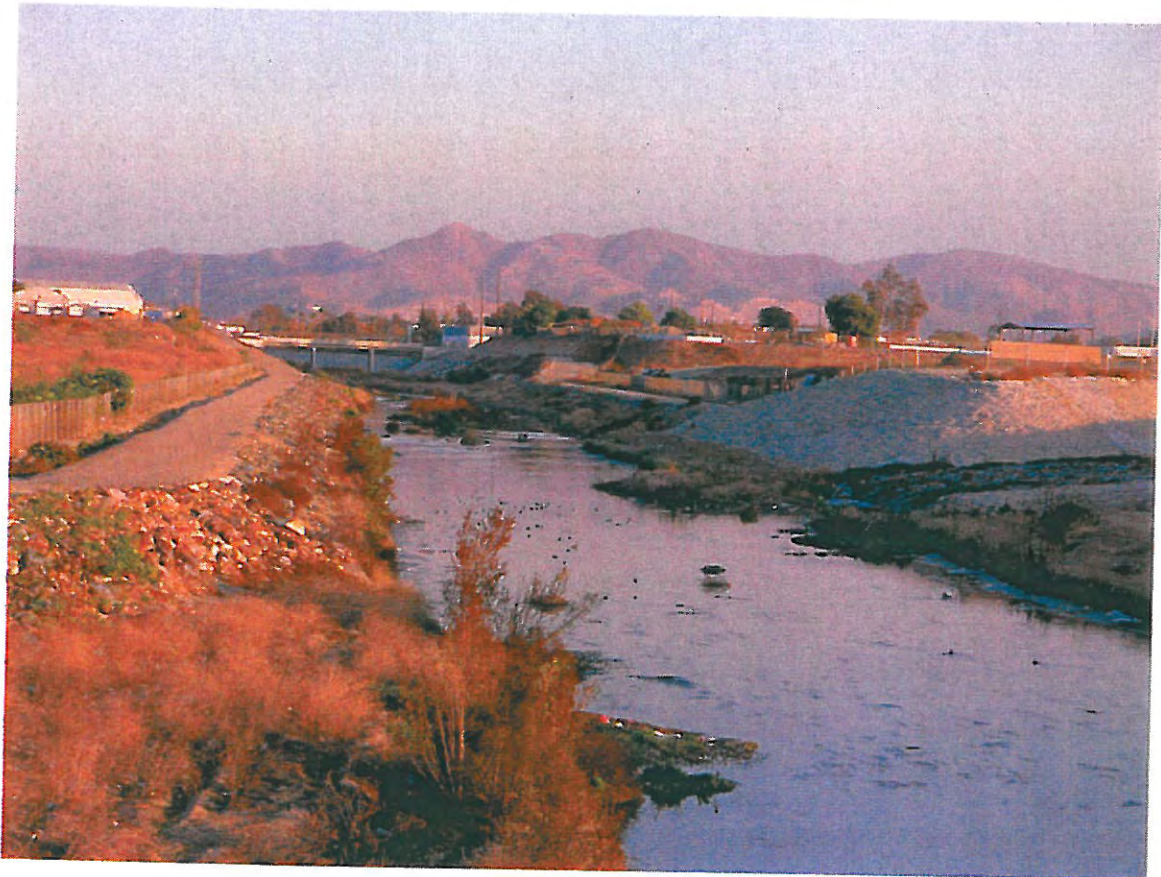


# Corona Bicycle Master Plan



Prepared for:  
City of Corona

Prepared by:  
Alta Transportation Consulting  
Ryan Snyder Associates

May 31, 2001

<b>Figures</b>	<b>Page</b>
1. Types of Bikeway Facilities	7
2. Existing Bikeways Map	15
3. Proposed Bikeway Map	26
4. Class II Bike Lane Cross Section	64
5. Class II Bike Lane Intersection Design	65
6. Right-Turn Channelization	66
7. Typical Bicycle Route Sign	69
8. Colored Pavement Marking and Sign	70
9. Stencil Schematic	70
10. Sign at Signalized Intersection	71
11. Sign at Unsignalized Intersection	72
12. Motorist Warning Signs	73
13. Bicycle Racks	75
14. Bicycle Lockers	76

<b>Bicycle Transportation Account</b>	<b>Page</b>
1. Existing and Future Bicycle Commuters	18-20
2. Land Use Map and Population Density	83
3. Existing and Proposed Bikeways	9,15, 26
4. Existing and Proposed Bicycle Parking Facilities	13,15,26
5. Existing and Proposed Multi-modal Connections	14
6. Existing and Proposed Changing and Storage Facilities	11
7. Bicycle Safety and Education Programs	14
8. Citizen Participation	5
9. Consistency with Transportation and Air Quality	23
10. Project Descriptions and Priority Listings	28-40
11. Past Expenditures and Future Financial Needs	55



# Corona Bicycle Master Plan Introduction

## Introduction

The City of Corona recognizes that a safe and effective bikeway network enhances the quality of life for residents and visitors to the City. The City and its residents have called for a comprehensive Bicycle Master Plan (BMP) that will create the foundation for a bicycle friendly environment to serve commuter and recreational riders.

This Bicycle Master Plan serves as a document to guide the development and maintenance of a bicycle network, support facilities and other programs for Corona over the next 20 years. The Plan addresses important issues related to Corona's bicycling environment including bikeways, parking, multi-modal integration, safety and education, support facilities as well as implementation, maintenance and funding.

The success of the plan will only be assured by continued support of the City Staff, the bicycling community and other residents who recognize the benefits of cycling in their community.

## Setting

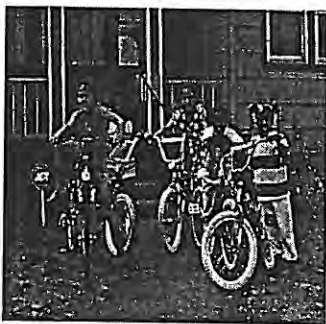
Corona is one of the fastest growing cities in the United States. Nearly 123,000 people presently reside in Corona. The population increased by 61.9% between 1990 and 2000. The number of housing units increased by 48.9% during the same 10 years. (Economic, Demographic and Life Style Information prepared for the City Housing and Development Department by Dr. John Husing, 2000.) More than a century old, Corona now boasts a young, well-educated and ethnically diverse population. The City now has more than 275 acres of parks, with park development an ongoing process.

More than 50,000 people work in Corona as well, as commercial, industrial and retail areas continue to expand (Economic, Demographic and Life Style Information prepared for the City Housing and Development Department by Dr. John Husing, 2000). As housing costs rise, and congestion in Orange County grows, Corona attracts more commercial development. Until recently, the non-residential real estate market has been primarily industrial, but the future looks to more commercial office development.

## Existing Transportation

Corona lies in the southwest corner of Riverside County, and is close to Orange, San Bernardino and Los Angeles Counties. It is about 45 miles southeast of Los Angeles. Corona encompasses about 36 square miles. It is linked to the region via the State Highways 91 and 71, as well as Interstate Highway 15. Situated at the top of Santa Ana Canyon, many residents of Corona, commute to job-rich Orange County. Many other Riverside County residents pass through Corona on their daily trek to Orange County.

The City is also connected to the region by public transportation services. The Riverside Transportation Authority (RTA) runs two bus lines through Corona. Metrolink trains stop at one station in Corona serving longer distance commuters. Another Metrolink station will open in Corona in the future. Additionally, this year Corona commenced local shuttle service along three lines.



### **Bicycle Master Plan Needed**

The vitality of the City of Corona brings with it traffic congestion for residents and visitors. For both long commutes and short commutes in the City, people tend to drive, adding to the traffic conditions they dislike. If there were better alternatives, people would be more likely to choose bicycling in the temperate climate, along tree-lined streets, to their destination. In order to achieve this goal, the bicycling environment in Corona must be enhanced. Having a planning document such as the Bicycle Master Plan (BMP) that identifies bicycle routes, programs and facility priorities will enable the City to create an attractive alternative.

Another reason to have a Bicycle Master Plan is the enjoyment and quality of life for the residents of Corona. Since bicycling is one of the most popular forms of recreational activity in the United States (with 46% of Americans bicycling for pleasure), we can assume that based on this national data, approximately 56,000 of them would bicycle in Corona purely for pleasure, at least occasionally.

Safety is a primary reason to improve bicycling conditions in Corona. Concerns for safety is the single greatest reason people don't commute by bicycle, according to a 1991 Lou Harris Poll. Addressing those concerns for bicyclists through physical and program improvements is another major objective of this Bicycle Master Plan.

Safety, access, quality of life, and effective implementation are imperative elements for Corona's success as a bicycle-friendly city.

**Safety** is the number one concern of citizens, whether they are avid or casual recreational cyclists or bicycle commuters. The City's wide arterial streets City create a fairly safe cycling environment, however the widths of the traffic lanes can also contribute to higher vehicle speeds. Heavy traffic volumes combined with narrower streets in the central force bicyclists to use side streets to avoid traffic along the commercial corridors, making safe access to employment centers and shopping destinations problematic. Few streets cross the 91 freeway north-south, and those that do are generally busy arterials.

**Bicycle Master Plan  
Needed, continued**

**Access improvements** for bicyclists are important to help improve the ability to take utilitarian trips to destinations such as work, shops and schools. The 91 and 15 freeways sport busy on and off ramps, forcing bicyclists to negotiate difficult interchanges. Presently only a few stretches of bikeways exist.

This Plan urges Corona to take measurable steps toward the goal of improving every Corona citizen's **quality of life**, creating a more sustainable environment, reducing traffic congestion, vehicle exhaust emissions, noise, and energy consumption. The importance of developing a bicycle system that is attractive and inviting is a key element in preserving Corona as a city where people want to live, work, and visit. The attractiveness of the environment not only invites bicyclists to explore Corona, but more importantly, a beautiful environment helps to improve everyone's positive feelings about the quality of life in Corona.

Education, enforcement, engineering, and funding are the basic components of an **effective implementation** program for this Bicycle Master Plan. Education must be targeted to the bicyclist as well as to the motorist regarding the rights and responsibilities of the bicyclists and automobile drivers. Comprehensive enforcement of existing traffic and parking laws, coupled with the implementation of sound design and engineering principles for bike corridors, is also critical. This plan proposes a systematic review of all new development projects, including public works efforts, to assure compliance with planning and building codes and the goals of this Bicycle Master Plan. Finally, this plan proposes an aggressive strategy for obtaining grants and competing for other funding sources in order to realize the physical improvements identified as the highest priorities.

**Major Recommendations**

The plan contains recommendations that, if implemented over the next 20 years, will make Corona a model community for bicycling in Riverside County. The City calls for a bold vision for Corona that will improve conditions for those who choose to ride a bicycle for commuter and recreational use. Through a public workshop residents have cited concerns about traffic congestion, safety and general livability as the primary impetus

**Major  
Recommendations,  
continued**

to implement the plan. The end result will be to dramatically increase the number of people bicycling for utilitarian trips such as work, school or shopping, as well as for recreational bicyclists.

The specific recommendations of the Corona BMP include the completion of a comprehensive bikeway network and implementation of new educational and promotional programs to be implemented over the 20-year life of the Plan. Short-term projects in general order of preference are detailed later in this report and include bikeways along the following corridors:

- Temescal Creek
- Maybey Canyon Wash
- 6<sup>th</sup> Street
- Buena Vista Avenue
- Main Street
- Fullerton Avenue
- Olive Street
- Railroad Street/Auto Center Drive
- Parkridge Avenue/Harrison Street/Blaine Street

The BMP also includes as high enough priority to consider as short term projects:

- Bicycle Parking Program
- Bicycle Safety Awareness Program

**Planning Process**

This plan has been developed during the fall of 2000 and winter of 2001 by the City of Corona Public Works Department. A Technical Advisory Committee (TAC) of the City was established to oversee the project. The TAC includes representatives from the City's Public Works, Planning and Parks Departments.

In addition, the public has been involved in the planning process. A public workshop was held and some people have submitted comments to the City at various times. The public workshop was advertised through the media, bicycle shops, city hall, mailings to neighborhood and community association leaders.



# Corona Bicycle Master Plan Existing Conditions

It is important to evaluate existing conditions in order to develop a bicycle system that enhances the existing system and more importantly builds and improves upon it. Consideration of existing conditions includes evaluating and assessing bikeways, signage, support facilities, safety education and multi-modal connections.

## Bikeways Definitions

Bikeways are described by Caltrans in Chapter 1000 of the Highway Design Manual as being one of three basic types (Figure 1).

**Class I Bikeway** Variousy called a bike path or multi-use trail. Provides for bicycle travel on a paved right of way completely separated from any street or highway.

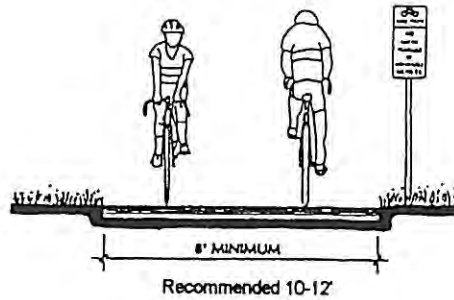
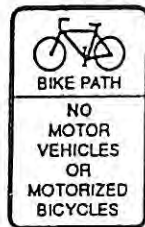
**Class II Bikeway** Referred to as a bike lane. Provides a striped lane for one-way travel on a street or highway.

**Class III Bikeway** Referred to as a bike route. Provides for shared use with pedestrian or motor vehicle traffic and is identified only by signing.

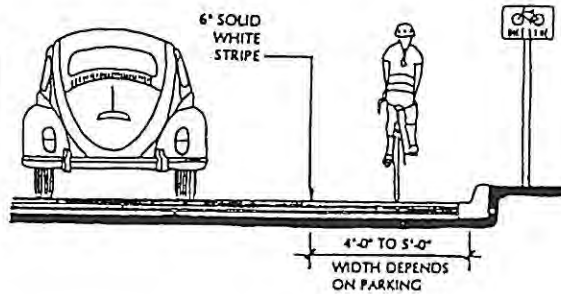
It is important to ensure that all bikeways in Corona meet the Caltrans minimum designated Class I, II and III standards. For example, Class I multi-use paths must meet specific width, clearance, curve radii, gradient, and other requirements, while Class II bike lanes and Class III bike routes must meet specific striping, signing and other requirements. Off-street paved paths that do not meet Caltrans standards should not be identified as Class I paths on maps or plans. The design guidelines provided later in this plan should help ensure consistency with accepted state and national standards.



BIKE PATH



BIKE LANE



BIKE ROUTE

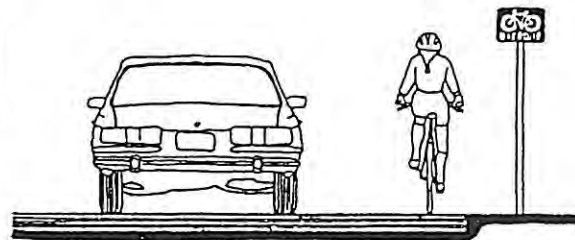


Figure 1: Types of Bikeway Facilities

**Existing  
Bikeways**

An extensive field review was conducted of all the existing bikeways in Corona. There are approximately 8 miles of Class I, II and III bikeways. The breakdown of the bikeways by class includes approximately 1 mile of Class I, 7 miles of Class II and no Class III bikeways. Table 1 provides an inventory of each class type, destinations, conditions, comments and length in miles of each existing bikeway. Figure 2 , shows the existing bikeways.

Corona presently has few bikeways, and nothing that could be called a bikeway network. However, the bicycling community, ranging from experienced club riders to school children, has figured out a way to use the existing streets and routes for their own purposes. This plan looks at the existing opportunities and constraints to help develop a comprehensive bike system that will make it easier for all types of bicyclists to travel to their destinations.

Table 1: Existing Corona Bikeways

Bikeway	Class	From	To	Condition	Comments	Miles
Chase/Foothill bike path	I	Ben Franklin Elementary School	Buena Vista Ave.	good	This is a short bikeway; has no bike parking or other amenities; needs better signage to entrances and along the way, as well as markings for motorists to see	0.9
Hidden Valley Dr. bike lanes	II	Parkridge Ave.	Promenade Ave.	good	The bike lanes are wide and the pavement is well maintained; the paint needs maintenance	1.5
Parkview Dr. bike lanes	II	Hidden Valley Dr.	Norco Hills Dr.	good	short residential connector bikeway that serves a park and a school	0.5
Green River Rd. bike lanes	II	CA 91	Paseo Grande	excellent	wide and well-marked bike lanes	3.3
Palisades Dr. bike lanes	II	Green River Rd.	Serfas Club Dr.	fair	needs repaving and paint maintenance	1.7

The City of Corona is a rapidly developing city. Neighborhoods and commercial districts in the central sections of the city have narrow streets and a high level of density compared with the rest of Corona, which is more suburban with long wide streets.

### **Sidewalk Bikeways**

Corona has some sidewalk bikeways, which are not mapped because they do not meet design standards. These bikeways have significant disadvantages and should be used only in circumstances where there is "high speed or heavily traveled roadways having inadequate space for bicycles" or along bridges as described by Caltrans in the Highway Design Manual. They can be useful to people traveling within their own block.

### **Sign Conditions**

Implementing a well planned, attractive, and effective system of network signing greatly enhances bikeway facilities by promoting their presence to both potential and existing users. Signing helps increase bicycle use by leading people to city bikeways and also helps increase visibility for safety reasons. There are four major types of signs, including those used to identify a route, destination signs, access signs and safety signs warning cyclists and motorists of each other. Good signage would improve bicycling in the City, but since there are presently few bikeways, it will help most as more are installed.

There are no destination signs in the City. These types of signs identify major destination centers and indicate the approximate number of miles to that location.

Safety signs are important in reducing the number of accidents between bicyclists and motorists. The most common safety signs can either warn motorists of bicyclists or caution bicyclists to on coming traffic. There are no bicycle safety signs in Corona.

## **Bicycle Amenities**

In a nationwide Harris Poll conducted in 1991, almost half the respondents stated that they would sometimes commute to work by bicycle or commute more often if there were amenities such as showers, lockers and secure bicycle storage at work.

There is a need for potential commuting cyclists to have access to shower, locker and changing facilities at the end of their destination. For those cyclists needing to dress more formally, traveling longer distances or cycle during inclement weather, the ability to shower and change clothing can be as critical as bicycle storage. There are existing shower and changing facilities in the public schools. A few private companies and industrial sites have amenities that cyclists can use. This information was gathered from an employer survey. The bicycle amenities are shown in Bicycle Parking and Support Facilities, Table 2, as well as the Existing Bicycle Facilities Map, Figure 2.

## **Bicycle Parking and Storage**

A bicyclist's needs for bicycle parking or storage ranges from simply locking a bike to a convenient piece of street furniture, to storage in a bicycle locker that affords weather, theft and vandalism protection, gear storage space and 24-hour access. Bicycle parking is determined by several factors:

- Type of trip being made: whether or not the bicycle will be left unattended all day or for just a few minutes.
- Security of area: A well-lighted area with supervision is optimal, although security is often determined by the bicyclist's perception.
- Value of the bicycle: the more a bicyclist has invested in a bicycle relative to their income, the more there will be a concern for protection or theft.

Class I bicycle parking facilities accommodate employees, students, residents, commuters and others who are expected to park more than two hours. This type of parking is to be provided in a secure, weather protected manner and location. Class I bicycle parking is either a bicycle locker, or a secure area like a bike corral that can be accessed only by bicyclists.

**Bicycle Parking and Storage, continued**

Bike lockers are covered storage units that typically accommodate one or two bicycles per locker, and provide additional security and protection from the elements. These are typically located at large employment center, colleges, and transit stations.

Class II bicycle parking facilities are best used to accommodate visitors, customers, messengers, and others who are expected to depart within two hours. Bicycle racks provide support for the bicycle but do not have locking mechanisms. Racks are relatively low-cost devices that typically hold between two and eight bicycles, allow bicyclists to securely lock their frames and wheels, are secured to the ground and are located in highly visible areas. They are usually located at schools, commercial locations, and activity centers such as parks, libraries, retail locations and civic centers.

A field review of Corona revealed that there are existing bicycle parking facilities that range from simple bike racks to bike lockers. The bicycle parking facilities are typical racks that are often located at shopping centers. Since the design of these racks don't support bicycles well, and they are difficult to lock to, they are not considered user-friendly.

These bicycle parking facilities are located at public buildings, parks and private commercial developments. The City has 14 bicycle lockers located at City Hall and at the library. Additionally, the City has placed bicycle parking at numerous parks. Besides public facilities in Corona, the Corona Hills Marketplace shopping center and Citrus Village shopping center also have bicycle racks. The locations of these existing bicycle parking facilities are shown on the Existing Bicycle Parking and Support Facilities (Table 2). These are also shown on the Existing Bicycle Facilities Map (Figure 2).

Table: 2 Existing Bicycle Parking and Support Facilities

Parks	RACK CAPACITY (# Bikes)
Village	6
Eagle Glen	6
Promenade	6
Brentwood	18
City	18
Civic Center Ballfields	18
Cresta Verde	18
Kellogg	18
Mountain Gate	7
Neighborhood Center	18
Ontario	7
River Road	14
Tehachapi	5
Victoria	14

Employer	Bicycle Racks or Storage Area	Bicycle Lockers	Changing Area and/or Clothing Lockers	Showers
Corona Regional Medical Center	X		X	X
Golden Cheese Factory	*X		X	X
Waste Management			X	
Sports Carriers Inc.			X	
Cast Arts Industries	X		X	
Kmart	X			
Marshall Vinyl	X			
Fender Musical Instruments		**X		
NOTE: *response did not specify racks or lockers **bicycle lockers have been ordered				

## **Bicycle Safety**

A safety education program has been conducted in each of the last two years at the elementary schools. It has taught students in grades 2<sup>nd</sup> through 6<sup>th</sup>. Altogether, 90 students received the training the first year, and 232 the second. The curriculum lasts four hours and includes:

- A bike safety film and rodeo from the American Automobile Association
- On-bike training including avoiding road hazards, balance, rules of the road, main causes of accidents
- Bike inspections
- Safety test

## **Multi-Modal**

The local transit operator, Riverside Transit Authority, has bike racks on all the front of its buses. Two lines presently serve Corona. In a survey taken in one week in January, 2001, an average of 13 cyclists used the racks per day in Corona. The most popular stops were on 6<sup>th</sup> Street.

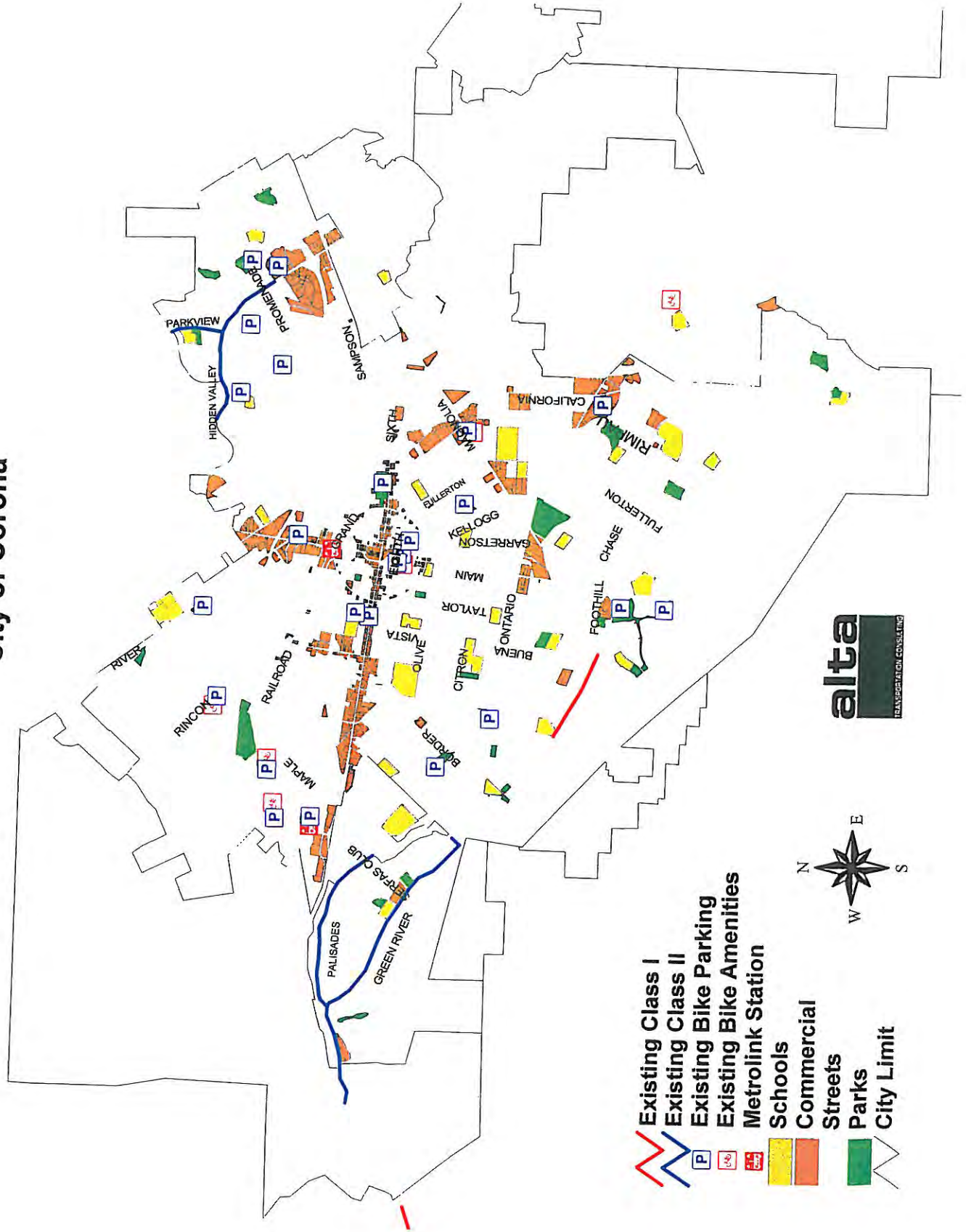
The City of Corona has recently initiated its own shuttle bus service for local trips, called the Corona Cruiser. Each of the five buses has bike racks on the front.

The Metrolink (commuter rail) Station has bicycle lockers and racks. A future Metrolink Station will open on Blaine Street under Main Street in the future. It will also have bicycle lockers and racks.

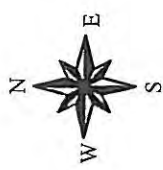




**Figure 2: Existing Bicycle Facilities Map  
City of Corona**



- Existing Class I
- Existing Class II
- Existing Bike Parking
- Existing Bike Amenities
- Metrolink Station
- Schools
- Commercial
- Streets
- Parks
- City Limit





## Bicycle Commuter Needs

# Corona Bicycle Master Plan Needs Analysis

The purpose of reviewing the needs of commuter and recreational bicyclists is twofold: (1) it is instrumental when planning a system that must serve both user groups, and (2) it is useful when pursuing competitive funding and attempting to quantify future usage and benefits to justify expenditures of resources.

Commuter bicyclists in Corona range from employees who ride to work to a child who rides to school. Millions of dollars nationwide have been spent attempting to increase the number of people who ride to work or school, with some success. Despite this fact, Corona has a great potential to increase the number of people who ride to work or school because of:

- the manageable size of the city
- the easy to moderate terrain
- favorable climate throughout most of the year
- a large number of jobs which allow local residents to work in the city
- a large number of school-aged people.

In addition to the reasons why there is a potential for commuter bicycling, is a population in the City that is prime for bicycle commuting. The type of bicyclists and the characteristics of their cycling is summarized below.

- Commuter bicyclists typically fall into one of three categories: (1) adult employees, (2) students, and (3) shoppers.



**Commuter Bicycle  
Needs, continued**

- Commuter trips usually range from several blocks to five miles.
- Commuters typically seek the most direct and fastest route available, with regular adult commuters often preferring to ride on arterials rather than side streets.
- Commute periods typically coincide with peak traffic volumes and congestion, increasing the exposure to potential conflicts with vehicles.
- Places to safely store bicycles are of paramount importance to all bicycle commuters.
- Major commuter concerns include changes in weather (rain), riding in darkness, personal safety and security.
- Rather than be directed to side streets, most commuting adult cyclists would prefer to be given bike lanes or wider curb lanes on direct routes.
- In general, a primary concern to all bicycle commuters are intersections with no stop signs or signal controls.
- Commuters generally prefer routes where they are required to stop as few times as possible, thereby minimizing delay.
- Many younger students (ages 7-11) use sidewalks for riding to schools or parks, which is acceptable in areas where pedestrian volumes are low and driveway visibility is high. Where on-street parking, street furniture, and/or landscaping obscures visibility, sidewalk riders may be exposed to a higher incidence of accidents. Older students (12 years or older) who consistently ride at speeds over 10 mph should be directed to riding on-street wherever possible.
- Students riding the wrong way on streets are common and account for the greatest number of recorded accidents in California, pointing to the need for safety education.

**Recreational Bicycle Needs**

The needs of recreational bicyclists in Corona must be considered, as they are often different from commuter bicycle needs. Recreational cycling in Corona can be attractive because

- There are accessible parks and some water channels that show strong potential for off-road bike paths
- The terrain is easy to moderate
- Mild climate throughout most of the year
- A young, well-educated population.

There are also different needs and patterns for bicycling that are specific to the recreational rider:

- Recreational bicycling typically falls into one of three categories; (1) exercise, (2) non-work destinations such as parks, or (3) touring, long distance treks or events.
- Recreational users range from healthy adults to children to senior citizens. Each group has their own abilities, interests and needs.
- Directness of the route is typically less important than routes with less traffic conflict. Visual interest, shade, protection from weather elements, moderate gradients or other "comfort" features are also very important.
- People exercising or touring often prefer a loop route rather than having to backtrack.

**Bicycle Population and Needs Assessed**

A key goal of the Bicycle Master Plan is to maximize the number of bicycle commuters in order to help achieve larger transportation goals such as minimizing traffic congestion and air pollution. In order to set the framework for these benefits, national statistics and policies are used as a basis for determining the benefits to Corona.

**Bicycle Population and Needs, continued**

- Currently, nearly 3 million adults in the United States (about 1 in 60) commute by bicycle. This number could rise to 35 million if adequate facilities were provided (according to a 1991 Lou Harris Poll).
- Bicycling is one of the most popular forms of recreational activity in the United States, with 46% of Americans bicycling for pleasure. If Corona is consistent with the national average, based on a total population of nearly 123,000 Corona residents, more than 56,000 residents in Corona do, or would like to, bicycle for pleasure. If nothing else, this indicates a latent demand for facilities and a potent constituency to push for better facilities. Another way of saying this is, if you build it, they will come.
- The latent need for bicycle facilities, versus actual bicyclists, is difficult to quantify; we must rely on evaluation of comparable communities to determine potential usage.
- Mode split refers to the choice of transportation people make whether for work or non-work trips. Currently, the average household in the U.S. generates about 10 vehicle trips per day. Work trips account for less than 30% of these trips on average.
- Using the 1990 U.S. census data adjusted for current population numbers, about 0.67 percent all employed Corona residents commute primarily by bicycle. This does not include those who ride to work less than 50% of the time, nor does it always include those who may walk or ride to transit and list transit as their primary mode. Based on a total employed population of just under 50,000 in 2000, approximately 333 people in Corona are estimated to use a bicycle to commute to work.
- Nationally, the mean travel time for bicycle and pedestrian commuters was 14.2 minutes, which translates roughly into a commute distance of about 3.5 miles for bicyclists.

**Bicycle Population,  
continued**

- The U.S. Department of Transportation in their publication entitled National Walking and Bicycling Study (1995) sets as a national goal the doubling of current walk and bicycling mode shares by the year 2010, assuming that a comprehensive bicycle system was in place. This would translate into a full-time commute bicycle mode share of 1.34% in Corona. However, adding in the estimated number of commuters who commute to local schools (based on national averages), the average number of daily bicyclists in Corona increases to 1.87% with an estimated 5,646 bicycle commuters when the Bicycle Master Plan is fully implemented. These bicyclists will be saving an additional projected 25,545 vehicle miles per day.

**Bicycle Safety**

Safety ranks as one of the top concerns for bicyclists when considering riding either for commuter or recreational purposes. Although there is a bicycle safety program in Corona, the program is not monitored. Thus, it is difficult to determine its effectiveness. Other communities with successful bicycle safety programs have found such programs to be of great value in improving safe cycling.

Although the center of Corona is older, most of the city shows newer suburban characteristics. High-speed arterial streets designed to get large numbers of motorists to freeways quickly present the primary safety hazards noted during field research conducted for this Plan. The streets are generally well maintained. The drainage grates are bicycle-safe, as are the railroad track crossings.

**Accident Data Assessed**

Many potential bicyclists cite the fear of traffic as one of their main objections to riding a bicycle in suburban communities such as Corona.

Bicycle related accidents were collected for the past three year from October of 1997 through September of 2000 in Corona. Accident data was generated from the City of Corona engineering.

**Accident Data,  
continued**

A total of 103 bicycle accidents were reported for the last three years with the following breakdown by period and type.

**Table 3 Bicycle Accident Data for Corona**

12-Month Period	# Non-Injury Accidents	# Injury Accidents	# Fatalities
10/97-9/98	16	20	2
10/98-9/99	7	27	0
10/99-9/00	7	24	0

Given that 103 accidents were reported during the three year period, it seems that bicycle related incidents are a to be considered as an important issue in Corona. Corona's average annual rate is approximately 0.28 per 1,000 based on an estimated population of 122,989 residents. This falls well below the average of 0.67 of incidents per 1,000 persons in over 30 other California cities. Nevertheless, it is a serious problem. The lower average could be due to any number of reasons that are unknown. It may be that conditions are generally safer than in other cities. Perhaps people in Corona are safer riders. Or maybe people cycle less than in other cities on average.

The accidents occurred at various times of the year with no season significantly worse than the others. The accidents were also scattered throughout Corona. However, there was some general concentration in the central areas of town.

**Accident Data and  
Police Enforcement**

The Corona Police Department enforces all traffic laws, for bicycles and motor vehicles as part of their regular duties. They ticket violators as they see them. This includes bicyclists who break traffic laws, as well as motorists who disobey traffic laws and make the cycling environment more dangerous.

The level of enforcement depends on the availability of officers. The Police Department also responds to particular needs and problems as they arise. The Police Department reviewed the Bicycle Master Plan as the consultant released drafts to city staff.



**Police Enforcement,,  
continued**

The Police Department also dispatches a fleet of bicycle-mounted officers. These officers have had special training in bicycle safety and assist in enforcing traffic laws. They are especially qualified to enforce laws as they pertain to bicycles.

The number of bicycle-related accidents hasn't changed much in the past three years, so it is difficult to assess the effectiveness of the safety program and police efforts. However, since the accident rate of .28 is much lower than the state average, these efforts are likely helping.

**Air Quality Needs in  
the Region Assessed**

There is a need in the greater Los Angeles area, which includes Corona, to consider the need for better air quality where bicycling can help. The combined air quality benefits of future bicycle commuters over the next 20 years are an annual reduction of tens of thousands of pounds of reduced air pollutants like nitrogen oxides and particulate matter. The annual reduction of pollutants is estimated at 30,373 pounds of particulate matter PM10, 82,338 pounds of nitrogen oxide NOx and 119,842 pounds of reactive organic gases ROG.

The calculation of future bicycle commuters, the miles reduced and air pollution reduced from build-out of the Bicycle Master Plan is shown in Table 4. It uses statistics from sources cited and a methodology developed by Alta Transportation Consulting for the Los Angeles County Metropolitan Transportation Authority.

**Table 4 Bicycle Demand and Air Quality**

Population	122,989	(City Economic, Demographic & Life Style Information, Dr. John Husing, 2000.)
# of Employed Persons	49,722	(Dr. John Husing, 2000.)
# Bicycle-to-Work Commuters	333	1990 US Census extrapolated consistent with population growth
Bicycle-to-Work Mode Share	0.67%	calculated from above
Population: Ages 6-14 years	17,729	1990 US Census extrapolated consistent with population growth
# of College Students	7,922	1990 US Census extrapolated consistent with population growth
# of Daily Bike-Transit Users	13	local transit agency
Total # of Bicycle Commuters	2,025	assumes 5% of school students and 10% of college students commute by bicycle - from national studies and estimates
# Miles Ridden by Bicycle Commuters per Weekday	4,101	work commuters (including bike-transit users) x 7 miles + college and school students x 1 mile (round trip)
# of Future Daily Bicycle Commuters	5,649	estimated using increase to 279% of baseline from 2000 LACMTA study by Alta
Future # Miles Ridden by Bicycle Commuters per Weekday	11,441	
Reduced Vehicle Miles per Weekday	7,340	
Reduced PM10 (lbs/weekday)	135.06	(.0184 tons per reduced mile)
Reduced NOX (lbs/weekday)	366.13	(.04988 tons per reduced mile)
Reduced ROG (lbs/weekday)	532.90	(.0726 tons per reduced mile)
Reduced Vehicle Miles per Year	1,650,718	180 days for students, and 256 days for employed persons
Reduced PM10 (lbs/year)	30,373	(.0184 tons per reduced mile)
Reduced NOX (lbs/year)	82,338	(.04988 tons per reduced mile)
Reduced ROG (lbs/year)	119,842	(.0726 tons per reduced mile)



# Corona Bicycle Master Plan Recommended Improvements

## Planned Bicycle System

The recommended system and improvements consists of three (3) distinct components:

- Bikeway network
- Bicycle parking program
- Bicycle safety program

This set of recommendations comprises the heart of the Bicycle Master Plan (BMP). It is consistent with other local and regional transportation and air quality plans. First, the BMP will be folded into Corona's Circulation Plan, as well as the City's General Plan. Second, while Riverside County has not engaged in a comprehensive bicycle planning process, it does link to other regional plans.

Presently, a trail plan for the Santa Ana River is underway where this BMP proposes to connect. The Santa Ana River trail will provide a scenic, pleasant bike ride into both Orange and San Bernardino Counties. Additionally, only two cities abut Corona: Riverside and Norco. This plan links with bike routes that Riverside has planned. Norco has no bicycle route plans. Overall, this plan will fit nicely into Riverside County's portion of the Regional Mobility Plan (RMP) prepared by the Southern California Association of Governments. The RMP is the regional transportation plan. It is also the transportation element of the South Coast Air Quality Management District's Air Quality Master Plan.

**Short Term  
Recommendations**

Each recommended short-term project is presented on its own Project Sheet. The Project Sheets are designed to be used as a direct resource and addendum to funding applications. Each Project Sheet provides detailed information on the proposal. The cost estimates are included on Table 7 in Section 5: Implementation.

In addition to implementing the recommended short-term projects, all of the action items should be implemented, as resources become available. The recommendations, as described in the design section, create the framework for an effective bicycle system and are an important elements of the Plan.

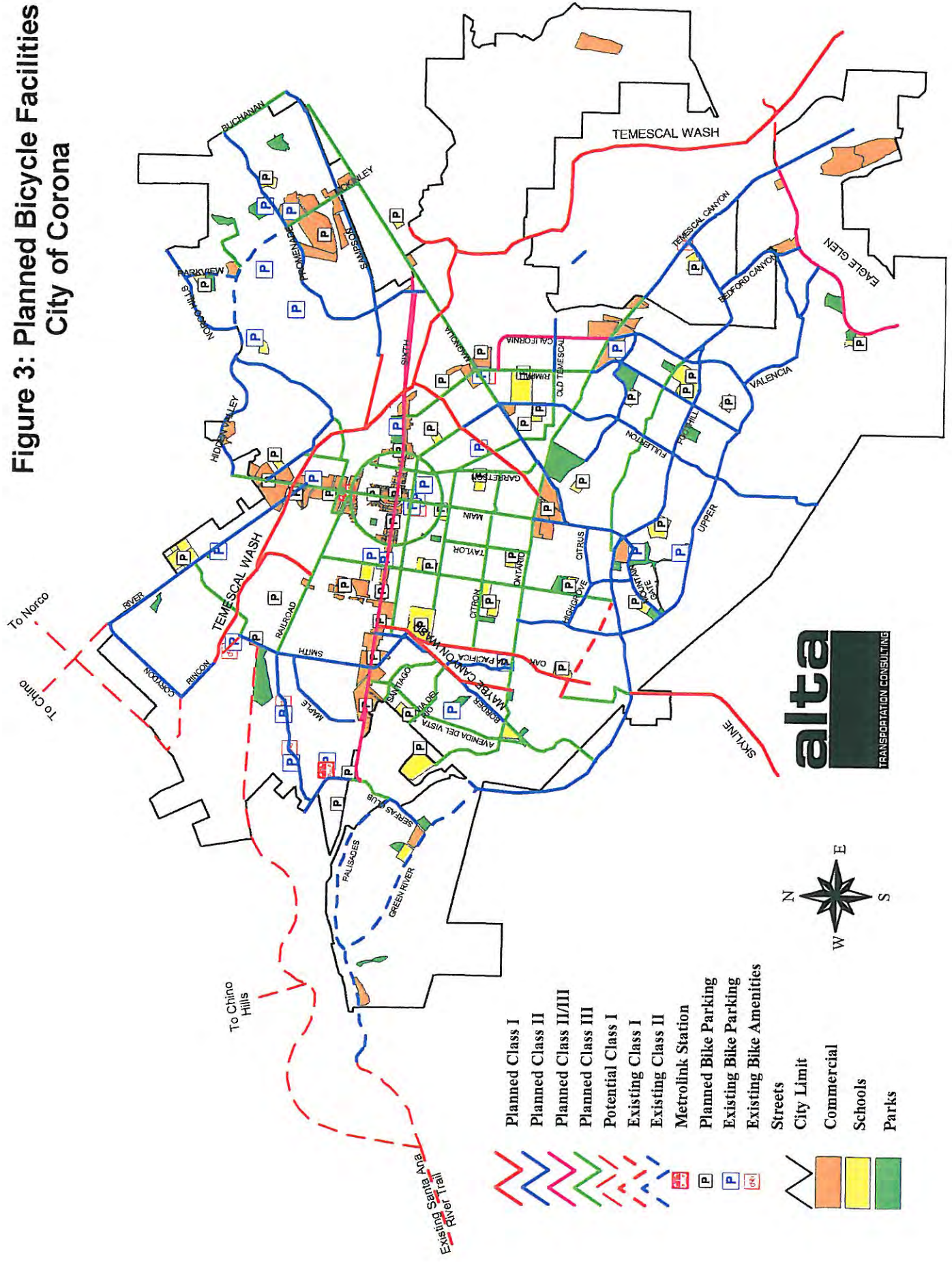
The short term projects were selected by staff, the public and consultants based on their local knowledge and cycling experience, the orientation of funding programs, and other the planning criteria. These short-term projects will be discussed in detail.

A bikeway system is a network of bikeways that, for a variety of reasons including safety and convenience, provide a superior level of service for bicyclists. It is important to recognize that, by law, bicyclists are allowed on all streets and roads regardless of whether they are a part of the bikeway system.

The bikeway system is a tool that allows the City to focus and prioritize implementation efforts where they will provide the greatest community benefit.

The Corona bikeway system was developed focusing on connecting existing segments of bike lanes, and focusing on specific opportunities and constraints. The street grid pattern offers through corridors that connect residential areas with activity centers such as downtown, schools and parks. It is based on a primary system of north-south and east-west corridors, using a combination of paths, lanes and routes. The proposed system takes advantage of several flood control channels that could offer pleasant off-road riding, as well as regional connectivity. The bikeway projects are broken down into short, mid and long-term categories. The proposed bikeway system is shown in Figure 3.

**Figure 3: Planned Bicycle Facilities  
City of Corona**



- Planned Class I
- Planned Class II
- Planned Class II/III
- Planned Class III
- Potential Class I
- Existing Class I
- Existing Class II
- Metrolink Station
- Planned Bike Parking
- Existing Bike Parking
- Existing Bike Amenities
- Streets
- City Limit
- Commercial
- Schools
- Parks

### **Selecting a Bikeway System**

There is an established methodology for selecting a bikeway system for a community includes careful assessment of the existing system, the input from the community and consultants expertise.

The existing network of bikeways in the City and in adjacent Cities and Counties provides a basis for Corona. The process and specific analysis of the existing conditions is explained in the previous chapters.

The real human factor is input from the local bicycle community and city staff that is already familiar with the constraints and opportunities in Corona. Input was received through the public workshop session and meetings with City staff to determine which bikeways would meet their needs.

In addition, the consultant team considered more technical criteria to select the most feasible projects.

- connectivity
- travel volumes and speeds
- amount of side friction (driveways, side streets)
- curb-to-curb width
- pavement condition
- access from residential areas
- number of destinations served (schools, employment centers, transit stations, parks, etc.)
- topography
- integration into the regional system
- adjacent land use
- on-street parking
- accident data and safety concerns
- existing bicycling patterns
- existing bottlenecks or constraints
- existing opportunities such as planned roadway improvements

**Project 1**  
**Temescal Creek Bike Path**

**Ranking - Short Term**

**Responsibility - Corona**

**Existing Challenge - inadequate continuous northeast to southwest bicycle route**

**Classification - Class I Bike Path**

**Length - Approximately 10 miles**

Temescal Creek offers the best opportunity in Corona for a long uninterrupted bikeway useful for commuting and recreation. It would take cyclists through residential neighborhoods to the industrial employment district in the northern part of Corona. It would bring cyclists near downtown and several shopping centers. Since Temescal Creek cuts through a fairly central area, it would improve access to much of Corona. In the long run, this bike path may link to a future Santa Ana River trail providing access to the Prado Basin, as well as other parts of Riverside County, and Orange and San Bernardino Counties. Within Corona it will serve as a backbone to link with the Main Street Wash and other bikeways.

- Conduct an engineering study to determine the best alignment and intersection crossings
- Pave a Class I path along the designed route from the southern end to Rincon Street
- Consider a Class I path all the way to the Santa Ana River
- Construct underpasses where feasible, and appropriate at-grade crossings where underpasses are not feasible
- Add signals and signage at crossings
- Post access signs telling cyclists where to get on the route, location and safety signs along the route, as well as signs to destinations along connecting bikeways
- Add information kiosks, bicycle parking, drinking fountains and benches along the route (possibly restrooms or signage directing users to nearby park restrooms)

**Project 2**

**Maybey Canyon Wash**

**Ranking - Short Term**

**Responsibility - Corona**

**Existing Challenge -  
Inadequate north to  
south bicycle route**

**Classification - Class I**

**Length - Approximately  
1.5 miles**

The Maybey Canyon Wash traverses through a residential neighborhood in the southeastern part of Corona. A bike path along this wash would provide off-street bicycle access to Corona High School, parks and end directly behind a shopping center. It would also provide access to 6th Street.

- Conduct an engineering study to determine the best alignment and intersection crossings
- Pave a Class I path along the designed route from Ontario Avenue to Sixth Street
- Construct appropriate at-grade crossings
- Add signals and signage at crossings
- Post access signs telling cyclists where to get on the route, location and safety signs along the route, as well as signs to destinations along connecting bikeways



**Project 3**  
**Sixth Street Frontage**  
**Road**

**Ranking - Short Term**

**Responsibility - Corona**

**Existing Challenge -**  
**Inadequate east to**  
**west bicycle route**  
**through the center of**  
**town**

**Classification - Class II**  
**bike lanes and or Class**  
**II bike route**

**Length - Approximately**  
**4.9 miles**

Sixth Street serves as the primary commercial and retail street through central Corona. A bikeway along Sixth Street will enhance access to the many stores and offices, as well as civic center. It will connect with many of the other bikeways in Corona linking the network together. Sixth Street also serves as the most direct route for cyclists traveling through Corona.

- Stripe bike lanes where width allows
- Consider adding pavement stencils where there is inadequate width for bike lanes
- Sign cyclists along Frontage Road from Sixth Street
- Add good signage along the entire route from Magnolia Avenue to Serfas Club Drive

**Project 4**

**Buena Vista Avenue**

**Ranking - Short Term**

**Responsibility - Corona**

**Existing Challenge -  
Inadequate north to  
south bicycle route with  
few places to cross  
under the 91 Freeway**

**Classification - Class  
III Bike Route**

**Length - Approximately  
2.8 miles**

Buena Vista Avenue is the most bicycle-friendly street to use in crossing the 91-Freeway. The other streets that cross the freeway are busy and have freeway access. This makes it an excellent choice to link northern and southern Corona. It would make a good route for commuters live in southern Corona and work in northern Corona. Buena Vista also serves Corona High School as well as several parks. It would be a good choice of a street to enhance to the level of a bicycle boulevard as described in the Design and Maintenance Section of this Plan.

- Add good signage along the entire route from Railroad Street to Foothill Parkway
- Consider adding pavement stencils
- Consider adding traffic circles and special signalization (or other traffic calming measures) to create a bicycle boulevard

**Project 5  
Main Street**

Main Street is the primary north-south route through Corona. It serves many shopping centers, some work sites and civic center, several parks and schools, as well as a future Metrolink station for commuter rail.

**Ranking - Short Term**

**Responsibility - Corona**

**Existing Challenge -  
Inadequate north to  
south bicycle route with  
few links to Norco and  
points north of Corona**

- Stripe bike lanes south of Ontario Avenue to Mountain Gate Drive
- Add good signage along the entire route
- Consider adding pavement stencils north of Ontario Avenue to the northern city limit

**Classification - Class II  
Bike Lanes and or Class  
III Bike Routes**

**Length - Approximately  
1.0 miles Class II and  
3.0 miles Class III**

Project 6  
Fullerton Avenue

Ranking - short Term

Responsibility - Corona

Fullerton Avenue provides bicycle access on the east side of Corona from residential neighborhoods in the southern part of town to the downtown area. It provides access to several parks and schools, and would help create a community-wide network of bikeways. It is a nice wide street for bicycling south of Magnolia Avenue.

Existing Challenge -  
Inadequate north to south bicycle access to central Corona from the east side

Classification - Class II Bike Lane and or Class III Bike Route

Length - Approximately 3.7 miles Class II and 0.5 miles Class III

- Stripe bike lanes south of Magnolia Avenue to the southern end
- Add good signage along the entire route
- Consider adding pavement stencils north of Magnolia Avenue to Grand Boulevard
- Sign cyclists onto Eighth Street at the northern end

**Project 7  
Olive Street**

**Ranking - Short Term**

**Responsibility - Corona**

**Existing Challenge -  
Inadequate east to  
west bicycle access  
through Central Corona**

**Classification - Class  
III Bike Route**

**Length - Approximately  
1.4 miles**

Olive Street provides a convenient east-west route through central Corona, just south of downtown. It serves Corona High School, as well as other schools. Olive Street goes through a relatively dense residential neighborhood. It would help to complete a functional network of bikeways. It has low traffic volumes.

- Add good signage along the entire route from Garretson Avenue to Lincoln Avenue
- Consider adding pavement stencils along the route

**Project 8  
Railroad Street and  
Auto Center Drive**

**Ranking - Short Term**

**Responsibility - Corona**

**Existing Challenge -  
Inadequate east to  
west bicycle access  
through large  
employment center**

**Classification - Class II  
Bike Lanes and or Class  
III Bike Route**

**Length - Approximately  
2.0 miles Class II and  
1.7 miles Class III**

Railroad Street is the primary access route through the large industrial employment district in northwest Corona. It would enhance commuting opportunities for the many people who work there. This bikeway would continue along Auto Center Drive and would provide access to an existing Metrolink station, as well as a future Metrolink station on the east end.

- Stripe bike lanes on Auto Center Drive from the 91 Freeway to Railroad Street
- Stripe bike lanes on Railroad Street from Auto Center Drive to Smith Avenue
- Consider adding pavement stencils along the Class III portion of the route from Smith Avenue to Grand Boulevard
- Add good signage along the entire route

**Project 9**  
**Parkridge Avenue to**  
**Harrison Street and**  
**Blaine Street**

This bikeway will enhance bicycle access for residents living in northeast Corona to the large industrial employment area in northwest Corona. It will also provide a good bicycle route to a future Metrolink station, as well as shopping on Main Street. It will follow a comfortable route with low traffic volumes.

**Ranking - short Term**

**Responsibility - Corona**

**Existing Challenge -**  
**Inadequate access**  
**linking residential**  
**neighborhoods to**  
**industrial district in**  
**northeast Corona**

- Stripe bike lanes on Parkridge Avenue from Hidden Valley Drive to Harrison Street
- Consider adding pavement stencils on Harrison Street from Parkridge Avenue to Howard Street, along Howard Street for one block to Blaine Street, along Blaine Street to Sheridan Street, and to Railroad Street
- Add good signage along the entire route, especially directing cyclists along the route where it turns

**Classification - Class II**  
**Bike Lanes and or Class**  
**III Bike Route**

**Length - Approximately**  
**1.1 miles Class II and**  
**1.1 miles Class III**

**Project 10  
Bicycle Parking and  
Amenities**

**Ranking - Short Term**

**Responsibility - Corona  
and Private Businesses**

**Existing Challenge -  
Inadequate bicycle  
parking and amenities**

The lack of bicycle amenities has been identified as one of the major obstacles in cycling for transportation in Corona. This citywide program would provide and install bike racks in commercial districts, at schools, parks, public buildings and at employment sites. This program will also encourage showers and clothing lockers at work sites.

- The City should first develop specific design guidelines for bicycle amenities, perhaps with the assistance of local bicyclists. These guidelines should be used by city staff, developers and employers to determine the location and type of bicycle parking to be provided.
- The City should place bicycle racks on public sidewalks in front of retail and commercial establishments.
- The City should place bicycle racks, or lockers, at schools where they are needed.
- The City should place bicycle racks in public parks, in front of the library and any public building where they are needed.
- The City should contact the owners or managers of shopping centers to put bike racks in front of stores, where they are permitted.
- The City should contact large employers to see which of them would like to use bicycle lockers.
- The implementation program could be also implemented on an 'as requested' basis by commercial and retail property owners.
- The City will consider requirements for bicycle parking, showers and clothing lockers at new commercial developments. This will require developing guidelines for the required amount of bicycle parking, showers and clothing lockers based on gross square feet.



**Project 11  
Bicycle Safety**

**Ranking - Short Term**

**Responsibility - Corona  
and Other  
Organizations**

**Existing Challenge -  
Need to improve bicycle  
safety for various user  
groups**

The bicycle safety awareness program will teach bicycle safety to children, adults and other groups that encounter bicyclists. A specific curriculum geared for each audience, along with a handbook or other literature is recommended.

- Children - Although bicycle safety program exists in the way of bike rodeos and on-bike training, the program should be comprehensive enough to ensure that all children in public schools go through a bicycle safety program at least once before they graduate. In addition, bicycle safety should be taught to students who are taking drivers education classes.
- Adults - A safety education component will also be available to adults at employment sites and on selected weekends for the general public.
- Other Groups - Safety education should be taught to those people who come in to contact with bicyclists or involved in bicycle programs. These groups of people may include Corona Cruiser drivers, Corona Police and Corona City staff whose work impacts the bicycling environment. Bicycle safety education can be incorporated into existing training or orientations.

The City will apply for grants to fund the education program. It will be a continuous program. The implementation of this program should prioritize those groups that are most easily accessible, and then develop programs for other groups as follows:

- City staff
- City police
- School aged children
- Adults at employment sites
- Adults in the general public
- Corona Cruiser drivers

**Other Bikeways**

The Bicycle Master Plan will provide a more complete network of bikeways than highlighted in the top priority project list. It will serve every area of Corona, every residential neighborhood, every school and park, as well as all the shopping and employment. When carried out, Corona will become one of the most bicycle-friendly communities in California, as well as the United States. This will provide for an enhanced quality of life that will attract residents and businesses. Some of the network will unfold as funds become available. The rest will occur with new development. The entire network is shown on the map on page 26, and on the table below.

**Medium-Term Bikeways**

Altogether there are approximately 4 miles of Class I, 21 miles of Class II and 20 miles of Class III bikeways in the Second Priority List.

**Table 5 Medium-Term Bikeway Projects**

Street or Corridor	Classification	From	To
River Rd.	II	Corydon Way	Main St.
Promenade Ave.	II	Magnolia Ave.	Buchanan St.
Sampson Ave.	I/II	Buchanan St.	Temescal Creek
Rincon St.	II	Corydon Way	Temescal Creek
Grand Blvd.	III	Full circle	
Magnolia Ave.	II/III	Main St.	Buchanan St.
Eighth St.	III	Lincoln Ave.	Grand Blvd.
Ontario Ave./Temescal Canyon Rd.	II/III	Paseo Grande	Dos Lagos
Foothill Pkwy./Chase Dr./El Cerrito Rd.	II/III	Upper Dr.	Temescal Canyon Rd.
Serfas Club Dr.	II/III	Green River Rd.	91 Freeway
Border Ave./Smith Ave./Rincon Rd./Auburndale St.	II/III	South city limit	River Rd.
Oak Street Wash	I	Southern end	Maybey Canyon Wash
Main Street Wash	I	Ontario Ave.	Temescal Canyon Wash
Rimpau Ave.	II/III	Upper Dr.	Sixth St.

**Long-Term Bikeways**     Altogether there are approximately 3 miles of Class I, 20 miles of Class II and 15 miles of Class III bikeways in the Third Priority List.

**Table 6 Long-Term Bikeway Projects**

Street or Corridor	Classification	From	To
Hidden Valley Dr.	II	Main St.	Parkridge Ave.
Ranch Vista Rd./Clear Springs Dr./ Stevan Dr.	III	McKinley St.	Rock Vista Park
Citron St.	III	Lincoln Ave.	Main St
Highgrove St.	II	Lincoln Ave.	Mountain Gate Dr.
Citrus Way	II	Highgrove St.	Main St.
Green River Rd./Upper Dr.	II	Paseo Grande	California Ave.
Foothill Parkway	II	Chase Dr. (east)	Chase Dr. (west)
Valencia Rd.	II	Upper Dr.	Eagle Glen
Eagle Glen	II/III	Temescal Canyon Dr.	Southwest end
Maple St.	II	Sixth St.	Smith Ave.
Maybey Canyon Wash (north)	I	Temescal Creek	Railroad St.
Parkridge Dr./Joy St.	II/III	Main St.	Harrison St.
McKinley St.	III	Promenade Ave.	Magnolia Ave.
Buchanan St.	III	Promenade Ave.	Magnolia Ave.
Avenida del Vista	III	Border Ave.	Sixth St.
Via Pacifica/ Via del Rio	II/III	Ontario Ave.	City limit
Via del Santiago	III	City limit	Border Ave.
Taylor Ave.	III	Ontario Ave.	Olive St.
Garretson Ave./Joy St.	III	Magnolia Ave.	Grand Blvd.
Kellogg Ave./Kingfisher Ct./Old Temescal Rd.	II/III	Garretson Ave.	Compton Ave.
California Ave.	II/III	Rimpau Ave.	Upper Dr.
Riverside Canal	I	Temescal Creek	Indiana Ave.
Chase/Mangular Ave./ Skyline	I/III	Ben Franklin School	South of south city limit



# Corona Bicycle Master Plan Implementation

## Selection of Projects

This section identifies costs for the proposed bicycle improvements, plus strategies on funding and financing.

Some of the primary goals of the Corona Bicycle Master Plan ensure that the City receives its fair share of competitive funding. Thus, the Plan prioritizes projects so that those projects providing the greatest benefit are implemented in the short term.

This plan recognizes that cooperation between local agencies in the selection of priority projects and the allocation of local funding (such as Transportation Development Act monies) is critical to ensuring an orderly implementation of an effective bicycle system.

## Previous Funding

Previous expenditures on bicycle projects by the City of Corona over the past 5 years is approximately \$245,000. The City has received funding for one Class I bikeway in two separate grants. In Fiscal Year (FY) 98/99, Corona received \$52,000, and \$193,000 in FY99/00 for the Chase/Foothill bikeway. Both of these grants were from SB 821 funds.

## Funding Recommendation

Short-term projects identified in this plan represent the highest priority bicycle projects currently identified in Corona. Local available matching funds, such as Transportation Development Act(TDA), should be allocated whenever possible to these projects or to other locally-identified projects that

**Funding  
Recommendation,  
continued**

meet the funding criteria of the TDA program. The actual schedule for implementation on a year-to-year basis should be determined by (a) the readiness of each project in terms of local support, (b) California Environmental Quality Act (CEQA) approvals, (c) right-of-way control, (d) timing with other related improvements, and/or (e) success in obtaining competitive funding

The City should monitor the short- and mid-term projects identified in this Plan and subsequent updates, and keep a year-to-year list of projects and their TDA and other local funding allocations. Should a project not be ready or able to utilize its allocation, it may trade with another short-term project. This process eliminates the constant evaluation of new projects and ensures that viable top priority projects have access to matching funding. It provides the City with a five- to ten-year schedule so that it may program its resources and feel assured that its projects will be implemented in the short term. Each year the City should review the list of projects slated for that year, review the project readiness of each project to be funded, and listen to requests for changes to the sequencing of the projects.

**Cost Breakdown**

Costs are separated between bicycle facilities and programs. A complete breakdown of costs for the top priority bicycle projects is estimated at approximately \$6,988,000 (Table 7). The medium and long-term projects total approximately \$6,390,000. Program costs for the operations and maintenance are estimated at approximately \$302,200 (Table 7). Of the total project cost over 20 years, it is assumed that the City will be responsible for only a portion of the costs while grants will comprise of the majority of the costs.

Table 7 Corona Bikeway System Cost Estimates

<p style="text-align: center;"><b>Table Corona Bikeway System Cost Estimates</b></p>			
Segment or Program	Units or Miles	Type	Cost
<b>1. Temescal Creek Bike Path</b>			<b>\$ 5,500,000</b>
New Class I design	10	construction, signals	\$ 5,000,000
	10	engineering	\$ 500,000
<b>2. Maybey Canyon Wash Bike Path</b>			<b>\$ 825,000</b>
New Class I design	1.5	construction, signals	\$ 750,000
	1.5	engineering	\$ 75,000
<b>3. Sixth Street/Frontage Road Bike Route</b>			<b>\$ 196,000</b>
New Class II and III	4.9	signs, striping, stencils	\$ 196,000
<b>4. Buena Vista Avenue Bike Route</b>			<b>\$ 169,200</b>
New Class III	2.8	signs	\$ 28,000
New Class III	2.8	stencils	\$ 11,200
Optional Bike Boulevard Traffic Signal	1	signal	\$ 100,000
Optional Bike Boulevard Traffic Circles	2	traffic circles	\$ 30,000
<b>5. Main Street Bike Route</b>			<b>\$ 92,000</b>
New Class II	1	signs, striping, stencils	\$ 50,000
New Class III	3	signs	\$ 30,000
New Class III	3	stencils	\$ 12,000
<b>6. Fullerton Avenue Bike Route</b>			<b>\$ 192,000</b>
New Class II	3.7	signs, striping, stencils	\$ 185,000
New Class III	0.5	signs	\$ 5,000
New Class III	0.5	stencils	\$ 2,000
<b>7. Olive Street Bike Route</b>			<b>\$ 19,600</b>
New Class III	1.4	signs	\$ 14,000
New Class III	1.4	stencils	\$ 5,600

**CORONA BICYCLE MASTER PLAN Implementation**

Table 7 Cost Estimates, continued			
Segment or Program	Unit or Miles	Type	Cost
<b>8. Railroad Street/Auto Center Drive Bike Route</b>			<b>\$ 123,800</b>
New Class II	2	signs, striping, stencils	\$ 100,000
New Class III	1.7	signs	\$ 17,000
New Class III	1.7	stencils	\$ 6,800
<b>9. Parkridge Avenue/Harrison Street/Blaine Street Bike Route</b>			<b>\$ 70,400</b>
New Class II	1.1	signs, striping, stencils	\$ 55,000
New Class III	1.1	signs	\$ 11,000
New Class III	1.1	stencils	\$ 4,400
<b>10. Bicycle Parking Program</b>			<b>\$ 50,000</b>
Bike racks	200	selected racks	\$ 50,000
TOTAL FIRST PRIORITY PROJECTS			\$ 6,988,000
<b>11. Medium-Term Projects</b>			<b>\$ 3,530,000</b>
New Class I	4	construction, engineering	\$ 2,200,000
New Class II	21	signs, striping, stencils	\$ 1,050,000
New Class III	20	signs, stencils	\$ 280,000
<b>12. Long-Term Projects</b>			<b>\$ 2,860,000</b>
New Class I	3	construction, engineering	\$ 1,650,000
New Class II	20	signs, striping, stencils	\$ 1,000,000
New Class III	15	signs, stencils	\$ 210,000
TOTAL ALL PROJECTS			\$ 13,378,000

Note: The total is the sum of the listed costs. The actual costs of some types of projects may vary significantly. More precise estimates of costs for Class I facilities will depend on: complexity of the alignment, amount of new pavement, number of underpasses, number of traffic signals. More precise estimates of costs for Class II facilities will depend upon: complexity of the alignment, and resulting need for design, need to sandblast existing striping and concurrency with re-surfacing projects.

**CORONA BICYCLE MASTER PLAN Implementation**

Table 8  
Corona Bikeway System: Annual Operation and Maintenance Costs

Project	Unit Cost	Description	Existing Miles	Proposed Miles Short Term	Proposed Miles Medium and Long Term	Total Miles or Units	Total Cost
Class I Maintenance	\$8,500	Cost per mile	1	2.5	7	10.5	\$89,250
Class II Maintenance	\$2,000	Cost per mile	7	10.3	41	58.3	\$116,600*
Class III Maintenance	\$1,500	Cost per Mile	0	12.9	35	47.9	\$71,850*
Total Maintenance							\$277,700
Bicycle Safety Awareness Program	\$25,000	Cost per year					\$25,000
<b>TOTAL O &amp; M COSTS</b>							<b>\$302,700</b>

\*Some of the maintenance cost of Class II and III bikeways can be absorbed in routine maintenance of streets.



**CORONA BICYCLE MASTER PLAN Implementation**

**Table 9 Corona Bikeway System Funding Sources**

Grant Source	Due Date	Agency	Annual Total	Matching Requirement	Eligible Applicants	Eligible Bikeway Projects			Comments
						Commuter	Recreation	Safety/Education	
<b>Federal Funding</b>									
F1. TEA-21 Surface Transportation Program (STP)	Jan. 10 Annually	Regional Transportation Agency, Caltrans, FHWA		20% non-federal match	federally certified jurisdictions	X	X		STP funds may be exchanged for local funds for non-federally certified local agencies; no match required if project improves safety
F2. TEA-21 Congestion Mitigation and Air Quality Program	Dec. 1 Annually	Regional Transportation Agency, CTC		20% non-federal match	federally certified jurisdictions	X			Counties re-designated to attainment status for ozone may lose this source
F3. TEA-21 Transportation Enhancement Activities (TEA)	pending	FHWA, Regional Transportation Agency		20% non-federal match	federally certified jurisdictions	X	X		Contact the Regional Transportation Agency
F4. TEA-21 National Recreational Trails	Oct. 15 Annually	State Dept. of Parks & Recreation		no match required	jurisdictions, special districts, non profits with management responsibilities over the land		X		For recreational trails to benefit bicyclists, pedestrians, and other users; contact State Dept. of Parks & Rec., Statewide Trails Coordinator, (916) 653-8803

**CORONA BICYCLE MASTER PLAN Implementation**

**Table 9 Corona Bikeway System Funding Sources, Continued**

Grant Source	Due Date	Agency	Annual Total	Matching Requirement	Eligible Applicants	Eligible Bikeway Projects			Comments
						Commute	Recreation	Safety/Education	
<b>State Funding</b>									
S1. Flexible Congestion Relief (FCR) Program Major Projects, \$300,000+	Dec. of odd # years	Regional Transportation Agency			cities, counties, transit operators, Caltrans	X	X		Must be included in an adopted RTP, STIP, CMP, RTIP
S2. State and Local Transportation Partnership Program (SLPP)		Caltrans		none	Cities, counties, assessment districts	X	X		Any road projects being resurfaced or using local funds should include bike lane for reimbursement through this program; contact Caltrans
S3. Environmental Enhancement and Mitigation (EEM) Program	Nov.	State Resources Agency		not required but favored	Local, state and federal government non-profit agencies	X	X	X	Projects that enhance or mitigate future transportation projects; contact EEM Project Manager (916) 653-5800
S4. Bicycle Transportation Account (BTA)	Spring 2001	Caltrans	\$7.2 m annually	10%	Cities and counties	X			Contact local Caltrans district office for details
S5. Safe Routes to School (AB1475)	Varies	Caltrans	\$18 m	11.5%	Government agencies, non-profit groups, schools, community groups	X	X	X	Only two years of funding currently authorized as of 2000; submission dates and deadlines in flux

**CORONA BICYCLE MASTER PLAN Implementation**

**Table 9 Corona Bikeway System Funding Sources, Continued**

Grant Source	Due Date	Agency	Annual Total	Matching Requirement	Eligible Applicants	Eligible Bikeway Projects			Comments
						Commuter	Recreation	Safety/Education	
<b>Local Funding</b>									
L1. Transportation Development Act (TDA) Section 99234 (2% of total TDA)	Jan.	Regional Transportation Agency		no match required	Cities, counties; currently allocated by population	X	X	X	Contact the Regional Transportation Agency
L2. State Gas Tax (local share)		Allocated by State Auditor Controller		no match required	local jurisdictions	X			
L3. Developer Fees or Exactions (developer fee for street improvements - DFSI)		Cities, or County		no match required		X	X	X	Mitigation required during land use approval process
L4. Vehicle Registration Surcharge Fee (AB 434)		Air Quality Control District		no match required	local agencies, transit operators, others	X	X	X	Competitive program for projects that benefit air quality
L5. Vehicle Registration Surcharge Fee (AB 434)		Air Quality Control Dist. or Congestion Management Agency		no match required	local jurisdictions	X	X	X	Funds are distributed to communities based on population
L6. Clean Air Fund (AB 2766)	Varies by region	Air Quality Control District	\$50,000-\$200,000	10-15%	local jurisdictions, transit agencies	X	X	X	Consult local air quality control district for program details

**Funding**

There are a variety of potential funding sources including local, state, regional, and federal funding programs that can be used to construct the proposed bicycle improvements. Most of the Federal, state, and regional programs are competitive, and involve the completion of extensive applications with clear documentation of the project need, costs, and benefits. Local funding for bicycle projects typically comes from Transportation Development Act (TDA) funding, which is prorated to each community based on return of gasoline taxes. Funding for many of the programs would need to be procured either with TDA, general fund (staff time), or possibly private grants. Table 9 presents a summary of available funding along with timing, criteria, and funding agency.

**Transportation Equity Act for the 21st Century (TEA-21)**

Federal funding through the TEA-21 (Transportation Equity Act) program will provide a significant portion of outside funding. TEA-21 currently contains three major programs, STP (Surface Transportation Program), TEA (Transportation Enhancement Activities), and CMAQ (Congestion Mitigation and Air Quality Improvement) along with other programs such as the National Recreational Trails Fund, Section 402(Safety) funds, Scenic Byways funds, and Federal Lands Highway funds.

TEA-21 was adopted by both houses of Congress on May 22, 1998. However, there was delay in adopting the new transportation legislation resulting from conflicts between donor and recipient states (states that received more or less money than they paid in gas taxes) under the old transfer arrangements. The new formulas will rectify the past imbalances, allowing large donor states with higher amounts that can be transferred between various funding programs. The follow-up to ISTEA, TEA-21 offers some important changes in funding opportunities.

TEA-21 funding is administered through the state (Caltrans or Resources Agency) and regional governments (Riverside County Transportation Commission). Most, but not all, of the funding programs are transportation versus recreational oriented, with an emphasis on (a) reducing auto trips and (b) providing an

**TEA 21, continued**

inter-modal connection. Funding criteria often includes completion and adoption of a bicycle master plan, quantification of the costs and benefits of the system (such as saved vehicle trips and reduced air pollution), proof of public involvement and support, CEQA compliance, and commitment of some local resources. In most cases, TEA-21 provides matching grants of 80 to 90 percent--but prefers to leverage other moneys at a lower rate.

With an active and effective regional agency such as the Riverside County Transportation Commission, Corona should be in a good position to secure more than its fair share of TEA-21 funding. It will be critical to get the local State assemblyman and senator briefed on these projects and lobbying Caltrans and the California Transportation Commission for these projects.

**TEA-21 Highlights**

1. The Surface Transportation Program (STP) was amended as follows:
  - Approximately \$33 billion available nationwide.
  - Bicycle and pedestrian projects remain eligible.
  - Sidewalk improvements to comply with the Americans with Disabilities Act (ADA) are now eligible for Surface Transportation Program funds.
2. The National Highway System (NHS) program was amended as follows:
  - Pedestrian projects may now be funded with NHS funds.
  - NHS funds may now be used on bicycle and pedestrian projects within Interstate corridors.
3. The Transportation Enhancement Activities (TEA) program was amended as follows:
  - \$3.3 billion available nationwide
  - Bicycle and pedestrian safety and education programs
  - Tourist and welcome centers
  - Environmental mitigation to provide wildlife corridors

TEA-21 Highlights,  
continued

- Requirement that each project be directly related to a surface transportation project
  - Eighty percent federal matching requirement applies only to total non-federal share rather than total project cost.
  - Eight specific projects are funded off the top of the TEA program, none in the western United States.
4. The Congestion Mitigation and Air Quality Improvements (CMAQ) program was amended as follows:
- \$8.12 billion available nationwide
  - Bicycle project eligibility remains essentially the same
  - A small percentage can be transferred to other programs
5. The Recreational Trails Program was amended as follows:
- \$270 million available nationwide over the next six years
  - Bicycle project eligibility remains essentially the same
6. The Hazard Elimination Program was amended as follows:
- Now can be used for bicycling and walking hazards
  - Definition of a "public road" now expanded to include bikeways, pathways, and traffic calming measures.
7. A new category, Transit Enhancements Program, was created that calls for transit agencies in urbanized areas over 200,000 population to use 1 percent of their Urban Formula Funds for Transit Enhancements Activities. Up to \$50 million per year may be available for pedestrian access, walkways, bicycle access, bike storage facilities, and bike-on-bus racks. The program calls for 95% Federal/5% local match.
8. Scenic Byway, bridge repair, transit, safety (non-construction), and Federal Lands programs all remain essentially the same under TEA-21, with the amounts either the same or increasing from ISTEA.

TEA-21 Highlights,  
continued

9. Planning provisions for states and Metropolitan Planning Organizations (MPOs) such as the Los Angeles Metropolitan Transportation Authority, have been streamlined, with bicycle and pedestrian needs to be given due consideration in the development of comprehensive transportation plans. Specific policies include directives to not approve any project or regulatory action that will have an adverse impact on non-motorized safety, unless a reasonable alternative route is provided or already exists.
10. When state or local regulations permit, allow use of bicycle facilities by electric bicycles and motorized wheelchairs.
11. Railway-highway crossings should consider bicycle safety.
12. A new Surface Transportation-Environment Cooperative Research Program is established for funding non-motorized research.
13. In cooperation with AASHTO, ITE, and other groups, new bicycle design guidelines have been established.

A detailed program-by-program of available funding programs along with the latest relevant information is provided on the following pages. Specific amounts and deadlines are not yet identified for some of the TEA-21 programs.

**State Funding  
Programs**

TDA Article III (SB 821)

Transportation Development Act (TDA) Article III funds are state block grants awarded annually to local jurisdictions for bicycle and pedestrian projects in California. These funds originate from the state gasoline tax and are distributed to local jurisdictions through call for projects administered by the Riverside County Transportation Commission.

State Funding,  
continued

AB 434

AB 434 funds are available for clean air transportation projects, including bicycle projects, in California.

AB 2766

Clean air funds are generated by a surcharge on automobile registration. The Air Quality Management District may allocate some of these funds for external bicycle projects. The grants are generally in the range of \$50,000 to \$200,000 and are based on a cost-benefit formula for air quality developed by the District. Projects must have a direct and positive effect on reducing air pollutants through transportation programs or projects in the City.

Bicycle Transportation Account

The State Bicycle Transportation Account (BTA) is an annual statewide discretionary program that is available through the Caltrans Bicycle Facilities Unit for funding bicycle projects. Available as grants to local jurisdictions, the emphasis is on projects that benefit bicycling for commuting purposes. While the fund has been small it was increased to 7.2 million per year starting fiscal year 2001. The City of Corona may apply for these funds through the Caltrans Office of Bicycle Facilities.

Safe Routes to School (AB1475)

The Safe Routes to School program is a newly created State program using funds from the Hazard Elimination Safety program from TEA-21. For the year 2001, this program is meant to improve school commute routes by eliminating barriers to bicycle and pedestrian travel through rehabilitation, new projects and traffic calming. A local match of 11.5% is required for this competitive program, which will allocate 18 million dollars annually. Planning grants are not available through this program. This fund expires this year, but legislation is pending to extend it.



## Local Funding

### New Construction

Future road widening and construction projects are one means of providing bike lanes. To ensure that roadway construction projects provide bike lanes where needed, appropriate and feasible, it is important that an effective review process is in place so that new roads meet the standards and guidelines presented in this master plan.

### Impact Fees

Another potential local source of funding is developer impact fees, typically ties to trip generation rates and traffic impacts produced by a proposed project. A developer may reduce the number of trips (and hence impacts and cost) by paying for on- and off-site bikeway improvements which will encourage residents to bicycle rather than drive. In-lieu parking fees may be used to help construct new or improved bicycle parking. Establishing a clear nexus or connection between the impact fee and the project's impacts is critical in avoiding a potential lawsuit.

### Mello Roos

Bike paths, lanes, and pedestrian facilities can be funded as part of a local assessment or benefit district. Defining the boundaries of the benefit district may be difficult unless the facility is part of a larger parks and recreation or public infrastructure program with broad community benefits and support.

### Other

Local sales taxes, fees, and permits may be implemented, requiring a local election. Volunteer programs may substantially reduce the cost of implementing some of the proposed pathways. Use of groups such as the California Conservation Corp (who offer low cost assistance) will be effective at reducing project costs. Local schools or community groups may use the bikeway or pedestrian project as a project for the

**Local Funding,  
continued**

year, possibly working with a local designer or engineer. Work parties may be formed to help clear the right of way where needed. A local construction company may donate or discount services. A challenge grant program with local businesses may be a good source of local funding, where corporations 'adopt' a bikeway and help construct and maintain the facility.

Other opportunities for implementation will appear over time which may be used to implement the system.

**Financing**

Proposed improvements and programs to be developed over the next 20 years in Corona have been analyzed to determine the annual financing requirements, and to allow the City to budget its resources and target funding applications. It is important to note that the majority of funding for bicycle projects is expected to be derived from federal sources, TEA-21. These funding sources are extremely competitive, and require a combination of sound applications, local support, and lobbying on the regional and state level.



# Corona Bicycle Master Plan Design & Maintenance

## Existing Design Standards and Classifications

This chapter provides details on the recommended design and maintenance operations for the Corona Bikeway System.

National design standards for bikeways have been developed by the American Association of Highway and Transportation Officials (AASHTO) and the California Department of Transportation (Caltrans). The Caltrans Highway Design Manual, Chapter 1000: Bikeway Planning and Design, serves as the official design standard for all bicycle facilities in California. Design standards in Chapter 1000 fall into two categories, mandatory and advisory. Caltrans advises that all standards in Chapter 1000 be followed, which also provides a measure of design immunity to the City. Not all possible design options are shown in Chapter 1000. For example, intersections, ramp entrances, rural roads, and a variety of pathway locations are not specified in the Caltrans Highway Design Manual.

The following section summarizes key operating and design definitions:

- **Bicycle**: A device upon which any person may ride, propelled exclusively by human power through a belt, chain, or gears, and having either two or three wheels in tandem or tricycle arrangement.
- **Class I Bikeway**: Variously called a bike path or multi-use trail. Provides for bicycle travel on a paved right of way completely separated from any street or highway.
- **Class II Bikeway**: Referred to as a bike lane. Provides a

**Design Standards and Classifications, continued**

striped lane for one-way travel on a street or highway.

- Class III Bikeway: Referred to as a bike route. Provides for shared use with pedestrian or motor vehicle traffic.

Graphic descriptions of Class I, II, and III bikeways are shown in Figure 1, page 8.

**Class I, II and III Bikeway Design Guidelines**

The following guidelines present the recommended minimum design standards and other recommended ancillary support items for Class I bike paths (also referred to as multi-use trails), Class II bike lanes, and Class III bike routes. All bikeways should meet minimum Caltrans standards as spelled out in the California Highway Design Manual, Chapter 1000. Where possible, it may be desirable to exceed the minimum standards for bike paths or bike lane widths, signage, lighting and traffic signal detectors.

**Recommendation 1:**

Design Recommendations

**Class I Guidelines.**

1. All Class I bike paths should generally conform to the design recommendation by Caltrans.
2. Multi-use trails and unpaved facilities that serve primarily a recreation rather than a transportation function and will not be funded with federal transportation dollars may not need to be designed to Caltrans standards.
3. Class I bike path crossings of roadways require preliminary design review. A prototype design is presented in Figure -. Generally speaking, bike paths that cross roadways with Average Daily Trips (ADTs) over 20,000 vehicles will require signalization or grade separation. No multi-use trails are proposed to cross a major arterial at an unprotected location with ADTs over 20,000 vehicles in Corona.

**Class I Guidelines,  
continued**

4. Landscaping should generally be low water consuming native vegetation and should have the least amount of debris.
5. Lighting should be provided where the bike path will be used by commuters in the evenings.
6. Barriers at pathway entrances should be clearly marked with reflectors and ADA accessible (minimum five feet clearance).
7. Bike path construction should take into account impacts of maintenance and emergency vehicles on shoulders and vertical requirements.
8. Provide two feet wide unpaved shoulders for pedestrians/runners, or a separate tread way where feasible. Direct pedestrians to right side of pathway with signing and/or stenciling.
9. Provide adequate trailhead parking and other facilities such as restrooms, drinking fountains at appropriate locations.

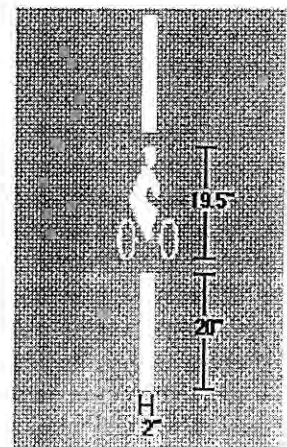
**Recommendation 2:**

Design Recommendations

**Class II Guidelines**

1. All Class II bike lanes should generally conform to the minimum design recommendations according to Caltrans standards.
2. Whenever possible the Department of Public works should recommend that wider bike lanes, beyond the minimum standard are installed.
3. Intersection and interchange treatment. Caltrans provides recommended intersection treatments in Chapter 1000 including bike lane 'pockets' and signal loop detectors. The Department of Public Works should develop a protocol for the application of these recommendations, so that improvements can be funded and made as part of regular improvement projects. Figure 4 and 5 illustrates designs for Class II Bike lanes at intersections. There is also an illustration for recommended Right Turn Channelization in Figure 6. These are details for Class II recommended intersection treatments.

4. Signal loop detectors which sense bicycles should be considered for all arterial/arterial, arterial/collector, and collector/collector intersections. The location of the detectors should be identified by a stencil of a bicycle and the words 'Bicycle Detector'.



5. When loop detectors are installed, traffic signalization should be set to accommodate bicycle speeds.
6. Bicycle-sensitive loop detectors are preferred over a signalized button specifically designed for bicyclists.

**Class II Guidelines**

**Class II Guidelines,  
continued**

7. Bike lane pockets (min. 4' wide) between right turn lanes and through lanes should be provided wherever available width allows, and right turn volumes exceed 150 motor vehicles/hour.
8. Where bottlenecks preclude continuous bike lanes, they should be linked with Class III route treatments.

**Recommendation 3:**

**Class III Design.**

Class III bike routes are typically simply signed routes and don't provide much advantage for bicyclists. With proper selection, signage and other treatments they can add significant visibility, direction and advantages. Class III routes can become more useful when coupled with such techniques as:

- route, directional and distance signage
- wide curb lanes
- accelerated pavement maintenance schedules
- new stencils marking the bike routes
- traffic signals timed for cyclists
- traffic calming

**Recommendation 4:**

**Other Guidelines to  
Consider**

**Signing**

In addition to those identified by Caltrans, there are a variety of improvements which will enhance the safety and attraction of streets for bicyclists.

All bikeway signing in Corona should conform to the signing identified in the Caltrans Traffic Manual and/or the Manual on Uniform Traffic Control Devices (MUTCD). These documents give specific information on the type and location of signing for the primary bike system. A list of bikeway signs from Caltrans and the MUTCD Bikeway Signing and Marking Standards are shown in Table 10. A typical bike route sign is shown in Figure 7.

Corona should also provide standard signing at signalized and unsignalized intersections on bikeways, as shown in Figures 10 and 11. In addition, warning signs for motorists at intersection are also recommended for safety reasons (Figure 12)

In addition to the signing, striping and stencils should be

**Striping**

considered according to Caltrans standards. This includes striping along bicycle lanes which differentiate the space between the bicyclist and the automobile (Figure 7). Striping, and other treatments such as colored pavement (Figure 8), double stripes, and new technologies should be considered for Corona.

**Stencils**

Stencils can also be included on Class III bicycle facilities, to help cyclists and motorists more easily identify the bike route. Stencils currently under examination for approval should be used (Figure 9).

Action

A bicycle signing program is recommended as a high priority project for Corona. In addition new technologies and strategies for bicycle striping and stencils should be considered for bicycle lanes and routes where deemed appropriate.

**Parking**

Bicycle Parking is not standardized by any codes. However, there are preferable types of secure bicycle furnishing available on the market. When bicycle parking is being considered, the types of bicycle lockers and racks in Figures 12 and 13 are both recommended. More specific guidelines to determine bicycle parking capacity and location are suggested in Table 11.

Action

A bicycle-parking program is recommended as a high priority project for Corona. Specific bicycle parking guidelines should be developed to help city staff, developers and commercial districts determine the types of furnishings and location of bicycle parking.



## Sidewalks

The use of sidewalks as bicycle facilities is not encouraged by Caltrans, even as a Class III bike route. There are exceptions to this rule. The California Vehicle Code states: 'Local authorities may adopt rules and regulations by ordinance or resolution regarding the (...) operation of bicycles (...) on the public sidewalks.' (CA VC 21100, Subdiv. H). Caltrans adds in Chapter 1000: 'In residential areas, sidewalk riding by young children too inexperienced to ride in the street is common. With lower bicycle speeds and lower auto speeds, potential conflicts are somewhat lessened, but still exist. But it is inappropriate to sign these facilities as bikeways. Bicyclists should not be encouraged (through signing) to ride facilities that are not designed to accommodate bicycle travel.'

### Action

Corona has a number of existing sidewalks that are currently designated as bicycle facilities, but new sidewalks should be considered only when there are no other options.

## Traffic Calming

Traffic calming includes any effort to moderate or reduce vehicle speeds and/or volumes on streets where that traffic has a negative impact on bicycle or pedestrian movement. Because these efforts may impact traffic outside the immediate corridor, study of traffic impacts is typically required. For example, the City of Berkeley instituted traffic calming techniques by blocking access into residential streets. The impact was less traffic on local streets, and more traffic on arterials and collectors. Other techniques include installing traffic circles, intersection islands, partial street closings, 'bulb-out' curbs, pavement treatments, lower speed, signal timing, and narrowing travel lanes.

The City of Corona already has a relatively continuous street grid system with little filtering of through traffic into residential neighborhoods. Traffic circles, roundabouts, and other measures may be considered for residential collector streets where there is a desire to control travel speeds and traffic volumes but not to install numerous stop signs or traffic signals.

**Traffic Calming,  
continued**

Action

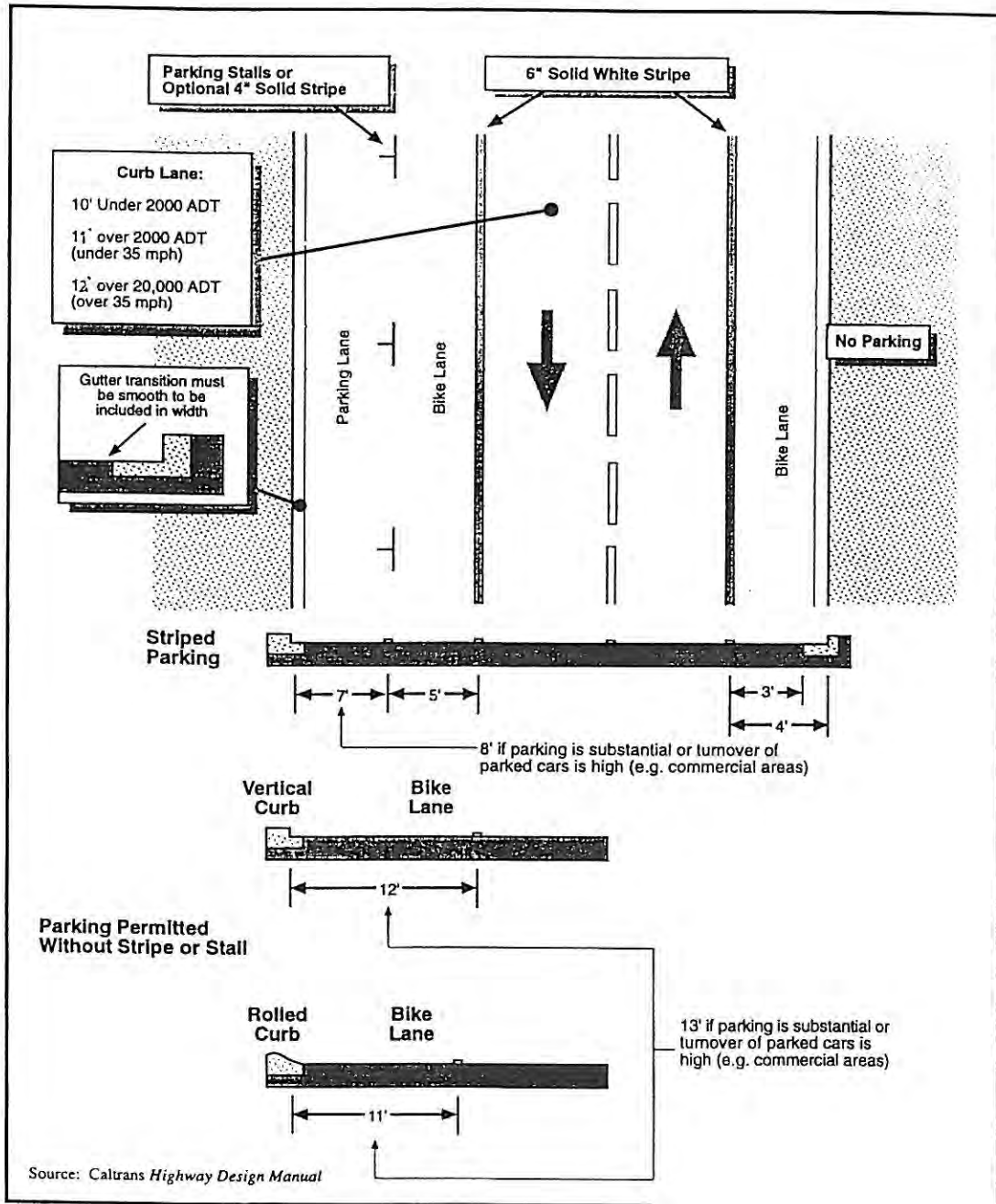
Traffic calming alternatives should be considered where traffic speeds are exceedingly high, and when safety is an issue.

**Bicycle Boulevards**

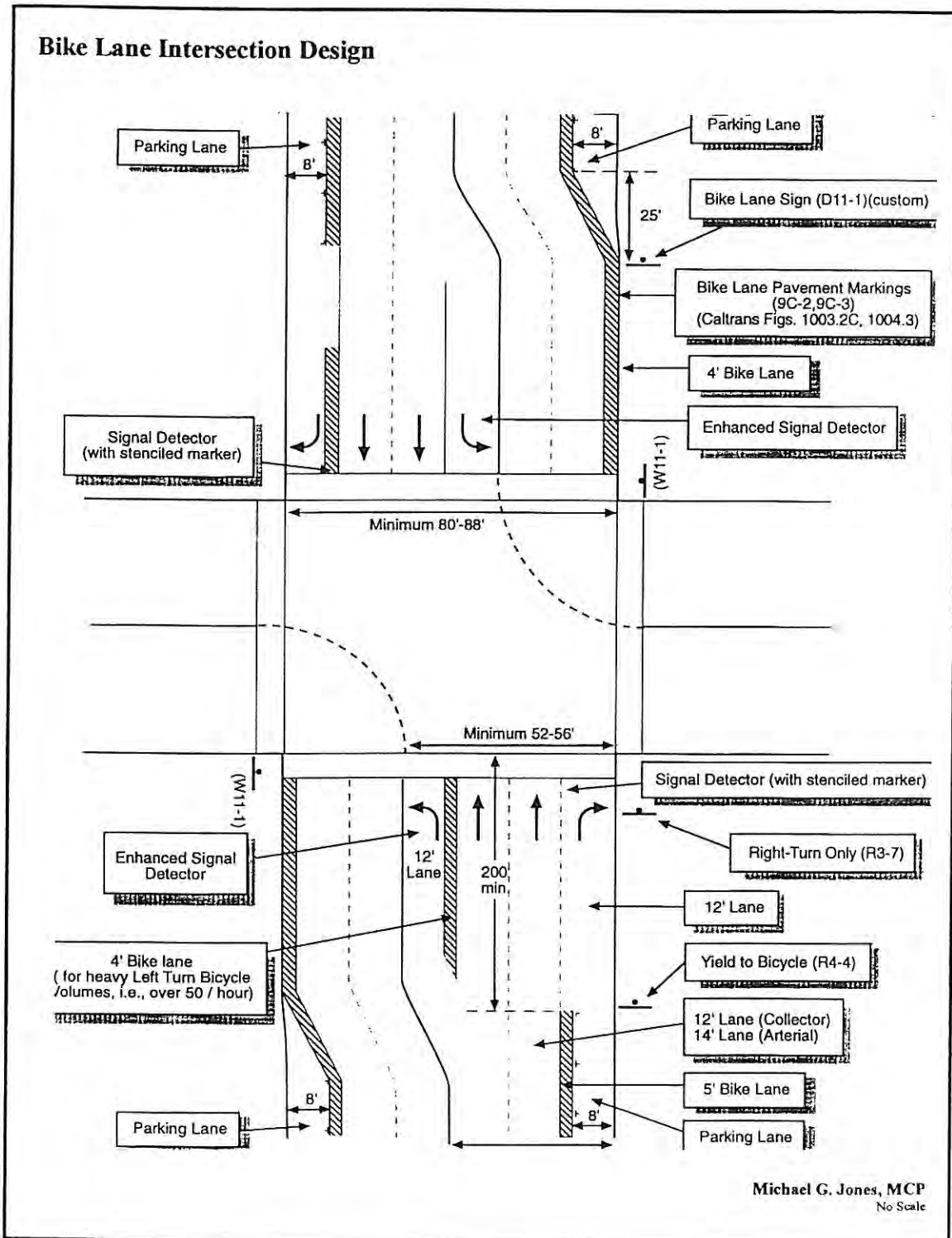
Palo Alto pioneered the concept of a bicycle boulevard, which in that city is a street directly parallel to a major commercial corridor that was designed to promote bicycle movement and discourage through vehicle movement. This was achieved by partial street closures and lack of coordinated signals. In addition, wider curb lanes and frequent signing as a 'Bicycle Boulevard' helps increase the motorists' awareness.

Action:

The bicycle boulevard may be considered as an option if the City of Corona decides it can be feasible.



**Figure 4: Class II Bike Lane Cross Section**



**Figure 5: Bike Lane Intersection Design**

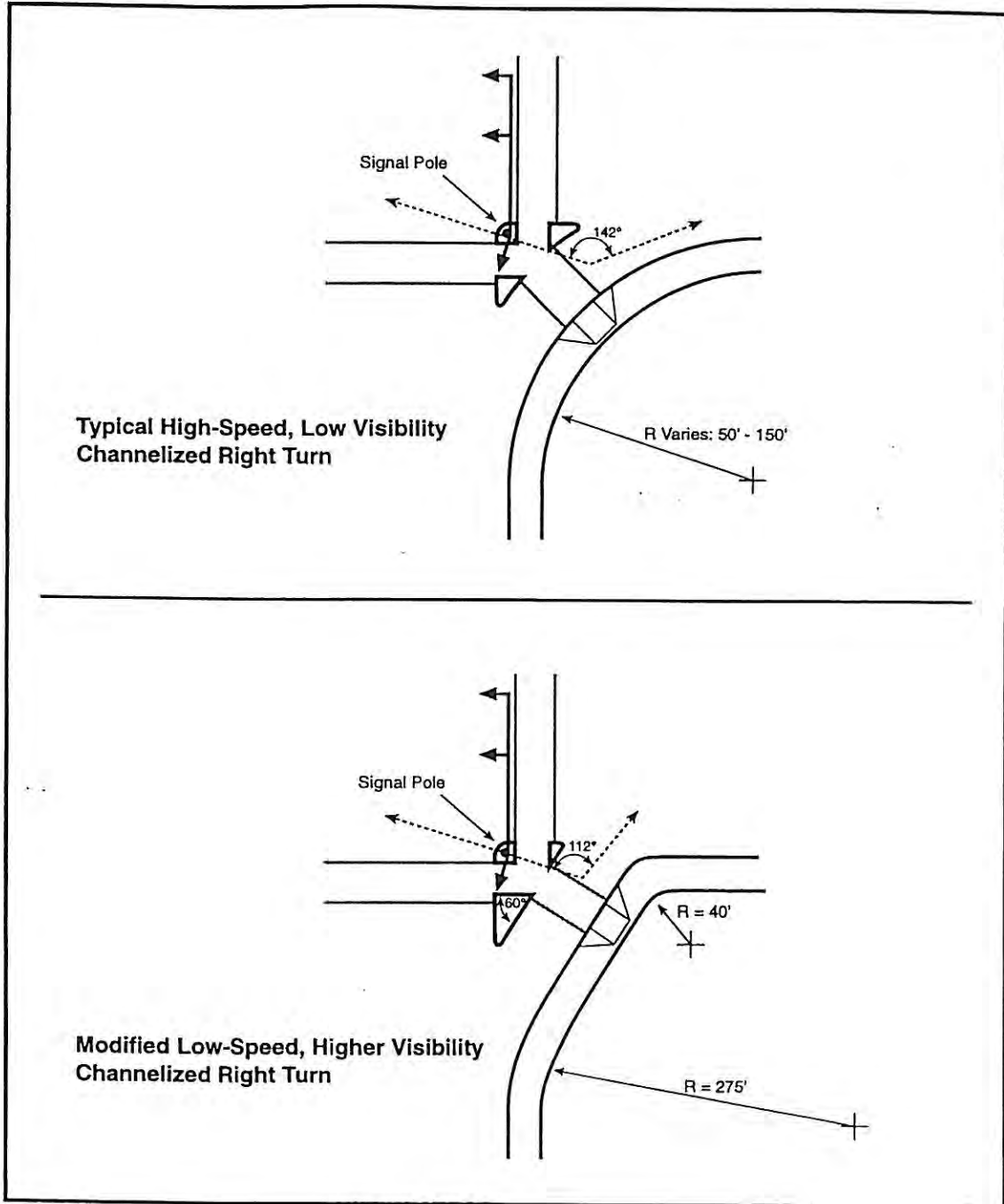


Figure 6: Recommended Right Turn Channelization

**Table 10: Recommended Signing and Marking**

Item	Location	Color	Caltrans Designation	MUTCD Designation
No Motor Vehicles	Entrances to trail	B on W	R44A	R5-3
Use Ped Signal/Yield to Peds	At crosswalks; where sidewalks are being used	B on W	N/A	R9-5 R9-6
Bike Lane Ahead: Right Lane Bikes Only	At beginning of bike lanes	B on W	N/A	R3-16 R3-17
STOP, YIELD	At trail intersections with roads and Coastal Bikeways	W on R	R1-2	R1-1 R1-2
Bicycle Crossing	For motorists at trail crossings	B on Y	W79	W11-1
Bike Lane	At the far side of all arterial intersections	B on W	R81	D11-1
Hazardous Condition	Slippery or rough pavement	B on Y	W42	W8-10
Turns and Curves	At turns and curves which exceed 20 mph design specifications	B on Y	W1,2,3 W4,5,6,14 W56,57	W1-1,2 W1-4,5 W1-6
Trail Intersections	At trail intersections where no STOP or YIELD required, or sight lines limited	B on Y	W7,8,9	W2-1, W2-2 W2-3, W2-3 W2-4, W2-5
STOP Ahead	Where STOP sign is obscured	B,R on Y	W17	W3-1
Signal Ahead	Where signal is obscured	B,R,G	YW41	W3-3
Bikeway Narrows	Where bikeway width narrows or is below 8'	B on Y	W15	W5-4
Downgrade	Where sustained bikeway gradient is above 5%	B on Y	W29	W7-5
Pedestrian Crossing	Where pedestrian walkway crosses trail	B on Y	W54	W11A-2
Restricted Vertical Clearance	Where vertical clearance is less than 8'6"	B on Y	W47	W11A-2
Railroad Crossing	Where trail crosses railway tracks at grade	B on Y	W47	W10-1
Directional Signs (i.e. Cal State LB, Downtown, Train Station, etc.	At intersections where access to major destinations is available	W on G	G7 G8	D1-1b(r/l) D1-1c
Right Lane Must Turn Right; Begin Right Turn Here, Yield to Bikes	Where bike lanes end before intersection	B on W	R18	R3-7 R4-4

**Table 10: Recommended Signing and Marking, continued**

Item	Location	Color	Caltrans Designation	MUTCD Designation
Trail Regulations	All trail entrances	B on W	n/a	n/a
Multi-purpose Trail: Bikes Yield to Pedestrians	All trail entrances	n/a	n/a	n/a
Bikes Reduce Speed & Call Out Before Passing	Every 2,000 feet	B on W	n/a	n/a
Please Stay On Trail	In environmentally-sensitive areas	n/a	n/a	n/a
Caution: Storm Damaged Trail	Storm damaged locations	B on Y	n/a	n/a
Trail Closed: No Entry Until Made Accessible & Safe for Public Use	Where trail or access points closed due to hazardous conditions	n/a	n/a	n/a
Speed Limit Signs	Near trail entrances: where speed limits should be reduced from 20 mph	B on W	n/a	n/a
Trail Curfew 10PM - 5AM	Based on local ordinance	R on W	n/a	n/a



Figure 7: Bike Route Sign



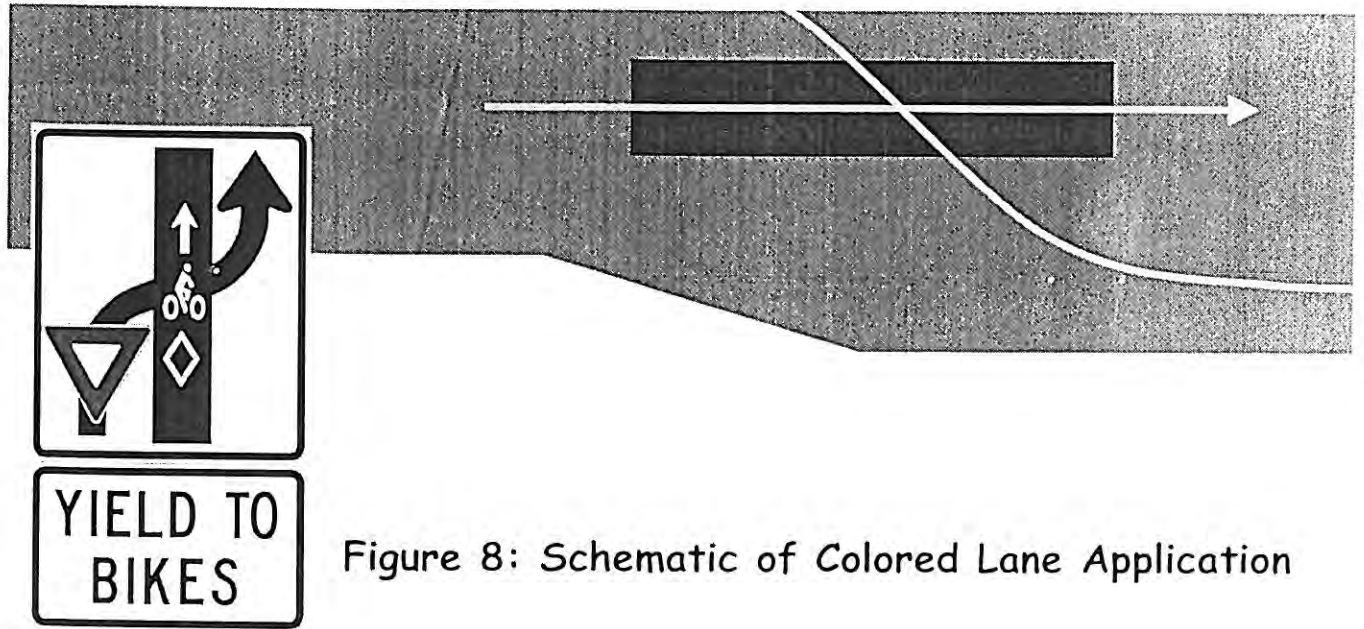


Figure 8: Schematic of Colored Lane Application

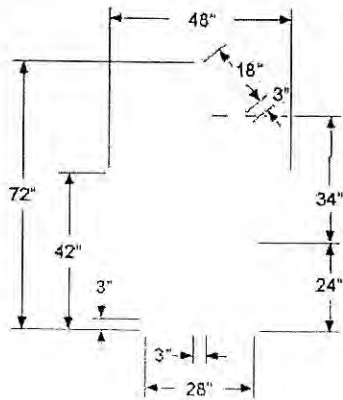


Figure 9  
Schematic of Pavement Stencil  
in use in San Francisco and  
Denver

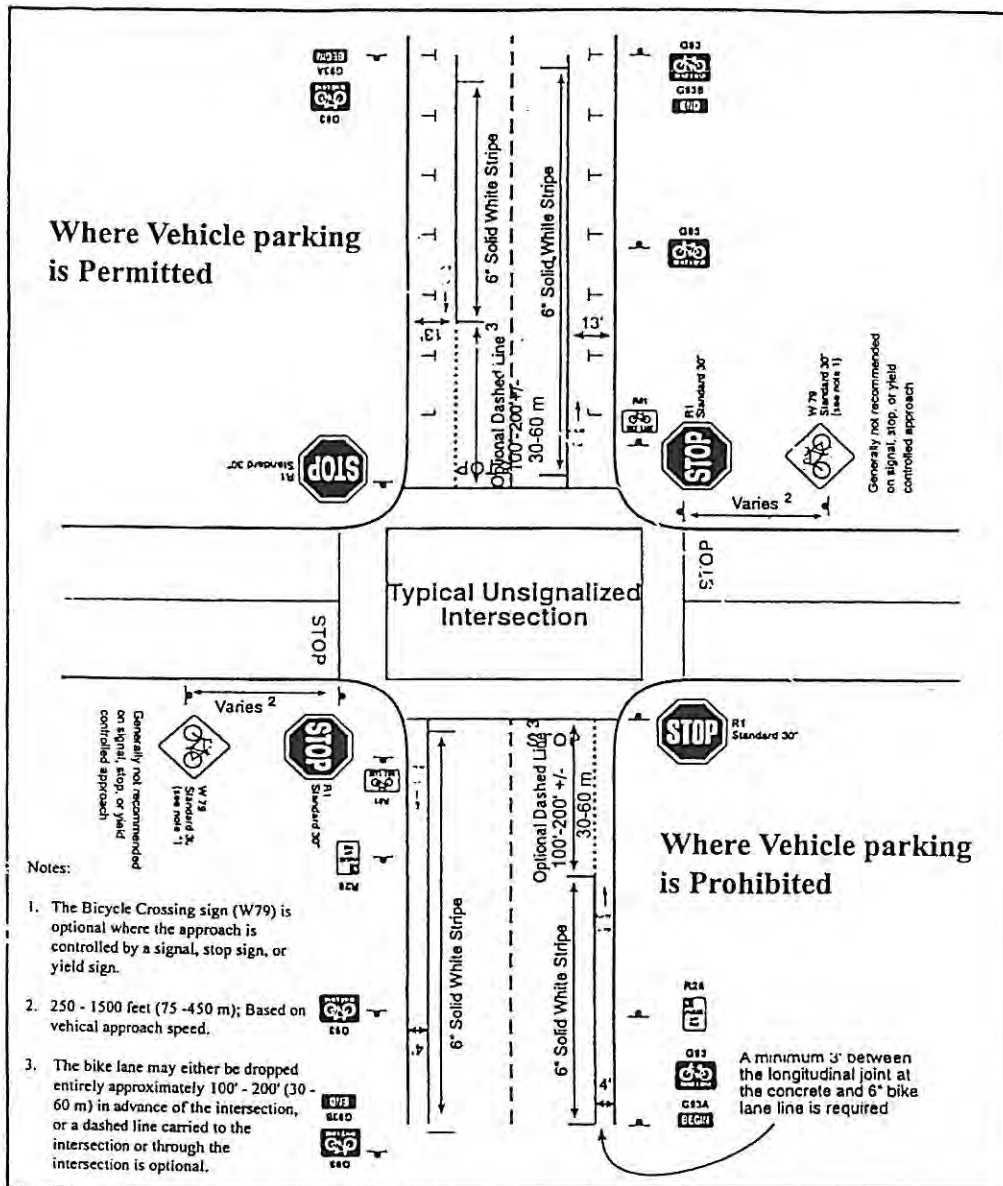
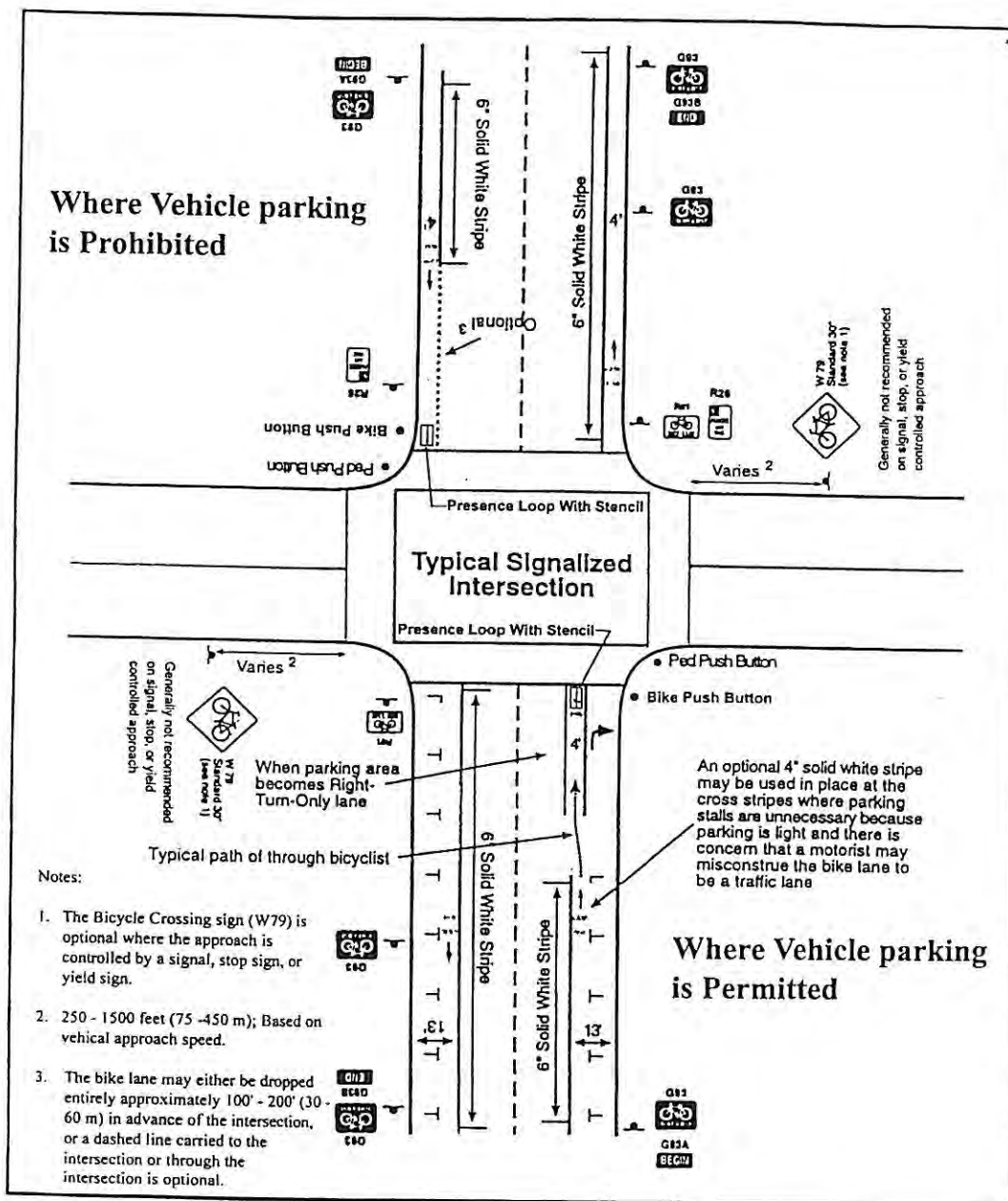
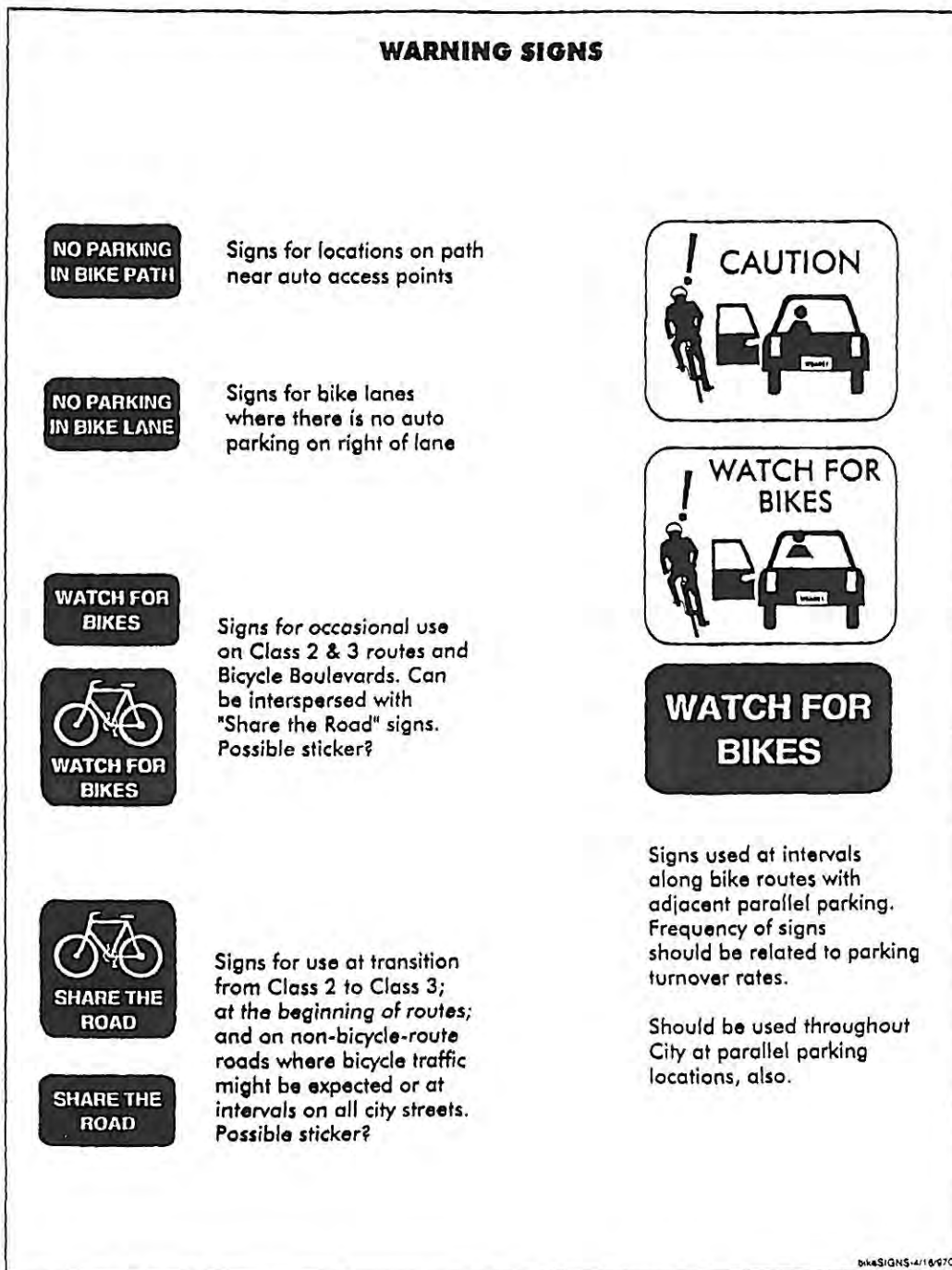


Figure 10: Signing at Unsignalized Intersections



**Figure 11: Signing at Signalized Intersections**



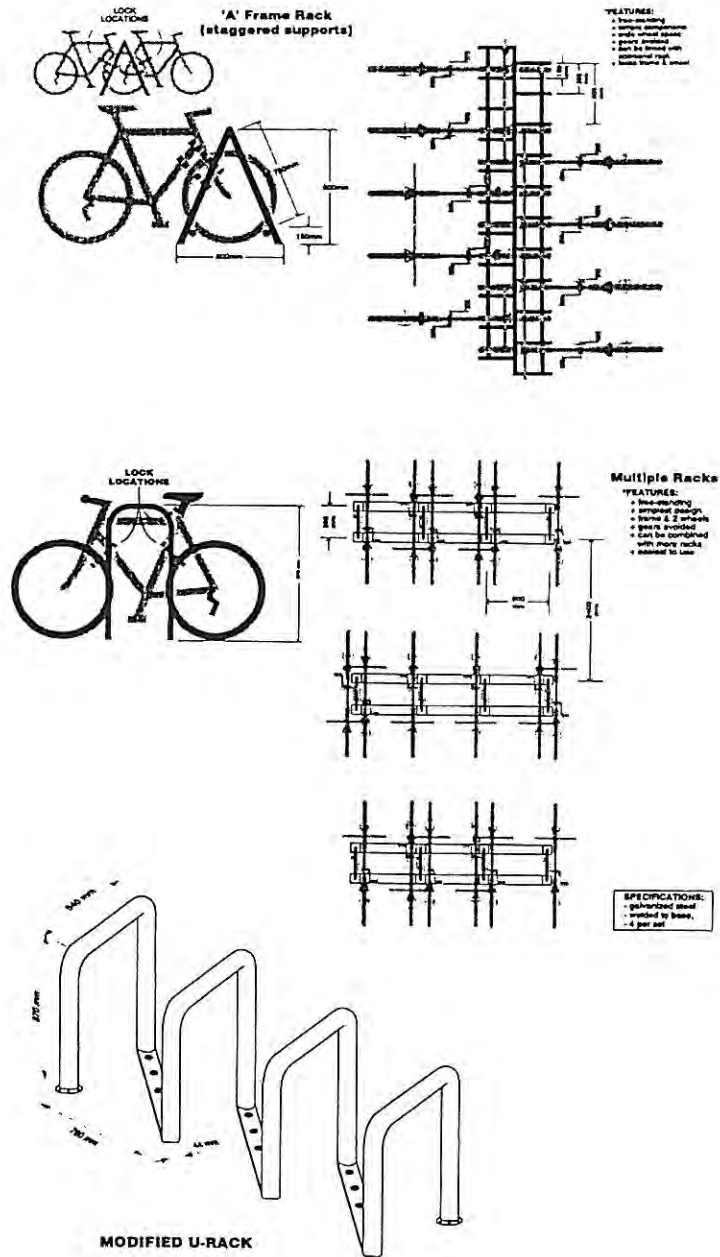
**Figure 12: Warning Signs**

**Table 11: Recommended Guidelines for Bicycle Parking Locations and Quantities**

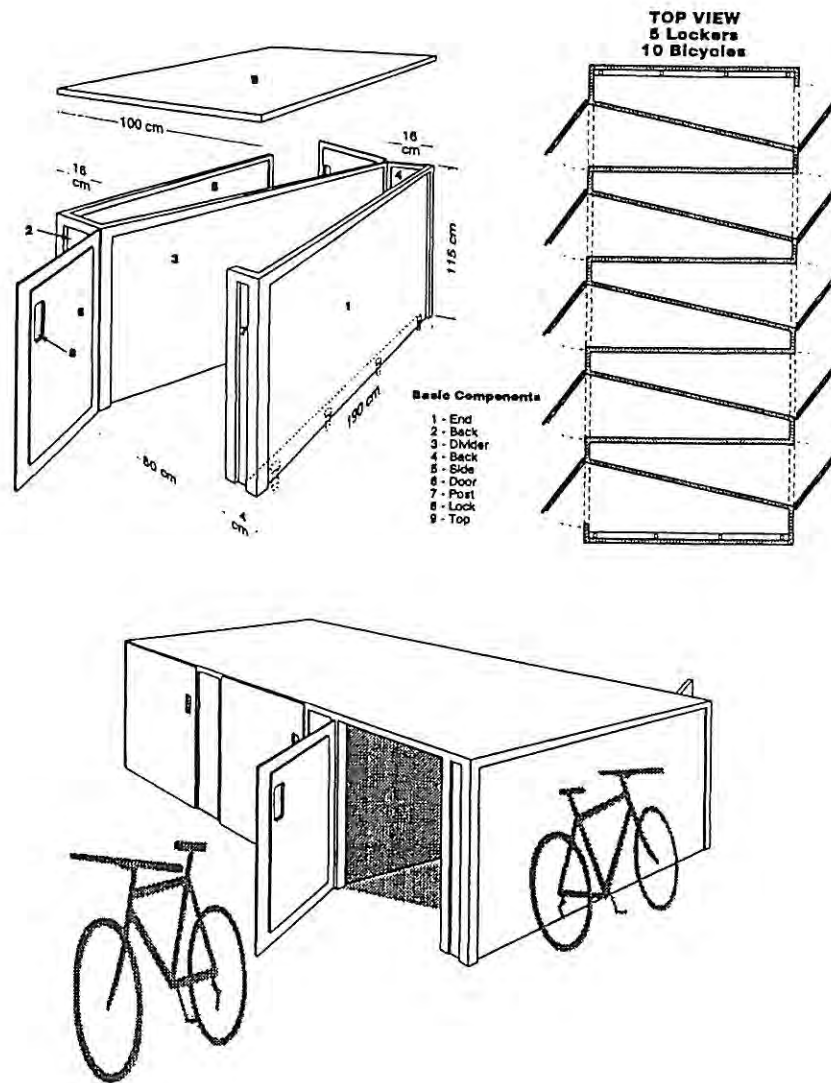
Land Use or Location	Physical Location	Type of Parking	Bicycle Capacity
City Park	Adjacent to restrooms, picnic areas, fields, and other attractions	A Frame, Staple Rack	8 bicycles per acre
City Schools	Near office entrance with good visibility	A Frame, Staple rack in fenced area	8 bicycles per 40 students
Public Facilities (City Hall, libraries, community centers)	Near main entrance with good visibility	U, Staple Rack	8 bicycles per location
Commercial, Retail and Industrial Developments over 10,000 gross square feet	Near main entrance with good visibility	U, Staple Rack	1 bicycle per 15 employees or 8 bicycles per 10,000 gross square feet
Shopping Centers over 10,000 gross square feet	Near main entrance with good visibility	U, Staple Rack	8 bicycles per 10,000 gross square feet
Commercial Districts	Near main entrance with good visibility  Not to obstruct auto or pedestrian movement	U or Staple Rack	2 bicycles every 200 feet
Transit Stations	Near platform or security guard	Enclosed Lockers	1 bicycle per 30 parking spaces

***Recommended Locations***

Prohibited Locations	4 Feet Minimum Distance From	5 Feet Minimum Distance From
Red zones, blue zones, bus zones, white zones, corners	Parking meters, newspaper boxes, trees, sign posts, light poles and public telephones.	Wheelchair ramps, driveways fire hydrants, fire escapes, and doorways.



**Figure 13: Bicycle Racks**



**Figure 14: Bicycle Lockers**

## **Maintenance**

The total annual maintenance cost of the primary bikeway system is estimated to be about \$- annually once it is fully implemented (see Table -). Most of the maintenance costs are associated with the proposed off-road bike paths, as bike lanes and routes are assumed to be maintained as part of routine roadway maintenance. However, as bicycle lanes do require occasional restriping and other maintenance, a cost of \$2000 per mile annually is used based on experience in other cities. This includes costs like sweeping, replacing signs and markings, and street repair. Class I bike path maintenance costs are based on \$8,500 per mile, which covers labor, supplies, and amortized equipment costs for weekly trash removal, monthly sweeping, and bi-annual resurfacing and repair patrols.

Maintenance access on the Class I bike path will be achieved using standard City pick-up trucks on the pathway itself. Sections with narrow widths or other clearance restrictions should be clearly marked. Class I bike path maintenance includes cleaning, resurfacing and restriping the asphalt path, repairs to crossings, cleaning drainage systems, trash removal, and landscaping. Underbrush and weed abatement should be performed once in the late spring and again in mid-summer. In addition, these same maintenance treatments should be performed on Class II and Class III facilities. These facilities should be prioritized to include an accelerated maintenance plan, that is already a part of the City's ongoing street maintenance. A maintenance schedule and checklist is provided in Table 12.

### Action

Identify a reliable source of funding to cover all new Class I, II and III bike facility maintenance. All proposed designs should be closely examined to minimize future maintenance costs. In particular, maintenance on Class II and III facilities should be accelerated.



**Table: 12**  
**Bikeway Maintenance Check List and Schedule**

Item	Frequency
Sign Replacement/Repair	1 - 3 years
Pavement Marking Replacement	1 - 3 years
Tree, Shrub & grass trimming/fert.	5 months - 1 year
Pavement sealing/potholes	5 - 15 years <sup>1</sup>
Clean drainage system	1 year
Pavement sweeping	Weekly-Monthly/As needed
Shoulder and grass mowing	Weekly/As needed
Trash disposal	Weekly/As needed
Lighting Replacement/Repair	1 year
Graffiti removal	Weekly-Monthly/As needed
Maintain Furniture	1 year
Fountain/restroom cleaning/repair	Weekly-Monthly/As needed
Pruning	1 - 4 years
Bridge/Tunnel Inspection	1 year
Remove fallen trees	As needed
Weed control	Monthly/As needed
Remove snow and ice	Weekly/As needed
Maintain emergency telephones, CCTV	1 year
Maintain irrigation lines	1 year
Irrigate/water plants	Weekly-Monthly/As needed

## Security

Security may be an issue along portions of the Class I bike paths. The following actions are recommended to address these concerns.

### Action

Enforcement of applicable laws on the bike path will be performed by the City of Corona Police Department, using both bicycles and vehicles. Enforcement of vehicle statutes relating to bicycle operation will be enforced on Class II and Class III bikeways as part of the department's normal operations. No additional manpower or equipment is anticipated for Class II or III segments.

## Liability

Liability is a major concern for all local governments. Liability for local agencies implementing and operation new bikeways and pedestrian facilities should be no different than the liability for new roads, parks, or schools. Local agencies should adhere to the following guidelines to minimize their liability.

### 1. Use of Design standards.

The designers, builders, and inspectors of a facility should adhere to widely accepted standards governing the design and construction of the trail. A standard of conduct includes adherence to published documents such as safety codes, standards, or guidelines that are sponsored or issued by government agencies or voluntary associations, even though such documents lack the force and effect of law. Provisions of state laws related to transportation facilities, if mandatory, may provide the basis for a finding of negligence per se.

Applicable California standards include the Uniform Building Code, and Caltrans Design Manual for Class I and II Bikeways. Other available design standards include AASHTO's Guide for the Development of Bicycle Facilities; Florida Department of

Transportations Trail Intersection Design Guidelines, Island Press's "Greenways: A Guide to Planning, Design, and Development," Americans with Disabilities Act (ADA), and the Rail-to-Trails Conservancy's Trails for the 21st Century: A

**Liability, continued**

Planning, Design, and Management Manual for Multi-Use Trails.

Note that Caltrans requirements and guidelines are legally binding for all bikeways in California: deviations to these standards must go through the design exception process. Careful compliance with applicable laws, regulations, route selection criteria, and design standards should greatly reduce the risk of injury to bicyclists using the bikeway, and also provide strong evidence that the agency used reasonable care. A detailed Project Feasibility Report is specifically designed to address existing standards.

2. Traffic signals and warning devices.

CalTrans has adopted a Traffic Design Manual, which defines the circumstances under which traffic signals and warning devices are required. While California law limits the liability of public entities for failure to install regulatory traffic signals, signage and markings, non-regulatory warning signs must be installed where necessary to warn of dangerous condition, such as an intersection. All signals and warning devices must be adequately maintained, so as not to invite reliance on a defective warning device.

3. Usage of Professionals.

Facilities that have been reviewed and approved by unregistered or unlicensed professionals may increase liability exposure.

4. Adhere to Maintenance Standards.

Maintenance practice should be consistent along the entire facility, and conform to recognized maintenance practices. The responsible maintenance agency(ies) should have a written procedure to follow to maintain all portions of the facility, including pre-existing conditions such as drain grates.

5. Monitor Conditions.

The responsible agency(ies) should have an internal mechanism to monitor and respond to actual operating conditions on the

**Liability, continued**

**Liability, continued**

facility. This is typically done through the maintenance procedures, a record of field observations and public comments, and an annual accident analysis. Accidents should be reviewed to determine if physical conditions on the bikeway were a contributing cause.

6. Keep Written Records.

Written records of all maintenance activities and procedures, responses to reports of safety hazards, and other regular through numerous jurisdictions, it may make sense to have one contact persons/department responsible for the entire facility, rather than risk confusion by incidents being reported to the wrong jurisdiction. Mileposts on the route may also help maintenance and enforcement personnel respond to problems.

7. Correct Hazards.

Trail managers should correct all hazards known by public officials in a timely fashion.

8. Warn of Known Hazards.

Trail users should be warned that the trail is adjacent to an active railroad corridor and to use caution when crossing the tracks or at intersections with roadways.

9. Insurance.

Proper insurance coverage or budgeting for self-insurance to cover potential liability will do much to alleviate concerns.

10. Be Careful With the Word 'Safe'.

Do not make any verbal or written comments that the facility is safe or safer than a non-designated route. For example, a Project Feasibility Report should not make any blanket claims that the facility is safe or safer than comparable routes, however.

**Liability, continued**

11. Do Not Rush to Settle.

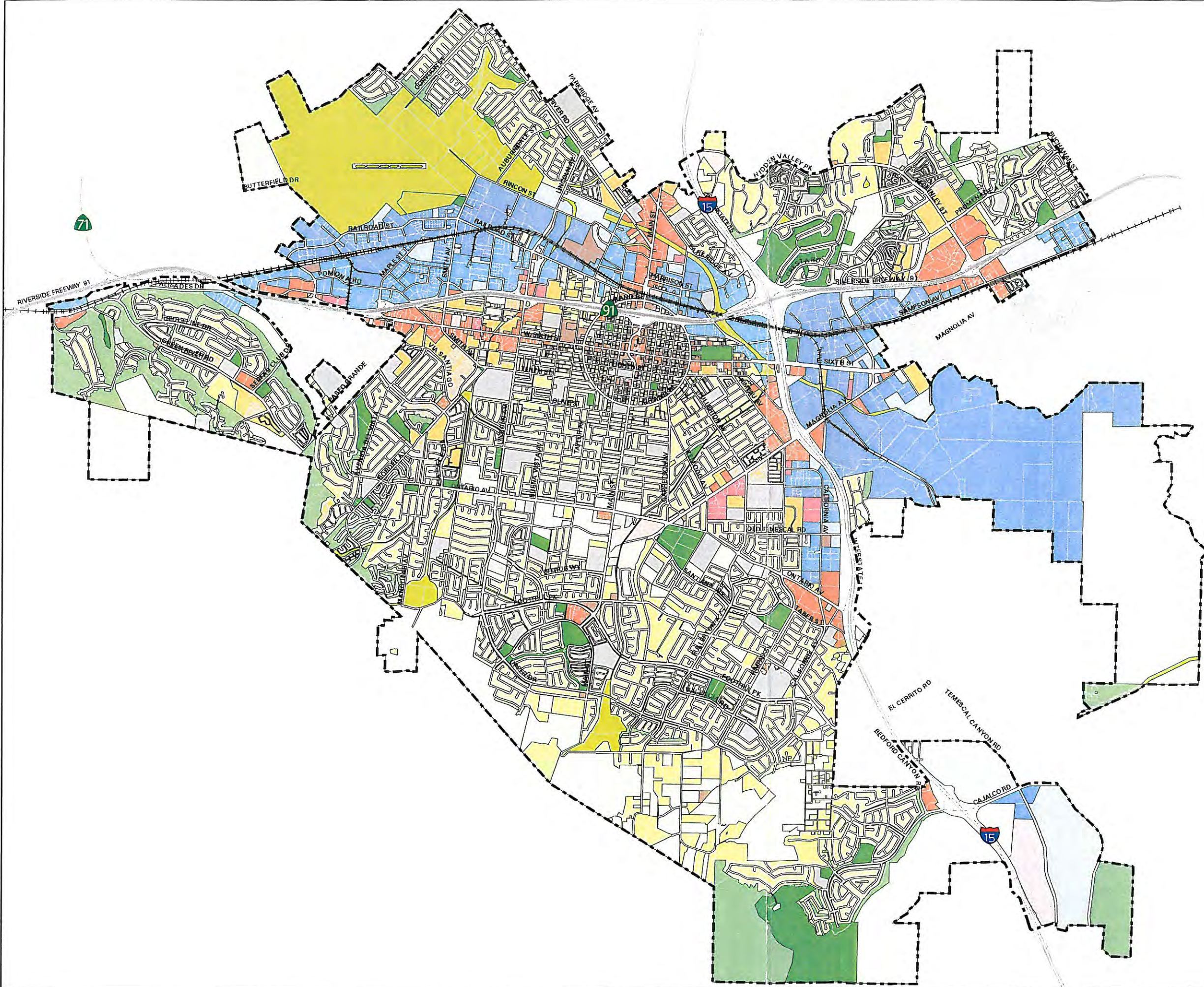
Fear that juries will award a plaintiff large sums for damages has made many attorneys eager to settle cases before they come to court. Lawsuits related to bikeways and walkways may be settled more quickly than other types of lawsuits due to the misconception that walking or bicycling are inherently unsafe activities.

Attorneys may feel that a local government has an extra responsibility on designated bikeways or walkways—more than it does for motor vehicles on roadways for example—to prevent incidents. In fact, there is no evidence that bicycling or walking is inherently more or less safe than other transportation modes such as driving, flying, or other recreational activities such as swimming or playing soccer. This misconception is probably shared by the same public, who must be educated about the facts of bicycling and walking. The same exceptions for user responsibility and facility condition that apply to driving should apply to bicycling or walking. Since by law bicyclists and pedestrians are allowed on all roadways except where expressly prohibited, and roadway conditions vary widely, a public agency incurs no additional liability by identifying the route on a map or a plan. The net effect of prematurely settling a case is to incrementally reduce the types of improvements that can be offered by local government. In other cases, settling cases prematurely may simply encourage legal actions by others.

Appendix A

(Insert Land Use Map)

# City of Corona Landuse



- SFR Single Family Residential
- MFR Multiple Family Residential
- VR Vacant Residential
- C Commercial
- CP Commercial-Office
- VC Vacant-Commercial
- LI Industrial Light
- GI Industrial General
- VI Vacant Industrial
- I Institutional
- QP Public Facility/Quasi-Public
- OS-P Passive Open Space
- OS-R Recreational Open Space
- FC Flood Control
- AG Agriculture
- VAG Vacant-Agriculture

Corona City Boundary



Map scale 1" to 4000'

*[Signature]*  
PLANNING DIRECTOR      DATE

## Appendix B

### Acronym List

1	AASHTO	American Association of Highway and Transportation Officials
2	ADA	American Disabilities Act
3	ADT	Average Daily Trips
4	BMP	Bicycle Master Plan
5	BTA	Bicycle Transportation Account
6	Caltrans	California Department of Transportation
7	CEQA	California Environmental Quality Act
8	CMAQ	Congestion Mitigation and Air Quality Improvement
9	ITE	Institute of Transportation Engineers
10	LACBC	Los Angeles County Bicycle Coalition
11	LACMTA	Los Angeles County Metropolitan Transportation Authority
12	LBATRA	Long Beach Area Transportation Resource Association
13	MPO	Metropolitan Planning Organization
14	MUTCD	Manual on Uniform Traffic Control Devices
15	NHS	National Highway System
16	OTS	Office of Traffic Safety
17	RFP	Request For Proposal
18	RTP	Regional Transportation Plan
19	SCAG	Southern California Association of Governments
20	STP	Surface Transportation Program
21	SWITRS	Statewide Integrated Traffic Records System
22	TAC	Technical Advisory Committee
23	TDA	Transportation Development Act
24	TE Funds	Transportation Enhancement Funds
25	TEA	Transportation Enhancement Activities
26	TEA-21	Transportation Equity Act for the 21st Century