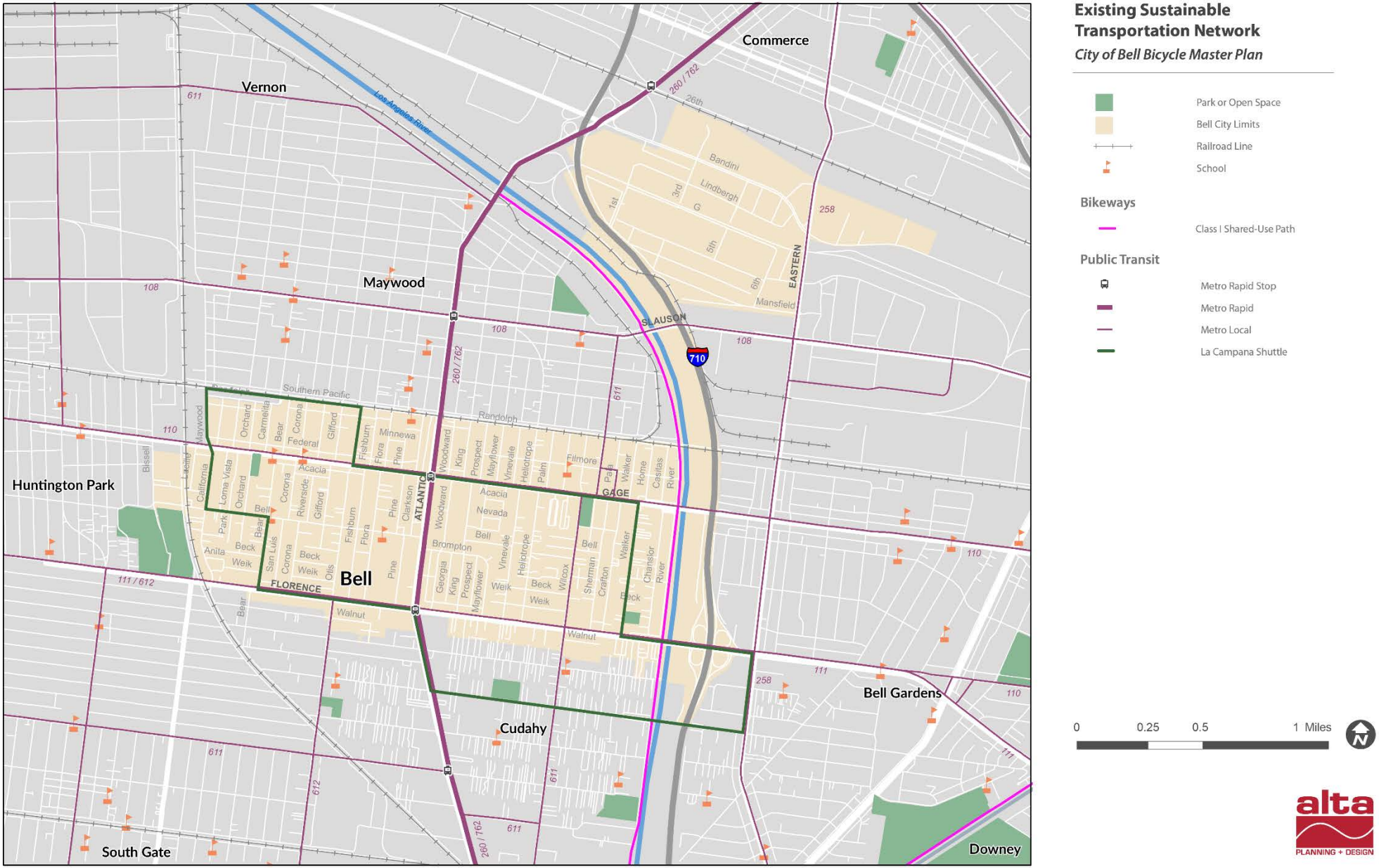

Figure 1-3: Existing Sustainable Transportation Network

Among Bell's neighbors, only the City of Huntington Park has adopted a bicycle transportation plan that includes a planned bikeway network. Metro and the Gateway Cities Council of Governments also adopted active transportation plans relevant for the city. However, none of the proposed bikeways have been built. Table 1-3 shows proposed bikeways in adjacent jurisdictions on streets that intersect the city and could help to create a regional connection.

Table 1-3 Proposed Bikeways in Adjacent Jurisdictions

Street	Facility Type	Mileage
Carmelita Avenue	Class III	0.36
Florence Avenue	Class III	13.5
Gage Avenue	Class III	6.4
Randolph Street	Class I	4.4
Salt Lake Avenue	Class I	9.8
Slauson Avenue	Class II	11.5

Traffic Calming

The City of Bell has numerous motor vehicle traffic calming devices throughout the city, including traffic diverters, speed bumps, and chicanes. The city also has posted 25 mph speed limits on most local streets. These traffic calming devices help to address resident concerns about traffic issues in residential neighborhoods, particularly issues of speeding and cut-through traffic, and indicate a commitment by the city to provide safer neighborhoods. Although traffic calming devices are not bicycle-specific infrastructure, they help to create and maintain low-stress travel conditions for bicycling by reducing the speed or volume of motor vehicle traffic. Streets with existing traffic calming are candidates for further local street bikeway improvements. Table 1-4**Error! Reference source not found.** presents a list of existing traffic calming devices by type and location and Figure 1-4 shows their geographic location.

Table 1-4 Traffic Calming Devices in Bell

Intersection/Street	Type of Device
Loma Vista Place at Gage Avenue	Traffic Diverter (Right-Out Only)
Mayflower Avenue at Florence Avenue	Traffic Diverter (Right-Out Only)
King Avenue at Florence Avenue	Traffic Diverter (Right-In, Right-Out)
Woodward Avenue at Florence Avenue	Traffic Diverter (Right-In Only)
Otis Avenue at Gage Avenue	Chicane
Wilcox Avenue at Gage Avenue	Chicane
Lindbergh Lane west of Amelia Earhart Way	Speed Bump
K Street btwn 3rd Street and 6th Street	Speed Bumps x2
River Drive btwn Randolph Street and Filmore Street	Speed Bump
River Drive btwn Filmore Street and Gage Avenue	Speed Bump
River Drive btwn Gage Avenue and Southall Lane	Speed Bumps x 3

Intersection/Street	Type of Device
Chanslor Avenue btwn Gage Avenue and Southall Lane	Speed Bumps x 3
Home Avenue btwn Randolph Street and Filmore Street	Speed Bump
Home Avenue btwn Filmore Street and Gage Avenue	Speed Bump
Chanslor Avenue btwn Southall Lane and Florence Avenue	Speed Bumps x 2
Crafton Avenue btwn Gage Avenue and Acacia Street	Speed Bump
Crafton Avenue btwn Acacia Street and Southall Lane	Speed Bumps x 2
Crafton Avenue btwn Southall Lane and Florence Avenue	Speed Bump
Alamo Avenue btwn Randolph and Filmore Street	Speed Bump
Southall Lane btwn Wilcox Avenue and Sherman Way	Speed Bump
Wilcox Avenue btwn Randolph Street and Filmore Street	Speed Bump
Wilcox Avenue btwn Filmore Street and Gage Avenue	Speed Bump
Woodlawn Avenue btwn Randolph and Filmore Street	Speed Bump
Bell Avenue btwn Heliotrope Avenue and Wilcox Avenue	Speed Bumps x 2
Beck Avenue btwn Heliotrope Avenue and Wilcox Avenue	Speed Bumps x 3
Heliotrope Avenue btwn Gage Avenue and Nelson Drive	Speed Bumps x 2
Heliotrope Avenue btwn Nelson Drive and Bell Avenue	Speed Bump
Heliotrope Avenue btwn Bell Avenue and Brompton Avenue	Speed Bump
Beck Avenue btwn Vinevale Avenue and Heliotrope Avenue	Speed Bump
Vinevale Avenue btwn Gage Avenue and Bell Avenue	Speed Bump
Mayflower Avenue btwn Filmore and Gage Avenue	Speed Bump
Prospect Avenue btwn Acacia Street and Nevada Street	Speed Bump
Prospect Avenue btwn Randolph Street and Filmore Street	Speed Bump
Prospect Avenue btwn Filmore and Gage Avenue	Speed Bump
Bell Avenue btwn King Avenue and Vinevale Avenue	Speed Bumps x 2
King Avenue btwn Randolph Street and Federal Avenue	Speed Bumps x 2
King Avenue btwn Brompton Avenue and Weik Avenue	Speed Bumps x 2
King Avenue btwn Weik Avenue and Florence Avenue	Speed Bump
Woodward Avenue btwn Randolph Street and Federal Avenue	Speed Bump
Woodward Avenue btwn Gage Avenue and Brompton Avenue	Speed Bumps x 4
Woodward Avenue btwn Beck Avenue and Weik Avenue	Speed Bump
Pine Avenue btwn Gage Avenue and Bell Avenue	Speed Bump
Flora Avenue btwn Gage Avenue and Bell Avenue	Speed Bump
Fishburn Avenue btwn Gage Avenue and Bell Avenue	Speed Bumps x 4
Otis Avenue btwn Gage Avenue and Bell Avenue	Speed Bumps x 2
Gifford Avenue btwn Acacia Avenue and Bell Avenue	Speed Bump
Scelina Avenue btwn Acacia Avenue and Bell Avenue	Speed Bump

Intersection/Street	Type of Device
Corona Avenue btwn Acacia Avenue and Bell Avenue	Speed Bump
Otis Avenue btwn Randolph Street and Federal Avenue	Speed Bump
Gifford Avenue btwn Randolph Street and Federal Avenue	Speed Bump
Riverside Avenue btwn Randolph Street and Federal Avenue	Speed Bump
Corona Avenue btwn Randolph Street and Federal Avenue	Speed Bump
Corona Avenue btwn Federal Avenue and Gage Avenue	Speed Bump
Bear Avenue btwn Randolph Street and Federal Avenue	Speed Bumps x 3
Gifford Avenue btwn Bell Avenue and Brompton Avenue	Speed Bump
Brompton Avenue btwn Gifford Avenue and Otis Avenue	Speed Bump
Brompton Avenue btwn cul de sac and Gifford Avenue	Speed Bump
Beck Avenue btwn Corona Avenue and Otis Avenue	Speed Bump
Weik Avenue btwn Corona Avenue and Otis Avenue	Speed Bump
San Luis Avenue btwn Bell Avenue and Florence Avenue	Speed Bump
Bear Avenue btwn Beck Avenue and Weik Avenue	Speed Bump
Orchard Avenue btwn Bell Avenue and Beck Avenue	Speed Bump
California Avenue btwn Bell Avenue and Beck Avenue	Speed Bump
California Avenue btwn Nevada Avenue and Gage Avenue	Speed Bump
Lucille Avenue btwn Gage Avenue and Nevada Avenue	Speed Bump
California Avenue btwn Randolph Place and Federal Avenue	Speed Bump
Filmore Street btwn Alamo Avenue and Wilcox Avenue	Speed Bump

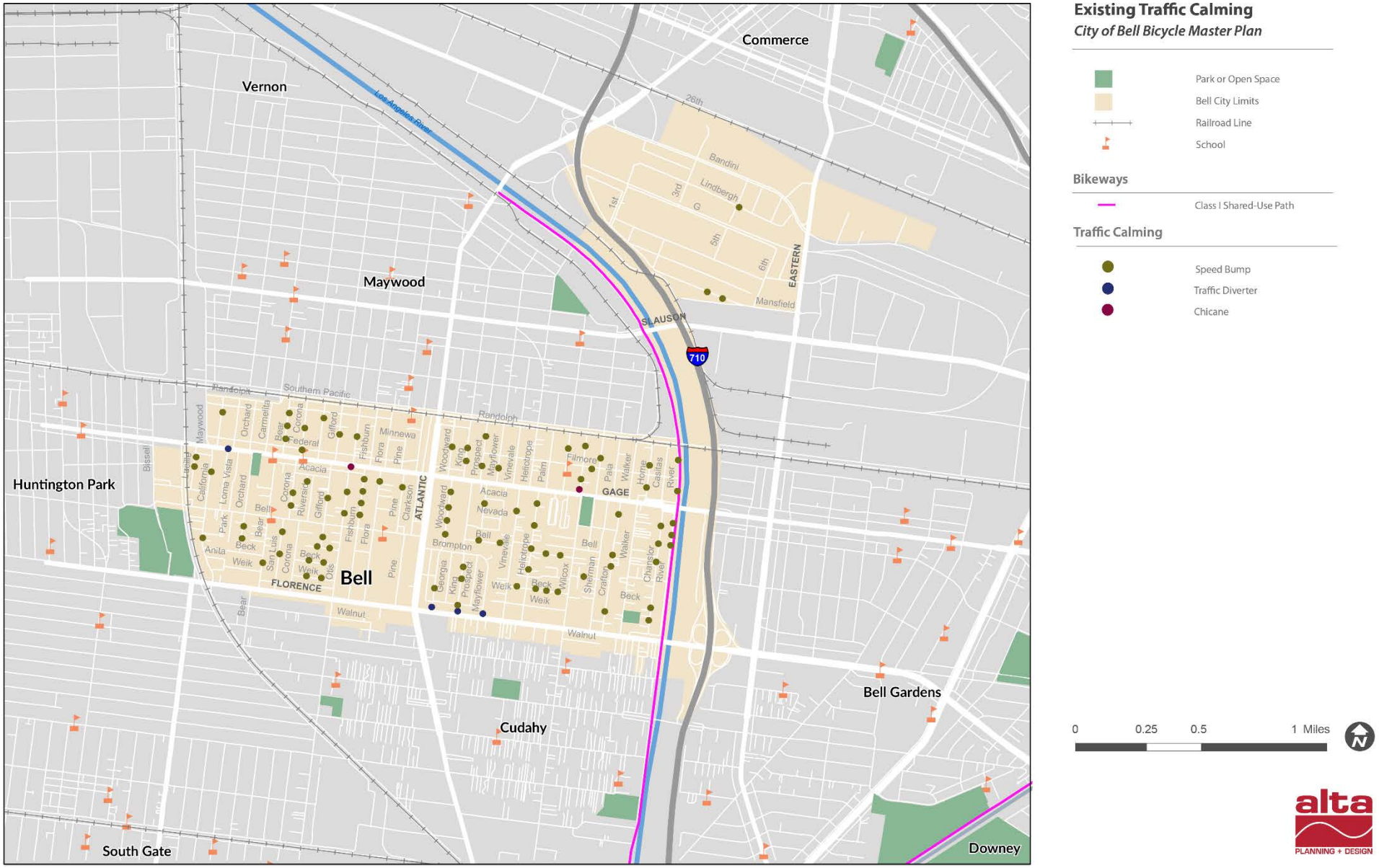

Figure 1-4: Existing Traffic Calming Devices

Planned Bikeways in Bell

Although the City of Bell has not previously developed a plan for its bikeway network, several regional planning efforts have proposed bikeways within the City, such as the Metro Active Transportation Strategic Plan, Metro's Rail to River Study, and the Gateway Cities Strategic Transportation Plan:

- Two routes on the countywide Regional Active Transportation Network (a spine network developed as part of the ongoing Metro Active Transportation Strategic Plan) serve Bell. These are the Los Angeles River bicycle path and the Union Pacific Railroad on Salt Lake Avenue.
- The Regional Active Transportation Network also includes four potential bikeways that are part of Metro's Rail to River Study. One of the four alternatives will be added to the Regional Active Transportation Network after the preferred alignment is selected. Although only one of the four Rail to River Study alignments goes through the City of Bell, it is one of the strongest candidates (the Southern Pacific Railroad ROW along Randolph Street).
- The Gateway Cities Strategic Transportation Plan identified four regionally significant bicycle projects within the City of Bell: Slauson Avenue, the West Santa Ana Branch (Union Pacific ROW), Gage Avenue and Florence Boulevard.

These planned bikeways are mapped in**Error! Reference source not found.** and listed in Table 1-5. Planned bikeways appearing in more than one regional plan, such as the Los Angeles River Path, are identified with an asterisk.

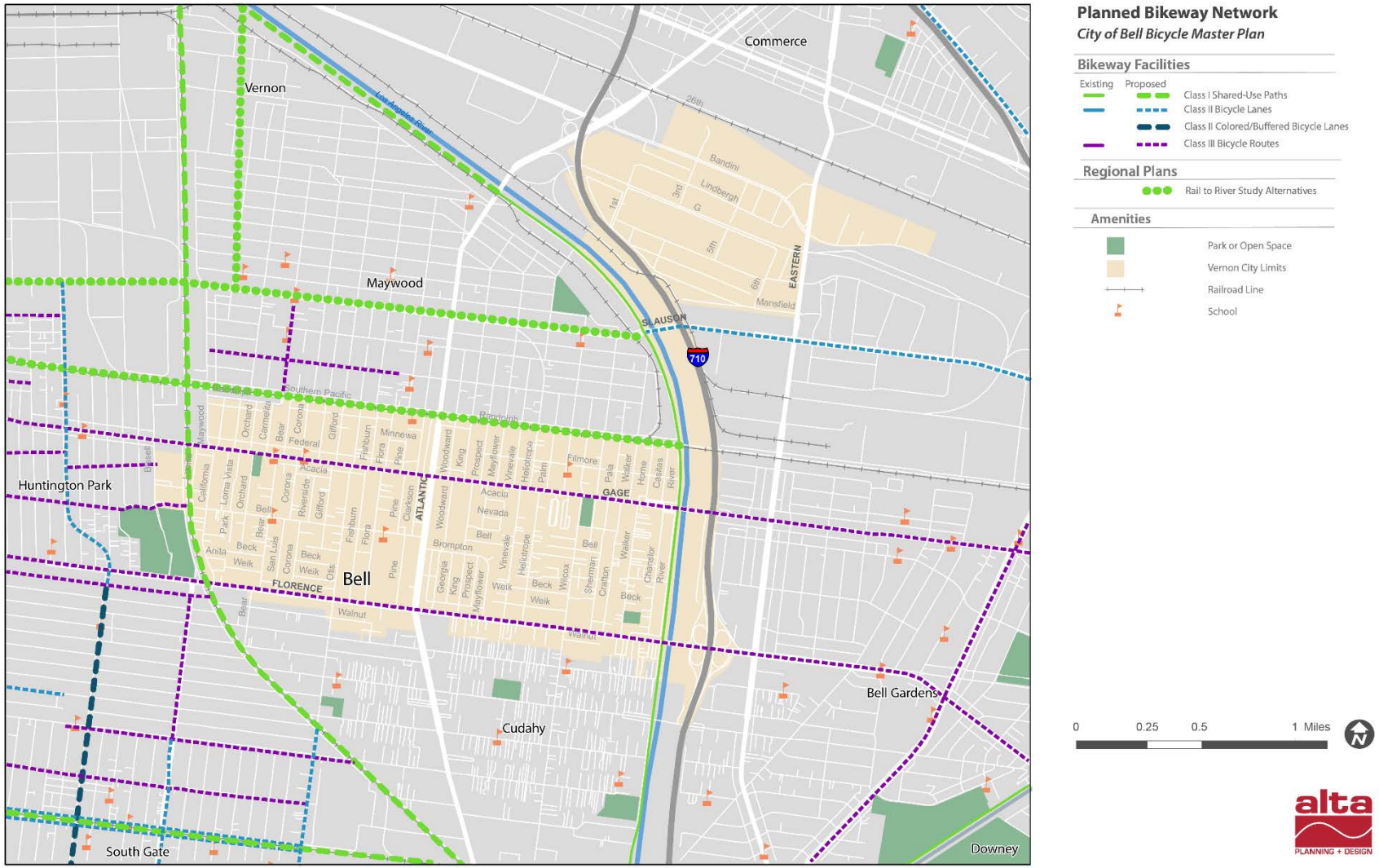

Figure 1-5: Planned Bikeways in Bell

Table 1-5: Planned Bikeways in Bell

Street	Facility Type	Source Plan	Mileage
West Santa Ana Branch Corridor*	Off-Street (Class I)	Metro Active Transportation Strategic Plan	0.25
Randolph Street	Off-Street (Class I)	Metro Rail to River Feasibility Study	1.6
Slauson Avenue	Dedicated On-Street (Class II)	Gateway Cities Strategic Transportation Plan	0.2
Florence Avenue	Shared On-street (Class III)	Gateway Cities Strategic Transportation Plan	2.0
Gage Avenue	Shared On-street (Class III)	Gateway Cities Strategic Transportation Plan	2.1
Total			4.6– 6.2*

Planned Bikeways in Adjacent Jurisdictions

Among Bell's municipal neighbors, the City of Los Angeles and the City of Huntington Park have adopted bicycle transportation plans. These individual plans are supplemented by regional plans, including those described in the preceding section. Planned bikeways in adjacent jurisdictions are also shown in Figure 1 5.

Current Activity Levels

There are 263 daily bicycle commuters in the City of Bell. As Table 1-6 shows, this represents a 1.6 percent mode share – significantly higher than national, statewide, and county averages. Walking and public transit are also more prevalent in Bell than at the national and state level – close to average Los Angeles County rates. Drive alone trips are lower than county, state, and national averages, while carpool trips are higher. These statistics suggest that, even with limited networks in place, conditions in Bell are conducive to active transportation.

Table 1-6: Journey to Work Mode Share (Percent) Compared to the Nation, State and County

Mode	Nationwide	Statewide	Los Angeles County	City of Bell
Bicycle	0.6	1.1	0.9	1.6
Walk	2.8	2.7	2.9	3.7
Public Transit	5.0	5.3	7.1	6.8
Drive Alone	76.3	73.2	72.4	72.3
Carpool	9.8	11.1	10.6	11.8
Other	1.2	1.3	1.2	0.5
Worked from home	4.3	5.3	5.0	3.3

Source: American Community Survey (ACS), 2009-2013 Five-Year Estimates

Future Activity Levels

Table 1-7 shows the existing bicycle commute mode share (1.6 percent) for the City of Bell and three aspirational bicycle commute mode shares (mid, high and very high). These bicycle commute mode shares represent alternative scenarios for future conditions, and are as follows:

- Mid – Four percent (150 percent increase in bicycle commuters)
- High – Seven percent (338 percent increase in bicycle commuters)
- Very High – Ten percent (525 percent increase in bicycle commuters)

Achieving these mode share targets will result in benefits to community health, environment, and transportation by shifting trips from private motor vehicle to bicycle. The benefits associated with each vehicle removed from the roadway system can be quantified with greater benefits associated with fewer vehicles. This section summarizes the health, environment, and transportation benefits that the City of Bell would receive given three future bicycle transportation scenarios.

Table 1-7 City of Bell Bicycle Commute Forecast

Employed Population[3]	Existing Bicycle Commute Trips per Day[4]	Existing Bicycle Commute Mode Share[5]	Future Bicycle Commute Mode Share[6]		
			Mid	High	Very High
13,300	216	1.6%	4%	7%	10%

Health Benefits

The implementation of a well-designed, connected bicycle network across Bell will encourage a shift from energy-intensive modes of transportation, such as cars and trucks, to active modes of transportation, such as bicycling. The Benefit Impact Model evaluated and quantified the estimated increase in bicycling trips, the estimated increase in hours of physical activity, and the annual savings resulting from reduced healthcare costs. The primary inputs into the health component of the Benefit Impact Model derived from 2009-2013 ACS journey to work data, 2009 National Household Travel Survey, and historic Safe Routes to School data. Existing bicycle commute data was multiplied by national trip purpose ratios to generate mode split data that includes all trip purposes.

If Bell's bicycle commute mode share increases to the one of the three aspirational mode share levels, the city would experience between 1,226,000 and 4,321,000 more bicycling trips per year and between 1,664,000 and 5,864,000 miles bicycled per year, resulting in 1,105,000 to 3,896,000 fewer vehicle-miles traveled (VMT) annually. These annual distance estimates and VMT reduction estimates were used to calculate changes in physical activity rates among residents in Bell. Achieving a four to ten percent bicycle commute mode share would result in between 166,000 and 586,000 more hours of physical activity per year among Bell residents. This potential increase in physical activity would result in between 1,200 and 4,500 more residents meeting the Centers for Disease Control and Prevention's guidelines for the minimum recommended number of hours of physical activity per day, which is equal to a jump from approximately 4.1 percent of the regional physical activity need being met from bicycling to between 7.7 and 16.7 percent of the regional physical activity need being met. This growth in the percent of people within the city exercising also equates to a $51,000 to $181,000 reduction in healthcare expenses per year. Table 1-8 summarizes the annual health benefits for Bell.

[3] US Census, American Community Survey, five-year estimates (2009-2013)
[4] US Census, American Community Survey, five-year estimates (2009-2013)
[5] US Census, American Community Survey, five-year estimates (2009-2013)
[6] Forecasted future bicycle commute mode split set by the City of Bell as aspirational values.

Table 1-8 Estimated Annual Health Benefits

	Baseline	Future Estimates					
		Mid		High		Very High	
	Total	Total	Difference	Total	Difference	Total	Difference
Annual Trips	838,000	2,064,000	1,226,000	3,611,000	2,773,000	5,159,000	4,321,000
Annual Miles	1,896,000	3,560,000	1,664,000	5,660,000	3,764,000	7,760,000	5,864,000
Annual Hours of Physical Activity	190,000	356,000	166,000	566,000	376,000	776,000	586,000
Rec. Physical Activity Minimum Met	1,500	2,700	1,200	4,400	2,900	6,000	4,500
Regional Physical Activity Need Met	4.1%	7.7%	3.6%	12.2%	8.1%	16.7%	12.6%
Healthcare Cost Savings	$35,000	$86,000	$51,000	$151,000	$116,000	$216,000	$181,000

Environmental Benefits

The Benefit Impact Model evaluated and quantified the estimated increase in bicycle trips and the annual savings from reduced vehicle emissions. In order to evaluate these environmental factors, a number of readily-available data inputs were analyzed. Using the estimates of VMT reductions calculated in the health benefits analysis, changes in hydrocarbon, particulate matter, nitrous oxides, carbon monoxide, and carbon dioxide were analyzed. In total, the replacement of motor vehicle trips with active transportation trips may result in an estimated range of 1,846,000 to 6,506,000 fewer pounds of CO_2 emissions per year, 2,400 to 8,700 fewer pounds of nitrous oxides, and between 32,600 and 117,300 fewer pounds of criteria pollutant vehicle emissions. Based on a review of air emissions studies, each pound of emissions was assigned an equivalent dollar amount based on how much it would cost to clean up the pollutant or the cost equivalent of how much damage the pollutant causes to the environment. The total reduction in vehicle emissions is equal to a savings between $37,000 and $131,000 in related environmental damage or clean-up per year. Other potential ecological services associated with the bicycle projects such as water regulation, carbon sequestration, carbon storage, and waste treatment exist, but the quantifiable value of these services are negligible on the overall impact of the recommended project list. Table 1-9 summarizes the annual environmental benefits for Bell.

Table 1-9 Estimated Annual Environmental Benefits

	Baseline	Future Estimates Mid		High		Very High	
	Total	Total	Difference	Total	Difference	Total	Difference
CO2 Emissions Reduced (lbs)	1,261,000	3,107,000	1,846,000	5,437,000	4,176,000	7,767,000	6,506,000
Nitrous Oxides (lbs)	1,700	4,100	2,400	7,300	5,600	10,400	8,700
Criteria Pollutants (lbs)	23,300	55,900	32,600	99,000	75,400	141,000	117,300
Total Vehicle Emission Costs Reduced	$25,000	$62,000	$37,000	$109,000	$84,000	$156,000	$131,000

Transportation Benefits

The most readily-identifiable benefits of the recommended project list exist in its ability to increase transportation options and access to activity centers for Bell residents and visitors. While money rarely changes hands, real savings can be estimated from the reduced costs associated with congestion, vehicle crashes, road maintenance, and household vehicle operations.

Using the same annual VMT reduction estimates highlighted in the health and environmental components, transportation-related cost savings were calculated. By multiplying the amount of VMT reduced by established multipliers for traffic congestion, vehicle collisions, road maintenance, and vehicle operating costs, monetary values were assigned to the transportation-related benefits. In total, an annual cost savings between $630,000 and $2,221,000 is estimated for the city at the aspirational bicycle commute mode share levels. Table 1-10 summarizes the annual transportation benefits for Bell.

Table 1-10 Estimated Annual Transportation Benefits

	Future Estimates Baseline	Mid		High		Very High	
	Total	Total	Difference	Total	Difference	Total	Difference
VMT Reduced	756,000	1,861,000	1,105,000	3,256,000	2,500,000	4,652,000	3,896,000
Reduced Traffic Congestion Costs	$53,000	$130,000	$77,000	$228,000	$175,000	$326,000	$273,000

	Future Estimates						
	Baseline Total	Mid Total	Difference	High Total	Difference	Very High Total	Difference
Reduced Vehicle Crash Costs	$378,000	$930,000	$552,000	$1,628,000	$1,250,000	$2,326,000	$1,948,000
Reduced Road Maintenance Costs	$113,000	$279,000	$166,000	$488,000	$375,000	$698,000	$585,000
Household Vehicle Operation Cost Savings	$431,000	$1,061,000	$630,000	$1,856,000	$1,425,000	$2,652,000	$2,221,000

Total Benefits

If the City of Bell achieves a bicycle commute mode share of four percent, it would experience approximately $1,513,000 in additional health, environmental, and transportation benefits per year. Achieving a bicycle commute mode share of ten percent would bring approximately $5,339,000 in additional annual benefits year. Table 1-11 summarizes all calculated benefits.

Table 1-11 Total Annual Benefits

	Baseline	Future Estimates Mid		High		Very High	
	Total	Total	Difference	Total	Difference	Total	Difference
Health Benefits	$35,000	$86,000	$51,000	$151,000	$116,000	$216,000	$181,000
Environmental Benefits	$25,000	$62,000	$37,000	$109,000	$84,000	$156,000	$131,000
Transportation Benefits	$975,000	$2,400,000	$1,425,000	$4,200,000	$3,225,000	$6,002,000	$5,027,000
Total Benefits	$1,035,000	$2,548,000	$1,513,000	$4,460,000	$3,425,000	$6,374,000	$5,339,000

Bicycle-Involved Collision Analysis

This section reviews bicycle-involved collisions from January 1, 2009 to December 31, 2013 as reported by the Statewide Integrated Traffic Records System (SWITRS). The California Highway Patrol updates SWITRS each quarter.

While collision data are sometimes incomplete and do not capture 'near misses,' they do help to create a general understanding of the safety issues facing bicyclists in Bell. The purpose of the bicycle-involved collisions analysis is to asses trends in bicycle collisions over time, identify hotspots and conflict areas between motorists and bicyclists, and understand the circumstances of bicycle collisions.

Table 1-12 presents the number of bicycle-involved collisions in the City of Bell from 2009-2013 and Figure 1-6 shows their location. The number of collisions ranged from 11 to 24 per year, with an average of 18 collisions per year. While a total of 91 bicycle-involved collisions were reported during the studied time period, zero bicycle-involved collisions in the city resulted in fatalities. Table 1-12 and Table 1-13 show an upward trend in bicycle-involved collisions since 2009 and a slight reduction in 2013. This trend not only represents a higher number of collisions, but also a higher percentage of total collisions.

Table 1-12 Bicycle-Involved Collisions by Year

Year	Number of Collisions
2009	11
2010	15
2011	21
2012	24
2013	20
Total	**91**

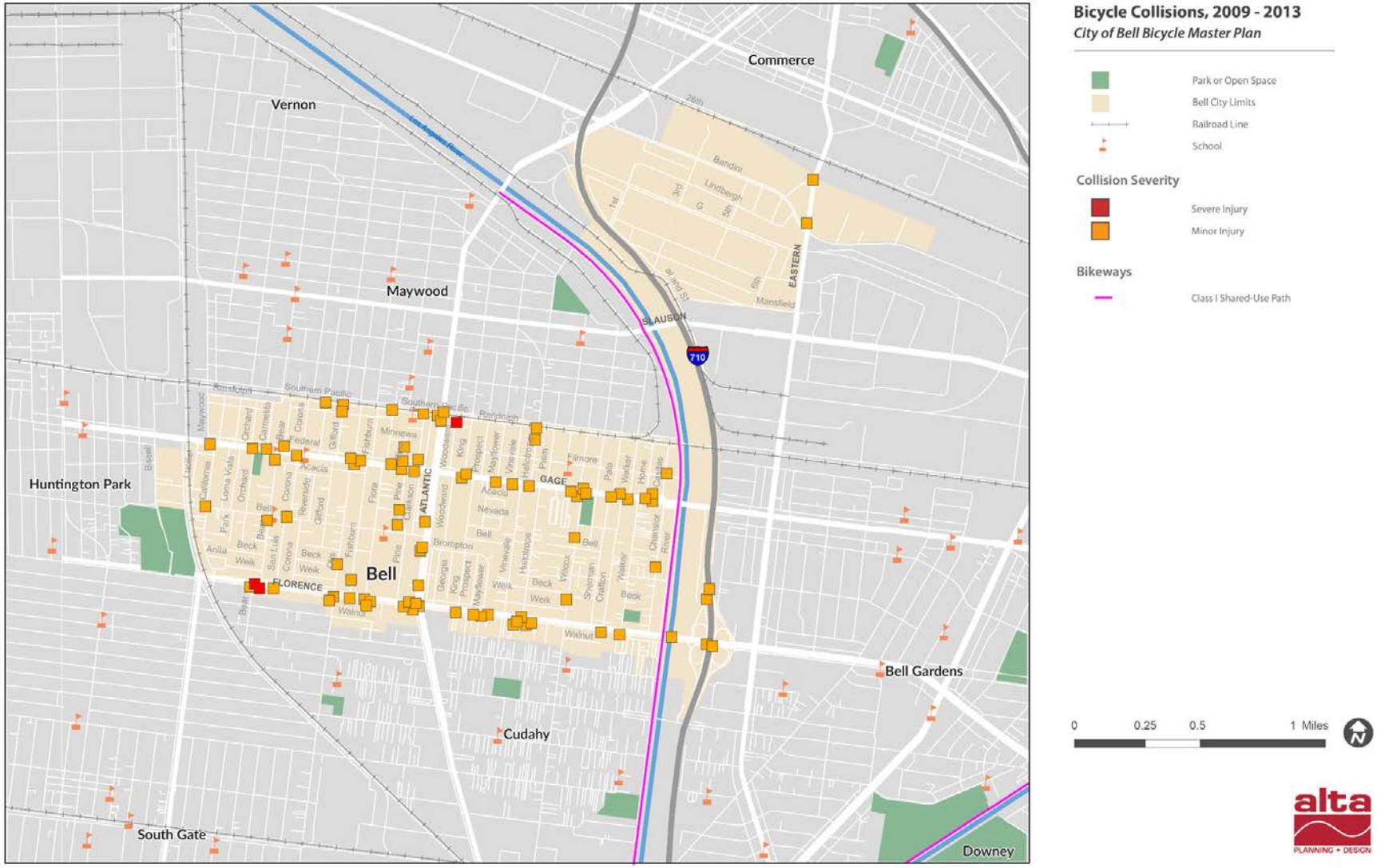

Figure 1-6: Bicycle Involved-Collisions (2009-2013)

Between January 2009 and December 2013, there were 792 total collisions reported in the City of Bell. The 91 bicycle-involved collisions represent an 11 percent of total collisions, a considerable higher percentage when compared to the nine percent in Los Angeles County. Ninety-three bicycle riders were involved in these 91 bicycle-involved collisions, and every reported bicycle-involved collision resulted in at least one bicycle rider(s) injured. Three of the collisions resulted in severe injuries[7] to the bicycle rider. This three severe injuries represent a higher percentage of bicyclists severe injured in Bell than countywide, where six percent of bicycle-involved collisions resulted in severe injuries. Table 1-13**Error! Reference source not found.** summarizes the number of bicycle-involved collisions in the city by year, both in absolute numbers and as a percentage of all collisions and injuries.

Table 1-13 Bicycle-Involved Collision Summary

Year	Bicycle-Involved Collisions (Total Bicycle Riders Involved)	Bicycle Share of Total Collisions	Bicycle-Involved Collisions Resulting in Severe Injury	Bicycle Share of Severe Injuries
2009	11 (11)	8.4%	0	0%
2010	15 (16)	8.8%	0	0%
2011	21 (21)	13.2%	0	0%
2012	24 (25)	15.5%	2	33.3%
2013	20 (20)	11.4%	1	7.7%
Total	**91 (93)**	**11.5%**	**3**	**8.3%**

Table 1-14 displays the top four roadways with the most bicycle-involved collisions based on data from 2009-2013. Florence Avenue, an arterial street with a 35 mph speed limit, experienced the most bicycle collisions among roadways in the City of Bell during the study period with 25 reported collisions. Gage Avenue, another arterial road with a 30 mph speed limit, closely followed with 15 bicycle-involved collisions during the study period. Together, the four roadways identified in Table 1-14 accounted for 56 percent of all bicycle-involved collisions.

Table 1-14 Highest Bicycle-Involved Collision Roadways

Roadway	Number of Bicycle-Involved Collisions
Florence Avenue	25
Gage Avenue	15
Pine Avenue	6

[7] *The California Highway Patrol defines a severe injury as one "which prevents the injured party from walking, driving, or performing activities he/she was normally capable of before the collision." Source: California Highway Patrol Glossary.*

Roadway	Number of Bicycle-Involved Collisions
Atlantic Avenue	5

As shown in Table 1-15, more than two thirds of the bicycle-involved collisions occurred outside daylight hours (67 percent). The relatively high number of collisions that occurred in the nighttime hours likely reflects both high traffic levels and poor visibility after dark. It is also important to mention that all the severe injuries that happened during the period studied happened between 6PM and 9PM. The number of collisions and severity indicates a need for various countermeasures such as bicycle safety education concerning visibility and lights, motorist education regarding watching for people on bicycles, or other means to improve the visibility of people on bicycles to motorists (i.e., bicycle lanes, "Share the Road" signs, etc.).

Table 1-15 Bicycle-Involved Collisions by Time of Day

Time of Day Comparison	Collisions	Percent of Collisions
Daylight (9AM-5PM)	29	31.9%
Dawn and Dusk (6AM-9AM & 5PM-8PM)	30	33%
Nighttime (8PM-6AM)	32	35.1%
Total	**91**	**100%**

Table 1-16 shows that sideswipes made up the vast majority (62.6 percent) of known bicycle-involved collisions in Bell during 2009-2013. Sideswipes generally occur when a motorist or person bicycling fails to yield while changing lanes or turning. The second highest bicycle-involved collision type is 'Other,' which includes a collision while a vehicle was backing among other possibilities. In Los Angeles County, 'Broadside' collisions accounted for almost half of bicycle-involved collisions. 'Other' and 'Sideswipe' complete the top three with 23 and 11 percent, respectively.

Table 1-16 Bicycle-Involved Collisions by Type

Type of Collision	Number of Collisions	Percentage of Total
Sideswipe	57	62.6%
Other[8]	13	14.3%
Head On	8	8.8%
Broadside	4	4.4%
Rear End	4	4.4%

[8] *According to the SWITRS Collision Investigation Manual, 'Other' is defined as "a collision not covered in the preceding elements. This entry shall be explained in the narrative, such as a vehicle involved with: (1) A bicycle, train, or animal; (2) An automobile fire; (3) Passengers falling or jumping from a vehicle; (4) A vehicle backing or; (5) A bicycle involved with a pedestrian or another bicycle."*

Type of Collision	Number of Collisions	Percentage of Total
Pedestrian	4	4.4%
Not Stated	1	1.1%
Total	**91**	**100%**

Table 1-17 shows that violation of automobile right of way was the most common type of violation recorded (29.7 percent) of known bicycle-involved collisions in Bell during 2009-2013. Violation of automobile right of way happens when, in the estimation of an officer, a cyclist fails to yield to motorist when required. The second and third highest type of violation were 'Wrong Side of Road' (16) and 'Improper Turning,' (15) which includes improper u-turns or an improper left or right turn at a traffic signal. In Los Angeles County, 'Wrong Side of the Road' was the first violation reported during the study period with 27 percent, closely followed by 'Automobile Right of Way" with 22%. 'Improper Turning' violations percentage is almost two times higher in Bell than in Los Angeles County.

Table 1-17 Bicycle-Involved Collisions by Violation Category

Violation Category	Number of Collisions	Percentage of Total
Automobile Right of Way	27	29.7%
Wrong Side of Road	16	17.6%
Improper Turning	15	16.5%
Other	15	16.5%
Other Hazardous	7	7.7%
Traffic Signals and Signs	6	6.6%
Unsafe Speed	2	2.2%
Unsafe Starting or Backing	2	2.2%
Unsafe Lane Change	1	1.1%
Total	**91**	**100%**

Bicycle-Involved Collisions Summary

Bicycle-involved collisions occurred at higher frequencies at intersections on arterial streets such as Florence Avenue and Gage Avenue, particularly during hours of darkness and limited visibility. A large majority of these bicycle-involved collisions were classified as sideswipe collisions, which typically are referred to as "blind spot" or "right hook" collisions.

Many of the bicycle-involved collisions were the result of bicyclists riding on the wrong side of the street or caused by improper turning. This may suggest that the bicycle network is incomplete and does not serve desired paths of travel.