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Revised January 10, 2001
ABSTRACT

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ABSTRACT: This study evaluated several transportation alternatives to accommodate future traffic flows on the rural Highway 94 corridor and recommended a strategy that combines improvements for roads, ports of entry, and rail cargo service.
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The Rural Highway 94 Corridor Study was prepared with the guidance and assistance of a Policy Advisory Committee and a Technical/Citizens Advisory Committee.

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Boulevard Sponsor Group
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California Department of Fish & Game
California Highway Patrol
California Trucking Association
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City of Lemon Grove
City of San Diego
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Consejo de Desarrollo Económico de Tecate (Economic Development Council)
County of San Diego
Endangered Habitats League
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Tecate Regional Economic Development Commission
Tecate Sponsor Group
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U. S. Environmental Protection Agency
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RECOMMENDATIONS
INTRODUCTION

In July 1998, SANDAG initiated the Rural Highway 94 Corridor Study. Policy and Technical/Citizens Advisory Committees have provided input to SANDAG at several meetings held since that time. In September 2000, the SANDAG Board of Directors approved the recommendations proposed by the study Committees. These recommendations, which are described below, have been transmitted to Caltrans, District 11, and to the County of San Diego.

RECOMMENDATIONS

A strategy that combines improvements for roads, ports of entry, and rail cargo service is likely to achieve the objective of accommodating future traffic on the Highway 94 corridor while trying to minimize the financial burden to the San Diego region and the potential environmental impacts associated with major improvements in this sensitive corridor.

Population growth in the Jamul/Dulzura and Mountain Empire areas will directly affect traffic growth on the Highway 94 corridor. The County of San Diego currently is updating its General Plan. In 1998, the Board of Supervisors adopted 2020 population figures for the unincorporated communities. However, alternatives are still under consideration and the population forecasts that ultimately are incorporated in the County of San Diego General Plan should be used in future traffic forecasts.

Over time, several actions will be necessary to provide an adequate level of service for drivers on Highway 94. Figure 1, on page 6, illustrates the recommended actions, which are described below:

- **Highway Improvements**

  The Policy Advisory Committee recommended Caltrans revise planning documents, such as the Highway 94 Transportation Concept Report, to reflect Highway 94 as a two-lane conventional highway between Steele Canyon Road and its junction with Ribbonwood Road/Interstate 8 near the community of Boulevard.

  The Policy Advisory Committee also recommended the widening of Highway 94 to four lanes from the Jamacha junction (junction of State Routes 94 and 54) to Steele Canyon Road as a near-term project. Projects such as the recently opened Steele Canyon High School are expected to increase traffic on that section of the Highway 94 corridor.
The SANDAG 2020 Regional Transportation Plan (RTP) includes the construction of Highway 94 as a four-lane freeway on a new alignment between Avocado Boulevard and Millar Ranch Road. No funding has been identified for this project at this time. Given the recommended widening to four lanes between the Jamacha junction and Steele Canyon Road, this long-range project will have to be re-evaluated to assess whether or not it is needed.

In addition, non-capacity increasing operational improvements such as passing lanes, turnouts, and curve realignments also will be needed to provide better operating and safer conditions in the corridor. Caltrans’ Truck Restriction Study has identified locations where curve realignments would be needed west of Route 188. Additional curve improvements may be identified when Caltrans completes the study for the segment of Highway 94 east of Route 188.

Other regional and binational projects also will help relieve traffic on the Highway 94 corridor by providing alternative routes or transportation modes for both passenger vehicles and trucks. These projects include:

- **Border Crossing Improvements**

  **San Diego-Tijuana:** Additional vehicular capacity at the Otay Mesa and future East Otay Mesa border crossings would reduce wait times in the San Diego-Tijuana international border. In turn, those two ports could attract more cargo and passenger vehicle traffic currently moving between Tecate, Baja California, and the San Diego area and points north.

  Expanding the hours of operation at the existing Otay Mesa port of entry would allow more vehicles to cross the border at this location and could attract vehicles from the Tecate to the San Diego-Tijuana ports of entry. In 1999, federal agencies initiated a four-month pilot project to extend cargo inspection and processing at the Otay Mesa port of entry from 5:00 to 8:00 p.m. Also, planning is underway on both sides of the border for the opening of a new port of entry at East Otay Mesa by 2010.

  In conjunction with expanded cross-border capacity at the San Diego-Tijuana border, reduction or elimination of tolls in the Tijuana-Tecate toll road would provide an incentive to increase the use of the toll highway as an alternative to Highway 94. This would probably require a Mexican government subsidy since a private firm holds the long-term concession of the Tijuana-Tecate toll road.

  **Tecate:** The upgrades approved at the Tecate, California port of entry will improve the inspection facilities but will not increase the vehicular capacity at the port. The proposed enhancements to the facilities in Tecate, Baja California would improve the traffic circulation within the City of Tecate by rerouting trucks to inspection yards located to the east of the downtown area.

  **Jacumba-Jacumé:** This potential border crossing would improve access for passenger vehicles and trucks that travel between Baja California and locations east of San Diego. Future traffic volumes across the Jacumba-Jacumé port of entry will depend in part upon the level of cross-border traffic the Tecate port of entry is able to accommodate. Traffic pro-
jections for 2020 suggest that approximately 4,100 vehicles would use the Jacumba-Jacumé crossing if Tecate maintains the current level of traffic in the future.

To allow for the future development of the Jacumba-Jacumé border crossing, it will be necessary for government agencies in California and Baja California to continue planning and coordination efforts to identify and reserve right-of-way for inspection facilities and connecting roadways.

- **San Diego and Arizona Eastern (SD&AE) Railway Reopening**

  Restoring the Desert Line section of the SD&AE railroad would provide a freight link to the entire United States and Mexico through its connection to the Union Pacific Railroad at Plaster City, California. The SD&AE Railway would reduce truck traffic on the Highway 94 corridor by diverting to rail some cargo currently transported by truck across the Tecate port of entry.

  The ownership of the 44-mile section of the line that runs between Tijuana and Tecate, Mexico has been transferred to the State of Baja California. The San Diego and Imperial Valley Railroad currently provides freight service between San Diego and Tecate only.

- **Monitoring Efforts**

  In preparation for the next Regional Transportation Plan update, it is recommended that SANDAG and Caltrans continue monitoring the following:

  - Traffic volumes on the Highway 94 corridor
  - The County of San Diego General Plan update and the population forecasts for the Jamul/Dulzura and Mountain Empire community planning areas
  - Cross-border traffic at the Tecate port of entry
Figure 1
Rural Highway 94 Corridor Study Recommendations

September 2000
RURAL HIGHWAY 94 CORRIDOR: TRANSPORTATION ISSUES
RURAL HIGHWAY 94 CORRIDOR: TRANSPORTATION ISSUES

PROBLEM STATEMENT

A Problem Statement was prepared to identify existing and projected transportation problems on the Rural Highway 94 corridor. Because Highway 94 not only accommodates travel within the San Diego region but also trips to and from Baja California, a U.S.-Mexico binational area was selected for planning purposes.

The study area encompasses the San Diego Region-Baja California border area, as shown in Figure 2. The boundaries of the study area are as follows:

- West boundary: Interstate 805, State Route 54, and the Sweetwater segment of State Route 125 (under construction)
- North Boundary: Interstate 8
- East Boundary: San Diego/Imperial County line
- South Boundary: Northern section of the Municipalities of Tijuana and Tecate, including the Tijuana-Mexicali highways (Free Route 2 and Toll Route 2D) from Mesa de Otay to the vicinity of El Cóndor

Following the Background section, current traffic conditions in the study area are presented. Problems identified by the Policy and Technical Advisory Committees are described afterward, including the following:

- Safety considerations
- Protection of the environment
- Economic considerations
- Projected growth: population and employment
- National coordination
- Potential for growth inducement
BACKGROUND

Growth and development in the San Diego region will continue to impact traffic on State Route 94. Connecting to Interstate 5 in downtown San Diego, Highway 94 extends east 64 miles to join Interstate 8 in southeastern San Diego County.

State Route 94 is a major commuter route between Downtown San Diego and Jamacha Road, in the community of Rancho San Diego. East of Rancho San Diego, Highway 94 is a winding, two-lane rural highway that serves the communities of Jamul, Dulzura, Barrett Junction, Potrero, Campo, and Boulevard. West of Potrero, the highway connects to State Route 188. Route 188 traverses the community of Tecate and extends for two miles to the Tecate international border crossing.

A distinct characteristic of Highway 94 is its role in international trade. Route 94 is the only east-west link to the U.S. interstate highway system for commercial vehicles crossing at the Tecate port of entry. Linking the communities of Tecate, Baja California, and Tecate, California, the Tecate border crossing is a relatively small gateway for trade between the United States and Mexico.

CURRENT TRAFFIC CONDITIONS

Traffic Volumes

State Route 94

State Route 94 extends 64 miles from Interstate 5, in downtown San Diego, east to the junction with Interstate 8 near Boulevard. The western section of this highway is a major commuter route. Traffic volumes in 1999 reached nearly 196,000 daily vehicles east of the junction with Interstate 805.

From Avocado Boulevard in Rancho San Diego, Highway 94 continues as a four-lane expressway to Jamacha Boulevard. East of this junction, Route 94 is a two-lane conventional rural highway over rolling and mountainous terrain. Highway 94 also connects with State Route 188 where the community of Tecate and the Tecate international border crossing are located.

In 1999, Highway 94 carried 39,500 vehicles daily east of Avocado Boulevard. Traffic volumes averaged 48,500 vehicles west of the junction with Route 54 and 15,600 vehicles east of that junction. Between Steele Canyon Road and Lyons Valley Road, Highway 94 carried 17,100 vehicles. East of Lyons Valley Road, daily volumes dropped to 7,600 vehicles. Between Otay Lakes Road and Dulzura, volumes averaged 6,100 vehicles. The segment of Highway 94 west of Route 188 carried 6,800 daily vehicles. Between Route 188 and Buckman Springs Road, traffic volumes dropped to 1,700 vehicles. East of Buckman Springs Road, volumes ranged between 1,200 and 1,700 daily vehicles.

**State Route 188**

This two-lane conventional highway extends 1.9 miles, connecting the U.S.-Mexico international border with Highway 94. Two local roads join State Route 188 from the east. Thing Road intersects the highway one-tenth of a mile north of the Tecate port of entry while Humphries Road joins Route 188 one-half of a mile farther north. Tecate Mission Road intersects Route 188 from the west approximately two-tenths of a mile north of the border.

In 1999, daily traffic volumes on Route 188 averaged 6,500 vehicles.

**Mexican Federal Highway 2 (MX-2)**

Federal Highway 2 is a two-lane facility that connects Tijuana and Mexicali in Baja California. From Mexicali, the highway continues easterly into the State of Sonora. The Tijuana-Mexicali segment runs parallel to the international border for 113 miles. Nearly 32 miles separate Tijuana and Tecate, where Highway 2 connects with Highway 3 to Ensenada. The Tecate to La Rumorosa segment runs for 38 miles. From La Rumorosa to El Centinela, 30 miles west of Mexicali, the highway becomes a toll road (MX-2D).

In 1998, traffic volumes on Highway 2 west of the Rodríguez Dam, near Tijuana, averaged 8,000 daily vehicles. Daily volumes reached nearly 7,000 vehicles at Tecate, dropping to 6,500 vehicles at La Rumorosa. Approaching the city of Mexicali, traffic averaged 13,000 daily vehicles.

**Mexican Federal Highway 2D (MX-2D)**

This toll road is also known as the Tijuana-Mexicali Highway. The western segment opened in 1992 and begins in the Mesa de Otay district of Tijuana, ending east of the city of Tecate. It is a 22-mile, four-lane, controlled-access highway. At the south entrance to Tecate, Highway 2D connects with Highway 3 to Ensenada. The middle segment between Tecate and La Rumorosa opened to traffic in December 1998 and has a length of 41 miles. The eastern part of Highway 2D runs for 30 miles between La Rumorosa and El Centinela.


Table 1 shows current toll charges at this facility. The cost in U.S. dollars was calculated at an exchange rate of 9.50 pesos to the dollar.

---

Table 1
Toll Rates
MX-2D Tijuana-Mexicali Highway

<table>
<thead>
<tr>
<th>Vehicle Type</th>
<th>Tijuana-Tecate Toll Rates</th>
<th>Tecate-La Rumorosa Toll Rates</th>
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<tbody>
<tr>
<td></td>
<td>(in Mexican Pesos)</td>
<td>(in U.S. Dollars)</td>
</tr>
<tr>
<td>Passenger and light-duty vehicles</td>
<td>$ 50</td>
<td>$ 5.25</td>
</tr>
<tr>
<td>Trucks with 2 axles and buses</td>
<td>$ 73</td>
<td>$ 7.70</td>
</tr>
<tr>
<td>Trucks with 3 and 4 axles</td>
<td>$ 96</td>
<td>$10.10</td>
</tr>
<tr>
<td>Trucks with 5 and 6 axles</td>
<td>$137</td>
<td>$14.40</td>
</tr>
<tr>
<td>Trucks with more than 6 axles</td>
<td>$175</td>
<td>$18.42</td>
</tr>
</tbody>
</table>

Source: Secretaría de Comunicaciones y Transporte (SCT), November 2000

**Truck Traffic**

About 300 trucks drove across the Tecate port of entry daily in 1997 and nearly three-fourths of them traveled on State Route 94 before or after crossing the border. The remaining 25 percent of commercial trips through the port are between Tecate (California) and Mexico.³

In 1997, Caltrans conducted 12-hour vehicle classification counts at several locations on Highway 94. The proportion of trucks at those locations was estimated for a 24-hour period. Table 2 summarizes the truck data. Truck traffic includes both commercial vehicles moving between the San Diego region and Tecate, Baja California, and local truck deliveries accessing the communities along Route 94.

---

### Table 2
State Route 94
1997 Truck Volumes and Truck Shares of Total Traffic

<table>
<thead>
<tr>
<th>Location</th>
<th>12-Hour Truck Volumes (6 a.m. to 6 p.m.)</th>
<th>12-Hour Truck Share (6 a.m. to 6 p.m.)</th>
<th>Estimated Daily Truck Share</th>
</tr>
</thead>
<tbody>
<tr>
<td>SR 94 at Singer Lane</td>
<td>599</td>
<td>6.1%</td>
<td>5.5%</td>
</tr>
<tr>
<td>SR 94 West of Lyons Valley Road</td>
<td>558</td>
<td>5.4%</td>
<td>4.8%</td>
</tr>
<tr>
<td>SR 94 West of Otay Lakes Road</td>
<td>209</td>
<td>5.7%</td>
<td>5.0%</td>
</tr>
<tr>
<td>SR 94 East of Barrett Lake Road (a)</td>
<td>222</td>
<td>7.7%</td>
<td>7.1%</td>
</tr>
<tr>
<td>SR 94 West of SR 188</td>
<td>228</td>
<td>7.0%</td>
<td>5.1%</td>
</tr>
<tr>
<td>SR 94 West of Tierra del Sol</td>
<td>60</td>
<td>11.9%</td>
<td>10.6%</td>
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</table>

(a) Counts at this location were performed in October 1997.

Source: Caltrans, April 1997 (12-hour counts); SANDAG

Truck traffic on State Route 188 represented approximately seven percent of the total traffic in 1997.

The section of Mexican Highway 2 (free road) from Tijuana to Mexicali carried a high proportion of truck traffic, according to 1998 traffic counts. At the City of Tecate, trucks accounted for 23 percent of all vehicles. Truck shares were even higher both east and west of Tecate. At La Rumorosa, trucks represented 26 percent of the total traffic. At the Rodriguez Dam, the share of truck traffic was 16 percent.

**Public Transit**

Minimal transit service is available on the rural section of the Route 94 corridor. San Diego County Transit’s Route 894 provides one round-trip daily between Cameron Corners, east of Campo, and Grossmont Center, in the City of La Mesa.

**Rail Service**

The San Diego and Arizona Eastern (SD&AE) Railway runs from downtown San Diego to Plaster City, near El Centro, via Tijuana and Tecate. At Plaster City, the line connects with the Union Pacific Railroad, providing rail links to the entire United States and Mexico. However, segments of the track between Tecate and El Centro, on the “Desert Line,” have been out of service since 1983 due to damaged tunnels, bridges, and tracks.
The San Diego and Imperial Valley (SD&IV) Railroad, a subsidiary of RailTex, Inc., is the current freight operator of the line between San Diego and Tecate. The SD&IV Railroad has a long-term operational agreement with the Metropolitan Transit Development Board, the owner of the U.S. section of the rail line.

The National Railways of Mexico has transferred the operating rights of the Tijuana-Tecate section of the line to the State of Baja California. A new agency to administer the rail line has been formed and will be in charge of awarding the concession of the line. The SD&IV Railroad holds a temporary license to transport freight between Tijuana and Tecate.

Currently, limited cargo moves on the SD&AE line, such as deliveries of propane to Tijuana and grain for the Tecate brewery. According to a SANDAG study, the market for a reopened Desert Line appears to be largely in bulk commodities and lower value freight, as opposed to automobiles or intermodal shipments of consumer goods such as televisions.

IDENTIFICATION OF PROBLEMS

The following sections describe issues and concerns related to the rural Highway 94 corridor, which were identified by the Advisory Committees.

Safety Considerations

Concerns regarding the safety of traveling on the rural section of Highway 94 focus on several issues:

- Highway 94’s winding alignment and mountainous terrain
- Lack of passing opportunities and queues behind slow-moving vehicles
- Traffic accidents
- Mix of passenger vehicles and trucks
- Size of trucks
- Potential hazards to school buses due to truck traffic
- High driving speeds on some segments of Highway 94
- Inadequate inspection facilities and road infrastructure at the Port of Entry

In 1999, Caltrans, in cooperation with the California Highway Patrol and other agencies, conducted a study to evaluate the potential safety hazards of operating large commercial vehicles on Highway 94. The study analyzed the segment of Highway 94 west of Route 188. The segment of Highway 94 east of Route 188 is currently under study.

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The report concluded that Route 94 from Otay Lakes Road to Route 188 has non-standard sections of roadway that inhibit the ability of truck tractor-semi-trailers with a kingpin to rear axle length over 30 feet to negotiate the highway without crossing the centerline or going off the existing edge of the pavement.\(^5\)

The study recommended that advisory signs be kept in place with a high level of surveillance by the California Highway Patrol. As an intermediate goal, Caltrans recommended implementing operational improvements in seven locations identified in the report. A longer-term goal is to prepare the appropriate environmental document to improve an additional location. In general, several curves would require realignments and lane widening.

**Protection of the Environment**

Route 94’s rural corridor holds environmentally sensitive resources, including biological, cultural, and visual resources. Accommodating future traffic growth on Highway 94 could impact the corridor’s natural and social environment, including the rural character of the small East County communities, and diminish its tourist potential.

Several properties where residential or commercial projects previously had been proposed have been acquired by conservation trusts or government agencies. In 1996, 1,840 acres in Rancho San Diego were transferred to the U.S. Fish and Wildlife Service as part of the San Diego National Wildlife Refuge and the Multiple Species Conservation Program.

In 1997, the Trust for Public Land acquired the 4,800-acre Rancho Jamul, located south of Highway 94 and north of Otay Lakes Road, and the 950-acre Las Montanas Estates near Jamul. Portions of these lands have been conveyed to the U.S. Fish and Wildlife Service and the State of California Department of Fish and Game.

**Economic Considerations\(^6\)**

The economic livelihood of Tecate, Baja California and Tecate, California is highly dependent upon international trade. In 1995, trucks carried over 430,000 tons of freight, valued at nearly $600 million, through the Tecate port of entry. This freight is moved between Mexico and the United States via State Routes 94 and 188.

While Tecate is an active port of entry, it accommodates a small fraction of all U.S.-Mexico trade moving through California’s border ports — less than five percent of the total dollar value of two-way trade. In comparison, Otay Mesa captures almost 67 percent of the current trade flow and Calexico nearly 29 percent.

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\(^5\) Caltrans, Truck Restriction Study, State Route 94 (Otay Lakes Road to State Route 188), January 1999.

\(^6\) SANDAG, **Tecate Port of Entry: Trade and Truck Traffic**, July 1997.
Despite a growing population and industrial base in Tecate, Baja California, the Tecate port of entry is not expected to attract a higher proportion of future trade crossing California’s border with Mexico: The location of the port of entry is relatively remote, the industrial base in the area is more traditional and less capitalized than industry in Tijuana or Mexicali, and the lack of urban services and housing supply in Tecate, California limits cross-border economic development opportunities. On the other hand, the Tecate port could play a larger role in accommodating cross-border traffic to the extent the Otay Mesa crossing experiences more congestion and longer delays, causing southbound and northbound traffic to divert to the Tecate crossing.

But even if it maintains its current share of trade through California ports, the Tecate crossing likely will become much busier. In real dollars, the total value of freight moving through the Tecate port of entry is forecast to rise from $600 million (1995’s level) to $966 million by the year 2000. That represents a real increase of over 60 percent in five years.

By the year 2020, the trade flow could exceed $2.6 billion, although any projection of international trade over such a long period is subject to much uncertainty. This forecast of trade through the Tecate port of entry assumes that the inspection operations and facilities would keep up with the projected increase in international trade. Physical or operational constraints on any particular port of entry may cause the volume of trade to shift to one or more border crossings but would not affect the total volume of binational trade.

Projected Growth: Population and Employment

Population and employment forecasts are used as inputs to prepare traffic projections. Forecasts for the Jamul/Dulzura and Mountain Empire community planning areas as well as for Tecate, Baja California are shown in this section.

Table 3 shows the population and employment forecast for Jamul/Dulzura and Mountain Empire.

<table>
<thead>
<tr>
<th>Rural Highway 94 Corridor Communities: Growth Forecast 1995-2020</th>
</tr>
</thead>
<tbody>
<tr>
<td>Jamul/Dulzura</td>
</tr>
<tr>
<td>----------------</td>
</tr>
<tr>
<td>Population</td>
</tr>
<tr>
<td>Employment</td>
</tr>
</tbody>
</table>

Source: SANDAG, 2020 Cities/County Forecast
Tecate, Baja California, is the second smallest municipality in the State of Baja California, after Playas de Rosarito. INEGI, Mexico’s National Institute of Statistics, Geography and Informatics, reported a population of 62,629 for the Municipality of Tecate in 1995. Preliminary data from the population census conducted in April 2000 indicates population has increased to 77,444 residents.

SANDAG developed a population forecast for Tecate, Baja California as part of the Tecate border crossing study. The municipality of Tecate’s population is projected to grow at an annual rate of 4.4 percent, reaching nearly 184,000 in 2020.

In 1995, the Municipality of Tecate’s total employment was estimated at 26,000. Maquiladora plants provided over 8,300 jobs, or about one-third of the municipality’s jobs.

An employment forecast for the Municipality of Tecate was derived from the trade projections prepared as part of SANDAG’s study. From 1995 to 2010, job growth is expected to occur at 4.9 percent per year and, from 2010 to 2020, at 4.1 percent annually. Total employment would grow to nearly 80,000 by 2020.

Binational Coordination

Coordination among the federal, state, and local governments in both the Republic of Mexico and the United States is paramount to solving transportation needs at the border. Issues that require binational cooperation include capital and operational improvements at the port of entry facilities and connecting roads, management of existing roadways, and consideration of traffic impacts on border cities and communities.

Specific areas that would benefit from a cooperative binational approach are the proposed improvements to the border stations at Tecate, California and Tecate, Baja California; the potential for physical or operational improvements at the Otay Mesa crossing; the feasibility of opening additional ports of entry along the San Diego Region-Baja California border; and renewed efforts toward the reopening of the San Diego and Arizona Eastern Railway.

Potential for Growth Inducement

In 1998, the Committees identified two projects that are no longer under consideration. They were the potential traffic impacts on the Highway 94 corridor that would result from the proposed rezone in the community of Tecate, California and from the expansion of the Tecate border station.
TRAFFIC PROJECTIONS ACROSS THE TECATE PORT OF ENTRY
TRAFFIC PROJECTIONS ACROSS THE TECATE PORT OF ENTRY

INTRODUCTION

The rural Highway 94 corridor serves travel within the San Diego region and trips to and from Baja California. Traffic growth on this corridor will be affected by development in both the San Diego region and in Tecate, Mexico, along with expansion of international trade.

As a result, traffic on Highway 94 can be projected for two main components: 1) future travel within the San Diego region, and 2) future cross-border travel. The first element largely will be influenced by local land use decisions. The second element will depend, in part, upon operations at the Tecate port of entry.

This chapter deals with cross-border travel. It describes long-range traffic projections through the Tecate border station and several projects that could change the pattern and volume of travel through this port of entry. The magnitude of these possible traffic impacts would depend, in turn, on a range of actions related to the Tecate international crossing.

The intent of this evaluation is to provide an analysis of how various combinations of projects and policies would affect traffic conditions within the binational study area, focusing on Highway 94. Implementation of some of these options would require extensive coordination among local, state, and federal agencies in both the United States and Mexico.

First, this chapter presents a projection of vehicle crossings at the Tecate port of entry based upon population and employment growth forecasts for the San Diego region and for Tecate, Baja California, as well as forecasts of international trade through the Tecate crossing. These vehicle projections were developed as part of previous SANDAG studies.

Second, the traffic impacts on the Tecate port of entry that would result from the following projects were estimated:

- Reopening of the San Diego and Arizona Eastern (SD&AE) Railway to the Imperial Valley
- Construction of an Ensenada-Tecate rail line
- Expansion of the Otay Mesa port of entry or opening of a new East Otay Mesa crossing, along with reductions in toll charges on the Tijuana-Tecate toll road
- Opening of a new port of entry connecting Jacumba and Jacumé
Finally, those potential traffic impacts are summarized under four alternatives, as shown in Table 4, on page 23. These scenarios were created to project the contribution of cross-border traffic to overall traffic volumes on highways 188 and 94 and were suggested by the Advisory Committees.

Alternative 1 assumes no vehicle restrictions through the Tecate port of entry. Alternatives 2 and 3 consider limitations to truck traffic. Under Alternative 2, “large” commercial trucks would be restricted from operating on the rural section of Highway 94 while, under Alternative 3, no commercial vehicles would be allowed across the Tecate port. Finally, Alternative 4 assumes no vehicle crossings through the Tecate border station.

TECATE PORT OF ENTRY: BASELINE TRADE AND TRAFFIC PROJECTIONS

Trade and Truck Traffic Forecast

On a typical weekday, over 300 trucks pass through the Tecate port of entry, and nearly three-fourths of them travel on SR 94 before or after crossing the border. The remaining 25 percent of commercial trips through the port are between Tecate, California and Mexico. For some Mexican exports to the United States, freight is consolidated in warehouses on the U.S. side of the border. Larger shipments involving fewer trucks then are sent north on SR 188 to SR 94. Freight moving in the opposite direction is consolidated as well.

In 1995, trucks carried an estimated 434,000 metric tons of freight through the port. The cargo was valued at nearly $600 million, including both northbound and southbound shipments. The trucks that cross the border at Tecate tend to haul heavier and less valuable cargo (per ton) than those moving through other California border ports.

While Tecate is an active port of entry, it accommodates a small fraction of all U.S.-Mexico trade moving through California’s border ports — less than five percent of the total dollar value of two-way trade, as shown in Figure 3. In comparison, the current trade flow, measured in dollars, is 13 times greater through Otay Mesa and seven times greater through Calexico.

Engine of Cross-border Activity: Manufacturing in Tecate, Baja California

With over 62,000 residents, Tecate, Baja California, is the origin or destination of most of the freight that moves through the Tecate port. This municipality employs over 26,000 people, including 8,300 workers in the export-oriented maquiladora industry. Of the municipality’s 84 maquiladora plants, Schlage Lock Company is the largest, engaging 1,600 workers in the production of locks and other metal products. The largest non-maquiladora employer is the Tecate brewery, Cervecería Cuahtémoc Moctezuma. The company’s beer exports account for about eight percent of the total truck traffic through the Tecate port.

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## Table 4
Summary of Projected Vehicle Crossings Through the Tecate Port of Entry

<table>
<thead>
<tr>
<th></th>
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</thead>
<tbody>
<tr>
<td></td>
<td>Passenger Vehicles</td>
<td>Trucks</td>
</tr>
<tr>
<td>Cross-Border Traffic Projection (Baseline)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Estimated changes to vehicle crossings due to:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1) SD&amp;AE Railway Reopening</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2) Tecate-Ensenada Railway</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3.a) Otay Mesa Crossing and Tijuana-Tecate Truck Toll Reduction</td>
<td></td>
<td></td>
</tr>
<tr>
<td>OR</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3.b) Otay Mesa Crossing and Tijuana-Tecate Truck Toll Removal</td>
<td></td>
<td></td>
</tr>
<tr>
<td>4) New Jacumba-Jacumé Crossing</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Projected Vehicle Crossings</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Passenger Vehicles</td>
<td>Trucks</td>
</tr>
<tr>
<td>---------------------</td>
<td>--------</td>
</tr>
<tr>
<td>12,877</td>
<td>1,223</td>
</tr>
</tbody>
</table>

Estimated changes to vehicle crossings due to:

1) SD&AE Railway Reopening
2) Tecate-Ensenada Railway
3.a) Otay Mesa Crossing and Tijuana-Tecate Truck Toll Reduction
3.b) Otay Mesa Crossing and Tijuana-Tecate Truck Toll Removal
4) New Jacumba-Jacumé Crossing

Projected Vehicle Crossings: 12,665 (12,665 - 0 = 12,665)

Source: Caltrans, U.S. Customs, SANDAG (forecasts)
Figure 3
California Border Ports
Current Share of the Value of Surface Freight
Moving Between California and Mexico


Tecate’s economy is forging ahead again, having recently suffered setbacks stemming from the peso devaluation and California’s construction slowdown, which depressed sales of concrete/clay tiles and other building materials made in Tecate, Baja California. Employment in the local maquiladora industry has shown strong growth in recent years.

Tecate’s population is expected to nearly treble by the year 2020, reaching 184,000 people. Driven primarily by manufacturing, job creation in the municipality likely will match or exceed the rate of population growth.

Despite a growing population and industrial base in Tecate, Baja California, the port of entry that serves that municipality is not expected to attract a higher proportion of future trade crossing California’s border with Mexico. The location of the port of entry is relatively remote. The industrial base in the area is more traditional and less capitalized than industry in Tijuana or Mexicali. And the lack of urban services and housing supply in the neighboring town of Tecate, California limits cross-border economic development opportunities. On the other hand, the Tecate port could play a larger role in accommodating transborder traffic to the extent the Otay Mesa crossing experiences more congestion and longer delays, causing southbound and northbound traffic to divert to the Tecate crossing.
Baseline Forecast of Trade and Truck Traffic

The Tecate port of entry likely will become much busier, even if it maintains its current share of trade through California ports. Truck traffic through the port is expected to quadruple by the year 2020, exceeding 1,220 vehicles daily. Nearer-term, the projection is 460 daily truck crossings in the year 2000, or 57 percent more truck traffic than in 1995. The port’s contribution to traffic on SR 94 is expected to rise by similar magnitudes, as shown in Table 5, where three-fourths of the trucks crossing the border also use SR 94. International trade will continue to fuel the traffic volumes. Figure 4 illustrates the forecast of daily truck traffic through the Tecate crossing.

Table 5
Tecate Port of Entry and Junction of State Routes 94/188
Baseline Forecast of Truck Traffic

<table>
<thead>
<tr>
<th></th>
<th>Average Trucks per Weekday</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>1995</td>
</tr>
<tr>
<td>Tecate Port of Entry:</td>
<td></td>
</tr>
<tr>
<td>Southbound</td>
<td>125</td>
</tr>
<tr>
<td>Northbound</td>
<td>167</td>
</tr>
<tr>
<td>Total</td>
<td>292</td>
</tr>
<tr>
<td>SR 94/SR 188 Junction*</td>
<td>211</td>
</tr>
</tbody>
</table>

*Includes only trucks passing through the Tecate port of entry.
Sources: U.S. Customs Service, Caltrans, and SANDAG (all forecasts)

Figure 4
Tecate Port of Entry
Baseline Forecast of Average Daily Truck Crossings

Sources: U.S. Customs Service (1995 northbound trucks), Caltrans survey (1995 southbound trucks), and SANDAG
In *real* dollars, the total value of freight moving through the Tecate port of entry is forecast to increase from $600 million (1995’s level) to $966 million by the year 2000, or a real increase of over 60 percent in five years. By the year 2020, the trade flow could surpass $2.6 billion, almost 4.4 times the level in 1995, although any projection of international trade over such a long period is subject to much uncertainty. These trade forecasts are illustrated in Figure 5.

**Figure 5**

*Total U.S.-Mexico Trade Through the Tecate Port of Entry*

*Real 1996 Dollars in Billions*

![Graph showing total U.S.-Mexico trade through the Tecate port of entry from 1985 to 2020.](image)

**Sources:** California State Department of Finance (1985-1995 trade data for California Customs Districts), U.S. Bureau of Transportation Statistics (1995 Transborder Surface Freight Data), and SANDAG

**Trade Outlook**

The expected rise in trade through Tecate and other California border ports has roots that extend beyond the expansionary effects of NAFTA, which merely continued a trend of trade liberalization that began in the late 1980s. By lowering the cost of Mexican goods, the peso devaluation in late 1994 raised U.S. demand for Mexican products more than it reduced Mexican demand for U.S. products. One reason is that the surge in U.S. imports has been accompanied by a rise in U.S. exports of intermediate goods to Mexico’s maquiladora industry. The result has been a very sizable net gain in total two-way trade during the past three years.
Also, California’s economy, dormant for much of the 1990s, is moving forward again. Last year was the first year since 1992 that the percentage rise in exports to Mexico through California’s customs districts exceeded that for imports. And with respect to NAFTA, the scheduled reductions in import duties through the year 2000 are proportionately larger for Mexican tariffs than for U.S. tariffs. While any reduction in the cost of exchanging goods between nations should stimulate trade, the disproportionate larger drop in Mexican duties will especially benefit U.S. exporters.

Beyond 2000, the annual rate of growth for U.S.-Mexico trade through California land ports should begin to diminish. The stimulative effect of the peso devaluation on U.S. import demand already is showing signs of abating. This trend should continue, assuming continued stability of the Mexican currency. Furthermore, under NAFTA, the largest barriers to trade already have been eliminated or are scheduled to expire over the next three years. Additional stimulus beyond 2000 largely will depend upon normal economic growth in both the United States and Mexico.

**Baseline Forecast of Passenger Vehicle Traffic**

The forecast of passenger vehicles through the Tecate port of entry takes into account growth factors in both the San Diego region and the Municipality of Tecate, Baja California. This forecast was prepared in 1997 following the methodology developed for SANDAG by Wilbur Smith and Associates in its feasibility study for the proposed toll road (State Route 11) to the U.S.-Mexico border.

Trip productions and attractions were obtained from a vehicle survey conducted by Caltrans at the Tecate border crossing. The share of trips by purpose (i.e., work, shopping trips) also was obtained from the same survey.

Two variables were selected to forecast vehicle trips across the Tecate port of entry: population and employment. SANDAG’s Series 8 Regional Growth Forecasts are the source for the population and employment growth rates for the San Diego region. The population forecast for the Municipality of Tecate, Baja California was developed as part of SANDAG’s Tecate Port of Entry: Trade and Truck Traffic study. Projections of employment for Tecate, Baja California were prepared for this traffic study.

For the San Diego region, population is forecast to grow at an annual average rate of 1.7 percent to the year 2015. Employment is predicted to increase at 1.1 percent average per year for the same forecast period.

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10 Caltrans vehicle survey conducted on March 23, 1993 at the Tecate port of entry.
The population for the municipality of Tecate is projected to grow at a rate of 4.4 percent average per year to the year 2020. Tecate’s employment forecast was derived from the trade projections prepared for SANDAG’s trade study. From 1995 to 2010, job growth is expected to occur at almost five percent average per year and, from 2010 to 2020, at a four percent annual average.

Work trips produced in Mexico were forecast using the projected employment growth rate for the San Diego region. Likewise, Tecate’s employment growth rate was applied to work trips produced in the San Diego region. Other trip purposes are assumed to depend upon population increases; therefore, the population growth rates for the San Diego region and for Tecate, Baja California were used to forecast non-work trips.

The population and employment growth rates described in the previous paragraphs were applied to Tecate’s annual vehicle crossings in the northbound direction for 1995. This methodology resulted in a forecast of nearly 1,825,000 northbound vehicles for the year 2010 and approximately 2,629,000 northbound vehicles for the year 2020. These projections represent an average annual growth rate of 3.6 percent for the period between 1995 and 2020.

Historical count data indicate that traffic on State Route 188 is balanced in both the northbound and southbound directions. Therefore, the northbound vehicle forecast was doubled to represent total traffic crossing the port of entry in both directions. The annual vehicle forecast finally was converted to average weekday traffic, as shown in Table 6.

<table>
<thead>
<tr>
<th>Year</th>
<th>Total Vehicles (Two-Way)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1995</td>
<td>5,814</td>
</tr>
<tr>
<td>2010</td>
<td>9,789</td>
</tr>
<tr>
<td>2020</td>
<td>14,100</td>
</tr>
</tbody>
</table>

Source: U.S. Customs and Caltrans (1995), SANDAG (forecast)
ESTIMATED TRAFFIC IMPACTS OF POTENTIAL PROJECTS

Reopening of the San Diego and Arizona Eastern Railway\[^{11}\]

The San Diego and Arizona Eastern (SD&AE) line runs for about 150 miles from downtown San Diego to Plaster City, near El Centro, via Tijuana and Tecate. At Plaster City, the line connects with the Union Pacific Railroad, providing rail links to the entire United States and Mexico. However, segments of the track between Tecate and El Centro, on the “Desert Line,” have been out of service since 1983 due to damaged tunnels, bridges, and tracks.

The San Diego and Imperial Valley (SD&IV) Railroad currently provides freight service between San Diego and Tecate. The Mexican government owns the 44-mile section of the line that runs between Tijuana and Tecate and has granted a temporary license to the SD&IV Railroad to transport freight on it. The privatization of this section of the line is under negotiation.

**Impact on Truck Traffic Through the Tecate Port of Entry**

A 1995 market study by SANDAG estimated the freight potentials of the SD&IV railroad, assuming restoration of the Desert Line.\[^{12}\] The shipment of maquiladora finished products to the United States was identified as one possibility. In 1995, an estimated 12,900 containers and trailers of maquiladora goods were moved by truck from Tijuana, Tecate, and Ensenada to Los Angeles and San Bernardino and placed on rail for transport to the U.S. Southwest and Midwest.

Through its connection with the Union Pacific Railroad, the SD&IV Railroad could offer less costly and more direct service to the U.S. market, according to the SANDAG study.

Although the study did not delineate potential rail shipments from each Mexican municipality, Tecate’s share is estimated in this report to have been 1,000 truck loads in 1995, or 7.8 percent of Tecate’s 1995 share of the maquiladora industry employment in Baja California, excluding Mexicali.\[^{13}\] Mexicali already is served by the Union Pacific Railroad. Also, this estimate includes only new freight, not existing rail shipments to Baja California, including Tecate, on the operational sections of the SD&AE line and the Mexican Tijuana-Tecate line.

If the estimated rail freight potential for Tecate, Mexico (1,000 truck loads in 1995) grows in proportion to the municipality’s exports, then restoration of the SD&AE’s Desert Line would reduce northbound truck traffic by the volumes shown in Table 7. Trucks transporting maquiladora finished products to rail yards in Southern California often return empty. A maximum allowance for empty trucks also is shown in Table 7.

Table 7
Reopening the SD&AE Railway
Projected Decrease in Truck Crossings
Through the Tecate Port of Entry

<table>
<thead>
<tr>
<th></th>
<th>2010</th>
<th>2020</th>
</tr>
</thead>
<tbody>
<tr>
<td>Loaded Trucks Per Year</td>
<td>2,219</td>
<td>3,473</td>
</tr>
<tr>
<td>Empty Trucks Per Year</td>
<td>2,219</td>
<td>3,473</td>
</tr>
<tr>
<td>Total Trucks Per Year</td>
<td>4,439</td>
<td>6,946</td>
</tr>
<tr>
<td>Reduction in Trucks Per Weekday</td>
<td>17</td>
<td>27</td>
</tr>
</tbody>
</table>

Source: SANDAG

An update of the SD&AE Railway market study was prepared since the above estimates were developed. In 1996, the largest segments of projected traffic in Modern Service were truck traffic (35 percent) and containerized hay (30 percent), followed by grain (24 percent) and automobiles and parts (8 percent). In 1999, the significant sectors for Modern Service are in hay (18 percent), truck traffic (19 percent), municipal solid waste (9 percent), manufactured trailers and containers (16 percent), and cement and backhaul sand (5 percent each). For Basic Service, a similar shift occurred, away from grains and hay (87 percent down to 29 percent), toward a wider market minus the container traffic.

Low-value products such as solid waste, as well as selected manufactured goods, offer good intermodal potential for the SD&AE. For example, an exceptional opportunity for the SD&AE is the transport of shipping trailers and containers manufactured at the Hyundai Precision plant in Tijuana. These various products require an intermodal facility for truck-to-rail transfers and, until one can be built on each side of the border, a site in the United States could best serve both regions.

The market for containers, chassis, and trailers identified in the 1999 study update would make up for the lower projections of maquiladora goods that would be transported by rail. Thus, the projections presented in Table 7 remain reasonable.

Proposed Ensenada-Tecate Rail Service

The U.S. - Pacific Rim Market for Waterborne Commerce

In addition to maquiladora trade, the Port of Ensenada could attract freight moving between the United States and foreign countries — shipments that otherwise would be handled by California seaports, particularly those in Los Angeles, Long Beach, and San Diego. To be competitive

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with Southern California ports, the Port of Ensenada probably will require rail service. The ports in Los Angeles, Long Beach, and San Diego are served by at least one Class I railroad.

The prospects of building a rail line connecting Ensenada and Tecate have been discussed, but no specific project has been proposed. The new rail line would connect with the existing Tijuana-Tecate railroad in Tecate and link to the San Diego and Arizona Eastern (SD&AE) Railway. As described subsequently, a new Ensenada-Tecate rail line would be of little use unless the eastern segment of the SD&AE line, or Desert Line, is repaired and reopened for freight service.

Currently, seaports in Southern California receive cargo from places throughout the United States for waterborne export to many countries on the Pacific Rim. They also receive foreign imports for overland shipment in the U.S. domestic market. As shown in Table 8, international shipments through Long Beach, Los Angeles, and San Diego totaled 56.0 million metric tons in 1995, compared to nearly 35.7 million tons in 1985, reflecting an annual average growth rate of 5.0 percent over the ten-year period. International exports have grown faster than imports, as shown in Table 9. These tonnage figures exclude domestic shipments, which are defined as cargoes having both an origin and destination in the United States.

<table>
<thead>
<tr>
<th>Table 8</th>
<th>Southern California Seaports, International Waterborne Cargo (Metric Tons)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Long Beach</td>
<td>10,424,578</td>
</tr>
<tr>
<td>Los Angeles</td>
<td>8,577,388</td>
</tr>
<tr>
<td>San Diego</td>
<td>699,709</td>
</tr>
<tr>
<td>Total</td>
<td>19,701,675</td>
</tr>
</tbody>
</table>

Source: U.S. Army Corps of Engineers, Waterborne Commerce Statistics Center

Although the Port of Ensenada’s cargo tonnage has not grown on a consistent basis since 1990, the port’s new international operator combined with the availability of rail service may enable the port to participate in the market for trans-Pacific Ocean shipments to and from the United States. Again, in this market, the Ensenada port would be competing primarily with Southern California seaports, which have better transportation access and infrastructure. On the other hand, Ensenada may have advantages in terms of less traffic congestion and lower cargo handling costs.
Ensenada probably will attract additional commerce in other maritime markets as well, including the Mexican domestic trade and waterborne export of local agricultural products and fish. But growth in these markets would not have a significant impact on transborder surface freight between California and Baja California.

### Table 9

**Southern California Seaports**  
**Growth in Waterborne International Cargo**  
**(Metric Tons)**

<table>
<thead>
<tr>
<th>International Cargo</th>
<th>1985-1995</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Total Increase</td>
</tr>
<tr>
<td>Total Imports</td>
<td>7,392,447</td>
</tr>
<tr>
<td>Total Exports</td>
<td>12,966,211</td>
</tr>
<tr>
<td>Total Cargo in Metric Tons</td>
<td>20,358,658</td>
</tr>
<tr>
<td>Total International Cargo</td>
<td></td>
</tr>
<tr>
<td>Annual Average % Increase</td>
<td>5.0%</td>
</tr>
</tbody>
</table>

Source: U.S. Army Corps of Engineers, Waterborne Commerce Statistics Center

For the U.S.- Pacific Rim market, a projection of additional cargo through the Port of Ensenada is shown in Table 10 for both exports and imports. Excluded from this table is potential cargo from maquiladora intermediate products, discussed previously.

In this market, additional waterborne cargo for the Port of Ensenada is projected at 226,000 metric tons in the year 2000 and approximately 2 million tons in the year 2020. These volumes would be in addition to the port’s current cargo volume of 820,000 metric tons, assuming the port maintains its current base of support.
### Table 10
**Port of Ensenada**
Projected New Waterborne Cargo From U.S.-Pacific Rim Market  
(Excludes Potential Maquiladora Cargo)

<table>
<thead>
<tr>
<th></th>
<th>Metric Tons</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>2010</td>
</tr>
<tr>
<td><strong>TRUCK FREIGHT</strong></td>
<td></td>
</tr>
<tr>
<td>From United States to Port of Ensenada (Waterborne Exports)</td>
<td>311,422</td>
</tr>
<tr>
<td>From Port of Ensenada to United States (Waterborne Imports)</td>
<td>175,175</td>
</tr>
<tr>
<td><strong>Total Truck Metric Tons</strong></td>
<td>486,597</td>
</tr>
<tr>
<td><strong>RAIL FREIGHT</strong></td>
<td></td>
</tr>
<tr>
<td>From United States to Port of Ensenada (Waterborne Exports)</td>
<td>254,800</td>
</tr>
<tr>
<td>From Port of Ensenada to United States (Waterborne Imports)</td>
<td>143,325</td>
</tr>
<tr>
<td><strong>Total Rail Metric Tons</strong></td>
<td>398,124</td>
</tr>
<tr>
<td><strong>TOTAL TRUCK/RAIL FREIGHT</strong></td>
<td></td>
</tr>
<tr>
<td>From United States to Port of Ensenada (Waterborne Exports)</td>
<td>566,222</td>
</tr>
<tr>
<td>From Port of Ensenada to United States (Waterborne Imports)</td>
<td>318,500</td>
</tr>
<tr>
<td><strong>Total Metric Tons</strong></td>
<td>884,721</td>
</tr>
</tbody>
</table>

Source: SANDAG

Other assumptions supporting these forecasts:

1. An Ensenada-Tecate rail line will be built by the year 2010.

2. The Desert Line of the SD&AE Railway will be reopened for freight service prior to completion of the Ensenada-Tecate line.

3. The Port of Ensenada’s total cargo tonnage, excluding increased imports of maquiladora products, will grow by five percent annually. This growth rate is the combined historical average, 1985-1995, for the ports of Los Angeles, Long Beach, and San Diego, and it includes only waterborne international cargo originating in or destined for the U.S. domestic market.
4. For the projected increase in cargo tonnage through the Port of Ensenada, exports and imports will comprise 36 percent and 64 percent of the total, respectively. These shares are the ten-year historical averages for the ports of Los Angeles, Long Beach, and San Diego.

5. For overland shipments to and from the Port of Ensenada, rail will carry 45 percent of the tonnage beginning in 2010. The comparable percentages at the ports of Los Angeles and Long Beach are 55 percent and 40 percent, respectively. Both numbers are estimates obtained from the port operators, and both percentages exclude shipments of petroleum.

**Impact on Truck Traffic Through Tecate**

As the Port of Ensenada’s cargo operations grow, the Tecate border crossing would capture more freight movements between Ensenada and Tecate, in proportion to its current share of the value of freight moving through California border ports. However, the Port’s cargo operations are not expected to have a major effect on truck traffic through the Tecate port of entry.

Of the highways linking Ensenada to the border, Highway 1 is the preferred route for shipping goods to the United States. The remaining commercial vehicle traffic bound for the United States uses Highway 3 to Tecate and Highway 5 to Mexicali. In addition, rail would carry a sizable share (estimated at 45%) of the Port’s exports and imports, assuming a rail line is built between Ensenada and Tecate.

From Ensenada, most freight currently exported to the United States is transported by truck. A 1996 study by the U.S. General Services Administration found that 80 percent of these trucks transport their goods to Tijuana, which is the shortest route. Tijuana-bound trucks travel north on Highway 1. For other exports, Mexicali is the preferred port of entry over Tecate because it is a transportation hub for the southwestern United States and the mainland of Mexico. Mexicali-bound trucks travel south from Ensenada on Highway 3, which turns east across the Baja peninsula to San Felipe. The trucks then turn north on Route 5 and go on to Mexicali. This route is used because it is relatively flat compared to the mountainous routes from Ensenada to Tecate via Highway 3 and from Tecate to Mexicali. However, trucks will use the Ensenada-Tecate route when congestion is anticipated at Tijuana and when the alternate route to Mexicali is out of service during rain storms.

By the year 2020, the Port of Ensenada’s level of cargo from the U.S.-Pacific Rim market is projected to cause the number of truck crossings through Tecate to rise by about 30 per day, as indicated in Table 11.

---

Table 11
Tecate Port of Entry
Projected Impact of the Port of Ensenada’s Potential Cargo
From U.S. Pacific-Rim Market
(Excludes Potential Maquiladora Cargo)

<table>
<thead>
<tr>
<th></th>
<th>Metric Tons</th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>2010</td>
<td>2020</td>
</tr>
<tr>
<td>CROSS-BORDER TRUCK FREIGHT</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Additional Truck Freight in Metric Tons:</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Southbound Shipments to Port of Ensenada</td>
<td>17,440</td>
<td>38,573</td>
<td></td>
</tr>
<tr>
<td>Northbound Shipments from Port of Ensenada</td>
<td>5,781</td>
<td>12,786</td>
<td></td>
</tr>
<tr>
<td><strong>Total Metric Tons</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>CROSS-BORDER TRUCKS</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Number of Southbound Trucks:¹</td>
<td>2,474</td>
<td>5,471</td>
<td></td>
</tr>
<tr>
<td>Average Trucks per Weekday</td>
<td>10</td>
<td>21</td>
<td></td>
</tr>
<tr>
<td>Number of Northbound Trucks:²</td>
<td>1,233</td>
<td>2,726</td>
<td></td>
</tr>
<tr>
<td>Average Trucks per Weekday</td>
<td>5</td>
<td>10</td>
<td></td>
</tr>
<tr>
<td><strong>Total Additional Truck Crossings:</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Annual Truck Crossings</td>
<td>3,706</td>
<td>8,197</td>
<td></td>
</tr>
<tr>
<td><strong>Average Trucks per Weekday</strong></td>
<td>15</td>
<td>31</td>
<td></td>
</tr>
<tr>
<td>ENSENADA-TECATE RAIL LINE</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>CROSS-BORDER RAIL FREIGHT</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Southbound Shipments to Port of Ensenada</td>
<td>254,800</td>
<td>563,562</td>
<td></td>
</tr>
<tr>
<td>Northbound Shipments from Port of Ensenada</td>
<td>143,325</td>
<td>317,003</td>
<td></td>
</tr>
<tr>
<td><strong>Total Metric Tons</strong></td>
<td>398,124</td>
<td>880,565</td>
<td></td>
</tr>
</tbody>
</table>

¹Based upon 7.05 metric tons per truck, the 1995 average for all California ports of entry.
²Based upon 4.69 metric tons per truck, the 1995 average for the Tecate port of entry.

Source: SANDAG

The projections shown in Table 11 exclude shipments of maquiladora inputs that are assumed to come into Mexico via the Port of Ensenada instead of by truck from the ports of Los Angeles and Long Beach. These waterborne shipments would reduce traffic through Tecate and are estimated separately (see discussion above).
The projections shown in Table 11 are based upon the assumption that 5.6 percent of the total southbound truck tonnage to the Port of Ensenada and 3.3 percent of the total northbound tonnage will be transported via the Tecate crossing. (These percentages are equivalent to Tecate’s average annual share of the value of freight that moved through all California border ports in 1994 and 1995.) Also, Tecate’s current average freight weight per truck in each direction is assumed to apply to the projected shipments to and from the Port of Ensenada. Because current average freight weights account for both loaded and empty trucks, the projections of truck traffic to and from the Port of Ensenada make no separate allowance for empty trucks.

Rail shipments between the Tecate port of entry and the Port of Ensenada are projected to be 880,000 metric tons in the year 2020, which corresponds to roughly 35-45 loaded rail cars per day. Again, this assumes that 45 percent of the Port of Ensenada’s intermodal cargo will go by rail.

**Otay Mesa Border Crossing and Tijuana-Tecate Toll Road (MX-2D)**

Considerable reductions in “wait times” for commercial vehicles at the Otay Mesa crossing would be necessary to make the Otay Mesa crossing a true option to the Tecate port. Additionally, lowering or eliminating toll charges for trucks on the Tijuana-Tecate toll road would make the Otay Mesa port still a more valuable alternative to the Tecate crossing.

Increasing the attractiveness of the Otay Mesa crossing in relation to the Tecate port could modify traffic patterns and result in lower truck volumes on Highway 94. For some U.S. exports, the Otay Mesa port of entry might become the preferred route for transporting goods to Tecate, Baja California, via MX-2D. The same could be said about shipments originating in Tecate and destined for the United States. That is, comparable “wait times” at both crossings and low-priced tolls on MX-2D would provide lower-cost access to and from Tecate through an alternate port of entry, reducing traffic through the Tecate crossing.

Lowering “wait times” at Otay Mesa could be achieved through various projects or policies, including physical expansion of the existing facilities, increasing hours of operation, or opening the East Otay Mesa crossing.

A 1994 study\(^{17}\) evaluated the feasibility of constructing State Route 11 as the first toll facility that would serve a border crossing between California and Baja California. This crossing would be the proposed East Otay Mesa-Mesa de Otay II port of entry. According to the study, SR 11 might be financially feasible without outside financial assistance after its first eight years of operation.

The feasibility study did not identify any traffic diversion from the Tecate port of entry to the future East Otay Mesa crossing. All traffic projected to cross at the new port would be diverted from San Ysidro-Puerta México and Otay Mesa-Mesa de Otay.

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Two scenarios were evaluated: 50 percent reduction of toll charges for trucks (Alternative 3.a) and elimination of tolls for trucks (Alternative 3.b).

**Impact on Truck Traffic Through the Tecate Port of Entry: 50 Percent Reduction in Truck Tolls**

This section describes truck diversion between Tecate and Tijuana under two potential options:

- No truck size restrictions
- Truck-size restrictions on Highways 188 and 94

Under both options, it is assumed that toll charges for trucks are cut by 50 percent and that “wait times” for commercial vehicles at Otay Mesa would be similar to those at Tecate.

**No truck size restrictions** — If no truck restrictions were imposed, an incentive to shippers to use the Otay Mesa crossing could be provided by reducing toll charges on the Tijuana-Tecate toll road. According to the toll road concessionaire, a pilot program was implemented in 1996 whereby toll charges for trucks were reduced between 40 percent and 60 percent, depending upon the size of the trucks.

However, after the toll reductions, truck volumes on this road remained fairly stable. These results may have been due to the short duration of the program (about 3 months). In addition, for cross-border shipments into San Diego, the lower cost and time savings gained by using the toll road likely were not sufficient to offset the “wait times” at the Otay Mesa crossing.

The governmental agency that operates the toll road between Tijuana and Ensenada (MX-1D) reduced toll charges for trucks in January of 1998. The rates for trucks were lowered to match the passenger vehicle rates. Tolls are charged at three locations between Tijuana and Ensenada and, in 1998, they were approximately $1.60 per segment (or 16 Mexican Pesos).

A comparison of truck volumes at the Rosarito toll booth between 1997 and 1998 (from January to September) showed a substantial increase in truck traffic. The average toll for trucks was reduced by 50 percent and resulted in an increase of 78 percent in the volume of trucks over the nine-month period. In comparison, automobile traffic grew by about three percent over the same period.

For this study, it was assumed that if tolls for trucks were reduced on the Tijuana-Tecate highway, increases in truck traffic would be proportional to the cutback in tolls. That is, a 50 percent drop in tolls would result in a 50 percent increase in truck traffic.

Currently, truck traffic represents about eight percent of the total traffic on the toll road. Between ten percent and 12 percent of those trucks are estimated to cross the border at Otay Mesa. Taking into account traffic growth on the toll road, approximately 120 trucks per day would be diverted from Tecate to Otay Mesa in 2020. This figure includes the new truck traffic that would use the Tijuana-Tecate toll road as a result of lower toll charges.

---

Truck-size restrictions on Highways 188 and 94 — Under the alternative with restrictions to truck size, this evaluation assumes commercial vehicles with four or more axles would be restricted from operating on Highways 188 and 94. In addition, it is assumed that local-serving truck deliveries are made with trucks with fewer than four axles.

Caltrans is authorized to restrict vehicle length only from 40 feet to 38 feet from kingpin to rear axle based upon safety considerations.

According to vehicle classification counts conducted at the Tecate port of entry (Caltrans, April 1997), 57 percent of the trucks traveling on Route 188 just south of the junction with Highway 94 had four or more axles. This figure reflects the cargo consolidation that takes place in Tecate, California, since the proportion of trucks with four or more axles at the port of entry is about 45 percent.

In 2020, 880 trucks are projected to travel daily on Highway 94 east or west of Route 188. If 57 percent of those trucks were not allowed to use these two highways, cross-border shipments with origins or destinations in Tecate, Baja California would travel on the Tijuana-Mexicali highways and cross the border at Otay Mesa or ports of entry east of Tecate.

Approximately 500 trucks per day would be diverted from the Tecate crossing to other border crossings. The vast majority of cargo would use the Otay Mesa port of entry and travel between Tijuana and Tecate on the Mexican Route 2 or the Tijuana-Tecate toll road (Route 2D). This should be considered the maximum potential reduction in large trucks across the Tecate port of entry since shippers, in some cases, may choose to break up loads and dispatch more trucks of smaller size.

Vehicle projections through the Tecate crossing were prepared for an additional scenario which, in addition to assuming improvements to the Otay Mesa port of entry, considers the removal of toll charges for truck traffic on the Tijuana-Tecate toll road. This alternative is presented under option 3.b in Table 4, on page 23.

Otay Mesa Border Crossing and No Tolls for Trucks on the Tijuana-Tecate Highway

Time and Distance Evaluation

The time and distance it would take for a trip between downtown Tecate, Baja California and a common point (San Diego-Orange County line) was evaluated under two alternative routes:

a. Across the Tecate port of entry, via Highways 188 and 94, and Interstates 805 and 5.

b. Via the Tijuana-Tecate toll road, across the Otay Mesa port of entry, on to future SR 905, and Interstates 805 and 5.
The time and distance calculations show that both routes are almost equally competitive. On the Tijuana-Tecate highway and Otay Mesa crossing route, a one-way trip would take an additional 1.5 minutes and about 6.5 miles longer than the route via the Tecate crossing and Highway 94. Therefore, the difference in time and distance between the two routes is practically negligible.

For both routes, no delay is assumed at the port of entry and truck speeds over the two routes represent free flow conditions.

**Impact on Truck Traffic through the Tecate Port of Entry: No Tolls for Trucks**

Currently, the main barriers to shipping to and from Tecate, Baja California via the Otay Mesa crossing are the wait times at Otay Mesa and the additional transportation cost of approximately $10 each way for toll charges. If these two barriers were removed, and as a result of the comparable time and distance for the two alternative routes, over time it would be expected that about one-half of the cross-border truck shipments would choose to travel across the Tecate port of entry and the other one-half would cross at Otay Mesa.

Therefore, for “western market” freight, removal of toll charges for trucks on Route 2D, in combination with shortening wait times at the Otay Mesa port of entry, could result in significant truck traffic diversion from the Tecate port to the Otay Mesa crossing.

However, the elimination of tolls for truck traffic on the Tijuana-Tecate toll road also could induce some commercial vehicles to use the Tecate port instead of Otay Mesa for freight moving between Tijuana and U.S. eastern markets. Truck volumes, thus, could increase on the section of Highway 94 east of Route 188.

This section describes truck diversion for “western market” cargo between the Tecate and the Otay Mesa crossings under two potential options:

- No truck size restrictions
- Truck-size restrictions on Highways 188 and 94

Under both options, it is assumed that “wait times” for commercial vehicles at Otay Mesa would be similar to those at Tecate.

**No truck size restrictions** — In 2020, approximately 916 cross-border trucks are projected to travel between U.S. “western markets” and Tecate, Baja California. If one-half of those trucks were to cross at the Otay Mesa port, then the remaining 460 trucks would travel on Highway 94 west of Route 188. The assumptions under this scenario are equal wait times at the Otay Mesa and Tecate ports of entry and no tolls for truck traffic on the Tijuana-Tecate highway.

**Truck-size restrictions on Highways 188 and 94** — Under the alternative with restrictions to truck size, this analysis assumes commercial vehicles with four or more axles would be restricted from operating on Highways 188 and 94. Moreover, it is assumed that local-serving truck deliveries are made with trucks with fewer than four axles.
In 2020, about 200 trucks would be expected to use Highway 94 (east or west of Route 188). The rest of the commercial vehicles that otherwise would have used the Tecate crossing would travel on Mexican highways and likely cross at the Otay Mesa POE. Truck diversion from the Tecate POE is projected at 680 vehicles. Again, this should be considered the maximum potential reduction in large trucks across the Tecate port of entry since shippers may break up loads and dispatch more trucks of smaller size.

**Future Jacumba-Jacumé Port of Entry**

One option to improve traffic conditions along California’s border with Mexico could be the opening of a new port of entry linking Jacumba, in San Diego County, and Jacumé, in the Municipality of Tecate. SAHOPE, Baja California’s state planning agency, also has considered this location as a future border crossing in its long-range planning work.

Sponsored by Caltrans, District 11, SANDAG prepared a study to evaluate the feasibility of a future international border crossing at Jacumba-Jacumé. Findings and recommendations from this study are summarized in this section.19

Jacumba is a small community located about 70 miles southeast of downtown San Diego. Situated immediately south of Jacumba is the tiny Mexican town of Jacumé with about 300 residents.

One advantage of a port of entry connecting those two communities is its proximity to major transportation corridors both in the United States and in Mexico: Interstate 8 and the Tijuana-Tecate-Mexicali free (MX-2) and toll (MX-2D) highways. The distance between Interstate 8 and the new port of entry would be between three and five miles. An eight-mile road would connect the border crossing with the toll road (MX-2D). One mile further south is the junction with the free highway (MX-2).

The potential location of the Jacumba-Jacumé port of entry and its major access routes are illustrated in Figure 6.

In December 1998, the toll road between Tecate and La Rumorosa opened to traffic. Currently, only a dirt road provides access between Jacumé and the Tijuana-Mexicali highways. In addition to the inspection facilities needed by federal and state agencies in both countries, the roadways connecting Interstate 8 in California and MX-2 and MX-2D in Baja California would need to be improved or built.

A border crossing at Jacumba would improve border access for some trucks that use Interstate 8 to transport goods between Baja California and locations east of San Diego. However, traffic to and from these “eastern markets” accounts for a small fraction of cross-border commercial traffic. Just over four percent of the trucks that cross the border at Tecate and Otay Mesa travel on Interstate 8. Most of the truck traffic to and from the border moves on Interstate 5, Interstate 805, and Interstate 15, and these freeways are more accessible to Otay Mesa and Tecate than Jacumba.

Figure 6
Future Jacumba - Jacumé Port of Entry

Road Classifications:
- Freeways & Toll Roads
- Highways & Non-Toll Roads
- Local Roads
- Ports of Entry
- Potential Ports of Entry

San Diego County

Imperial County

Figure 6
Future Jacumba - Jacumé Port of Entry

Road Classifications:
- Freeways & Toll Roads
- Highways & Non-Toll Roads
- Local Roads
- Ports of Entry
- Potential Ports of Entry

San Diego
ASSOCIATION OF GOVERNMENTS

May 19, 2000
**Forecast of Vehicle Crossings Across Jacumba-Jacumé**

Future traffic volumes across the Jacumba-Jacumé port of entry will depend in part on the level of cross-border traffic the existing ports of entry along the California-Mexico border are able to accommodate. The future East Otay Mesa-Mesa de Otay II border crossing will increase vehicular capacity in the San Diego-Tijuana area. The upgrades approved at the Tecate, California border station are not intended to increase the vehicle handling capacity of the port but to improve the inspection facilities. Enhancements to the cargo inspection facilities are also planned at Tecate, Baja California, in addition to improvements to commercial vehicle routing and circulation within the City of Tecate.

Forecasts of traffic through Jacumba-Jacumé were prepared for the year 2020 for three scenarios, based upon the assumption that this new border crossing would be operational by 2010:

- Tecate’s existing port of entry remains open for all vehicles
- The Tecate port of entry accommodates the 1999 level of vehicle crossings through 2020, due to capacity constraints
- Tecate’s existing port of entry stops handling commercial vehicles by the year 2010

The projected levels of truck traffic through Jacumba do not reflect expanded trade between California and Mexico, but rather diversion of freight that otherwise would be transported through the ports of entry in Tecate and Otay Mesa. Table 12 summarizes the vehicle forecasts across the Jacumba-Jacumé crossing.

<table>
<thead>
<tr>
<th>Table 12</th>
<th>Projected Daily Traffic through Jacumba-Jacumé Port of Entry</th>
<th>Year 2020</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Trucks</td>
<td>Passenger Vehicles</td>
</tr>
<tr>
<td>1.</td>
<td>464</td>
<td>1,017</td>
</tr>
<tr>
<td>2. Jacumba with Tecate POE maintaining 1999 vehicle crossings</td>
<td>747</td>
<td>3,379</td>
</tr>
<tr>
<td>3.</td>
<td>934</td>
<td>4,951</td>
</tr>
</tbody>
</table>

Source: SANDAG
With the Tecate crossing remaining open to commercial traffic, a port of entry in Jacumba-Jacumé would attract over 450 trucks per day in 2020. Passenger vehicle traffic is estimated at slightly over 1,000 daily vehicles for the same year. Two-way daily traffic, therefore, would amount to approximately 1,500 vehicles.

If the Tecate border crossing maintains the 1999 level of vehicle traffic through 2020, the Jacumba-Jacumé port of entry would accommodate approximately 4,100 vehicles per day, both northbound and southbound. Nearly 750 trucks and almost 3,400 passenger vehicles would use the new port of entry daily.

If the Tecate port of entry were to stop processing commercial vehicles, traffic volumes through a new port of entry at Jacumba would increase substantially. Daily crossings would reach nearly 5,900 vehicles. Trucks would account for 934 two-way crossings while passenger vehicles would make up the remaining 4,900 vehicles.

Under the scenario where the Tecate port stops processing commercial vehicles, new business growth would be expected to take place in the eastern section of the Municipality of Tecate, and subsequent increases in population, employment, and passenger-related traffic also would likely occur.

**Impact on Vehicular Traffic Through the Tecate Port of Entry**

Table 13 summarizes the projected traffic diversion from the Tecate port of entry to the Jacumba port of entry under the three scenarios described above. The feasibility study also includes projected traffic diversion to and from the San Ysidro and Otay Mesa ports of entry and the future Jacumba crossing.

### Table 13
**Projected Traffic Diversion from the Tecate Port of Entry to the Jacumba Port of Entry**
**Year 2020**

<table>
<thead>
<tr>
<th>Scenarios</th>
<th>Trucks</th>
<th>Passenger Vehicles</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. With Tecate Open to all Vehicles</td>
<td>30</td>
<td>212</td>
<td>242</td>
</tr>
<tr>
<td>2. Tecate Maintains 1999 Traffic Levels through 2020</td>
<td>313</td>
<td>2,574</td>
<td>2,887</td>
</tr>
<tr>
<td>3. With Tecate Open, except Commercial Vehicles</td>
<td>500</td>
<td>4,146</td>
<td>4,646</td>
</tr>
</tbody>
</table>

Source: SANDAG
LONG-RANGE TRAFFIC FORECASTS

DESCRIPTION OF ALTERNATIVES

Traffic projections for 2020 were prepared for eight alternatives, as described below.

The No Build Alternatives reflect no improvements to Highway 94. The number of vehicles across the Tecate port of entry was updated for each scenario to represent different operational situations, as follows:

- Alternative 1: No vehicle restrictions through the Tecate port of entry (demand forecast)
- Alternative 2: Truck size restrictions
- Alternative 3: No trucks through the Tecate port of entry
- Alternative 4: Maintains the 1999 volume of vehicle crossing through the Tecate port of entry in the year 2020

Alternative 3, which assumed no trucks would be processed at the Tecate port of entry, was eliminated from further evaluation by the Policy Advisory Committee.

The Build Alternatives reflect new corridors, highway widenings, and a potential new port of entry at Jacumba. Under current operations at the Tecate port of entry (without vehicle restrictions), the following potential corridor alignments were tested, as shown in Figure 7.

- Alternative 1a: Border Corridor
- Alternative 1b: Pine Valley Corridor
- Alternative 1c: Widening Highway 94 between SR 188 and Buckman Springs Road and widening Buckman Springs Road between SR 94 and I-8.
- Alternative 1d: Widening Highway 94 west of SR 188

Under the assumption that the Tecate port of entry would not handle commercial vehicles, the following scenario was evaluated:

- Alternative 3a: Opening of the Jacumba-Jacumé port of entry

SANDAG’s regional transportation model was used to prepare the traffic forecasts. The 2020 land use inputs for all alternatives, with the exception of Alternative 4, represent the 2020 population targets adopted by the County Board of Supervisors in 1998. Alternative 4, or Low Growth Alternative, uses a 10-year historical population growth trend for the Jamul/Dulzura and Mountain Empire community planning areas. Table 15, on page 52, shows both population forecasts.
Figure 7
Traffic Forecasts: Conceptual Corridor Alignments

- Pine Valley Corridor
- Highway 94 - Buckman Springs Corridor
- Jacumba - Jacumé Corridor
- Border Corridor
- Highway 94 West Corridor

The map contains data from SANDAG and SanGIS.
2020 TRAFFIC FORECASTS: SUMMARY OF FINDINGS

This section describes the results of the traffic projections for the year 2020.

Overall Findings: No Highway 94 Improvements

Table 14 shows the forecast of average daily traffic for the rural Highway 94 corridor in the year 2020 and the projected level of service under the four No Build alternatives.

- Under existing operations (Alternative 1), the level of service (LOS) on Highway 94 would range between E and F for most of its extension (from Jamacha Road to Buckman Springs Road). Only east of Buckman Springs Road, the LOS is projected to be between C and E.
- Restrictions to truck size would not be sufficient to result in level of service improvements on Highway 94 (Alternative 2).
- Under Alternative 3, if the Tecate port were to stop handling commercial vehicles, the level of service on Highway 94 would improve east of Route 188, and between Lyons Valley Road and Route 188. This is due to both the assumed reduction in trucks, passenger vehicles, and fewer commercial and industrial uses in the vicinity of the port of entry. However, for the sections of Highway 94 west of Route 188 (Lyons Valley to Otay Lakes), the LOS would only improve to LOS E. LOS D is considered an acceptable LOS for county roads. In addition, the LOS for the section of Highway 94 between Jamacha Road and Lyons Valley Road would not experience improvements.

Low Growth Alternative

The study Committees proposed an additional alternative for evaluation (Alternative 4), which assumed the following:

- A land use scenario that forecasts 2020 conditions based upon the population growth that took place on the Highway 94 corridor in the last 10 years.
- Vehicle crossings in 2020 at the Tecate port of entry are assumed to remain at the same level as in 1999.
- No improvements to Highway 94.

Land Use Data — Table 15, on page 52, illustrates the 2020 population projections for the communities that belong to the Jamul/Dulzura and Mountain Empire planning areas.

The “Trend” column reflects the 2020 population forecast based upon the growth trend that took place from 1990 to 1999 in each community. The “Target” column represents SANDAG’s 2020 Cities/County Forecast which, in the unincorporated area of San Diego County, is based upon the 2020 Targets adopted by the Board of Supervisors in 1998.
### Table 14

Rural Highway 94 Corridor Study
2020 Traffic Forecasts on Highway 94 for No Build Alternatives

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td>C</td>
<td>D</td>
</tr>
<tr>
<td>Buckman Springs Road and Jct. Interstate 8</td>
<td>Alt. 1: No Vehicle Restrictions</td>
<td>1,100</td>
<td>2,100</td>
<td>5,300</td>
</tr>
<tr>
<td></td>
<td>Alt. 2: Truck Size Restrictions</td>
<td>B</td>
<td>2,000</td>
<td>5,100</td>
</tr>
<tr>
<td></td>
<td>Alt. 3: No Trucks Across POE</td>
<td>2,000</td>
<td>5,100</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Alt. 4: Tecate POE with 1999 Vehicle Crossings</td>
<td>1,700</td>
<td>4,500</td>
<td></td>
</tr>
<tr>
<td>SR 188 and Buckman Springs Road</td>
<td>Alt. 1: No Vehicle Restrictions</td>
<td>1,600</td>
<td>6,400</td>
<td>8,000</td>
</tr>
<tr>
<td></td>
<td>Alt. 2: Truck Size Restrictions</td>
<td>B</td>
<td>6,300</td>
<td>7,200</td>
</tr>
<tr>
<td></td>
<td>Alt. 3: No Trucks Across POE</td>
<td>5,700</td>
<td>6,600</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Alt. 4: Tecate POE with 1999 Vehicle Crossings</td>
<td>3,000</td>
<td>5,500</td>
<td></td>
</tr>
<tr>
<td>Otay Lakes Road and SR 188</td>
<td>Alt. 1: No Vehicle Restrictions</td>
<td>6,800</td>
<td>12,000</td>
<td>13,000</td>
</tr>
<tr>
<td></td>
<td>Alt. 2: Truck Size Restrictions</td>
<td>D</td>
<td>11,000</td>
<td>12,000</td>
</tr>
<tr>
<td></td>
<td>Alt. 3: No Trucks Across POE</td>
<td>8,000</td>
<td>9,000</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Alt. 4: Tecate POE with 1999 Vehicle Crossings</td>
<td>6,700</td>
<td>7,500</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Alt. 4: Including Passing Lanes</td>
<td>6,700</td>
<td>7,500</td>
<td>5,500</td>
</tr>
<tr>
<td>Lyons Valley Road and Otay Lakes Road</td>
<td>Alt. 1: No Vehicle Restrictions</td>
<td>8,100</td>
<td>12,000</td>
<td>18,000</td>
</tr>
<tr>
<td></td>
<td>Alt. 2: Truck Size Restrictions</td>
<td>E</td>
<td>12,000</td>
<td>18,000</td>
</tr>
<tr>
<td></td>
<td>Alt. 3: No Trucks Across POE</td>
<td>10,000</td>
<td>15,000</td>
<td>5,000</td>
</tr>
<tr>
<td></td>
<td>Alt. 4: Tecate POE with 1999 Vehicle Crossings</td>
<td>8,500</td>
<td>14,000</td>
<td>4,200</td>
</tr>
</tbody>
</table>

56
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Steele Canyon Road and Lyons Valley Road</td>
<td>Alt. 1: No Vehicle Restrictions</td>
<td>16,100</td>
<td>27,000</td>
<td>30,000</td>
</tr>
<tr>
<td></td>
<td>Alt. 2: Truck Size Restrictions</td>
<td>E</td>
<td>27,000</td>
<td>28,000</td>
</tr>
<tr>
<td></td>
<td>Alt. 3: No Trucks Across POE</td>
<td>25,000</td>
<td>27,000</td>
<td>8,300</td>
</tr>
<tr>
<td></td>
<td>Alt. 4: Tecate POE with 1999 Vehicle Crossings</td>
<td>23,000</td>
<td>25,000</td>
<td>7,700</td>
</tr>
<tr>
<td>East of Jamacha Road and Steele Canyon Road</td>
<td>Alt. 1: No Vehicle Restrictions</td>
<td>14,700</td>
<td>23,000</td>
<td>34,000</td>
</tr>
<tr>
<td></td>
<td>Alt. 2: Truck Size Restrictions</td>
<td>E</td>
<td>23,000</td>
<td>34,000</td>
</tr>
<tr>
<td></td>
<td>Alt. 3: No Trucks Across POE</td>
<td>21,000</td>
<td>33,000</td>
<td>8,300</td>
</tr>
<tr>
<td></td>
<td>Alt. 4: Tecate POE with 1999 Vehicle Crossings</td>
<td>19,000</td>
<td>30,000</td>
<td>8,100</td>
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</tbody>
</table>

Source: SANDAG, March 1999 and January 2000
### Table 15
Rural Highway 94 Corridor Communities: Historical and Forecast Population

<table>
<thead>
<tr>
<th>Community Planning Area/Sponsor Group</th>
<th>1990</th>
<th>1999</th>
<th>Average Annual Change 1990-1999</th>
<th>10-Year Trend (^1)</th>
<th>Target (^2)</th>
<th>Absolute Change</th>
<th>Low Growth Alternative</th>
</tr>
</thead>
<tbody>
<tr>
<td>Jamul-Dulzura</td>
<td>8,509</td>
<td>10,270</td>
<td>2.2%</td>
<td>16,304</td>
<td>18,645</td>
<td>-2,341</td>
<td>16,304</td>
</tr>
<tr>
<td>Mountain Empire</td>
<td></td>
<td></td>
<td></td>
<td>Subtotal</td>
<td>8,509</td>
<td>10,270</td>
<td>16,304</td>
</tr>
<tr>
<td>Mountain Empire Remainder</td>
<td>106</td>
<td>110</td>
<td>0.4%</td>
<td>120</td>
<td>259</td>
<td>-139</td>
<td>120</td>
</tr>
<tr>
<td>Tecate</td>
<td>218</td>
<td>217</td>
<td>-0.1%</td>
<td>215</td>
<td>2,493</td>
<td>-2,278</td>
<td>215</td>
</tr>
<tr>
<td>Potrero</td>
<td>679</td>
<td>695</td>
<td>0.3%</td>
<td>736</td>
<td>684</td>
<td>-52</td>
<td>684</td>
</tr>
<tr>
<td>Lake Morena/Campo</td>
<td>2,653</td>
<td>3,130</td>
<td>1.9%</td>
<td>4,699</td>
<td>6,389</td>
<td>-1,690</td>
<td>4,699</td>
</tr>
<tr>
<td>Boulevard</td>
<td>1,164</td>
<td>1,506</td>
<td>3.0%</td>
<td>2,836</td>
<td>2,932</td>
<td>-96</td>
<td>2,836</td>
</tr>
<tr>
<td>Jacumba</td>
<td>543</td>
<td>656</td>
<td>2.2%</td>
<td>1,044</td>
<td>1,375</td>
<td>-331</td>
<td>1,044</td>
</tr>
<tr>
<td>Subtotal</td>
<td>5,363</td>
<td>6,314</td>
<td></td>
<td>9,650</td>
<td>14,132</td>
<td>-4,586</td>
<td>9,598</td>
</tr>
<tr>
<td>Total</td>
<td>13,872</td>
<td>16,584</td>
<td></td>
<td>25,954</td>
<td>32,777</td>
<td>-6,927</td>
<td>25,902</td>
</tr>
</tbody>
</table>

\(^1\) 1990 to 1999 average annual growth rate applied to 1999 population.

\(^2\) 2020 Targets from Planning and Sponsors Groups adopted by County Board of Supervisors, included in SANDAG’s 2020 Cities/County Forecast (February, 1999).

Sources: 1990 U.S. Census; SANDAG 1999 Population Estimates; SANDAG 2020 Cities/County Forecast

The Low Growth transportation alternative uses the Trend forecast, with the exception of the community of Potrero, where the 2020 Target is used (lower population forecast). The Low Growth population forecast for both planning areas is projected at 25,902 residents, which is lower than the Target population by nearly 7,000 residents, or 21 percent lower.

**Cross-border Traffic** — Table 16 shows the 1999 two-way vehicle crossings at the Tecate port of entry as well as the 2020 projected traffic demand (unconstrained) for both passenger vehicles and trucks.

The Low Growth traffic alternative assumes in 2020 the same number of vehicle crossings through the Tecate port of entry as in 1999.
Table 16
Tecate Port of Entry
Two-Way Daily Vehicle Crossings

<table>
<thead>
<tr>
<th></th>
<th>1999</th>
<th>2020 Demand Forecast</th>
</tr>
</thead>
<tbody>
<tr>
<td>Passenger Vehicles</td>
<td>6,595</td>
<td>12,877</td>
</tr>
<tr>
<td>Trucks</td>
<td>459</td>
<td>1,223</td>
</tr>
<tr>
<td>Total Vehicles</td>
<td>7,054</td>
<td>14,100</td>
</tr>
</tbody>
</table>


**Overall Findings** —Table 14, on pages 50 and 51, shows the traffic volumes projected on Highway 94 in 2020 under Alternative 4, as well as the forecast level of service.

- East of Buckman Springs Road, volumes would range from 1,700 to 4,500 daily vehicles and the LOS would be C and D. Between Route 188 and Buckman Springs Road, Highway 94 would carry between 3,000 and 5,500 vehicles daily, with level of service D.
- Between Otay Lakes Road and Route 188, traffic volumes would range from 6,700 to 7,500 vehicles. For the Otay Lakes to Route 188 segment, level of service was calculated under two conditions: without passing lanes and with passing lanes. Without passing lanes, LOS is projected to be E.
- Previously, Caltrans had proposed passing lanes at three locations: east of the Otay Lakes Road intersection, at Murphy’s curve (west of Barrett Lake Road), and east of the Cottonwood Creek Bridge. Considering these operational improvements, the passing opportunities would increase compared to the existing highway. The LOS with the passing lanes would improve from E to D.
- Between Otay Lakes Road and Proctor Valley Road, traffic volumes would range between 8,500 and 9,000 vehicles, which would result in a LOS of E. However, the segment just east of Lyons Valley Road (to Jefferson Road) would be at LOS E and carry approximately 14,000 vehicles.
- West of Lyons Valley Road, the projected traffic volumes would result in a LOS between E and F and volumes would range from 19,000 to 30,000 ADT.
- Based upon these results, the proposed passing lanes would improve traffic flow between Otay Lakes Road and Route 188. Also, road improvements would be needed west of Lyons Valley Road.
Overall Findings: Alternative Corridor Alignments

The traffic projections for the year 2020 for Highway 94, under the alternative corridor alignments, are shown in Table 17.

a. Border Corridor
   • Assumes no border-related trucks on Highway 94 west of Route 188.
   • The Border Corridor would carry nearly 6,000 daily vehicles. It would connect to Highway 94 east of Cottonwood Creek (near Barrett Junction), so traffic diversion from Highway 94 to the Border Corridor would happen west of this junction.
   • The segment of Highway 94 just west of Route 188 would carry approximately 12,000 daily vehicles, dropping to about 7,000 vehicles west of the Border corridor (LOS D). However, west of Otay Lakes Road, the projected LOS on Highway 94 would be LOS E. East of Route 188, the level of service on Highway 94 is projected to range from D to E.

b. Pine Valley Corridor
   • Assumes no border-related trucks on Highway 94, east or west of Route 188.
   • The Pine Valley Corridor would carry about 6,000 vehicles.
   • The LOS on Highway 94 is projected to between D and E between Buckman Springs Road and Steele Canyon Road, dropping to LOS E-F west of the Canyon. East of Buckman Springs Road, the LOS on Highway 94 is expected to range between LOS C and D.

c. Highway 94 East and Buckman Springs Road Corridor
   • Assumes no border-related trucks on Highway 94 east of Buckman Springs Road and west of Route 188. Highway 94 would be widened to four lanes between Route 188 and Buckman Springs Road. Buckman Springs Road also would be widened to four lanes in its entirety.
   • This alternative would provide an acceptable level of service only on the widened segment of Highway 94. East of Buckman Springs Road, the LOS on Highway 94 would range between D and E. West of Route 188, Highway 94 would experience LOS E or worse.

d. Highway 94 West Corridor
   • Assumes border-related trucks on Highway 94. This alternative tested widening Highway 94 from Jamacha Road to Route 188.
   • LOS is projected to be between A and C throughout the west section of Highway 94 (west of Route 188). East of Route 188, Highway 94 would experience LOS ranging from D to E.
e. Opening of the Jacumba-Jacumé Border Crossing

- Assumes no border-related trucks either east or west of Route 188. Fewer industrial and commercial uses as well as warehousing are assumed in the vicinity of the Tecate port of entry. Approximately 5,000 vehicles (both trucks and passenger vehicles) would cross at the new border crossing.

- The LOS on Highway 94 is projected to range from D to E between Buckman Springs Road and Lyons Valley Road. West of Lyons Valley Road, Highway 94’s LOS is projected at E and F. East of Buckman Springs Road, the LOS on Highway 94 would be between C and E.
<table>
<thead>
<tr>
<th>Highway 94 between</th>
<th>Alternative Corridors</th>
<th>1998 ADT &amp; LOS</th>
<th>2020 Forecasts Average Daily Traffic Range</th>
<th>Estimated Maximum Average Daily Traffic for Level of Service (LOS)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td>C</td>
<td>D</td>
</tr>
<tr>
<td>Buckman Springs Rd. &amp; Jct. Interstate 8</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Alt. 1a: Border Corridor</td>
<td>1,100</td>
<td>2,400</td>
<td>4,100</td>
</tr>
<tr>
<td></td>
<td>Alt. 1b: Pine Valley Corridor</td>
<td>B</td>
<td>2,400</td>
<td>4,100</td>
</tr>
<tr>
<td></td>
<td>Alt. 1c: Highway 94-Buckman Springs Rd. Corridor</td>
<td>2,700</td>
<td>2,400</td>
<td>4,100</td>
</tr>
<tr>
<td></td>
<td>Alt. 1d: Highway 94 West Corridor</td>
<td>2,700</td>
<td>2,400</td>
<td>4,100</td>
</tr>
<tr>
<td></td>
<td>Alt. 3a: Jacumba-Jacumé Crossing</td>
<td>2,900</td>
<td>2,400</td>
<td>4,100</td>
</tr>
<tr>
<td>SR 188 &amp; Buckman Springs Rd.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Alt. 1a: Border Corridor</td>
<td>1,600</td>
<td>3,000</td>
<td>5,100</td>
</tr>
<tr>
<td></td>
<td>Alt. 1b: Pine Valley Corridor</td>
<td>B</td>
<td>3,000</td>
<td>5,100</td>
</tr>
<tr>
<td></td>
<td>Alt. 1c: Highway 94-Buckman Springs Rd. Corridor</td>
<td>6,000</td>
<td>9,800</td>
<td>11,600</td>
</tr>
<tr>
<td></td>
<td>Alt. 1d: Highway 94 West Corridor</td>
<td>6,000</td>
<td>9,800</td>
<td>11,600</td>
</tr>
<tr>
<td></td>
<td>Alt. 3a: Jacumba-Jacumé Crossing</td>
<td>6,100</td>
<td>3,000</td>
<td>5,100</td>
</tr>
<tr>
<td>Otay Lakes Rd. &amp; SR 188</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Alt. 1a: Border Corridor</td>
<td>6,800</td>
<td>4,800</td>
<td>8,600</td>
</tr>
<tr>
<td></td>
<td>Alt. 1b: Pine Valley Corridor</td>
<td>D</td>
<td>4,800</td>
<td>8,500</td>
</tr>
<tr>
<td></td>
<td>Alt. 1c: Highway 94-Buckman Springs Rd. Corridor</td>
<td>11,200</td>
<td>8,600</td>
<td>18,600&gt;</td>
</tr>
<tr>
<td></td>
<td>Alt. 1d: Highway 94 West Corridor</td>
<td>11,600</td>
<td>11,100</td>
<td>13,100</td>
</tr>
<tr>
<td></td>
<td>Alt. 3a: Jacumba-Jacumé Crossing</td>
<td>8,300</td>
<td>4,800</td>
<td>8,500</td>
</tr>
</tbody>
</table>
## Table 17 (Continued)
Rural Highway 94 Corridor Study
2020 Traffic Forecasts on Highway 94

<table>
<thead>
<tr>
<th>Highway 94 between</th>
<th>Alternative Corridors</th>
<th>1998 ADT &amp; LOS</th>
<th>2020 Forecasts Average Daily Traffic Range</th>
<th>Estimated Maximum Average Daily Traffic for Level of Service (LOS)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lyons Valley Rd. &amp; Otay Lakes Rd.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Alt. 1a: Border Corridor</td>
<td></td>
<td>8,100</td>
<td>10,400 16,000</td>
<td>5,200 9,300 20,200</td>
</tr>
<tr>
<td>Alt. 1b: Pine Valley Corridor</td>
<td></td>
<td>E</td>
<td>9,500 15,700</td>
<td>5,200 9,300 20,200</td>
</tr>
<tr>
<td>Alt. 1c: Highway 94-Buckman Springs Rd. Corridor</td>
<td></td>
<td>11,700</td>
<td>17,900</td>
<td>5,200 9,300 20,200</td>
</tr>
<tr>
<td>Alt. 1d: Highway 94 West Corridor</td>
<td></td>
<td>11,900</td>
<td>18,100</td>
<td>10,900 13,000 15,100</td>
</tr>
<tr>
<td>Alt. 3a: Jacumba- Jacumé Crossing</td>
<td></td>
<td>9,700</td>
<td>15,900</td>
<td>5,200 9,300 20,200</td>
</tr>
<tr>
<td>Steele Canyon Rd. &amp; Lyons Valley Rd.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Alt. 1a: Border Corridor</td>
<td></td>
<td>16,100</td>
<td>25,400 27,800</td>
<td>8,400 13,000 25,400</td>
</tr>
<tr>
<td>Alt. 1b: Pine Valley Corridor</td>
<td></td>
<td>E</td>
<td>24,900 27,300</td>
<td>8,400 13,000 25,400</td>
</tr>
<tr>
<td>Alt. 1c: Highway 94-Buckman Springs Rd. Corridor</td>
<td></td>
<td>27,000</td>
<td>29,400</td>
<td>8,400 13,000 25,400</td>
</tr>
<tr>
<td>Alt. 1d: Highway 94 West Corridor</td>
<td></td>
<td>27,300</td>
<td>29,700</td>
<td>13,900 16,600 19,500</td>
</tr>
<tr>
<td>Alt. 3a: Jacumba- Jacumé Crossing</td>
<td></td>
<td>25,000</td>
<td>27,500</td>
<td>8,400 13,000 25,400</td>
</tr>
<tr>
<td>East of Jamacha Rd. &amp; Steele Canyon Rd.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Alt. 1a: Border Corridor</td>
<td></td>
<td>14,700</td>
<td>21,100 33,000</td>
<td>7,800 12,000 23,600</td>
</tr>
<tr>
<td>Alt. 1b: Pine Valley Corridor</td>
<td></td>
<td>E</td>
<td>21,000 32,500</td>
<td>7,800 12,000 23,600</td>
</tr>
<tr>
<td>Alt. 1c: Highway 94-Buckman Springs Rd. Corridor</td>
<td></td>
<td>22,700</td>
<td>34,200</td>
<td>7,800 12,000 23,600</td>
</tr>
<tr>
<td>Alt. 1d: Highway 94 West Corridor</td>
<td></td>
<td>22,800</td>
<td>34,300</td>
<td>13,900 16,600 19,500</td>
</tr>
<tr>
<td>Alt. 3a: Jacumba- Jacumé Crossing</td>
<td></td>
<td>21,100</td>
<td>32,900</td>
<td>7,800 12,000 23,600</td>
</tr>
</tbody>
</table>

Source: SANDAG
ENVIRONMENTAL CONSTRAINTS ANALYSIS
ENVIRONMENTAL CONSTRAINTS ANALYSIS

INTRODUCTION

This chapter presents a summary of the Environmental Constraints Analysis for the Rural Highway 94 Corridor Study prepared for SANDAG by Myra L. Frank & Associates, Inc. and published in December 1999.

METHODOLOGY

The environmental constraints analysis for the Rural Highway 94 Corridor Study was prepared to identify locations and issues that may affect the choice of alternatives, future design decisions, the level of environmental documentation required, and the level of mitigation and coordination that may be appropriate as the project progresses. This analysis is not an environmental clearance document pursuant to the California Environmental Quality Act or the National Environmental Policy Act. It is, however, a precursor to such a document that is intended to identify further studies and areas of controversy. Because of the conceptual nature of the project description, the level of analysis is general and should be used accordingly. Further detail on impacts, as would be expected in an environmental clearance document, would require conceptual design of each alternative, including revised centerlines, overall roadway width, possible right-of-way acquisition on either side, etc.

This study addresses five corridors: State Route (SR) 94, Buckman Springs Road, Jacumba-Jacumé, Pine Valley Road, and Border Road (see Project Description, following). The rapid growth in Tecate, Baja California, and future growth in Jacumba-Jacumé is not a specific part of the constraints analysis, nor are alternatives on the Mexican side of the border, including subsidy of the tollway. The SR 188 connection to Tecate also was not part of this study.

The study area for the constraints analysis was defined as a 1.6 km (1 mile) wide corridor. This corridor was centered on existing roadways for the SR 94, Buckman Springs Road, and Jacumba-Jacumé alternatives. However, as the Pine Valley Road and Border Road alternatives do not follow existing roadways (with the exception of limited sections of Japatul Valley Road and Lyons Valley Road for the Pine Valley Road alternative), a 1.6 km wide corridor was established through undeveloped areas between I-8 and SR 188, and SR 94 and Otay Mesa Road, respectively. Information was gathered from a variety of published sources and from a “windshield” survey of the corridors. This methodology inherently leads to some disparity in the level of detail of information available over such a large study area. For example, published San Diego Association of Governments (SANDAG) information and mapping covers the entire county and has a uniform level of detail for all alternatives. Information provided by SANDAG included existing land use, water resources/floodplains, and some community facilities. This
information is available throughout the 1.6 km corridor (and beyond). Census demographic
data and information published in the County’s General Plan also addresses the entire county,
but the discussion of the eastern section of the study area is less detailed than that of the
western, more developed area. Similarly, Thomas Bros. mapping is less detailed in the Jacumba
area of the county and in the Cleveland National Forest.

Vegetation and species information was available from three sources. The City of San Diego
Multiple Species Conservation Program (MSCP) study area extends as far east as approximately
Barrett Junction and provides recently mapped vegetation and species information in a
combined format. Information to the east of Barrett Junction was gathered from the County’s
vegetation maps and the California Department of Fish and Game Natural Diversity Database
(Rarefind 2). While providing an overview, the specificity of these sources of information is not
the same as that of the MSCP. As with other mapping, the entire corridor can be viewed and
constraints noted.

A “windshield” survey provides a different type of information. A brief field review of the
study corridors allowed for the documentation of resources and constraints adjacent to the
existing roadways and is particularly useful to understanding visual resources and existing
development. It also reveals potential physical constraints such as bridge openings, challenging
topography, and possible historic structures. The information from the windshield survey has
been included in the constraints analysis but it should be noted that the corridor improvements
that ultimately are proposed may not necessarily be widening of the existing roadways. This
type of survey was not performed for the Border Road alternative nor most of the Pine Valley
Road alternative.

PROJECT DESCRIPTION

Five alternatives were reviewed, as described below in Table 18 and shown on Figure 8. A 1.6
km wide corridor centered on the existing roadway provided the basic study area for SR 94,
Buckman Springs Road, and Jacumba-Jacumé alternatives, and the constraints along the
existing roads were especially noted. A 1.6 km corridor through predominately undeveloped
land was defined for the Pine Valley Road and Border Road alternatives as they do not follow
existing roads. The remainder of this report summarizes each alternative, then presents the
constraints analysis. For some topics, all five alternatives are discussed together, while in others,
each alternative is described separately.
<table>
<thead>
<tr>
<th>Component</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>SR 94</td>
<td>The study limits are Avocado Blvd. on the west and Buckman Springs Road on the east. Road widening from 2 to 4 lanes is being considered between Jamacha Rd. on the west and the Buckman Springs Road/SR 94 Junction.</td>
</tr>
<tr>
<td>Buckman Springs Road</td>
<td>Road widening from 2 to 4 lanes between I-8 and SR 94.</td>
</tr>
<tr>
<td>Jacumba - Jacumé Port of Entry</td>
<td>Widening of Old Highway 80 between Jacumba and I-8 to the east of Jacumba, associated with reopening the Port of Entry at Jacumba. Variations of this alternative are (1) improvement of the Carrizo Gorge/I-8 interchange and widening of Carrizo Gorge Road, and (2) improvement of the In-Ko-Pah Road/I-8 interchange and widening of In-Ko-Pah Road.</td>
</tr>
<tr>
<td>Pine Valley Road</td>
<td>The primary alternative improves the northern section of Japatul Valley Road near I-8 and creates a new road through the Cleveland National Forest, east of Barrett Lake, connecting to SR 94 immediately west of Potrero. The western variation includes improvements to more of Japatul Valley and Lyons Valley Roads and a new road segment from south of the Japatul Valley Road/Lyons Valley Road Junction, west of Barrett Lake, connecting to the primary component northwest of Potrero. The eastern variation follows the primary alternative to east of Barrett Lake, then extends further east before meeting SR 94 west of Potrero.</td>
</tr>
<tr>
<td>Border Road</td>
<td>New road along the U.S. – Mexico International Border between SR 94 at Barrett Junction and Otay Mesa Road in San Diego.</td>
</tr>
</tbody>
</table>

Sources: SANDAG, 1999; Myra L. Frank and Associates, Inc., 1999
Figure 8 is available by contacting SANDAG Project Manager Elisa Arias at (619) 595-5336.
SUMMARY BY COMPONENT

SR 94

The SR 94 component, which is the longest under consideration, would have several constraints, including:

- Sensitive species and habitats are prevalent along Cottonwood and Dulzura Creeks and elsewhere. The San Diego National Wildlife Refuge (which incorporates other reserves) crosses and abuts the highway. Coastal sage scrub, coastal sage-chaparral scrub, and oak woodland are considered sensitive upland communities that would require substantial mitigation. Wetland and riparian resources are extensive and would require mitigation as well. Focused surveys for listed species may be required. The corridor is within the Multiple Species Conservation Program (MSCP) boundary and crosses a Biological Core Area and Linkage.

- Known archaeological and historic resources abut the highway and complete surveys and evaluations would be required. Archaeological and historic resources are extensive.

- Existing development abuts the highway and includes many residential and commercial uses and community facilities that would require relocation or mitigation.

- Existing communities would be further divided if the existing alignment is used.

- The roadway passes through agricultural reserves and wildlife preserves.

- There are a variety of federal, state, and local landowners.

- Visual impacts would be significant.

- Several water resources that would be affected are drinking water supplies.

Buckman Springs Road

The Buckman Springs Road component would have several constraints:

- Sensitive species and habitats are prevalent in the northern section of the study area (in the Cleveland National Forest). Focused surveys for listed species may be required.

- Known archaeological resources are present and complete surveys (of both archaeological and historic resources) and evaluations would be required.

- A few existing community facilities would require relocation or mitigation. Some residential uses are adjacent as well.

- The roadway passes through agricultural reserves.

- Existing development abuts the highway and includes many residential and commercial uses and community facilities that would require relocation or mitigation.

- There are a variety of federal, state and local land owners, as well as the interests of the Campo Indian Tribe, to consider.
• Visual impacts could be substantial.

Jacumba-Jacumé Port of Entry

The Jacumba-Jacumé Port of Entry component would have several constraints, including:

• Sensitive species and habitats are present. Focused surveys for listed species may be required.
• Known archaeological and historic resources abut the highway and complete surveys and evaluations would be required. Archaeological resources are extensive.
• Existing development at towns abuts the highway and includes residential uses (including mobile homes) and community facilities that would require relocation or mitigation. Some residents may be low-income. The variations of this alternative would have differing effects.
• There are a variety of federal, state and local landowners.
• Visual impacts could occur.

Pine Valley Road

The following is a list of constraints for the Pine Valley Road alternative:

• All variations cross the Cleveland National Forest; the primary component and eastern variation traverse designated Wilderness Areas.
• Known archaeological resources are present and complete surveys (of both archaeological and historic resources) and evaluations would be required.
• Sensitive species and habitats are present. Focused surveys for listed species may be required.
• Visual impacts would be significant.
• Several water resources that would be affected are drinking water supplies.
• Large agricultural preserve overlays the Cleveland National Forest.

Border Road

Constraints of the Border Road alternative include:

• Sensitive species and habitats are present. Focused surveys for listed species may be required. The corridor is within the Multiple Species Conservation Program (MSCP) and crosses two Biological Core Areas.
• Known archaeological resources are present and complete surveys (of both archaeological and historic resources) and evaluations would be required.
• The corridor traverses a designated Wilderness Area.
• Visual impacts would be significant.

COMPARISON MATRIX

Based upon this constraints analysis, the Jacumba-Jacumé alternative (or one of its variations) would have the fewest adverse environmental impacts in comparison to the other four alternatives. A detailed environmental analysis would still be required once conceptual design information is available.

Table 19 provides a comparison of the five alternatives analyzed in this constraints study.
<table>
<thead>
<tr>
<th>Topic</th>
<th>SR 94</th>
<th>Buckman Springs Rd</th>
<th>Jacumba-Jacumé</th>
<th>Pine Valley Road</th>
<th>Border Road</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Land Use</strong></td>
<td>Residences and development adjacent; parks and refuges adjacent; communities of Jamul, Dulzura, Potrero, and Campo.</td>
<td>USFS land, County Park, and Campo Reservation adjacent; residential in southern half of corridor.</td>
<td>Residences and commercial adjacent in Jacumba; wildlife management area adjacent; proposed Jacumba Valley Ranch development. Anza Borrego State Park adjacent.</td>
<td>Residences at north and south ends. Traverses Cleveland National Forest/Wilderness Area, depending on variation.</td>
<td>Traverses Otay Mountain Wilderness Area.</td>
</tr>
<tr>
<td><strong>Agricultural</strong></td>
<td>2 preserves</td>
<td>Several preserves.</td>
<td>No preserves.</td>
<td>Preserve overlays most of the Cleveland National Forest.</td>
<td>1 preserve.</td>
</tr>
<tr>
<td><strong>Preserves</strong></td>
<td>5 schools, 2 libraries, 3 churches, 3 parks adjacent.</td>
<td>2 schools, 1 park adjacent.</td>
<td>1 school, 1 library, 1 park adjacent.</td>
<td>1 park, 1 school (eastern variation) and Barrett Honor Camp (western variation).</td>
<td>1 school.</td>
</tr>
<tr>
<td><strong>Community</strong></td>
<td>No inherent conflicts; design, visual and other unresolved issues. Plan area is concerned with dark night skies, visual, and rural character.</td>
<td>No inherent conflicts. Rural character and recreation/scenic features important. Design, visual, and other unresolved issues</td>
<td>No inherent conflicts. Rural character and recreation/scenic features important. Design, visual, and other unresolved issues</td>
<td>Conflict with Wilderness Area. Design, visual, and other unresolved issues.</td>
<td>Possible conflict with wilderness area; Resource Conservation Area (RCA) present; design, visual and other unresolved issues.</td>
</tr>
<tr>
<td><strong>Facilities</strong></td>
<td>Rural, historic towns; project could significantly affect.</td>
<td>Rural, no commercial areas; project could affect.</td>
<td>Rural and isolated; former resort area; project could affect but minor compared to proposed development.</td>
<td>Rural, no commercial areas.</td>
<td>Undeveloped.</td>
</tr>
<tr>
<td><strong>Consistency</strong></td>
<td></td>
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<td></td>
<td></td>
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<tr>
<td><strong>with Plans</strong></td>
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<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Community</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Character</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Topic</td>
<td>ALTERNATIVE</td>
<td></td>
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<tr>
<td>-----------------------------------</td>
<td>-----------------------------------------------------------------------------</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>SR 94</td>
<td>Buckman Springs Rd</td>
<td>Jacumba-Jacumé</td>
<td>Pine Valley Road</td>
<td>Border Road</td>
</tr>
<tr>
<td>Growth</td>
<td>Growth rate 2x rest of county; suburbanization pressures.</td>
<td>Growth rate 3x rest of county; Cleveland National Forest, may buffer growth pressures.</td>
<td>Growth rate 3x rest of county; large planned development, airport account for growth projections.</td>
<td>Cleveland National Forest restricts growth. New road would likely induce growth.</td>
<td>Eastern end growth rate is 2x county average. New road would likely induce growth.</td>
</tr>
<tr>
<td>Socio-economic Effects</td>
<td>Substantial residential and business acquisitions likely throughout corridor</td>
<td>Acquisitions possible in southern half.</td>
<td>Acquisitions likely within small Jacumba area.</td>
<td>Acquisitions are possible near north end.</td>
<td>Possible acquisitions at east end depending on the alignment.</td>
</tr>
<tr>
<td>Environmental Justice and Tribal Lands</td>
<td>No known effects</td>
<td>Within census tract with greatest number of minority and low income. Tribal lands present.</td>
<td>Within census tract with greatest number of minority and low income.</td>
<td>Partially within census tract with greatest number of minority and low income.</td>
<td>No known effects.</td>
</tr>
<tr>
<td>Cultural Resources</td>
<td>77 archaeological sites within 30 meters; Campo Stone Store is listed resource; other potentially historic trails, 10 bridges, 40 structures, and a historic District.</td>
<td>18 archaeological sites within 30 meters; potentially historic 2 bridges, 3 structures, 1 marker</td>
<td>24 archaeological sites within 30 meters; potentially historic trails, US 80, 3 bridges, 4 structures, and Table Mountain Historic District. 2 State Landmarks.</td>
<td>69 archeological sites within 1.6 km corridor. Several historic architectural sites relating to water transport. Possible sites in Cleveland National Forest.</td>
<td>24 archeological sites within 1.6 km corridor; potentially historic trail.</td>
</tr>
<tr>
<td>Sensitive Species and Habitats</td>
<td>San Diego National Wildlife Refuge, MSCP, and other reserves and RCAs; substantial potential impacts to wetlands, uplands, and sensitive species.</td>
<td>Cleveland National Forest; sensitive species in northern half of corridor.</td>
<td>Substantial potential impacts.</td>
<td>Substantial potential impacts including Cleveland National Forest, RCA, and Wilderness Area.</td>
<td>Substantial potential impacts including RCA, Wilderness Area, and MSCP.</td>
</tr>
</tbody>
</table>
### Table 19 (Continued)
#### Constraints Comparison Matrix

<table>
<thead>
<tr>
<th>Topic</th>
<th>SR 94</th>
<th>Buckman Springs Rd</th>
<th>Jacumba-Jacumé</th>
<th>Pine Valley Road</th>
<th>Border Road</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Floodplains and Water Resources</strong></td>
<td>8 resources affected, drinking water supplies.</td>
<td>2 resources affected.</td>
<td>4 resources affected.</td>
<td>4 resources affected, including drinking water supplies.</td>
<td>1 resource affected, including drinking water supplies.</td>
</tr>
<tr>
<td><strong>Soils</strong></td>
<td>Well drained sandy loams, no constraints.</td>
<td>Loamy coarse sand or coarse sandy loam, no constraints.</td>
<td>Loamy coarse sand or coarse sandy loam, and sandy/silty loam, no constraints</td>
<td>Sandy loams with some rocks.</td>
<td>Silt loams and rocky.</td>
</tr>
<tr>
<td><strong>Length of Alignment (approx.)</strong></td>
<td>58.1 km</td>
<td>36.0 km (includes 20.2 km along SR 94)</td>
<td>11.5 km</td>
<td>27.8 – 31.7 km</td>
<td>22.1 km</td>
</tr>
</tbody>
</table>

*Permitting and Doc. Requirements*

All would likely require an EIR/EIS and include detailed technical studies. Permitting for 404 and 401 would be extensive, as would any permitting for impacts to the MSCP or wildlife refuge. Section 4(f) would be required for impacts to parks, wildlife refuge, or significant cultural resources.

Source: Myra L. Frank and Associates, Inc., 1999
PRELIMINARY COST ESTIMATES
Caltrans staff prepared preliminary planning level cost estimates for the five build alternatives evaluated. Table 20 shows the cost estimates for two-lane roads, while Table 21 presents the estimated cost for four-lane roads.
<table>
<thead>
<tr>
<th>Description</th>
<th>Length (mi.)</th>
<th>Cost ($millions)</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>BORDER CORRIDOR</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>U.S.-Mexico Border at Tecate - Future SR 11 at Otay Mesa</td>
<td>20</td>
<td>$500 $850</td>
<td>new/existing alignment, difficult terrain, curb/shoulder improvement, climbing lane</td>
</tr>
<tr>
<td><strong>PINE VALLEY CORRIDOR</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>U.S.-Mexico Border at Tecate - Pine Valley (northeast alignment)</td>
<td>22</td>
<td>$450 $800</td>
<td>new/existing alignment, difficult terrain, climbing lane</td>
</tr>
<tr>
<td>U.S.-Mexico Border at Tecate - Pine Valley (northwest alignment)</td>
<td>21</td>
<td>$500 $850</td>
<td>new/existing alignment, difficult terrain, curb/shoulder improvement, climbing lane</td>
</tr>
<tr>
<td>U.S.-Mexico Border at Tecate - Pine Valley (bridge alignment)</td>
<td>22</td>
<td>$650 $1,100</td>
<td>new/existing alignment, difficult terrain, bridge, climbing lane</td>
</tr>
<tr>
<td><strong>HIGHWAY 94-BUCKMAN SPRINGS ROAD CORRIDOR</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>U.S.-Mexico Border at Tecate - I-8 Buckman Springs Interchange</td>
<td>25</td>
<td>$150 $200</td>
<td>existing alignment, difficult/moderate terrain, new bridge, curb/shoulder improvement, climbing/turning lane</td>
</tr>
<tr>
<td><strong>HIGHWAY 94 WEST CORRIDOR</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>U.S.-Mexico Border at Tecate - Avocado Blvd. (Rancho San Diego)</td>
<td>27</td>
<td>$150 $200</td>
<td>existing alignment, difficult/moderate terrain, curb/shoulder improvement, climbing lane</td>
</tr>
<tr>
<td><strong>JACUMBA CROSSING</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>U.S.-Mexico Border - I-8 Carrizo Gorge Interchange</td>
<td>3</td>
<td>$10 $13</td>
<td>new/existing alignment, easy terrain, passing lane</td>
</tr>
<tr>
<td>U.S.-Mexico Border - I-8 In-Ko-Pah Gorge Interchange</td>
<td>5</td>
<td>$22 $30*</td>
<td>new/existing alignment, easy/moderate terrain, curb improvement, passing lane</td>
</tr>
</tbody>
</table>

Note: Preliminary cost includes construction, support and right of way for a 2-lane roadway. Right of Way costs included **ONLY for NEW** alignments.

Source: Caltrans District 11 Advanced Planning, May 1999
<table>
<thead>
<tr>
<th>Description</th>
<th>Length (mi)</th>
<th>Cost (Millions)</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>BORDER CORRIDOR</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>U.S.-Mexico Border at Tecate - Future SR 11 at Otay Mesa</td>
<td>20</td>
<td>$700</td>
<td>$1,000</td>
</tr>
<tr>
<td><strong>PINE VALLEY CORRIDOR</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>U.S.-Mexico Border at Tecate - Pine Valley (northeast alignment)</td>
<td>22</td>
<td>$750</td>
<td>$1,100</td>
</tr>
<tr>
<td>U.S.-Mexico Border at Tecate - Pine Valley (northwest alignment)</td>
<td>21</td>
<td>$700</td>
<td>$1,000</td>
</tr>
<tr>
<td>U.S.-Mexico Border at Tecate - Pine Valley (bridge alignment)</td>
<td>22</td>
<td>$950</td>
<td>$1,500</td>
</tr>
<tr>
<td><strong>HIGHWAY 94-BUCKMAN SPRINGS ROAD CORRIDOR</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>U.S.-Mexico Border at Tecate - I-8 Buckman Springs Interchange</td>
<td>25</td>
<td>$300</td>
<td>$400</td>
</tr>
<tr>
<td><strong>HIGHWAY 94 WEST CORRIDOR</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>U.S.-Mexico Border at Tecate - Avocado Blvd. (Rancho San Diego)</td>
<td>27</td>
<td>$350</td>
<td>$500</td>
</tr>
<tr>
<td><strong>JACUMBA CROSSING</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>U.S.-Mexico Border - I-8 Carrizo Gorge Interchange</td>
<td>3</td>
<td>$22</td>
<td>$30</td>
</tr>
<tr>
<td>U.S.-Mexico Border - I-8 In-Ko-Pah Gorge Interchange</td>
<td>5</td>
<td>$50</td>
<td>$60</td>
</tr>
</tbody>
</table>

Note: Preliminary cost includes construction, support and right of way for a 4-lane conventional highway. Right of Way costs included **ONLY for NEW** alignments.

Source: Caltrans District 11 Advanced Planning, May 1999