




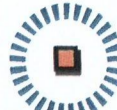
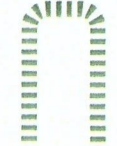




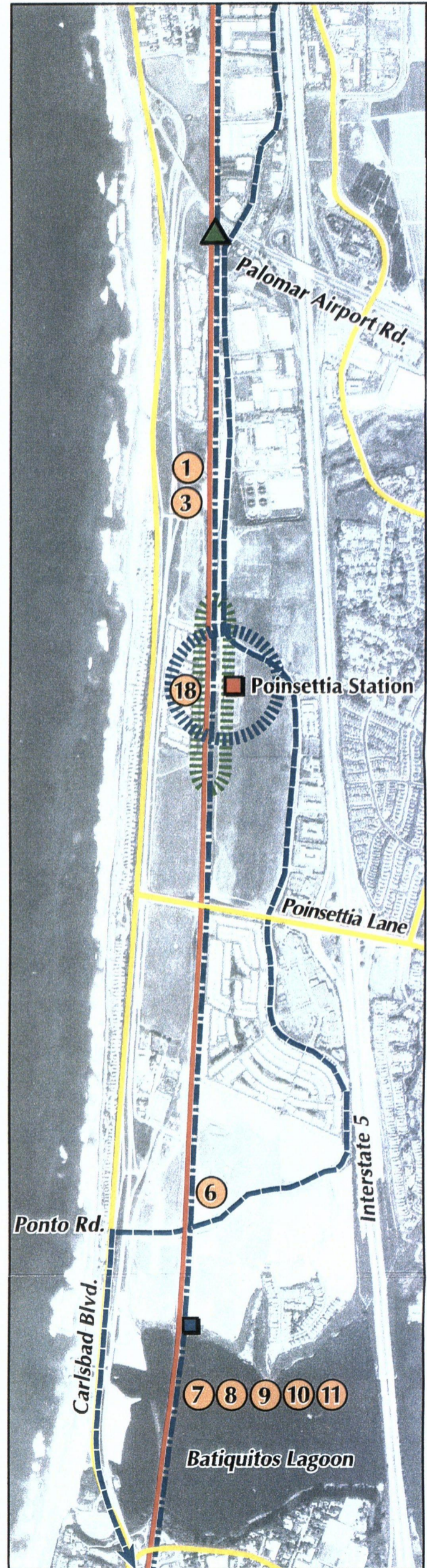
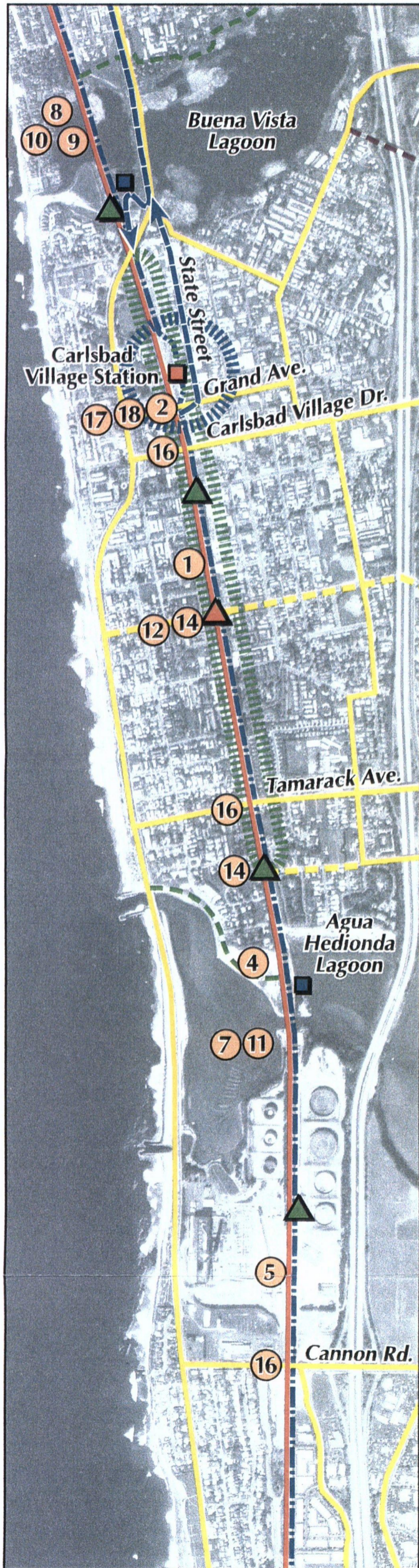


MAP LEGEND

-  Existing Rail Alignment
-  Long-Term Rail Corridor Trail Alignment
-  Interim Rail Corridor Trail Alignment
-  Proposed Pedestrian Trails/Class 1
-  Existing Bicycle Facilities/Class 2
-  Proposed Bicycle Facilities/Class 2
-  Proposed Bicycle Facilities/Class 3

-  Pedestrian Zones
1/4 mile radius from transit stations with extensive pedestrian connections
-  Urban Design Treatment Zones
Rail ROW within urban areas with upgraded landscaping, lighting, paving and fencing

-  NCTD Recommended Crossing Point
-  Observed Major Pedestrian Crossing Points
-  Transit Stations
-  Interstation Rest Stops
Locations based on distance from stations and viewing opportunities



COASTAL RAIL CORRIDOR MULTI-USE TRAIL IMPROVEMENTS
CITY OF CARLSBAD BIKEWAY MASTER PLAN

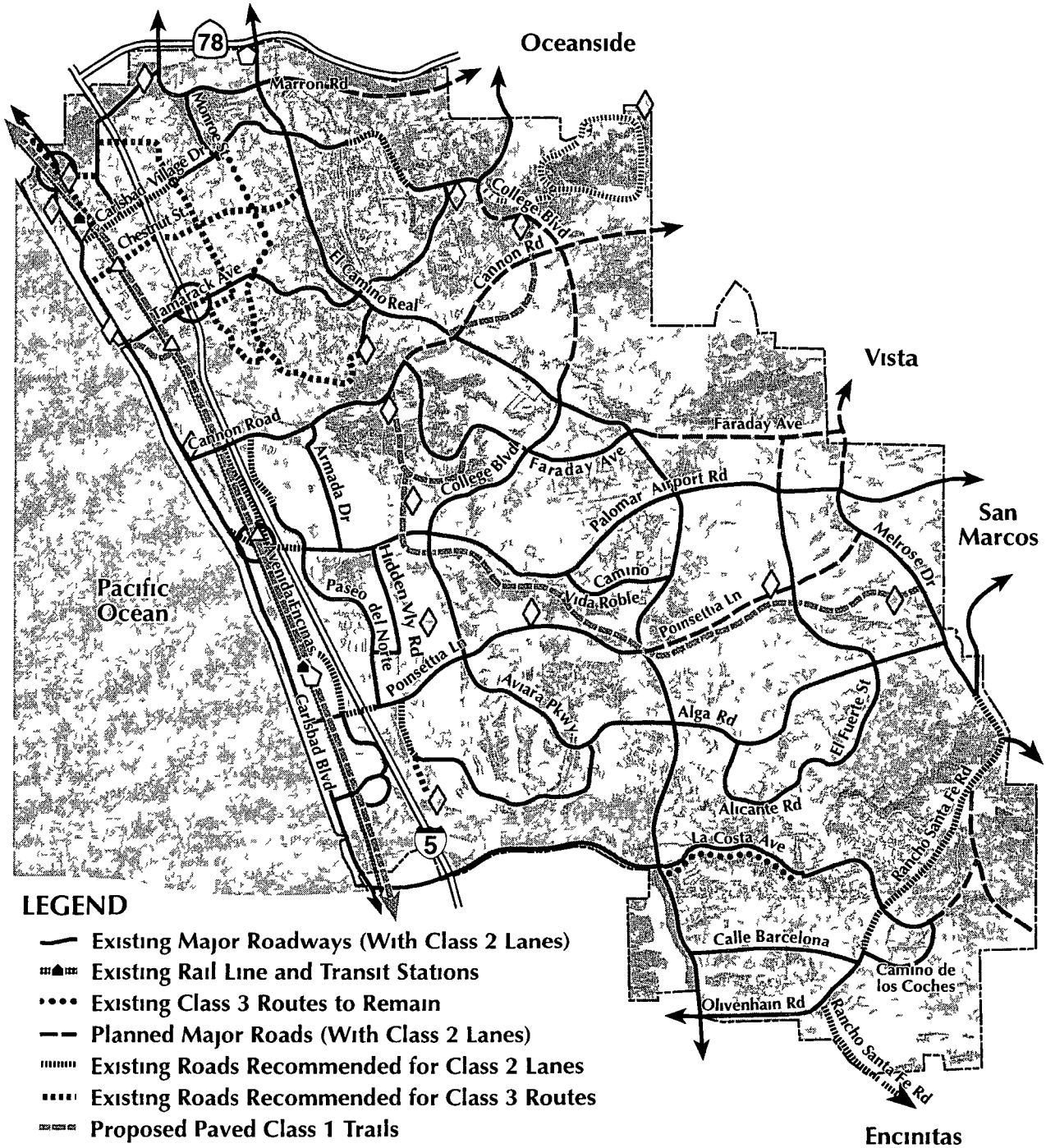
Figure 10-4

Note: Circled numbers correspond to Rail Trail conceptual details (Numbered 1 to 18 in Figures 10-1 to 10-3 on previous pages). Also see Section 10.4.1 for further information.



PROPOSED BICYCLE FACILITIES
CITY OF CARLSBAD BIKEWAY MASTER PLAN

Figure 10-5



LEGEND

- Existing Major Roadways (With Class 2 Lanes)
- ▬ Existing Rail Line and Transit Stations
- Existing Class 3 Routes to Remain
- Planned Major Roads (With Class 2 Lanes)
- ▬ Existing Roads Recommended for Class 2 Lanes
- Existing Roads Recommended for Class 3 Routes
- ▬ Proposed Paved Class 1 Trails
- ▬ Proposed (Paved or Unpaved) Multi-Use Trail Links
- ◊ Proposed Park and Ride Lots
- △ Proposed Rail Line Crossing
- ◊ Existing Parks Linked by Proposed Bikeway System
- Site-specific Problem Areas



Recommendations

• Intersections (crossing treatments)

Midblock crossing points would follow specific guidelines developed for this project and would incorporate a number of safety features. The basic facility design could be used for the entire length of the Coastal Rail Trail from Oceanside to downtown San Diego. (See Figure 10.3.)

• Special Urban Design Zones

The areas immediately surrounding transit stations in Carlsbad are proposed to have enhanced urban design amenities to highlight the importance of the stations. This may include improvements in paving, landscaping, lighting, fencing, site furnishings, signage and art that would relate to both the design of the transit stations and their urban context.

For a distance of half a mile along the rail line and within the rail right-of-way, these enhanced urban design treatments would highlight the approach to the core of two unique areas of the City, anchored by their transit centers. The existing design elements of these transit centers could be expanded throughout the urban design zones, with progressively more detail as users got closer to the transit center themselves. The urban design detailing could form relatively concentric zones of certain elements, beginning with landscaping, for example, and layering on the other amenities such as lighting, paving, fencing and site structures, culminating in a zone immediately around the transit center with all proposed amenities, as well as site structures that resemble the existing transit center buildings, but on a smaller scale.

• Public Art

Public art for inclusion within the Coastal Rail Trail development may be particularly appropriate at the transit stations, within the special urban design zones and at the proposed rest stops. For example, interpretive features at the rest stops could be designed to be part of the public art and take advantage of the views. Specific guidelines for public art in Carlsbad can be found in Appendix B.

10.4.2 Mid-City Historic Trail (Coast to Carrillo Ranch)

A paved trail along the Agua Hedionda Lagoon could be extended eastward to the Carrillo Ranch site in eastern Carlsbad near San Marcos. Its alignment would run from the shore of the lagoon eastward to a point just east of the Carlsbad Ranch development (Legoland) where it could turn south through a proposed golf course development to cross Palomar Airport Road. From just south of Palomar Airport Road, it could run eastward to cross El Camino Real south of Camino Vida Roble and then up the valley to the Carrillo Ranch site. From here it could continue on unpaved and connect with the City of San Marcos trail system.

10.4.3 Specific Park Connections

The proposed Class 1 facilities will connect several existing and programmed parks in the central portion of the city. These include Alta Mira, Veterans Memorial, Calavera Hills, Laguna Riviera, Carrillo Ranch, Alga Norte and Poinsettia Parks. The proposed Class 1 facilities would also intersect with other proposed trails and allow connection via those trails with several other parks around the periphery of the City.

10.5 Multi-use Trail Facilities

This type of facility is proposed for only one route system in this bikeway master plan, leading to and around Lake Calaveras. This facility is intended to take advantage of existing well established dirt roads in the area as an off-street route. Whether or not this route is paved will be based on environmental constraints and determined prior to implementation. Maintaining its unpaved status means that it can not be designated a Class 1 bicycle facility, but this route is intended to be an informal route for all types of trail users, not just cyclists.

10.6 Other Bicycle Facilities

Several other types of bicycle facilities are recommended under this master plan, but are not shown on the facility map due to scale or other factors.

10.6.1 Undesignated Bike Facilities

These routes are indicated on bikeway system maps only, without signage or striping. No undesignated bike facilities are proposed in this bikeway master plan. Typically, undesignated routes are most useful in more densely populated urban areas, but Carlsbad's relatively small areas of dense development should allow its bikeway system to function without the need for this type of facility. It should be noted that all of the currently existing undesignated routes are proposed to be upgraded to Class 3 facilities under this master plan. Implementing this upgrade would be of minimal cost since it would require the addition of bicycle route signage only. However, it should be a goal of any workable bikeway system to make as many streets as possible compatible for bicycle use.

10.6.2 Site-specific Projects

The site-specific project areas are intersections and bridges that will all require minor to significant reconfiguration to make them functional components of a safe bikeway system. (See Chapter 8.)



10 6 3 Urban Access Pathways

In some cases, opportunities to increase intermodal transit use may be available simply by providing convenient access between transit centers and bikeways where none yet exists. Where these urban access paths may prove useful, they would require development of multi-use pathways for non-motorized use because they would naturally attract pedestrian use as well. Therefore, multi-use standards should be implemented in the design of these access paths.

10 6 4 Connections to Urban Centers

Among the criteria used in the selection of routes for this bikeway master plan was the definition of activity and employment centers, as well as GIS evaluation of population and employment densities. These types of data probably best represent what could be called "urban centers." Using this data, bikeway routes were selected to provide the most direct connections possible between these urban centers and the existing transit centers. In some cases, existing bikeways already ran adjacent to transit centers, or an adjacent undesignated roadway was determined to be a candidate route.

10 6 5 School Access Paths/Routes

In most cases, a considerable percentage of students at any particular school will get there by bicycle. Many of these children are not experienced, knowledgeable or comfortable with riding on streets in the midst of motor vehicle traffic. For them, alternate routes should be designated to access schools from the surrounding neighborhoods they serve. These routes would utilize lightly traveled streets where sidewalk riding would be unlikely to pose safety problems for themselves or other users. These routes should also be designed to cross arterials or other high volume streets, when necessary, at specific points with sufficient sight distances, crosswalks, pedestrian signals and, where appropriate, crossing guards. The students for whom these routes are designated should be encouraged to use them.

10 6 6 Intermodal Facilities

For this bikeway master plan, intermodal facilities include bus stops, commuter rail stops and park and ride lots. These park and ride facilities need to be accessible to cyclists and should be equipped with bicycle lockers. The two coastal commuter rail stations could perhaps be improved by installing additional bicycle lockers as demand requires.

A proposed park and ride lot at the Poinsettia Station commuter rail stop could provide some benefits for bicycle, automobile and commuter rail users. The existing parking lot is probably large enough to accommodate a park and ride function without expansion. Putting a park and ride lot at the commuter rail station would

probably foster commuter rail use and would still place it close enough to I-5 to be convenient to persons who continued to drive. A potential added benefit may be that exposure to the commuter rail environment may encourage automobile commuters to try rail commuting.

Another park and ride lot could be installed at the Plaza Camino Real retail complex at SR 78 and El Camino Real. An existing transit center there is served by at least nine bus routes, including two express routes using bicycle rack-equipped buses, but bicycle lockers are needed. (See Figure 10-5, Proposed Bicycle Facilities.)

10 7 Current Constraints to Cycling

Several problems consistently constrain bicycle use in Carlsbad. The following sections describe the most prevalent ones.

10 7 1 Narrow Bridges

The most common constraint to bicycle use in Carlsbad results from narrow bridges, or from a lack of crossings over barriers such as highways and rail lines. Bridge construction or reconstruction takes place very infrequently, but when such work is planned, the needs of cyclists should be considered and crossing opportunities implemented. Retrofitting bicycle facilities onto existing substandard bridges is much more costly than including bicycle facilities within a scheduled improvement project. In some cities, the provision of bicycle facilities on bridges has been made a standard component of new bridge planning, design and construction. Besides roadway bridges, bicycle facilities have also been implemented as part of pipeline crossings over rivers, for example.

10 7 2 Topography

The next greatest constraint to cycling in Carlsbad is topography, especially in the southeastern and east central portions of the city. Long and often steep grades are common. Though a small percentage of cyclists may actually seek out such grades, most would rather avoid them. Little can be done to alleviate this problem except to provide alternative routes to circumvent steep areas wherever possible. One example of such an alternative route is the proposed segment along the northern shore of Batiquitos Lagoon. This particular segment is intended to serve as a multi-use route to take advantage of the views of the lagoon. However, it can also serve as an alternate route connecting coastal Carlsbad to El Camino Real without having to ride up and over the hills just north of the lagoon via Poinsettia Lane and Aviara Parkway.



Recommendations

10 7 3 Connectivity

There are a number of planned arterials as yet unbuilt, especially in the hilly southeastern portion of the city. Under current conditions, this lack of routes creates only minor inconvenience for motor vehicle drivers. However, until these streets are actually in place, there is a lack of desirable routes and cyclists are required to make longer, more indirect trips than they would prefer. Once in place, these planned arterials would provide cyclists with much more convenient routes from one neighborhood to another.

10 7 4 High Speeds

Many of Carlsbad's existing Class 2 roadways have relatively high posted motor vehicle speeds. Experienced cyclists are generally not concerned with adjacent motor vehicle speeds, especially when they can rely on the relative safety of their own lane. However, less experienced cyclists are more likely to find such conditions uncomfortable and are therefore less likely to use these roadways.



11 - CIP PROJECTS & FUNDING

Sections 11 1 to 11 3 define the recommended bikeway system improvements as CIP projects and provide construction costs See Figure 11-1, Proposed CIP Project Segments, for a graphic overview of the proposed bikeway segments See Table 11-1 for general costs For a description of each segment, see Table 11-2 and the specific CIP segment cost analyses spreadsheets in Appendix D The remaining sections of this chapter describe the funding sources available for bikeway projects, followed by a summary, Tables 11-3A and B, Trail and Bikeway Facility Funding Summary

11 1 Specific Projects

These are locations that presently do not function optimally for cyclists' safety The changes needed range from restriping and signage to complete reconfiguration However, for this master plan, their CIP projects costs are considered to be only the restriping and signage needed to complete the improvements The costs of actual reconstruction due to recommended reconfiguration is not included because the two intersections recommended for reconfiguration are already slated for such work The necessary reconstruction is described in the following paragraphs, but are not tallied

11 1 1 Carlsbad Boulevard/State Street

This intersection is probably the most problematic in the City of Carlsbad The recommended (and planned) solution is to realign State Street so that it forms a "T" intersection with Carlsbad Boulevard State Street would be controlled by a stop sign and a left turn lane would probably be provided on southbound Carlsbad Boulevard These alterations would greatly improve safety at this intersection, for cyclists and motorists alike However, environmental concerns about this reconfiguration may be troublesome considering the potential impacts to adjacent wetlands

11 1 2 Carlsbad Blvd /Palomar Airport Road

This intersection, like the previous one, is planned to be reconfigured with a standard intersection configuration This will be a significant undertaking since this reconfiguration requires the removal and realignment of an intersection styled after those used on interstate highways, complete with cloverleaf ramps and overpasses

11 1 3 Tamarack Avenue/Pio Pico Drive

This intersection is currently lightly traveled by cyclists, but the recommended improvements to make it safer for them would not be costly Restriping the lanes to accommodate a Class 2 lane and providing signage warning motorists to watch for cyclists would probably be sufficient for this intersection

11 2 Bikeway Development Priorities

The factors used in prioritizing the implementation of potential bikeway project types included probable demand, available funding, regional significance and transportation efficiency With these criteria, the proposed Coastal Rail Trail was given first priority, followed by on-street routes and off-street routes See Table 11-2, Capital Improvement Projects, for more information

11 3 Typical Unit Construction Costs

The cost of bicycle facility construction varies widely depending on the type of facility concerned A generalized list of typical unit construction costs are shown in Table 11-1 These figures can be used for preliminary cost estimates, but they do not reflect special circumstances that may occur in specific situations, such as the long bridges that would be needed to span lagoons, for instance The following sections provide generalized costs per mile for each class of bicycle facility, as well as what these costs cover, and just as importantly, what they do not

11 3 1 Multi-Use Trails (Segments 36-37)

This type of trail is represented by a small trail system leading to and around Lake Calaveras These segments would not fulfill Caltrans official bikeway designations because they are intended to serve as multi-purpose routes that may or may not be paved, depending upon environmental review prior to implementation Until surface type is determined, costs for multi-use trails should be considered the same as those for Class 1 bikeways

11 3 2 Class 1 Bikeways (Segments 28-35)

Because they are constructed independently of existing or programmed motor vehicle facilities, Class 1 paths are by far the most expensive of all bicycle facilities Typical costs are \$150,000 to \$350,000 per mile, exclusive of right-of-way acquisition, bridges and other potential major expenses such as extensive grading The range of costs is primarily due to topography and facility width For example, a Class 1 facility being converted from an abandoned rail roadbed will require far less grubbing, grading and structural enhancements than a facility being constructed through undeveloped hilly terrain

11 3 3 Class 2 Bikeways (Segments 10-27)

Class 2 facility costs are approximately \$15,000 to \$35,000 per mile This cost includes all necessary lane striping and signage, but does not include widening of roadways The cost variation is due to the amount of striping and signage installed The cost will be higher where substantial restriping is needed, such as where multiple motor vehicle lanes require restriping



CIP Projects and Bikeway Funding

11 3 4 Class 3 Bikeways (Segments 1-9)

Class 3 routes costs are the lowest of all facility types because the only physical improvement to be installed is route signage. The cost range of \$1,500 to \$5,000 per mile is due to the distance between signs, which can vary considerably depending upon factors such as horizontal and vertical curvature, the number the intersections and curb cuts, and how often the route changes direction onto a different roadway.

11 3 5 Bikeway Bridge Improvements

The following information concerns bridges designed to serve bicycle facilities in locations other than planned or programmed roadway bridges. Typical roadway bridges are constructed of reinforced concrete to withstand the enormous stresses of motor vehicle traffic and seismic activity. Bridges intended for non-motorized uses do not need to be as robust or as costly as bridges designed for regular motor vehicle use.

Bridges costs depend on design load and foundation, and to a lesser extent, length, width and materials. Bridges must be designed to carry the same loads as the bicycle facility they serve. On Class 1 facilities, for example, where patrol, emergency or maintenance vehicles are expected to use the bridge, it must be able to support at least the gross weight of the heaviest anticipated vehicle. Bridges intended to support motor vehicles will require much sturdier construction and increased width, both of which will increase costs.

Unstable soil conditions will require any bridge to be built with more expensive foundations in the form of larger footings or piers. Wooden bridges tend to be less expensive than metal bridges, though their useful life may be shorter. Bridge costs increase almost exponentially as their height increases due to increased structural complexity. Finally, prefabricated bridges are generally cheaper and less environmentally damaging to install than constructed-in-place bridges. For bridge preliminary cost estimates, \$1,200 to \$1,500 per linear foot is adequate.

Typical Bikeway Construction Costs **Table 11-1**

Description	Unit	Unit Cost
Clearing and Grubbing	LF	\$10 00-\$30 00
Excavation	CY	\$30 00-\$40 00
Asphalt Pavement (4")	SF	\$1 20-\$1 50
Soil Polymer Stabilizer	SF	\$0 07-\$0 10
Bike Lane Striping	LF	\$0 60-\$0 80
Pavement Markings	EA	\$40 00-\$50 00
Fencing (Chain link)	LF	\$16 00-\$20 00
Guardrail	LF	\$20 00-\$25 00
8' Steel or Concrete Bridge	LF	\$1,200-\$1,500
36" Retaining Wall (Concrete)	SF	\$32 00-\$40 00
Relocate Signs/Fencing	LF	\$1 00-\$2 00
Drainage	LF	\$1 00-\$5 00
Traffic/Bike Path Signing	LF	\$2 40-\$3 00
Lighting	EA	\$500 00
Traffic Control	LF	\$0 20-\$0 40
Clean up	LF	\$0 10-\$0 20

To subtotal above, add 20% for contingencies, 10% for engineering and design, 5% for administration and 7% for construction management.



11 4 Rail Trail Construction

The planning, design and construction of the Coastal Rail Trail will need to acknowledge some specific cost issues not commonly encountered in most bikeway projects. The following sections illustrate the specific concerns behind some of these issues.

11 4 1 Class 1 Bikeway

Though it is planned to be a multi-use facility, the Coastal Rail Trail is being designed to meet Caltrans Class 1 bikeway standards. Therefore, costs for the bikeway can utilize the estimates from Section 11 3 1, Typical Unit Construction Costs, for Class 1 Bikeways. As described in that section, specific significant additional expenses related to topography, bridges, etc. need to be added to normal costs. However, since the bikeway will be built adjacent to a prepared rail roadbed and land acquisition costs are not likely to be a factor, costs for this Class 1 facility may be somewhat lower than typical installations. On the other hand, the bridges needed to cross the lagoons will add substantially to the overall costs.

A factor that will play a role in facility costs specific to the City of Carlsbad is the width of the rail right-of-way. The right-of-way width varies through the city, being narrowest in the northern half of the city near downtown and the existing transit center at Carlsbad Village Drive, and widest in the southern half of the city. Where the right-of-way width is large, construction costs should be at the low end relative to typical Class 1 bikeways. However, where right-of-way widths are restricted, additional costs are likely to be incurred in the form of supplementary earth moving, grading, compaction and retaining wall construction to provide the necessary level linear space for Class 1 bikeway development.

11 4 2 Bike Bridges

The bike bridges for the coastal bikeway are significantly different from most bikeway installations for three reasons. First, they will require longer bridges than normally constructed for typical bikeways. Second, these bridges would likely be built as adjuncts to new rail bridge construction. Third, the rail bridge construction is not likely to occur for some time. For these reasons, costs are difficult, if not impossible, to determine at this time, especially since the type of rail bridge construction will determine the type of added bikeway decking and attachment. Therefore, in lieu of bridge costs, roadway segments that are planned to be used to circumvent the lagoons should be used for cost analyses for the foreseeable future. For more information on bridge construction requirements, see Section 11 3 4, Bikeway Bridge Improvements.

11 4 3 Signage

The City of Carlsbad's approved design for signage identifying the Coastal Rail Trail incorporates an icon that identifies the City of Carlsbad within its portion of the coastal route, as well as incorporates a graphic emblem that generally identifies the Coastal Rail Trail throughout its alignment from Oceanside to San Diego. This general configuration should be used by the other municipalities throughout the Coastal Rail Trail alignment.

This identifying signage should be placed in a uniform method such as at all trail crossing and access points, rest stops and transit stations. The selected size and method of installation should follow a standard acceptable and agreed to by all the municipalities along the Coastal Rail Trail alignment. The standard sign is likely to be a small, baked enamel-coated metal plate securely bolted to a sturdy wooden post.

11 4 4 Rest Stops

Rest stops are proposed for three locations within the City of Carlsbad's portion of the Coastal Rail Trail alignment. Their locations were selected to provide conveniently dispersed stopping points, to take advantage of available viewpoints at scenic areas and at points of natural interpretive opportunities along the Coastal Rail Trail alignment within the City of Carlsbad. The selected rest stops represent the culmination of the three criteria.

The City of Carlsbad envisions a substantial array of amenities at these rest stops. Among them are the following:

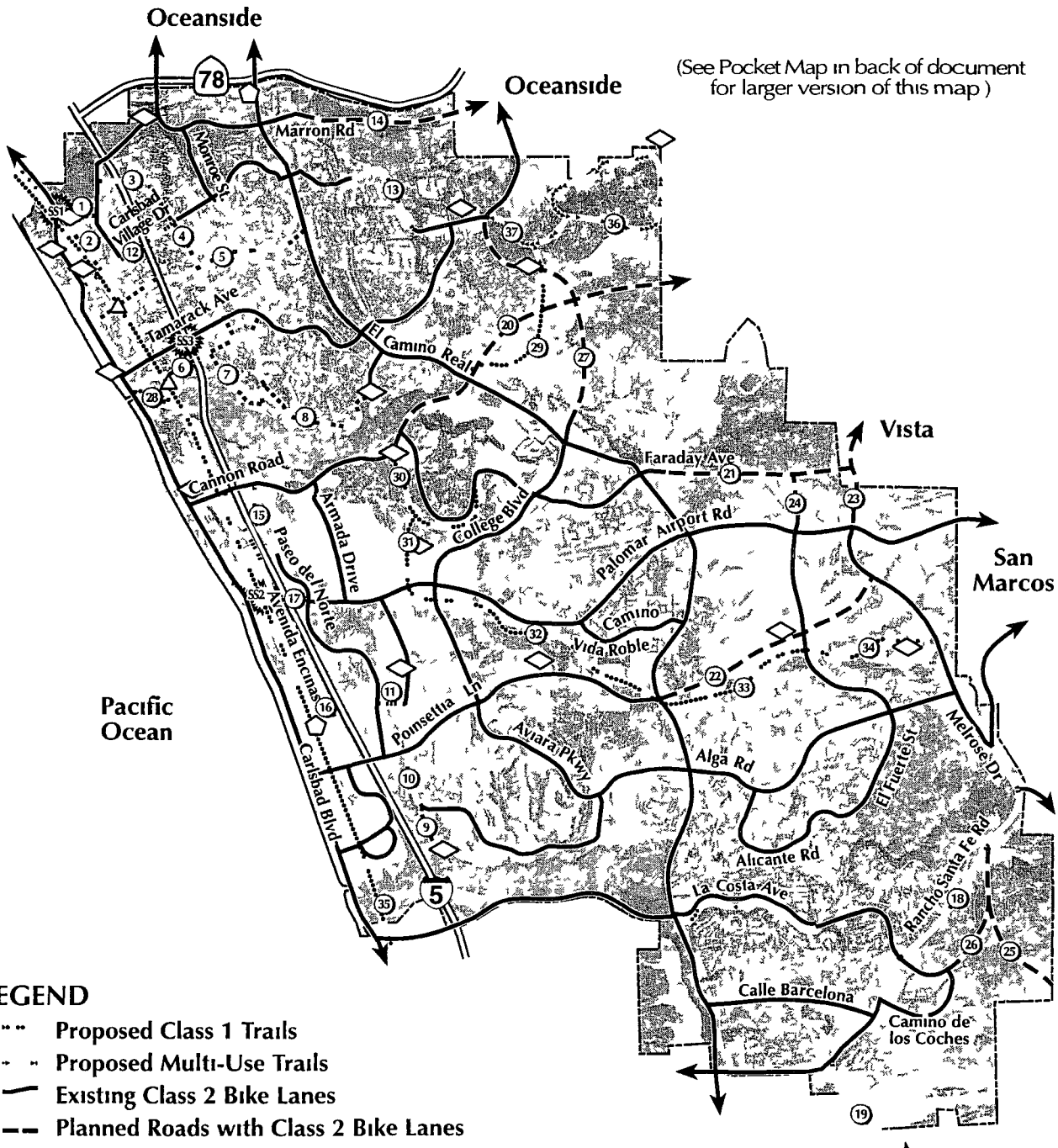
- Bike racks,
- Shade shelters,
- Seating,
- Signage (interpretive and directional),
- Lighting,
- Trash receptacles,
- Emergency telephones,
- Portable restrooms,
- Water fountains (with bottle spouts and dog basins)

Incorporation of all of these components into the rest stops would require some expense, but should be seen as an opportunity to create a favorable impression of the City of Carlsbad for large numbers of trail users in an highly effective manner. The provision of these amenities at scenic vista points within Carlsbad would leave a lasting favorable impression on users. To help ensure this, the signage should clearly identify the rest stops as being provided by the City of Carlsbad.



PROPOSED CIP PROJECT SEGMENTS CITY OF CARLSBAD BIKEWAY MASTER PLAN

Figure 11-1



(See Pocket Map in back of document for larger version of this map)

LEGEND

- Proposed Class 1 Trails
- - - Proposed Multi-Use Trails
- Existing Class 2 Bike Lanes
- - - Planned Roads with Class 2 Bike Lanes
- Proposed Class 2 Bike Lanes
- Existing Class 3 Bike Routes
- Proposed Class 3 Bike Lanes
- ◻ Proposed Park and Ride Lots
- △ Proposed Rail Line Crossings
- ◊ Existing and Planned Parks
- ⊙ Site-specific Corrective Projects
- Ⓟ CIP Segments