ROUTE CONCEPT REPORT

STATE ROUTE 91
ARTESIA/RIVERSIDE FREEWAY
12-ORA-91-PM 0.00/R18.90

OCTOBER 1999

Caltrans

ROUTE CONCEPT REPORT

STATE ROUTE 91

12-ORA-91 PM 0.00/R18.90

PREPARED BY DISTRICT 12 DIVISION OF PLANNING

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ROUTE CONCEPT REPORT
STATE ROUTE 91
ARTESIA FREEWAY (I-710 to I-5)
RIVERSIDE FREEWAY (I-5 to I-215)
12-ORA-91 0.00/R18.90
SUMMARY

State Route 91 (SR-91) in Orange County, also known as the Riverside Freeway and the Artesia Freeway is an access controlled, grade separated 6 to 12 lane freeway. It is used for commuter, goods movement and interregional travel. The average daily traffic (ADT) varies from 170,000 to 275,000. Travelers experience congestion during the week in both AM/PM peak periods, on holidays and during weekends.

ROUTE CONCEPT

The concept for this route is to provide the best Level of Service (LOS) possible and reduce the duration of congestion. If no major capital improvements are made, it is anticipated longer traffic delays will occur. For planning purposes, the route has been divided into segments as shown on the next page.

The SR-91 route concept calls for changes from the existing number of lanes by adding high occupancy vehicle (HOV) lanes between the Los Angeles County Line and SR-57 and one mixed flow lane in each direction between I-5 and SR-57. All these improvements are under construction except for the westbound mixed flow lane between SR-5 and SR-57. While HOV lanes were completed in December 95 between SR-57 and SR-55 for a total of 6 mixed flow and 2 HOV lanes, the ultimate concept calls for 8 mixed flow and 2 HOV lanes resulting in a 10 lane concept from the L.A. County Line to SR-55. The concept for SR-91 between SR-55 and the Riverside County Line was also completed in December 1995 with the addition of 2 toll lanes in each direction, known as the 91 Express Lanes, making a 12 lane concept from SR-55 to the Riverside County Line. The 91 Express Lanes were developed and are operated by the California Private Transportation Company under a franchise agreement with the State of California. By the year 2020, it is expected the LOS will worsen to F3 for some segments. Traffic forecasts for SR-91 from Riverside County to SR-55 will so overwhelm the facility that additional transportation facilities will be required. Caltrans encourages the development of non-highway solutions within the corridor and improvements to other corridors such as SR-74, SR-241 and even SR-57 to help improve transportation in the greater SR-91 corridor. Changes between existing conditions and the concept are shown in the LOS Summary Table on the next page.

In addition to the changes in the number of lanes mentioned above, there is an existing connector between the SR 55 carpool lanes and the SR 91 Express Lanes. HOV direct connectors are currently under construction to connect the HOV lanes on SR-91 to the HOV lanes on I-5 and SR-57. Direct connectors are also planned for the SR-91/SR-241 interchange in the ultimate configuration.

Moreover, on and off-ramp improvements to facilitate truck access to the freeway system must be explored. This would be adding an exclusive truck HOV "by-pass" lane. One potential location includes ramps connecting to Route 91 between I-5 and Imperial Highway. Additionally, it was recommended that a truck by-pass lane be constructed on the eastbound Route 91 which would allow trucks to avoid the Route 91/55 interchange, which currently creates congestion and difficult weaving maneuvers for eastbound trucks.

The inclusion of all traffic management elements is an integral part of the concept for SR-91 as well as all other urban freeways bringing these highways up to full Urban Freeway Standards. These traffic management elements are ramp metering, changeable message signs and closed circuit television cameras, with operational control from the Traffic Management Center (TMC). New Technology implementation is also a part of the route concept wherever applicable.

Finally, this concept calls for a new strategy emphasizing system management and operational improvements of our existing freeway system in a way that optimizes the carrying capacity referred to as Traffic Operations Strategies (TOPS). It is an operational strategy that will maximize the utilization of the existing urban freeway system through performance-based investment strategies. See *Traffic Operations Strategies (TOPS) on page 24.* Currently, the district with the cooperation of the other southern California districts is developing a system wide concept report for Southern California. If fully implemented, the concept for this route could improve to a Level of Service (LOS) of "E" which will reduce delay to motorists and the trucking industry except from SR-241 to Riverside County Line as noted on page 5. The one operational project identified at this time is to eliminate the WB outside lane drop near Coal Canyon Rd interchange. This improvement is consistent with the SR-91 Express Lane Franchise Agreement.

LOS SUMMARY TABLE

SEG	POSTMILE	LIMITS	1997 Number Of Lanes/ Peak Hour LOS	2020 Number of Lanes/ Peak Hour LOS	TOPS LOS
1	0.00/R3.64	L.A. Co Line/ I-5	8 + aux lanes/ F1	8 + ***2 HOV Lanes*** + aux lanes/ *F0*	*E0*
2	R3.64/6.12	I-5/SR-57	6 lanes + aux lanes/ F3	***8 + 2 HOV Lanes*** + aux lanes/ *F1*	*E0*
3	6.12/R9.19	SR-57/SR-55	6+2 HOV lanes + aux lanes/ F0	***8*** + 2 HOV lanes + aux lanes/ *F1*	*E0*
4	R9.19/R16.40	SR-55/ SR-241	8+4 toll lanes/ F2	8 + 4 toll lanes/ F3	*E1*
5	R16.40/R18.90	SR-241/ Riv County Line	8+4 toll lanes/ F3	8 + 4 toll lanes/ F3	*E1*

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ROUTE CONCEPT REPORT

STATEMENT OF PLANNING INTENT

The Route Concept Report (RCR) is an internal planning document which expresses the Department's judgment on what the characteristics of each state highway should be in response to proposed land use and projected travel demand over a 20-year planning period. Route Concept Reports are prepared in the districts and represent the combined expertise of district, local and regional agencies staff.

The RCR contains the Department's goals for the development of each route in terms of Level of Service (LOS). One of the Department's goal is the proposed concept of Traffic Operations Strategies (TOPS). The RCR broadly identifies the nature and extent of improvements needed to reach those goals. More specific design and operational detail will be included and analyzed in subsequent project development documents such as Project Study Reports, Environmental Documents, Project Reports and Preliminary and Final Design. These concept reports are used in the development of the District System Management Plan and other state and local planning and project development documents.

The traffic data for this report has been prepared for the following alternatives: Base Year 1997, Year 2020 Null (projects under construction and funded), Year 2020 Concept and Year 2020 TOPS. The LOS for this concept report is based on the ratio of Year 2020 forecast volume over capacity while the Year 2020 TOPS forecast is demand over capacity for each segment of the roadway. The LOS shown in Table 7 (ADT Summary Table) on page 26 is for the peak hour/peak direction. See *Appendix 1 - Graphic Representation and Definition of Levels of Service* on page 27.

In developing this RCR, the Transportation Planning Branch considered using the metric system for designating segment limits and other significant points along this route. It was decided that it would be inappropriate for Transportation Planning to perform even "soft conversions" at this point in the planning process. Transportation Planning will begin using the metric system in RCRs and other documents when the postmile system is converted and a standard set of data is in use throughout the District.

Information contained in the RCR is subject to change as conditions and priorities change and as new information is obtained. The nature and size of identified improvements may change as they move through the project development stages, with final determinations made at the time of project planning and design. Changes that occur during project development may require revision of the RCR.

Preparation of this report included field reviews, review of planned and programmed projects, review of previous RCRs prepared for this route, projects under construction, and analysis of Level of Service. Internal documents from Traffic, Maintenance, Project Development and Programming, Travel Forecasting Unit, Intermodal Transportation Management System (ITMS) software results, and external documents from Orange County Environmental Management Agency (OCEMA), Orange County Transportation Authority (OCTA), and Southern California Association of Governments (SCAG) were referenced for this RCR. Coordination with the Advanced Planning/Intergovernmental Review Branch was also undertaken to ensure consideration of external issues impacting this route.

ROUTE DESCRIPTION - STATE ROUTE 91 (SR-91)

SR-91, a major east-west route which passes through southern Los Angeles County, northern Orange County and western Riverside County, is 57.9 miles in total length. The route passes through three counties, and three Caltrans districts: 17.3 miles in length in Los Angeles County (District 7); 18.9 miles in Orange County (District 12); and 21.7 miles in Riverside County (District 8). SR-91 in Orange County passes through 5 cities plus unincorporated Orange County near the Riverside County Line.

In L.A. County, SR-91 operates as both an arterial highway and a controlled access freeway. This is a fully urbanized area and the route is a part of the urban grid of arterial highways and freeways. In Orange County, SR-91 operates as a controlled access freeway throughout. Most of northern Orange County in the vicinity of SR-91 is fully urbanized and the route is a part of the urban grid of arterial highways and freeways. At the eastern end of the route in Orange County near the Riverside County Line, SR-91 passes through the Santa Ana Canyon. The Santa Ana Canyon area is much less urbanized than the rest of northern Orange County yet the route lies within the urban/rural boundary. In Riverside County, as in Orange County, SR-91 operates as a controlled access freeway throughout.

Moving eastward from and through L.A. County, high occupancy vehicle (HOV) lanes are present on SR-91 from I-110 to the Orange County Line, a distance of approximately 14 miles. Between the Los Angeles/Orange County Line and SR-57, approximately 8 miles, HOV lanes are currently under construction and would become operational in the year 2000/01. At SR-57, HOV lanes begin again and extend to SR-55, a distance of approximately 3 miles. At SR-55, the 91 Express Lanes are present in the freeway median up to the Riverside County Line, a distance of approximately 10 miles. At the Riverside County Line HOV lanes begin again and extend to Arlington Ave in downtown Riverside, a distance of approximately 18 miles. When the programmed HOV lanes are completed in Orange County, there will be continuous HOV/Toll lanes on SR-91 through three counties for a distance of approximately 53 miles.

From the western end of SR-91 in Los Angeles County to SR-55 in Orange County the grade and terrain are flat. In the vicinity of SR-55 where the route enters the Santa Ana Canyon, the grade remains essentially flat and the terrain turns to rolling.

History

SR-91 between SR-55 in Orange County and SR-215 in Riverside County was originally added to the State Highway System as Rte 43 in 1931. The portion of present day SR-91 between SR-1 in Los Angeles County and SR-55 was added to the State Highway System as Rte 175 in 1933. The portion of the route between I-405 and SR-215 was added to the State Freeway and Expressway System in 1959.

CURRENT ISSUES/PROBLEM IDENTIFICATION

91 Express Lanes

In 1989 State legislation (AB 680) was approved which allows Caltrans ". . . to enter into agreements with private entities for the construction by, and lease to, private entities of four transportation demonstration projects ...". The 91 Express Lanes, a private toll road project located in the median of SR-91 between SR-55 and the Riverside County Line, is one of the four demonstration projects. The California Private Transportation Company (CPTC) is the private entity with which Caltrans has entered into agreement to build and operate the toll lanes on SR-91.

Although the 91 Express Lanes extend only from SR-55 to the Riverside County Line, the original franchise agreement gives the rights to toll lane development on SR-91 from the Los Angeles/Orange County Line to I-15 in Riverside County. CPTC has the first call on improvements in the median of the freeway if they pay for the improvements. They deferred taking the lanes currently under construction for SR 55/LA county line. The OCTA Board did consider the development and operation of public toll lanes westward from SR-55, but decided to stay with the HOV lane concept. One obstacle to this development may be concerns by Caltrans and local officials on intermediate ingress/egress access. As the 91 Express Lanes now operate, the user enters at one end of the toll lanes and exits at the other end with no intermediate ingress/egress.

Moreover, as traffic in the corridor continues to increase, along with an increased number of express buses, there may be a need to add HOV drop ramps at selected local interchanges and HOV direct connectors at freeway to freeway interchanges. One local interchange as a possible drop ramp location is Fairmont Blvd in the city of Anaheim, just east of Imperial Hwy (SR-90). Presently, Fairmont Blvd does not currently cross SR-91 and there is no interchange. This undertaking would require connecting Fairmont Blvd on the south side of SR-91 with Fairmont Blvd on the north side of the freeway. Additionally, if HOV lanes are built on SR-241, direct connectors are planned at the SR-91/SR-241 interchanges, between SR-241 and the 91 Express Lanes. These proposals may also address the issue of intermediate access to the 91 Express Lanes, and would have to be coordinated with the SR-91 Express Lane Franchise.

Eastern Transportation Corridor (ETC)

The ETC is a new toll road completed in February 1999 and extends south from SR-91 in the vicinity of Gypsum Canyon Rd. Its west leg crosses the I-5 near Jamboree Rd. in Tustin, and its east leg connects with I-5 and SR-133 in Irvine. Originally, the north and east portions of the ETC were designated SR-231 but now changed to SR-241 which essentially extends the Foothill Transportation Corridor (FTC) already designated SR-241, to SR-91. The portion of the east leg south of the Foothill Transportation Corridor has been redesignated SR-133. The west leg

retains its SR-261 designation. There is no longer a SR-231 associated with the ETC.
The ETC is expected to divert traffic from SR-91, SR-55 and I-5. While this new route will ease

congestion on SR-91 between SR-55 and SR-241, a bottleneck is expected on SR-91 at the SR-91/SR-241 interchange, particularly in the PM peak period. Eastbound traffic is already expected to be moderately congested up to this point, where the influx of SR-241 traffic is expected to add to the congestion significantly. The reduction in the number of lanes from 12 in Orange County to 10 lanes in Riverside County further exacerbates the bottleneck condition.

Findings had shown that after the construction of the 91 Express Lanes built by CPTC, actual accident rate is significantly higher than the average accident rate because of the internal heavy weave combined with the outside westbound lane drop. This problem is anticipated to get worse as traffic increases on the Eastern Toll Corridor (SR-241) and after the widening of SR-71 because it will create an outside overload that would make lane changing very difficult in both directions. It is estimated that over 5000 vehicles per hour will be changing lanes on SR-91 between SR-71 and SR-241 while over 3000 vehicles per hour will be trying to use the outside lanes to transition to and from SR-241 and SR-71, the same lanes being used by a growing number of heavy trucks.

To address this safety issue, Districts 12 recommends the extension of the lane on the westbound direction approximately ½ a mile to the newly opened SR-241.

Canyon Development

Along SR-91 in the Santa Ana Canyon area (between SR-55 and the Riverside County Line), there is a significant amount of undeveloped land. Much of this land is in canyons running perpendicular to the Santa Ana Canyon and SR-91. It is important that any development in any of these canyons be fully coordinated with Caltrans. The reasons for this are twofold:

Traditionally, it is important to assess the traffic impacts on SR-91 of any development in the vicinity. Although there are interchanges with local arterial highways in the Santa Ana Canyon area, Caltrans would want to ensure that the interchanges are adequate to handle any projected traffic increases.

It is also important to assess the impact of new drainage patterns from the canyons, across the State right of way, the highway facility and into the Santa Ana River. Caltrans would be concerned not only with drainage volumes but would also be concerned with any alteration of the make up of debris (natural and man made) flowing out of the canyons. It is imperative that any adverse impacts on the highway drainage system be fully investigated and mitigated if necessary.

Coal Canyon. The Coal Canyon bio-corridor has been regarded as the most environmentally valuable unprotected open space in Southern California , which connects the park and the surrounding Puente-Chino Hills on the north to the Cleveland National Forest and the Santa Ana Mountains on the south. The bio-corridor provides for the dispersal of plants and the movement

of animals between the two areas and extends within the park boundaries through brush and water canyons to the interior of the park. As of 1998, portions of the Coal Canyon biocorridor remain in private ownership and may be developed. To preserve this environmentally important canyon, the state and other groups are forging a deal allowing public purchase of the privately held corridor near the border of Orange and Riverside counties.

Class I Bikeway - Gypsum Canyon Rd to Green River Dr

Maintenance related issues have been brought forward regarding the Class I bikeway located within Caltrans right of way between Gypsum Canyon Rd and Green River Dr. This bikeway is a continuation of the Santa Ana River Trail which begins at the Pacific Ocean. The primary issue concerns drainage and related dirt and debris from adjacent slopes. There have been numerous complaints from bicyclists about the existing conditions which occurs during the rainy season. A drainage improvement project has been proposed that may resolve this issue.

SR 241 to Riverside County Line

Given the very high ADT forecast for this segment, combined with the inconsistencies of lanes between District 8 and District 12 and the Franchise Agreement with CPTC, it is unclear if a TOPS Level of Service "E" would be achieved.

HOV Lanes

For planning purposes, the HOV volumes were combined with Single Occupant Vehicle (SOV) volumes, and the HOV number of lane was combined with the freeway number of lanes to calculate the demand over capacity (D/C) ratio and Levels of Service (LOS) for each segment of the route. Year 2020 forecasts indicate that there will be excessive demand on the HOV system to continue the operation of this route and the HOV lanes as we do today. Between now and Year 2020, the 2+ HOV issue along with the dedicated lanes will have to be addressed.

ROUTE PURPOSE AND CLASSIFICATION

SR-91 serves several purposes in the Los Angeles/Orange/Riverside/San Bernardino metropolitan area. This route serves as a major commuter route for Riverside County and San Bernardino County residents working in Orange and Los Angeles Counties. It is a major inter-county and interregional route which intersects 7 interstate routes (I-405, I-110, I-710, I-605, I-5, I-15, and I-215), and 9 state routes (SR-1, SR-107, SR-19, SR-39, SR-57, SR-55, SR-90, SR-71, and SR-241). SR-91 is a major goods movement facility into and out of Orange County and southern Los Angeles County. On weekends and holidays this route carries a significant amount of recreational trips between Los Angeles/Orange counties and mountain and desert recreation areas to the east.

Federal/State Functional Classification

SR-91 is classified as Other Freeway or Expressway throughout Orange County.

Following are other designations which may affect planning and/or operations on SR-91:

DESIGNATION	LIMITS
• National Highway System (NHS)	entire length of SR-91 in Orange County
• Subsystem of Highways for the movement Extra Legal Loads (SHELL)	R9.19/R18.91- (SR-55 to Riverside County of Line)
• National Network for STAA Trucks	entire length of SR-91 in Orange County
• 12 Foot Wide Arterial System	entire length of SR-91 in Orange County
• Lifeline Route	6.12/R18.91 (I-5 to Riverside County Line)
• State Scenic Highway - Officially Designated State Scenic Highway - Eligible State Scenic Highway - Not Officially Designated	 R9.19/13.42 - (SR-55 to Anaheim east city limit) 13.42/R18.91 - (Anaheim east city limit to Riverside County Line)

Orange County

SR-91 is shown as a State Freeway on the County Master Plan of Arterial Highways (MPAH). The MPAH identifies state freeways for reference purposes only.

ROUTE ANALYSIS

SR-91 in Orange County is an access controlled freeway for its entire length. The number of lanes vary from 6 lanes to 12 lanes. The segment from the L.A. County Line to I-5 is 8 lanes. The segment from I-5 to SR-57 is 6 & 7 lanes. In the segment from SR-57 to SR-55, one HOV lane was opened in each direction in late 1995, making 6 mixed flow + 2 HOV lanes. And in the segment from SR-55 to the Riverside County Line the California Private Transportation Company opened 2 toll lanes (91 Express Lanes) in each direction, making that segment 12 lanes.

Parallel Alternative Facilities

Since SR-91 is part of the existing urban grid of arterial highways and freeways in southern Los Angeles County and northern Orange County, there are several existing parallel alternatives to SR-91. Included among these are freeways: SR-60 in San Bernardino/ Riverside/Los Angeles Counties, I-405 in Los Angeles County, I-105 in Los Angeles County and SR-22 in central Orange County. Also included are several arterial highways. The main parallel arterial highways in Orange County are: Orangethorpe Ave, La Palma Ave, Lincoln Ave, Santa Ana Canyon Rd and Imperial Highway (SR-90). SR-241 (Gypsum Canyon Rd) in Orange/Riverside County Line and, SR-74, approximately 24 miles to the south also parallels SR-91 and provides a link between southwestern Riverside County and southern Orange County. Since the other freeways and the arterial highways are also congested during the AM and PM peak hours, they are not necessarily viable alternatives to SR-91 at those times.

In the Santa Ana Canyon area, between SR-55 and the Riverside County Line, the number of nearby parallel arterials is much more limited. La Palma Ave and Santa Ana Canyon Rd are the only arterial roads that parallel SR-91 in this area. They are well known to regular commuters as alternatives to SR-91 in this area. In particular during the PM peak period both of these roads are heavily used to bypass the congested eastbound side of the SR-91 freeway. However, the time savings of such a detour may be questionable because both roads end at Gypsum Canyon Rd and commuters are forced to re-enter the freeway. The queue on the eastbound on-ramp at Gypsum Canyon Rd regularly backs up onto Gypsum Canyon Rd, Santa Ana Canyon Rd and La Palma Ave, causing severe congestion on these roads in this area. Since this is a fairly remote and somewhat rural area of Orange County, the resulting gridlock does not have widespread impact on the transportation system other than SR-91, Gypsum Canyon Rd, Santa Ana Canyon Rd and La Palma Ave.

The heavy influx of traffic onto the freeway at Gypsum Canyon Rd also adversely impacts the operation of the SR-91 freeway. This condition is a good example of the latent demand to use the SR-91 freeway. These vehicles are typically not accounted for in freeway ground counts west of Gypsum Canyon Rd.

Land Use

Orange County encompasses 790 square miles and has a population of 2.6 million people. For transportation planning purposes, Orange County is considered to be a fully urbanized county. The county is a continuation of the greater Los Angeles metropolitan area with the Pacific Ocean to the west, the Cleveland National Forest to the east and Camp Pendelton Marine Corps Base to the south. The majority of the land in the county not within or adjacent to the boundaries of the national forest is developed. The primary land use is residential with pockets of retail commercial, light industrial and professional office space. Industrial and commercial uses usually border freeways and major arterials.

For the purposes of this report, the county is roughly divided into north and south by SR-55 from Newport Beach to Chapman Ave in Orange. The dividing line then turns east on Chapman Av to Santiago Cyn Rd east to Silverado Cyn Rd east to the Orange/Riverside County Line. North County lies west of SR-55 and north of Santiago Cyn Rd and Silverado Cyn Rd. In this older portion of the county, most of the street system is based on an arterial grid. South County lies South of Santiago Cyn Rd and Silverado Cyn Rd and east of SR-55. South county contains much more new development and the street pattern meanders with the contours of the land. See *Exhibit 1 -(North/South County Split)*, on page 10.

Based on the 1997 census, the population of Orange County is approximately 2.7 million. By the year 2020, the population is expected to grow to approximately 3.2 million (19% increase) with 50% of the increase in the North. Given these numbers, the county population distribution in 2020 is projected to be 57% in the North and 43% in the South. Although the majority of growth is expected to occur in the South, the North will continue to be the more populous area of the county. See *Table 1- Population Growth/Distribution-Year 2020* below.

Based on the 1997 estimates, the Orange County job base is approximately 1.3 million. By the year 2020, the job base is expected to grow to approximately 2.1 million (61% increase) with 50% of the increase in the North. Given these numbers, the county job base distribution in year 2020 is projected to be 55% in the North and 45% in the South. As with the population projections, the majority of growth is expected to occur in the South, yet the North will continue to have a higher concentration of jobs. See *Table – Population Growth/Distribution-Year 2020* below.

TABLE 1

Population Growth/Distribution – Year 2020

	Year 1997	% in North County	% in South County	Year 2020	% in North County	% in South County
Population	2.7 *	58%	42%	3.2 *	57%	43%
Employment	1.3 *	58%	42%	2.1 *	55%	45%

* in millions

The land uses along and around SR-91 reflect the diversity of the land uses of the entire county. Those land uses include residential (from low to high density), retail commercial, industrial, institutional and recreation/conservation open space. With just under half of the expected growth in population and employment in Orange County by 2020 occurring in the North it will be important, not only to the County but to the region, to maintain the highest possible level of service on SR-91.

SR-91 is somewhat unique in that many of the commuter trips on the facility are interregional and inter-county in nature. This route serves as a major commuter route from Riverside and San Bernardino Counties into Orange and Los Angeles Counties. Thus many of the trips on SR-91 in Orange County are considered "pass through" trips. In addition to this pass through trips, there are traffic generators and attractions in the vicinity of SR-91 in Orange County which should be noted. Following is a list of some of these generators and attractions.

- The Towne Center in Cerritos (in Los Angeles County, approximately 1 mile west of county line),
- Knotts Berry Farm (and several other tourist related attractions in the vicinity) in Buena Park,
- Buena Park Mall,
- Martin Luther Hospital in Anaheim,
- Anaheim Plaza,
- Metrocenter Fullerton, Orangefair Mall, and Fullerton Town Center (all located at the intersection of Harbor Blvd and Orangethorpe Ave, about ½ mile north of SR-91),
- Fullerton College and California State University Fullerton,
- Mall of Orange, The Block
- Santa Ana River and related open space, recreation and conservation areas,
- Canyon Plaza in Anaheim Hills, and
- several retail and industrial parks scattered along the route.

Military Operations

The impacts of closure of the El Toro Marine Corps Air Base and the Tustin Air Station on SR-91 is not known at this time.

Bus

The Orange County Transportation Authority (OCTA) is the primary bus transit provider in Orange County. While OCTA operates several bus lines on the arterial highways that parallel SR-91, they do not operate any bus routes on SR-91 at this time.

The only transit bus route that operates on SR-91 is the Inland Empire Connection (IEC). This route, operated jointly under contract by the Riverside Transit Agency (RTA) and OCTA, runs on SR-91 between downtown Riverside and Orange Mall. At this time, the Inland Empire Connection operates 7 trips each weekday and 8 trips on weekends.

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Orange County - North/South Split

Major Bus and Park and Ride Transportation Centers

The Park and Ride program is an integral element of long term operation strategies for the state highway system, not just in Orange County, but throughout the region. Caltrans and OCTA work in concert to develop Park and Ride solutions in Orange County to complement the freeway system, and more importantly, to complement the HOV lane network. HOV lanes are currently existing, programmed or planned for each existing freeway in Orange County.

Currently there are 5 Park and Ride lots in the vicinity of SR-91 in Orange County. See Table 2 – *Park and Ride Lots* below for more detailed information on those 5 lots. Three of the 5 lots are dedicated full time to transportation purposes. They are the Fullerton Park and Ride, Lincoln Ave Park and Ride and Brea Park and Ride. The other 2 Park and Ride lots in the vicinity of SR-91 are "shared use" lots. Shared use lots are located where churches, shopping centers or other businesses dedicate a portion of their existing parking lot to park and ride users. Often times the entity name will be placed on guide signs directing motorists to their parking lot.

TABLE 2

Park and Ride Facilties

NAME OF P&R FACILITIES	LOCATION	# OF SPACES
Camelot Golfland	3200 E. Carpenter Ave in Anaheim	50
State College Church of Christ	311 N State College in Anaheim	40
Lincoln Ave Park & Ride	SR-55 @ Lincoln Ave	74
Brea Park and Ride	SR-57 @ Lambert Ave	102
Fullerton Park and Ride	Orangethorpe Ave @ Magnolia Ave	800

As of 2/99

Since SR-91 is a major inter-county commuter route, it is important to mention the importance of other Park and Ride lots outside Orange County. Currently in Riverside County, there are 7 Park and Ride lots, and in San Bernardino County there is 1 Park and Ride lot in the vicinity of SR-91. There are several Park and Ride lots in Riverside and San Bernardino Counties which are not in the immediate vicinity of SR-91 but which may be contributing to the ridesharing effort on SR-91 into and through Orange and Los Angeles Counties.

Bicycle Facilities

Bicycles are not permitted on any freeway portion of SR-91 in Orange County. Bikes are permitted on all arterial roads in the vicinity of SR-91, and some arterial highways in the area have designated bike routes. Thus, there are several options for bicycle travel along the SR-91 corridor in Los Angeles/Orange Counties, up to Imperial Hwy (SR-90). In the vicinity of SR-55, SR-91 enters the Santa Ana Canyon, where options to bicyclists are much more limited. The primary bicycle alternatives to SR-91 between Imperial Hwy and Gypsum Canyon Rd are: the Santa Ana River Trail, La Palma Ave and Santa Ana Canyon Rd. The only bicycle alternative to SR-91 between Gypsum Canyon Rd and Green River Dr (in Riverside County) is a Class I Bikeway located within the State Highway right of way. See *CURRENT ISSUES - Class I Bikeway - Gypsum Canyon Rd to Green River Dr* on page 5 for a brief discussion of issues on this Class I bikeway. Also see *Appendix 3-Bikeway Classifications* on page 29, for bikeway classification information.

Rail

In October 1995, Metrolink, the regional commuter rail operator, began regular passenger rail service on track owned by the Burlington Northern Santa Fe (BNSF) railroad and the Southern California Regional Rail Authority (SCRRA) between downtown Riverside and Irvine. In March 1996, Metrolink extended the downtown Riverside terminus to San Bernardino. The portion of the route on the BNSF mainline parallels SR-91 through the Santa Ana Canyon into Fullerton. The SCRRA tracks parallel SR-55 and I-5 south from the Santa Fe mainline to the San Diego County Line. This new Metrolink line called the Inland Empire - Orange County Line, is being billed as the first suburb to suburb commuter line in the nation. It currently serves 9 stations (including the endpoints) along the line, with 2 more stations proposed. *See next page for Exhibit 2, Metrolink System Map*. Metrolink operates on weekdays only. Their morning schedules include two trains that run from San Bernardino to Irvine, one train from San Bernardino to San Juan Capistrano and one train from Riverside-Downtown to San Juan Capistrano. Their afternoon schedules include two trips from San Bernardino to Irvine and one trip from Riverside-Downtown to West Corona. The reverse train morning schedules include two trains from West Corona to Riverside-Downtown and one train from San Juan Capistrano to San Bernardino. Their afternoon schedules include four trips from Irvine to San Bernardino and one trip from San Juan Capistrano to San Bernardino.

Metrolink is also operating a downtown Riverside to downtown Los Angeles service via Fullerton. For this service, the trains operates on the BNSF mainline on which the Inland Empire - Orange County Line operates through Riverside County and Santa Ana Canyon. This service parallels SR-91 for approximately 5 more miles through Fullerton, before turning north and paralleling I-5 into Los Angeles. This service is an alternative to freeway travel on SR-91
and I-5.


METROLINK
COMMUTER TRAIN SYSTEM
VENTURA COUNTY
LOS ANGELES COUNTY
SAN BERNARDINO COUNTY
RIVERSIDE COUNTY
ORANGE COUNTY
SAN DIEGO COUNTY
PACIFIC OCEAN
Oxnard
Camarillo
Moorpark
Simi Valley
Newhall
Chatsworth
Northridge
Van Nuys
Burbank Airport
Burbank
Glendale
Sylmar/ San Fernando
Sun Valley
Santa Clarita
Princessa
Lancaster
Vincent Grade/ Acton
L.A. Union Station
Cal State L.A.
El Monte
Baldwin Park
Covina
Pomona
Claremont
Montclair
Upland
Rancho Cucamonga
Fontana
Rialto
San Bernardino
Industry
Downtown Pomona
E. Ontario
Pedley
Riverside-Downtown
Montebello/ Commerce
Commerce
Norwalk/ Santa Fe Springs
Fullerton
Anaheim Canyon
W. Corona
Riv.-La Sierra
Anaheim
Orange
Santa Ana
Tustin
Irvine
Laguna Niguel/ Mission Viejo
San Juan Capistrano
San Clemente
Oceanside
LEGEND
Effective June 1999
This map is not to scale
Future Station
Ventura County Line
Antelope Valley Line
San Bernardino Line
Riverside Line
Orange County Line
Inland Empire-Orange County Line
Via Fullerton
Operated by MTA
Metro Red Line (Subway)
Metro Blue Line (Light Rail)
Metro Green Line (Light Rail)
Southern California Regional Rail Authority

EXHIBIT 2

TRAFFIC ANALYSIS

Introduction

SR-91 extends from the Pacific Ocean in Los Angeles County to downtown Riverside in Riverside County. It is a major link between Riverside/San Bernardino Counties and Los Angeles/Orange Counties which provides intra-regional, interregional and interstate access to the Southern California Region. During the week, this route is a heavily used commuter route between the abundant affordable housing of the Inland Empire (Riverside and San Bernardino Counties) and the more numerous jobs of Los Angeles and Orange Counties. On weekends, the route serves recreation trips between Los Angeles and Orange Counties, and the desert and mountain recreation areas to the east. Therefore, this route normally experiences heavy congestion 7 days per week. Even with the recent opening of the toll lanes (91 Express Lanes) between SR-55 and the Riverside County Line, this segment still experiences heavy congestion, although reduced from pre-toll lane times.

Average Daily Traffic

The ADT Summary Table for SR-91 is listed on page 26 as Table 7. There are four time frames given for this information: Existing, Year 2020 Null, Year 2020 Concept and Year 2020 TOPS. The existing data was collected from the *1997 Traffic Volumes On California State Highways* book and from the Los Angeles Regional Transportation Study (LARTS) base year forecast. Other sources of information used for existing volumes may include: count stations and other information taken from previously completed environmental documents and project related studies.

The future traffic data presented in this document is a product of the Los Angeles Regional Transportation Study (LARTS) transportation model. The peak hour traffic volume, peak hour direction volumes, and LOS are all products of the LARTS transportation mode.

Transportation Modeling Description and Socioeconomic Summary

The LARTS model simulates the interaction between socioeconomic factors and the transportation system. The LARTS model is a socioeconomic driven transportation model. Among existing and projected socioeconomic variables used in the development of the LARTS model include population, employment, income, highway transportation system, and transit service (includes rail service).

Table 3 on the next page shows numbers for population, housing and employment for Orange County and the SCAG Region.

Table 3
Year 2020 Socioeconomic Data Summary

Socioeconomic Data	Year 2020 – Orange County*	Year 2020 – Region**
Population	3,206,020	20,632,271
Housing	1,094,024	7,151,115
Employment	2,101,316	10,028,476

* Source: Orange County Transportation Authority
** Source: Southern California Association of Governments (except Orange County)
** Source: Los Angeles, Orange, Ventura, and Metropolitan portions of Riverside, and San Bernardino counties

The Southern California Association of Governments (SCAG), in cooperation with state and local county governments (Los Angeles, Orange, Riverside, San Bernardino, Ventura, and Imperial) prepared the socioeconomic forecast for the year 2020. In April 1998 SCAG completed the Regional Transportation Plan (RTP) - CommunityLink 21, the long range transportation plan for the SCAG Region. The inputs used in the traffic forecast for this RCR are consistent with SCAG's 1998 RTP.

Goods Movement

According to the publication *1997 Annual Average Daily Truck Traffic on the California State Highway System*, daily truck volumes on SR-91 in Orange County range from approximately 12,000 to 20,000. These numbers as a percentage of ADT range between 4.5% and 9.2%. The low numbers occurs in the vicinity of SR-55 and the high numbers in the vicinity of State College Blvd. See *Exhibit 3, Truck Percentage of AADT Map* on page 17 for a comparison of this route to other routes in the region.

It is important to mention the location of Truck Weigh Stations on SR-91 at Weir Canyon Rd; one in each direction. In the development stages of the Eastern Transportation Corridor (ETC/SR-241) a concern was brought forward regarding the location of these Weigh Stations and the possible use of the ETC as a means of bypassing the Weigh Stations. With the opening of the SR 241 in October 17, 1998, preliminary observation indicated a much greater than expected number of trucks using the facility. It may be necessary to determine if corrective action is necessary, such as constructing a new weigh station on SR-241 or possibly a strategically placed weigh-in-motion technology.

The SR-55/SR-91 Interchange is somewhat unique in that SR-55 ends at this interchange and the 3 northbound lanes of SR-55 join the 3 eastbound lanes of SR-91 in a confluence configuration rather than via ramps or collector/distributor roads. The eastbound segment of SR-91 between the SR-55/SR-91 interchange and Lakeview Ave is made up of 6 lanes plus the toll lanes. With this lane configuration, trucks traveling eastbound on SR-91 through the interchange end up in

the second and third lanes (of 6) from the left. Since these lanes are not the proper travel lanes for heavy duty trucks, the trucks must begin merging right. When they begin this merge movement, they are effectively moving into the leftmost (and fastest moving) lane of SR-55. This merge movement creates capacity constraints and associated congestion, especially in the PM peak period.

Further exacerbating this condition is the close proximity of the Lakeview Ave off-ramp from the eastbound side of SR-91, approximately one half mile beyond the merge point of eastbound SR-91 and northbound SR-55 traffic. All vehicles traveling eastbound through the SR-55/SR-91 interchange exiting at Lakeview Ave must merge across the 3 lanes coming from northbound SR-55 in less than one half mile in order to make the exit. This movement also creates capacity constraints and associated congestion, especially in the PM peak period. One possible solution to this situation would be a Truck by-pass Lane which would exit eastbound SR-91 west of the merge point with SR-55, cross over the lanes coming from SR-55 and merge into the right lanes east of the merge point. This Truck by-pass would also be open to other traffic traveling eastbound through the SR-55/SR-91 interchange wishing to exit at Lakeview Ave.

Traffic Systems Management

Traffic Systems Management is a strategy for improving mobility on the transportation system without adding capacity. The theory is to implement operational improvements and disseminate motorist information to achieve the maximum operating efficiency of the transportation system. In particular, Caltrans' goal is to develop all freeways in Orange County to full Urban Freeway Standards. Integral to this development is the Traffic Operation Systems (TOS) Plan and the system elements outlined in it. See *Appendix 5 - Urban Freeway Standards* on pages 32 & 33 for an introduction to the TOS Plan and its system elements.

Though there are TOS elements currently in place on SR-91 such as ramp metering, changeable message signs and closed circuit television cameras, many will be removed and replaced during the upcoming construction of HOV lanes between the L.A. County line and SR-57. In addition to the replacement of these system elements, additional system elements will be added to enhance existing freeway surveillance coverage. One of these new elements is a portion (I-5 to SR-55) of the systemwide fiber optic communication system, to tie in all of the Traffic Management Center. More elements are planned and will be accounted for in the installation of conduit and fiber optic cable, however not all of the planned elements are funded. Wherever possible these items should be included as part of larger projects to save time and money on project development and construction.

As part of the construction of the 91 Express Lanes, the CPTC installed 36 closed circuit television (CCTV) cameras for operational surveillance and 2 changeable message signs (CMS) for motorist information on SR-91 and SR-55. Caltrans has access and directional control of all CCTV cameras.

Exhibit 3
Truck Percentage of AADT Map

Accident Rates

The accident rate information shown below is taken from Table B of the Traffic Accident Surveillance and Analysis System (TASAS). It should be used for general planning purposes and as an indicator of how the accident rate of a particular segment of a route compares to the accident rate averages on similar routes statewide. Higher than average rates described in this report are alone not an indicator that there is a significant problem since accident rates can be greatly influenced by the length of the segment as well as the time period being measured.

The Accident Surveillance Procedures Manual developed by Division of Traffic is used to ensure Caltrans has statewide consistency in identifying safety problem locations for developing recommended solutions. One tool used in this process is the TASAS Table C Report that lists high accident concentration locations and uses an automated system for flagging locations requiring investigation.

Highway safety on state highway is Caltrans number one priority. Identification of safety problem areas is a continuous process. After a safety project is identified, it is prioritized and programmed as soon as possible in either the State Highway Operation and Protection Program (SHOPP), or through the District's Yearly Minor Program. For more detailed information please refer to the Accident Surveillance Procedures Manual.

Between July 1, 1995 and June 30, 1998, all 5 segments showed Actual Total Accident Rate exceeds the Average Total Accident Rate.

Table 4
Accident Rates from TASAS
(Table B)

SR-91

7/1/95 through 6/30/98			ACTUAL			AVERAGE		
			FATAL	FATAL + INJURY	TOTAL	FATAL	FATAL + INJURY	TOTAL
1	R0.00/R3.64	L.A. Co. Line to I-5	.007	0.33	1.38	.005	0.31	0.92
2	R3.64/6.12	I-5 to SR-57	.005	0.40	1.79	.009	0.46	1.31
3	6.12/R9.19	SR-57 to SR-55	.003	0.27	1.03	.005	0.30	0.88
4	R9.19/R16.40	SR-55 to SR-241	.003	0.24	0.87	.003	0.19	0.61
5	R16.40/R18.90	SR-241 to Riverside Co. Line	.002	0.18	0.61	.003	0.18	0.55

PROGRAMMED PROJECTS

Table 5 below list major projects that were programmed for construction beginning in State Fiscal Year 1996/97 or later. Projects are programmed in either of the two programming documents: State Transportation Improvement Program (STIP) and the State Highway Operation and Protection Program (SHOPP). Projects may be funded partially or totally by local funding sources.

TABLE 5
Programmed Projects

PPNO	RTE	PM	DESCRIPTION	EST $	COMPLETION DATE *
4507	91	0.0/2.9	Widen fwy, add HOV lanes	$15.7M	1/00
4510A	91	1.0/2.8	Add HOV lanes	$19.1M	1/00
4510B	91	2.8/5.1	Add HOV lanes	$40.2M	5/00
4557	91	5.1/6.7	Reconstruct interchange (SR-57/SR-91)	$68.1M	1/00
2854	5	41.5/43.5	Widen fwy (I-5/SR-91)(I-5 Seg E-1)	$67.4M	12/99
2854A	5	41.5/43.5	Widen fwy, reconstruct IC (I-5/SR-91) (Seg E-2)	$96.5M	12/00

*target date of completion

Legend:

PPNO = Planning and Program Number
PM = Postmile

ROUTE CONCEPT

Introduction

Although the concept will provide additional capacity in some segments, those segments and others may continue to operate at LOS F0 or below. According to the California Motor Vehicle Stock, Travel and Fuel Forecast (November 1995) the expected growth in vehicle kilometers traveled (VKT) is approximately 51% statewide, between 1995 and 2015. The expected growth for Los Angeles, San Bernardino, Riverside, San Diego and Orange Counties combined is also 51%. However, the expected growth for San Bernardino County is 104% and Riverside County 85%, both well over the statewide and regional averages. If the growth in VKT in Riverside and San Bernardino Counties continues to impact the major regional east/west routes such as SR-91, SR-60 and I-10, it will be difficult, if not impossible, to completely relieve congestion on these roads. Some degree of LOS F (congestion) will continue to exist.

Given projected increases in traffic demand and limited funding, multimodal solutions to the congestion problem should continue to be implemented and expanded. Remote telecommuting centers have been set up in Riverside and San Bernardino Counties by employers in the Los Angeles/Orange County area. Expansion will depend on employer/employee satisfaction and program funding. Metrolink initiated commuter rail service in the SR-91 corridor in 1995. Expanded service will depend on ridership and funding. Express bus transit service is currently in operation on SR-91 between downtown Riverside and Orange Mall in city of Orange; expanded service will depend on ridership and funding. The 91 Express Lanes opened in late 1995. There appears to be a noticeable benefit in the implementation of all these strategies. No one solution exists for the transportation challenges facing the SR-91 corridor.

As traffic in the corridor continues to increase, along with an increased number of express buses, there may be a need to add HOV drop ramps at selected local interchanges and HOV direct connectors at freeway to freeway interchanges. One local interchange that has been mentioned as a possible drop ramp location is Fairmont Blvd in the City of Anaheim, just east of Imperial Hwy (SR-90). Presently Fairmont Blvd. does not cross SR-91 and there is no interchange. This undertaking would require connecting Fairmont Blvd. on the south side of SR-91 with Fairmont Blvd. on the north side of the freeway. Additionally, when HOV lanes are built on SR-241, direct connectors are planned at the SR-91/SR-241 Interchange, between SR-241 and the 91 Express Lanes. These proposals may also address the issue of intermediate access to the 91 Express Lanes.

In addition to the HOV direct connectors for the I-5/SR-91 interchange and the SR-57/SR-91 interchange, direct connectors were built from the HOV lanes on SR-55 to the 91 Express Lanes on SR-91.

The full implementation of Traffic Operation System elements (CCTV, ramp metering, CMS, etc., with tie-in to TMC) is strongly recommended as a means of managing the state highway motoring public. These elements should be included in larger construction projects wherever

possible. See *Appendix 4 and Appendix 5* on pages 30-33 for more detail on *New Technology* and *Urban Freeway Standards* respectively.

Sensitive resources along this route will require early coordination with resource agencies. These are the State Department of Fish and Game, the U.S. Fish and &Wildlife Service, the Regional Water Quality Control Board and the Army Corps of Engineers whenever any projects are proposed along SR-91 that would impact wetlands, endangered species or any other sensitive natural resources.

Regional Consistency

The route concept called for in this report may be consistent with the 1998 Regional Transportation Plan (RTP) - CommunityLink 21. The RTP is the long range regional transportation plan for the six county Southern California Region. By law, all projects programmed in the Regional Transportation Improvement Program (RTIP) must be contained in the regional transportation plan and have a funding source identified. Most of the major projects already programmed or planned for this route will meet this route concept. All projects currently programmed in the RTIP for SR-91 are contained in the RTP, therefore, this concept is consistent with regional planning efforts.

Caltrans and OCTA are in full agreement on the following concept outlined for SR-91. Wherever a project does not meet the route concept, Caltrans will work with OCTA on a structured approach to planning and programming projects that will eventually meet the route concept.

This route concept is fully compatible with the route concept for this route in District 7 (Los Angeles County.) This route concept will extend the existing HOV lane in Los Angeles County into Orange County. The number of mixed flow traffic lanes also matches what is called for in the District 7 RCR.

The route concept in District 8 (Riverside County) calls for a 10 lane facility made up of 8 mixed flow lanes and 2 HOV lanes. The route concept in District 12 calls for a 12 lane facility, 8 mixed flow lanes and 4 toll lanes. The facility as it now exists at the Orange/Riverside County Line is already built to the route concept for each District. The lane difference is a problem primarily in the eastbound direction in the PM peak period. This condition is further exacerbated by the opening of the Eastern Transportation Corridor *(see CURRENT ISSUES - Eastern transportation Corridor* on pages 3 & 4.) The addition of another HOV lane (making 2 HOV lanes) in the eastbound direction up to SR-71 (approximately 2 miles) has helped to smooth the transition from 12 lanes to 10 lanes. The optimum solution to this problem would be to have District 8 match the District 12 cross section of 12 lanes on SR-91 from the Orange/Riverside County Line to I-15 in the City of Corona. Current information indicates there are no plans to do this in the foreseeable future.

Segment 1 (PM 0.00/R3.64)

Los Angeles County Line to I-5	**Lanes**	**LOS**
Existing Facility:	8 lanes	F1
Concept Facility:	8 lanes + 2 HOV	F0

This segment operates as 8 through lanes. Currently, two HOV lanes (one in each direction) are being constructed with a completion date of 1/00. Although the projected LOS remains in the F range, it has been determined that given the scope of programmed projects and the increase in future demand, this F condition has been minimized.

A key component of improvement in this segment of SR-91 is the reconstruction of the I-5/SR-91 interchange. The reconstructed interchange will include new mixed flow freeway to freeway ramps as well as HOV direct connectors. This project is being undertaken as part of the I-5 widening between SR-22 and SR-91. The target date for completion is 12/99.

Segment 2 (PM R3.64/6.12)

I-5 to SR-57	**Lanes**	**LOS**
Existing Facility:	6 lanes	F3
Concept Facility:	8 lanes + 2 HOV	F1

This segment currently operates as 6 through lanes. The concept calls for the addition of 2 mixed flow and 2 HOV lanes (1 of each in each direction). A series of three projects are currently under construction which will add 2 HOV lanes and extend an existing eastbound auxiliary lane, making it a through lane. This segment will then be made up of 7 lanes + 2 HOV lanes. The target dates for completion is 5/00 and 1/00 respectively. The ultimate concept still calls for the addition of another mixed flow lane westbound, making this segment 8 lanes + 2 HOV lanes. Although the projected LOS remains in the F range, it has been determined that given the scope of programmed projects and the increase in future demand, this F condition has been minimized.

Two key components to the programmed improvements in this segment of SR-91 are the reconstruction of the I-5/SR-91 interchange (mentioned in segment 1 above) and, the addition of HOV direct connectors at the SR-57/SR-91 interchange with a target completion date of 1/00

Segment 3 (PM 6.12/R9.19)

SR-57 to SR-55	**Lanes**	**LOS**
Existing Facility:	6 lanes + 2 HOV	F0
Concept Facility:	8 lanes + 2 HOV	F1

This segment currently operates as 6 through lanes + 2 HOV lanes. The concept calls for the addition of 2 mixed flow lanes (1 in each direction). A recently completed project in this segment added 2 HOV lanes. The ultimate concept still calls for the addition of 2 mixed flow lanes, making this segment 8 lanes + 2 HOV lanes. Although the projected LOS remains in the F

range, it has been determined that given the scope of programmed projects and the increase in future demand, this F condition has been minimized.

A key component to the programmed improvements in this segment of SR-91 is the addition of HOV direct connectors at the SR-57/SR-91 interchange (mentioned in Segment 2 above).

Segment 4 (PM R9.19/R16.40)

SR-55 to SR-241	**Lanes**	**LOS**
Existing Facility:	8 lanes + 4 toll lanes	F2
Concept Facility:	8 lanes + 4 toll lanes	F3

This segment currently operates as eight through lanes + 4 toll lanes. No additional capacity enhancements are proposed for this segment. The toll lanes known as the 91 Express Lanes opened in late 1995 and are operated by the California Private Transportation Company (CPTC), see *CURRENT ISSUES - 91 Express Lanes* on page 3. Although the projected LOS remains in the F range, it has been determined that given the scope of programmed projects (Eastern Transportation Corridor) and the increase in future demand, this F condition has been minimized.

One local interchange that has been mentioned as a possible drop ramp location is Fairmont Blvd in the City of Anaheim, just east of Imperial Hwy (SR-90). Presently Fairmont Blvd does not cross SR-91 and there is no interchange. This undertaking would require connecting Fairmont Blvd on the south side of SR-91 with Fairmont Blvd on the north side of the freeway. This proposal may address the issue of intermediate access to the 91 Express Lanes.

Segment 5 (PM R16.40/R18.91)

SR-241 to Riverside County Line	**Lanes**	**LOS**
Existing Facility:	8 lanes + 4 toll lanes	F3
Concept Facility:	8 lanes + 4 toll lanes + aux ln	F3

This segment currently operates as eight through lanes + 4 toll lanes. See above segment for more information on the 91 Express Lanes. This segment will be subject to more severe congestion and higher accident rates than the preceding segment because of the SR-91/SR-241 Interchange and the widening of SR-71. See *CURRENT ISSUES - Eastern Transportation Corridor (ETC* on pages 3 & 4*)*. Although the projected LOS remains in the F range, it has been determined that given the scope of programmed projects and the increase in future demand, this F condition has been minimized.

Although no additional capacity enhancements are proposed for this segment, there is an operational project programmed whose key components are the elimination of the lane drop in the westbound direction near SR-241.

APPENDICES

APPENDIX 1

Graphic Representation and Definition of Levels of Service

APPENDIX 2

Segment Summary Pages

APPENDIX 3

Bikeway Classifications

Class I Bikeway (Bike Path):	Provides a completely separated right of way for the exclusive use of bicycles and pedestrians with crossflow minimized.
Class II Bikeway (Bike Lane):	Provides a restricted right-of-way (striped lane) for the exclusive or semi-exclusive use of bicycles with through travel by motorized vehicles or pedestrians prohibited but with cross flows by pedestrians and motorists permitted.
Class III Bikeway (Bike Route):	Provides for shared use with pedestrian or motor vehicle traffic.

APPENDIX 4

New Technology

Intelligent Transportation Systems (ITS)
There are currently two pilot projects on-going in Orange County which may be considered as Intelligent Transportation System (ITS) projects. The first of these is the Mobile Video Surveillance and Communications Project. This project locates portable trailers at critical locations along the highway to monitor flow conditions on the mainline and interactively regulate on-ramp traffic flow. The second ITS project is the Integrated Freeway Ramp Meter/Arterial Adaptive Signal Control Project. This project will allow for the joint monitoring of the I-5 and I-405 interchange area and Alton Parkway by the District and the City of Irvine. The intent of both of these projects is to apply several new technologies in an effort to optimize traffic flow.

Intelligent Vehicle Highway Systems (IVHS)
These systems utilize what is also commonly referred to as smart systems. There are three basic components necessary to implement a fully functional IVHS. These three are discussed below.

- **Advanced Traveler Information Systems (ATIS)**
  This type of system would provide the motorist with real-time traffic routing information. This information could be provided to the motorist using virtually any medium including television, radio, telephone and personal computer. Information could be routed to offices, homes or even directly to an in-vehicle device.

- **Advanced Traffic Management Systems (ATMS)**
  These systems include the potential use of AVI (Automatic Vehicle Identification) systems and ATIS for electronic detection and interface with real-time TOS information. Other areas of research include bottleneck evaluations and the policies and procedures to be required for automated highway operation.

- **Automated Vehicle Control Systems (AVCS)**
  The greatest potential for improving highway safety within the IVHS technologies is the AVCS. These systems can electronically enhance or automate driving functions. There are two basic types of driving control offered for use of this new technology. First is the lateral control system which controls vehicle steering, and the second is the longitudinal system which automates vehicle spacing, or the distance between vehicles. PATH (see below) is currently researching both types of driving control systems. It is anticipated that these systems are more long term innovations but do have a high potential for feasible implementation.

Showcase for IVHS - The Priority Corridor

The Priority Corridor proposal is an endeavor to demonstrate the actual full potential of the transportation network with all possible new technologies in place and integrated. This comprehensive and coordinated approach should reveal new capabilities of the transportation system. It is meant to serve as a living laboratory for new developments in transportation.

The Priority Corridor is geographically described as: bounded on the north by SR-126 and I-210; on the east by SR-71, I-15 and I-215; on the south by the U.S. border with Mexico, the Otay Mesa Border crossing and SR-905; and on the west by the Pacific Ocean. This corridor includes a myriad of intermodal systems for moving people and goods. It is also an air quality non-attainment area and experiences severe congestion. The corridor is host to over half the population and jobs in California. It is being viewed as a Showcase for IVHS. This plan proposes to take full advantage of four Transportation Management Centers (TMC's), IVHS and Intermodal Transportation Management and Information System (ITMIS).

Consequently, the numerous and diverse difficulties experienced within the corridor area render it an ideal proving ground for new technology. These factors also provide an excellent opportunity to evaluate intermodal technologies, traffic management techniques, traveler information systems, passenger and fleet management systems, as well as freight vehicle control systems. Deployment and implementation of these different technologies will attempt to optimize and coordinate freeway and street operations with public and private transportation systems within the corridor. A cooperative effort among Caltrans, CHP, regional, county and city governments and the MPOs is essential to the success of Priority Corridor operations.

New Technology Research and Development

The Program on Advanced Technology for the Highway (PATH) has been established in cooperation with Caltrans and the California Institute of Transportation Studies. PATH researches new technologies such as warning and avoidance systems and electronic braking. PATH also analyzes ATIS, IVHS and ATMS developments for costs and feasibility.

The District is committed to working with cities, the county, regional agencies, other state agencies, and academic institutions on the research, development and implementation of new technology in the development of the transportation system. The implementation of new technology is necessary to obtain optimum efficiency of the system.

APPENDIX 5

Urban Freeway Standards

In April 1992 the Transportation Planning Branch completed a Traffic Operation Systems (TOS) Plan for District 12. The TOS Plan outlined the traffic system management elements required for efficient operation of the state highway system. Following is an excerpt from that report.

> "The goal of the Plan is to develop ultimate urban and regional freeways and highways, defined as transportation corridors, which have all system elements satisfied and will provide the following benefits:
>
> - Operate facilities at maximum efficiency
> - Minimize and manage travel delay and congestion
> - Disseminate motorist information using advanced technologies.
>
> The typical urban freeway operations plan includes:
>
> - Electronic Loop Detectors
> - Closed Circuit Television (CCTV)
> - Changeable Message Signs (CMS)
> - Highway Advisory Radio (HAR)
> - Freeway Ramp Meters
> - Communications System
> - Traffic Management Center (TMC)
> - Major Incident Response Teams
> - Motorist Call Boxes
> - Freeway Service Patrols (FSP)
> - Airborne Surveillance
> - Smart Corridor Interface with Local Agencies
> - High Occupancy Vehicle (HOV) Facilities.
>
> Methods to achieve maximum efficiency on transportation facilities include: ramp metering, freeway incident detection and confirmation (CCTV surveillance, etc.), freeway incident response teams, and FSP. Methods to disseminate motorist information include provision of real-time information on traffic conditions to allow motorists to make informed route decisions by using CMS, HAR, In-Vehicle Navigation Systems and teletext services (Commuter TV). Management of data includes monitoring technologies such as loop detectors and CCTV."

The TOS Plan was updated by Traffic Operations in January 1994. This iteration of the TOS Plan refined definitions and uses of the various technologies outlined in the original report.

More importantly the updated version looked closer at actual implementation plans and schedules. Several TOS elements were identified as individual projects with identified funding and implementation schedules. Because of potential cost savings, several other projects were proposed to be included as an element of larger projects (widening/reconstruction, adding HOV lanes, etc.); however, in many of these cases no funding was identified. Finally, several new projects were identified which neither had funding nor implementation schedules.

Full implementation of the TOS Plan elements is an integral part of this and all other freeway route concepts in Orange County. It is the goal of Caltrans District 12 to bring each freeway route in Orange County up to urban freeway standards. It may be most cost effective to implement these items as part of larger projects in order to save on project development and engineering costs.

New Technology

There are several elements of the existing and future transportation system which are referred to as "new technology". It would also be appropriate to consider most of these elements as Traffic System Management (TSM) elements. Most of the above-mentioned TOS elements take full advantage of new technology and these categories have a good deal of crossover application between them. In addition to the TOS elements mentioned above in the URBAN FREEWAY STANDARDS section, other New Technology programs are currently being implemented in Orange County, both on and off the State Highway System. See *Appendix 4 - New Technology* on page 30 for a brief outline of new technology programs and some implementation efforts currently underway in Orange County.

APPENDIX 6

References

Annual Average Daily Truck Traffic on the California State Highway System (1997)

ARDFA, Cal Poly, San Luis Obispo (SR-91 cover photo)

California State Highway Log - District 7, District 8 and District 12 (1994)

Caltrans 1997 Traffic Volumes on California State Highways

ND/FONSI - I-5/SR-91 Interchange Improvements (2/93)

OCEMA Existing Bikeways Map (1992)

OCEMA Traffic Flow Map Showing ADTs (1997)
FastForward OCTA (7/1998)

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Orange County Master Plan of Arterial Highways

Project Management Control System (PMCS) Milestone Report - 4/96, 10/96 and 2/99

SCAG Regional Transportation Plan - CommunityLink 21 (1998)

SR-91 RCR Prepared by Caltrans District 7 (1986 and 1991)

SR-91 RCR Prepared by Caltrans District 8 (1989)

SR-91 RCR Prepared by Caltrans District 12 (1997)

Traffic Accident Surveillance and Analysis System (TASAS)

Traffic Operational Strategies (TOPS) – Caltrans Southern District (8/98)

Traffic Operation Systems Plan (4/92 and 1/94)

Transportation System Development Plan - District 12 (7/95)

Traffic Volumes on California State Highways (1997)

ACRONYM GLOSSARY

ADT - Average Daily Traffic
ATIS - Advanced Traveler Information Systems

ATMS - Advanced Traffic Management Systems
AVCS -Automated Vehicle Control Systems
AVI – Automatic Vehicle Identification

BNSF- Burlington Northern Santa Fe Railroad

CBD - Central Business District
CCTV - Closed Circuit Television
CHP - California Highway Patrol
CMS - Changeable Message Sign

DOD - Department of Defense
DSMP - District System Management Plan

EB - Eastbound
EIR - Environmental Impact Report
ETC - Eastern Transportation Corridor

FAA - Federal Aviation Administration
FCR - Flexible Congestion Relief
FSP - Freeway Service Patrol
FTC - Foothill Transportation Corridor

HAR -Highway Advisory Radio
HOT - High Occupancy Toll
HOV - High Occupancy Vehicle

ITS - Intelligent Transportation Systems
ITMIS - Intermodal Transportation Management and Information System.
ITMS - Intermodal Transportation Management System
IVHS - Intelligent Vehicle Highway Systems

LARTS - Los Angeles Regional Transportation Study
LOS - Level Of Service
LOSSAN - Los Angeles/San Diego

MPAH - Master Plan of Arterial Highways
MPO - Metropolitan Planning Organization

NB - Northbound
NHS - National Highway System

OCEMA - Orange County Environmental Management Agency
OCTA - Orange County Transportation Authority

OHC - Other Highway Construction

PATH – Partners for Advanced Transit and Highways
PM - Post Mile
PPNO - Planning and Program Number
PSR - Project Study Report

RAS - Rehabilitate and Safety
RCR - Route Concept Report
RME - Regional Mobility Element
RTIP - Regional Transportation Improvement Plan
RTP - Regional Transportation Plan

SANDAG - San Diego Association of Governments
SB - Southbound
SCAG - Southern California Association of Governments
SCRRA - Southern California Regional Rail Authority
SHELL - Subsystem of Highways for the movement of Extra Legal Loads
SHOPP - State Highway Operation and Protection Program
SJHTC - San Joaquin Hills Transportation Corridor
SR - State Route
STAA - Surface Transportation Assistance Act
STIP - State Transportation Improvement Program
STRAHNET – STRategic Highway NETwork

TASAS - Traffic Accident Surveillance and Analysis System
TMC - Transportation Management Center
TOPS – Traffic Operations Strategies
TOS - Traffic Operation System
TSM - Traffic Systems Management
TSM - Transportation System Management

UCI - University of California Irvine

WB – Westbound