ROUTE CONCEPT REPORT

STATE ROUTE 57
ORANGE FREEWAY
12-ORA PM 0.00/R22.55

NOVEMBER 1999

Caltrans

ROUTE CONCEPT REPORT

STATE ROUTE 57 FREEWAY

12-ORA-057-0.00/R22.55

PREPARED BY DISTRICT 12 DIVISION OF PLANNING

November 1999

CALTRANS DISTRICT 12 APPROVAL

Recommended for
Approval by:

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DALE RATZLAFF
District Division Chief
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Prepared by District 12 Division of Planning

DRAFT June 2001

CALTRANS DISTRICT 12 APPROVAL

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ROUTE CONCEPT REPORT

STATE ROUTE 57 FREEWAY
ORANGE FREEWAY
12-ORA-057-0.00/R22.55

SUMMARY

STATE ROUTE 57

State Route 57 (SR-57), also known as the Orange Freeway, is a main north/south arterial connecting eastern Los Angeles County and the Inland Empire Counties to north and central Orange County. In addition to the daily commuters, SR-57 is also utilized by recreational users traveling to sporting and entertainment events . From I-5/SR-22/SR-57 interchange, the average daily traffic (ADT) on this route varies from 174,000 to 234,000. Approximately 11 miles between SR-1 and I-5/SR-22 has not been adopted. The existing facility is an 8 lane freeway, with HOV lanes for most of its length. The HOV lanes were opened in June of 1992. During both peak periods, the general purpose lanes experience congestion and the carpool lanes operate at near capacity.

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. All existing construction projects are assumed completed for the concept alternate. The concept recommendation for this route is to add HOV lanes north from Lambert Road to SR-60 in Los Angeles County. The Concept for this route will be met when ongoing and planned construction projects are completed.

For planning purposes, the route has been divided into ten segments shown below and on the *Strip Map.*

Recommended changes from existing are shown in ***bold italics***.

CONCEPT SUMMARY TABLE

Seg	Post Mile	Limits	Existing	2015 Concept # Lanes/LOS Peak hour
1	0.00/6.51	SR-1 to I-405	0 lane	delete from system
2	6.51/L11.30	I-405 to I-5/SR-22	0 lane	PSR for freeway extension (4 lanes)
3	L11.30/15.57	I-5/SR-22 to SR-91	8+2 lanes	8 + 2 HOV lanes + Aux* LOS F2
4	15.57/19.85	SR-91 to SR-90	8+2 lanes	8 + 2 HOV lanes + Aux* LOS F2
5	19.85/R22.55	SR-90 to LA County Line	8 lanes	***8 + 2 HOV lanes + Aux**** ***LOS F2***

* Auxiliary lanes where feasible

The existing operation is consistent with the Route Concept Report prepared by District 7 dated May 1986. The current concept calls for an 8 lane facility with HOV. The current concept also recommends a feasibility study of extending the freeway south (Segment 2) to I-405, and deleting Segment 1 (SR-1 to I-405).

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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 uses 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). It broadly identifies the nature and extent of improvements needed to reach those goals. RCR's are used in the development of the District System Management Plan and other state and local planning and project development documents. For purposes of this report, projects under construction are included as completed.

The LOS for this concept report is based on the ratio of forecast volume over capacity for each segment of the roadway. The LOS shown is for the peak hour/peak direction.
See Appendix 1, Graphic Representation and Definition of Level Of Service.

In developing this RCR, the System Planning Branch considered using the metric system for designating segment limits and other significant points. It was decided that it would be inappropriate for System Planning to perform even “soft conversions” at this point in the planning process. System Planning will begin using the metric system in the 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 for this route.

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 Maintenance, Project Development, Programming Traffic, and Travel Forecasting Unit, and, and external documents from the 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 57 (SR-57), also known as the Orange Freeway, is 30.96 miles long. The first 11.30 miles between SR-1 and I-5/SR-22 has not been adopted and thus have not been constructed. The constructed portion of SR-57 is 18.97 miles long and is located within two districts and counties; 11.25 miles in District 12, Orange County and 7.72 miles in District 7, Los Angeles County. SR-57 in Orange County lies within an urbanized setting and traverses through five cities (Orange, Anaheim, Placentia, Fullerton and Brea) and unincorporated portions of Orange County. Existing SR-57 starts at the Interchange of I-5 and SR-22. Traveling northbound, it intersects with SR-91 (PM 15.60 and, SR-90 (PM 19.86). This route serves major employment centers in the five cities. Other major traffic generators include:

- Main Place Shopping Center
- The City Shopping Center
- Disneyland
- Anaheim Convention Center
- Anaheim Stadium
- The Pond Arena
- California State University, Fullerton
- Fullerton College
- Western State University of Law
- Southern California College of Optometry
- Pacific Christian College
- Brea Mall

HISTORY

SR-57 was constructed over a number of years. The first segment opened in June of 1969 (SR-91 to Nutwood Avenue). In June of 1970, the segment from Nutwood Avenue to Imperial Highway (SR-90) opened. The next segment that opened was from Imperial Highway (SR-90) to the Los Angeles County line in March of 1972. The segment from SR-91 to Katella Ave opened in November of 1974 and the last segment of SR-57 to be opened is from Katella Ave to I-5/SR-22 in March of 1976.

HOV lanes were completed on SR-57 in June of 1992. The HOV lanes extend from I-5/SR-22 to Lambert Road. The extension of the HOV lane from Lambert Road to SR-60 is currently under construction and will be completed by mid 1997.

The latest constructed project on SR-57 to be opened is the I-5/SR-57 direct HOV connector. The HOV direct connector opened in May of 1996. This facility provides direct HOV/Bus access between the two freeways. The main impact of this facility will be a drastic reduction of weaving movement by carpoolers and buses traveling between these two routes.

This direct HOV connector is part of a transitway system that will provide carpoolers traveling between north and south Orange County an exclusive HOV facility, thus reducing weaving movements and impacts to mixed flow lanes. In addition, there will be another direct HOV connector at SR-91 and SR-57. This connector will allow movement from westbound SR-91 to

northbound SR-57 and the return move from southbound SR-57 to eastbound SR-91. The SR-91/SR-57 direct connector is anticipated to be under construction by mid 1997.

CURRENT ISSUES/PROBLEM IDENTIFICATION

Anaheim Sports Complex
The city of Anaheim is proposing to build a sport center around the existing Anaheim Stadium area. The proposed project would be to build a new stadium, retail/entertainment, office space, hotels, and youth sport centers. Special events could impact SR-57 and the surround arterial system.

Anaheim Resort Specific Plan
The Anaheim Resort Specific Plan is the proposed implementation of a specific plan covering approximately 549.5 acres of land designated by the City of Anaheim in the General Plan as Commercial Recreation. This designation permits development of uses such as hotels, them parks, visitor-serving retail, and other similar uses intended to provide for the needs of tourists and Convention Center visitor. The Anaheim Resort Specific Plan is in addition to the Disney Resort Specific Plan. The Disney Resort Plan is a 489.7 acre project which include a new theme park, hotels, entertainment and other ancillary services. Both of these plans are intented to complement each other and to enhance the resort character of the area overall. Both of these projects combine could impact SR-57 and the surrounding arterial system.

SR-57 extension (segment 2)
There is a proposal to extend SR-57 from I-5/SR-22 to I-405. The proposal is to build the 4.79 miles segment along the Santa Ana River. The freeway will be built on the river bed but at elevated level. This design is to ensure that travel on the freeway will not be impeded by seasonal water flow and that the freeway will not disrupt this seasonal flow. This portion of SR-57 will be a toll facility. The SR-57 extension is a privatization effort and the Perot Group holds the right to construct and collect tolls on the proposed extension. The design calls for a four (4) lane facility. The proposed extension would help to reduce traffic on I-5 and SR-55.

Urban Rail
OCTA has proposed a set of Urban Rail system alternatives connecting major activity centers in Orange County from Fullerton to Irvine. Some of the alignments will cross SR57 at several locations. The extent of impacts from this project are unknown, but the additional rail capacity will contribute to relief congestion along the SR-57 corridor.

ROUTE PURPOSE AND CLASSIFICATION

Purpose
SR-57 runs in a north-south direction beginning at I-5/SR-22 and ending at SR-60. This route provides access to commuters, recreational and tourist. At the I-5 interchange, travelers can have access to the southeast-northwest and at the SR-91 and SR-22 interchange, travelers gain access to east and west. The route is distinctly multipurpose in the type of travel its provides, serving commuters tourists, recreational, and local access to private and public properties.

Federal/State Functional Classification
SR-57 is classified as Freeway throughout Orange County.

Other designations which may affect planning and/or operations on SR-57 are:

- Subsystem of Highways for the Movement of Extra Legal Load
  PM 11.30 to PM R22.55

Orange County Classification
SR-57 is classified as a State Freeway on County Master Plan of Arterial Highways (MPAH). The MPAH identifies state freeway for reference purposes only.

ROUTE ANALYSIS

State Route 57 interchanges with three other freeways and one conventional state highway. Table 1 displays State Route 57 interchanges with these facilities in Orange County. There are twelve (12) local street ramped interchanges along the constructed portion of SR-57. There are HOV bypass lanes at northbound on ramps at Chapman Ave (Fullerton), Lincoln Ave, Nutwood Ave and SR-90 (Imperial Highway). HOV bypass lanes at southbound on ramps are located at SR-90 (Imperial Highway), Yorba Linda Blvd, Chapman Ave (Fullerton), Lincoln Ave, Ball Rd and Chapman Ave (Orange). SR-57 has one HOV lane in each direction from I-5/SR-22 interchange to Lambert Road. Construction is underway on the HOV extension from Lambert Rd to SR-60 and is scheduled to be completed by mid 1997.

Table 1: SR-57 Interchange with other Freeway Facilities in Orange County

Route Number	Route Name	Crossing Postmile
I-5	Santa Ana Freeway	11.30
SR-22	Garden Grove Freeway	11.30
SR-91	Riverside Freeway	15.57
SR-90	Imperial Highway	19.96

Parallel Alternate Facilities

There are no major routes that parallel SR-57 for it's entire length. There are several major arterial streets in the vicinity of SR-57 that serve as parallel routes. State College Blvd and Kraemer Blvd/Glassell Street parallel to east and west of SR-57 for the entire length in Orange County. The only freeway that parallels this route is SR-55 which is located about three (3) miles east of the southern third of SR-57.

Land Use

The County of Orange encompasses 790 square miles and is populated with more than 2.6 million persons and over 1.2 million employment opportunities. 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 the Camp Pendleton 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 spaces. Industrial and commercial uses usually border freeways and major arterials.

For the purpose of this report, the county is roughly divided into north and south by SR-55 from Newport Beach to Chapman Avenue in the city of Orange. The dividing line turns east on Chapman avenue to Santiago Canyon Road east of Silverado Canyon Road east to Orange/Riverside County Line. North County lies west of SR-55 and north of Santiago and Silverado Canyon Road. In this older portion of the county, most of the street system is based on the an arterial grid. South County lies south of Santiago and Silverado Canyon Road 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

Based on the 1994 estimates the population of Orange County is approximately 2.6 million. By the year 2015 the population is expected to grow to approximately 3.2 million (a 33% increase) with 46% of the increase in the north. Given these numbers, the county population distribution in 2015 is projected to be 66% in the north and 34% 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 2.

Based on the 1994 estimates the Orange County job base is approximately 1.2 million. By the year 2015 the population is expected to grow to approximately 2 million (a 54% increase) with 49% of the increase in the North. Given these numbers, the county job base distribution in 2015 is projected to be 60% in the north and 40% in the South. As with 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 2.

COUNTY NORTH/SOUTH SPLIT MAP GOES HERE

Table 2: Population Growth/Distribution

	Year 1994	% in North County	% in South County	Year 2015	% in North County	% in South County
Population	2.6 mil	71%	29%	3.2 MIL	66%	34%
Employment	1.2 mil	66%	34%	2.0	60%	40%

Bus

Orange County Transportation Authority (OCTA) is the primary bus operator in the County. There is one regular bus route which currently operates on SR-57. This is bus route #757. It runs from Diamond Bar to Santa Ana. The only other "major" service (OCTA bus route 49 Brea to Santa Ana) uses State College Blvd as an alternative to SR-57. Los Angeles Metropolitan Transit Authority (MTA) also has bus service which utilizes SR-57. MTA has one express bus route (#490) which runs from Downtown Los Angeles, stopping at Brea Mall and California State University at Fullerton.

Major Park and Ride Transportation Centers

SR-57 is served by one major Park-and-Ride facility . OCTA developed this Park-and-Ride facility and it provides 98 spaces. The Brea Park and Ride lot is located at northwest corner of SR-57 and Lambert Ave.

Bicycle Facilities

Bicycles are not allowed on SR-57.

Rail

There is no rail service on SR-57. However, Metrolink operates two services in Orange County, namefly Orange County line and Inland Empire to Orange County lines and that only a small portion parallel SR-57. The impact on SR-57 is probably minimal. See exhibit 2 for Metrolink System Map.

Truck Traffic

The State Highway inventory indicates that the truck percentage varies from 6.3% to 10.3% of the ADT. The segment from SR-90 to the Los Angeles County line shows the highest percentage of truck use on this route.

SR-57 in Orange County, from PM 10.67 to PM 22.55, is part of the Subsystem of Highways for the movement of Extra Legal Loads (SHELL). See Exhibit 3 for Truck Traffic Map.

METROLINK SYSTEM MAP GOES HERE ! ! !

TRUCK TRAFFIC MAP GOES HERE ! ! !

TRAFFIC ANALYSIS

Introduction
SR-57 is an 8 lane freeway facility plus HOV lane in each direction. It is a main route connecting eastern Los Angeles County and the Inland Empire Counties to north and central Orange County.

Average Daily Traffic (ADT)
The ADT summary sheet for SR-57 follows as Table 3. There are three time frames given for this information: Existing, Year 2020 Null (Programmed and Funded), and Year 2020 Concept. The existing data was collected from the *1996 Traffic Volumes on California State Highways* book and from 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 projected related studies.

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

Transportation Modeling Description and Socioeconomic Summary
The future traffic data presented in this document is a product of the Los Angeles Regional Transportation Study (LARTS) transportation model. 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 are:

-population
-employment
-income

The transportation system includes highway and transit service (includes rail service)

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 June 1994, SCAG completed the Regional Mobility Element (RME), the long range transportation plan for the SCAG Region. The inputs used in traffic forecast for this RCR are identical to SCAG's 1994 RME. Table 4 provides a summary of the socioeconomic variable input for the year 2015 at the county and the region level.

ROUTE 57 RCR TRAFFIC DATA GOES HERE ! ! !

Table 4: Year 2020 Socioeconomic Data Summary

Socioeconomic Data	Year 2015-Orange County	Year 2015-Region *
Population	3,179,197	20,235,306
Housing	1,087,809	7,093,471
Employment	2,005,651	9,804,758

* Los Angeles, Orange, Ventura, and Metropolitan portions of Riverside, and San Bernardino counties

ACCIDENT RATE-VEHICLES

The accident rate information shown in this report is taken from Table B of the Traffic Accident Surveillance and Analysis System (TASAS). This information 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 not alone an indicator of a significant problem, since accident rates can be greatly influenced by the length of the segment and the time period being measured. See appendix 3 for TASAS Table B information on SR-57.

The Accident Surveillance Procedures Manual developed by Division of Traffic, is used to ensure that 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 which lists high accident concentration locations and uses an automated system for flagging locations requiring investigation.

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

MAJOR PROGRAMMED PROJECTS

This section lists the major projects programmed for construction beginning in State Fiscal Year 96 (FY 96/97) or later. Programmed projects are defined as having a schedule and cost. Projects are programmed into one of the three State highway programs: State Transportation Improvement Program (STIP), the Highway System Operations and Protection Plan (SHOPP), and the Transportation System Management Program (TSM). Programmed projects also include locally funded and administered projects, noted as LOCAL. This listing does not include soundwalls, paving, planting or minor projects.

Table 5: Major Programmed Projects Summary

PPN #	Postmile	Description	EST $	Completion

ROUTE CONCEPT

Introduction

Although the Concept will provide additional capacity along most of SR-57 in the County, some segments will continue to operate at LOS F or below. Due to environmental and financial constraints, it will be impossible to relieve congestion on urban roadways strictly by adding capacity. Therefore, it will be necessary now, and in the future, to better manage the existing transportation system to its full potential. Given projected increases in traffic demand and limited funding, multimodal solutions to the congestion problem should continue to be implemented and expanded.

Upon the completion of the SR-57 reconstruction in Orange County, there will be continuous HOV lanes from I-5/SR-22 to the Orange County/Los Angeles County Line, a distance of 11.25 miles. SR-57 reconstruction include direct HOV connectors at SR-91 interchanges. As traffic in the corridor to increase, along with an increased number of express buses, there may be a need to add HOV drop ramp(s) at selected local interchanges.

The full implementation of Traffic Operational System Elements (CCTV, ramp metering, CMS, etc.,) is strongly recommended as a means of managing the State Highway System in the urban areas of California. In the interest of cost saving and convenience to the motoring public these elements should be included in larger construction projects wherever possible. See appendix 4 and 5 for more details on System Management Techniques.

Regional Consistency

The route concept called for in this report is consistent with the 2001 Regional Transportation Plan (RTP) by SCAG. 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 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-57 are contained in the RTP, therefore, this concept is consistent with regional planning efforts.

Segment by Segment Analysis

Segment 1 (PM 0.00/6.51)

SR-1 to I-405	**Lanes**	**LOS**
Existing Facility:	**0**	**---**
Concept Facility:	**0**	**---**

This segment currently is unconstructed and the concept calls for deleting it from the system.

Segment 2 (PM 6.51/L11.30)

I-405 to I-5/SR-22	**Lanes**	**LOS**
Existing Facility:	**0**	**---**
Concept Facility:	**4**	**---**

This segment currently is unconstructed and the concept calls for the extension of SR-57 from I-405 to I-5/SR-22. The proposal is to build a viaduct down along the Santa Ana River. The proposed extension would be a toll facility. Currently, a private consortium holds the right to construct and collect tolls on the proposed extension.

Segment 3 (PM L11.30/15.57)

I-5/SR22 to SR-91	**Lanes**	**LOS**
Existing Facility:	**8+ 2 HOV**	**F0**
Concept Facility:	**8+ 2 HOV**	**F2**

This segment currently operates as eight through lanes and two HOV lanes. The concept has already been met for this segment thus no additional capacity enhancements are proposed. The Concept LOS is projected to be at the range F2 in this segment.

Segment 4 (PM 15.57/19.85)

SR-91 to SR-90	**Lanes**	**LOS**
Existing Facility:	**8 + 2 HOV**	**F0**
Concept Facility:	**8 + 2 HOV**	**F2**

This segment currently operates as eight through lanes and two HOV lanes. The concept has already been met for this segment thus no additional capacity enhancements are proposed The Concept LOS is projected to be at the range F2 in this segment.

Segment 5 (PM 19.85/R22.55)

SR-90 to LA County line	**Lanes**	**LOS**
Existing Facility	**8**	**F0**
Concept Facility	**8 + 2 HOV**	**F2**

This segment currently operates as eight tthrough lanes and two HOV lanes. The concept has already been met for this segment thus no additional capacity enhancements are proposed. The Concept LOS is projected to be at the range F2 in this segment.

APPENDIX 1

Graphic Representation and Definition of Level Of Service (LOS)

APPENDIX 2

Traffic Data Tables
Pages A2-1 through A2-3

Segment Summary Pages
Pages A2-4 through A2-7

APPENDIX 3

Accident Rates from TASAS

TASAS Summary Table

STATE ROUTE-57 7/1/92 Thru 6/30/95			**ACTUAL**			**AVERAGE**		
Seg No.	**Posmile**	**Description**	**Fatal**	**Fatal + Injury**	**Total**	**Fatal**	**Fatal + Injury**	**Total**
1	0.00/6.51	SR-1 to I-405	X	X	X	X	X	X
2	6.51/L11.30	I-405 to I-5/SR-22	X	X	X	X	X	X
3	L11.30/15.7	I-5/SR-22 to SR-91	0.003	0.30	1.16	0.004	0.25	0.76
4	15.57/19.85	SR-91 to SR-90	0.004	0.24	.95	0.004	0.26	0.78
5	19.85/R22.5	SR-90 to Los Angeles County Line	0.002	0.21	.71	0.004	0.27	0.80

***** accident rates per million vehicles or per million vehicles miles from TASAS Table B

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. Please see Appendix 5 NEW TECHNOLOGY for a brief outline of new technology programs and some implementation efforts currently underway in Orange County.

APPENDIX 6

References

RCR Prepared by Caltrans District 7 (1986)
OCEMA Traffic Flow Map showing ADTs (1994)
Traffic Accident Surveillance and Analysis System (TASAS)
OCTA Transit Guide-February 1997
Caltrans 1994 Traffic Volumes on California State Highways
Project Management Control System (PMCS) Milestone Report
1994 Annual Average Daily Truck Traffic on the California State Highway
Route Concept Report- State Route 57 District 07 (1986)

APPENDIX 7

GLOSSARY/ACRONYMS

ADT - Average Daily Traffic
ATMS - Advanced Traffic Management Systems
ATIS - Advanced Traveler Information Systems
AVCS -Automated Vehicle Control Systems
CCTV - Closed Circuit Television
CHP - California Highway Patrol
CMS - Changeable Message Sign
DSMP - District System Management Plan
ETC - Eastern Transportation Corridor
FSP - Freeway Service Patrol
FTC - Foothill Transportation Corridor
HAR -Highway Advisory Radio
HOV - High Occupancy Vehicle
ITS - Intelligent Transportation Systems
ITMIS - Intermodal Transportation Management and Information System.
IVHS - Intelligent Vehicle Highway Systems
HOT - High Occupancy Toll
LARTS - Los Angeles Regional Transportation Study
LOS - Level Of Service
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
PM - Postmile
PPN - Planning and Program Number
PSR - Project Study Report
RAS - Rehabilitate and Safety
RCR - Route Concept Report
RME - Regional Mobility Element
SANDAG - San Diego Association of Governments
SB - Southbound
SCAG - Southern California Association of Governments
SHELL - Subsystem of Highways for the movement of Extra Legal Loads
SHOPP - State Highway Operation Project Program
SJHTC - San Joaquin Hills Transportation Corridor
SR - State Route
STIP - State Transportation Improvement Program

TASAS - Traffic Accident Surveillance and Analysis System
TMC - Transportation Management Center
TOS - Traffic Operation Systems
TSM - Traffic System Management
TSM - Transportation System Management
UCI - University of California Irvine