STANISLAUS COUNTY
REGIONAL EXPRESSWAY STUDY

Task Group 1 and 2 - Summary Final Report
Study Context, Criteria and Assumptions
Expressway Needs, Opportunities and Constraints

Task Group 3 - Draft Final Report
Recommended Ultimate Expressway System

Task Group 4 - Draft Report
System Design Concepts and Implementation Options

Prepared for
Stanislaus Area Association of Governments

June 14, 1990
89-345

Fehr & Peers Associates
Transportation Consultants

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SAAG REGIONAL EXPRESSWAY STUDY
TASK GROUP 3 REPORT

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I. INTRODUCTION

Stanislaus County's population and employment are expected to double within the next twenty years. Traffic conditions, which are already approaching critical levels in some parts of the region, will become considerably worse unless roadway improvements keep pace with this growth. Recent studies have shown that significant capacity increases will be needed along State Routes 132, 108 and 99 and along other primary travel corridors. These studies suggest that one way to substantially expand the area's street and highway capacity would be to develop a regional expressway system.

Expressways provide considerable capacity and safety advantages over normal arterials, and they generally require less land and are less expensive to build than full freeways. They have higher design standards, greater access restrictions and greater freedom from cross traffic than arterials streets, but they do not meet freeway design standards. Expressways are designed to remove longer-distance "through" traffic from urban arterials, freeing them to carry shorter-distance trips.

The Stanislaus Area Association of Governments (SAAG) has selected Fehr & Peers Associates to help identify potential locations for expressways within the region. The goals of this Regional Expressway Study are as follows:

- To establish the need for an expressway system
- To determine the preferred location and phasing
- To define the preferred expressway design concept
- To assess environmental and General Plan issues associated with the expressway plan
- To define the financing and institutional arrangements needed to implement the plan
- To gain consensus among the various state and local agencies and jurisdictions affected by the expressway plan

The desired product of the study is information to be used in preparing an amendment to the SAAG Regional Transportation Plan (RTP). Subsequent to this study, additional studies may be conducted to: identify and protect right-of-way; establish fees or other funding mechanisms; prepare plans, specifications, designs and cost estimates; produce environmental documentation. These subsequent studies will be intended to lead directly to funding, engineering and construction of the expressway system.

The present study is composed of five task groups:

1. Establish Study Context, Assumptions and Evaluation Criteria.
2. Determine Need for an Expressway System and Key Constraints and Opportunities.
3. Identify the Preferred Ultimate Expressway System Concept.
4. Refine the System Concept and Prepare Implementation Strategy.
5. Select Expressway System and Implementation Plan.

This report summarizes the final results of Task Group 1 (Study Context, Assumptions and Evaluation Criteria), and Task Group 2 (Expressway Needs, Opportunities and Constraints). Complete information on these two tasks was presented in our December 12, 1989 report on Tasks Groups 1 and 2.

This report also reviews and refines information originally presented in our March 9 report on Task Group 3, the Preferred Ultimate Expressway System. It also presents preliminary findings and recommendations on Task Group 4. This includes system design concepts, phasing costs, funding, implementation options, and performance policies.

II. NEED FOR AN EXPRESSWAY SYSTEM

A. Regional Development Forecasts

The planning horizon for this study is twenty years, consistent with the horizon for the Regional Transportation Plan (RTP). SAAG and its member jurisdictions have projected year 2010 population and employment levels for the Stanislaus region. These projections are listed in Table 1.

The region's 1990 population is about 363,000, and its employment is about 141,000. There are presently about 39 jobs in the County for every 100 residents, which translates to less than 90 jobs in the County for every 100 employed residents. Significant numbers of the region's residents commute to work at locations outside of the area, such as the San Francisco Bay Area.

The most recent projections for 2010 suggest that the area's population will exceed 700,000 and its employment will reach about 300,000. These represent an approximate doubling of both population and employment. The region's job/housing balance will improve slightly from 39 jobs for every 100 residents to 43. As a consequence, traffic levels within the region are expected to grow considerably. Out-commuting is also predicted to grow substantially, but at a lower rate than intra-county travel.

SAAG has allocated the projected population and employment to planning zones within each City and the unincorporated areas of the County. The distribution is in accordance with current General Plans. Several cities are in the process of updating their General Plans. However, as approved by the Study Advisory committees and SAAG Policy Board, the Regional Expressway Study will be based on adopted plans, and SAAG's current 2010 land use forecasts.

Alternative land use forecasts have also been analyzed. One series of sensitivity tests evaluated the County's remote development concept. This concept holds the regional population and employment forecasts constant at about 700,000 people and about 300,000 jobs, but it shifts

Table 1

REGIONAL POPULATION AND EMPLOYMENT PROJECTIONS

City (General Plan Area)	Population		Employment	
	1990	2010	1990	2010
Ceres	28,600	61,700	10,100	25,600
Hughson	3,000	7,800	1,900	4,100
Modesto	191,100	379,500	83,900	173,200
Newman	4,700	13,500	1,400	5,400
Oakdale	12,800	22,000	5,800	10,200
Patterson	8,800	19,100	1,500	6,200
Riverbank	9,500	19,700	3,500	8,000
Turlock	46,000	96,300	19,200	42,700
Waterford	3,400	6,400	1,000	2,400
Other	55,400	74,700	13,200	21,800
County Total	363,300	700,700	141,500	299,600

Jobs/Resident: 0.39 in 1990
0.43 in 2010

the development pattern. It places greater emphasis on development in western portions of the county, such as the Mapes Ranch and Lakeborough areas, and it reduces the levels of new development in the existing cities and eastern County areas.

Other sensitivity tests were performed in the Modesto Area. This testing used Modesto's citywide traffic model, which contains the detailed land use information that the City is using in its current circulation planning, Capital Facilities Financing Plan, and Urban Village studies. These land uses differ somewhat from the balanced regional forecasts which were adopted as the primary basis for the expressway study.

Stanislaus County and its cities may actually develop in a pattern which differs from any of those considered in this study. Potential changes in the currently anticipated development scenarios include:

- Major new growth areas could emerge in western parts of the county in addition to Lakeborough and Mapes Ranch.
- A new regional airport could be sited in the western part of the county.
- Improved transit service could affect the need for expressways.

If such circumstances do arise, the findings and recommendations of this regional expressway study should be reviewed and updated accordingly.

B. Expected Levels of Traffic Congestion

1. Regional Travel Growth

Stanislaus County's population and employment are projected to double within the next twenty years, doubling the amount of traffic generated within the County. Neighboring County's are also expecting to experience considerable growth, so that the amount of travel passing through Stanislaus County will also increase substantially. Congestion at existing traffic constraint points will worsen considerably, and new congestion points will arise.

2. Planned Non-Expressway Improvements

The Stanislaus Regional Expressway System is intended to supplement already planned improvements to the area's street and freeways systems. It will ease traffic flow through areas that would otherwise remain capacity-deficient even after all reasonably foreseeable improvements have been made to existing circulation networks.

Such "baseline" improvements include facilities that are already programmed within the short-term State and regional Transportation Improvements Programs (STIP and TIP), and those which are high-priority components of longer-range programs, including the SAAG Regional Transportation Plan (RTP) and the Caltrans Route Development Plan (RDP). Baseline improvements also include roadway projects specified in the General Plans or Capital Facilities Plans of the Stanislaus cities and the County.

Not all of these facilities would necessarily be in place by 2010. However, for purposes of this study it was assumed that these improvements would be in place before expressways would be developed in parallel corridors.

The baseline improvements are described fully in our December 1989 Task Group 1 and 2 report. They include one expressway that is a high-ranking regional priority in both Stanislaus and San Joaquin Counties, and which the consultant team was instructed to assume to be a "given" for the year 2010. That is the east/west expressway on Route 120 from Route 99 near Manteca east through southeastern San Joaquin County and northern Stanislaus County. It includes the following segments: Escalon Route 120 Bypass, Oakdale 120 Bypass, Lancaster Expressway, Valley Home Expressway. The following are also included in the baseline projects list:

- Spot interchange improvements along Route 99 and completion of Keyes Fwy.
- Route 108, widening from Route 219 to west Oakdale.
- Route 132, Empire railroad grade separation and widening from Empire to Waterford.

- o Fifty-two roadway widening projects identified in the County's proposed Capital Improvements Plan, including widening many County roads to four-lanes
- o Modesto arterial widenings; consistent with the City's recently adopted Capital Improvements Program, as well as: Richland-Tioga bridge, Faith Home Road bridge, Lincoln-Lakewood bridge.
- o Ceres area, widening major arterials to up to five lanes as needed.
- o Turlock area, widening major arterials to at least four lanes and six if needed.
- o Oakdale area, an east/west local bypass for Route 108, South Yosemite improvements (four lanes), and J Street extension.
- o Riverbank area, widening arterials to four lanes as necessary.
- o Hughson area, widening arterials to four lanes as necessary.
- o Waterford area, widening arterials to four lanes as necessary.
- o Patterson area, southerly bypass of Las Palmas, Sperry four-lane arterial.
- o Newman area, widening Moyer, Merced, Orestimba, Stuhr Road, Fink Road to four lanes if necessary.
- o In San Joaquin County, the following freeway widenings: Route 120 to six lanes from I-5 to Route 99, Route 132 upgrade to four-lane expressway from Stanislaus County to I-580, Route 205 to eight lanes from Alameda County to I-5, I-5 to ten lanes from I-205 to Route 120, Route 99 to six lanes from Ripon to north of Route 120.

3. Projected Traffic Congestion - Need for an Expressway System

The planned improvements identified above will not provide sufficient capacity to off-set expected traffic growth. Under this "non-expressway" scenario, less than three-fourths of all travel in Stanislaus and San Joaquin counties will be accommodated at acceptable levels of traffic efficiency (Level of Service A, B, or C). About 26% of all travel in the two counties will occur at congestion levels which are considered unacceptable (Levels of Service D, E or F). About half of this (about 12% of all travel in the two counties), will occur under extreme congestion (Level of Service F). This 12% represents the degree by which the projected traffic

volume will exceed the planned roadway capacity. It suggests that the region's street and freeway system will be capable of carrying less than 90% of the travel demand generated in the region in year 2010.

The purpose of this study is to define an expressway system which best meets the goals of the Stanislaus region. These goals were ascertained earlier in this study through a survey of members of the Expressway Study Advisory Committee, the SAAG Technical Advisory Committee, SAAG Citizens Committees, and the SAAG Policy Board. The most important expressway evaluation criteria were found to be: (1) traffic safety, (2) air quality, (3) traffic capacity and level of service, (4) regional economic impacts, and (5) mobility. In view of these goals, the expected high levels of congestion in the year 2010 are unacceptable. They will have adverse effects on travel safety and service level, air quality, mobility and the regional economy.

To meet its goals, the Stanislaus region will need to identify roadway capacity improvements by developing new routes and/or by increasing the capacity and operating efficiency of existing and planned routes.

C. How Expressways Can Reduce Congestion

1. What An Expressway Is

Caltrans defines an "expressway" as follows:

> An arterial highway with at least partial control of access, which may or may not be divided or have grade separations at intersections.[1]

Within this definition, a wide range of facility types may be considered expressways. Access control may be as minimal as restricting left-turn movements at driveways and collector streets,

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1 Caltrans, Highway Design Manual, 1986.

or it may involve the complete elimination of all driveway and collector street connections. Intersections with major arterials may be signalized, or they may be grade-separated interchanges. Although the design characteristics of expressways vary, the functional distinction between an expressway and an arterial street is well understood. "Expressways are facilities that provide for through-traffic movement with limited direct access to abutting property. Expressways serve a similar function to that of highways - the fast and safe movement of people in an urban setting."[2] The principal functional differences between an expressway and a major arterial street are safety, capacity and travel speed. Statewide, expressway accident rates per vehicle mile are about half the rates found on arterials. Expressways also offer capacities and travel speeds that are 20% to 50% higher per lane than arterials.

Stanislaus County presently has three expressways: Briggsmore Avenue in Modesto, Golden State Boulevard just north and south of Turlock, and Route 99 near Keyes. These facilities illustrate some of the principal features of expressways:

- Signals spaced infrequently (Briggsmore and Golden State north), or no signals at all (Route 99 and Golden State south).
- Infrequent driveways with right-turn-only access (Briggsmore), or no driveways at all (Route 99).
- Wide medians to store left-turns to and from stop-sign controlled side streets (Route 99, Golden State), or no side-street left-turns (sections of Briggsmore).

A four-lane expressway generally requires about 110 feet of right-of-way. Cross-section standards vary, but Figure 1 shows a typical configuration, including:

median - 22 feet
traffic lanes - 48 feet
shoulders, buffers - 40 feet

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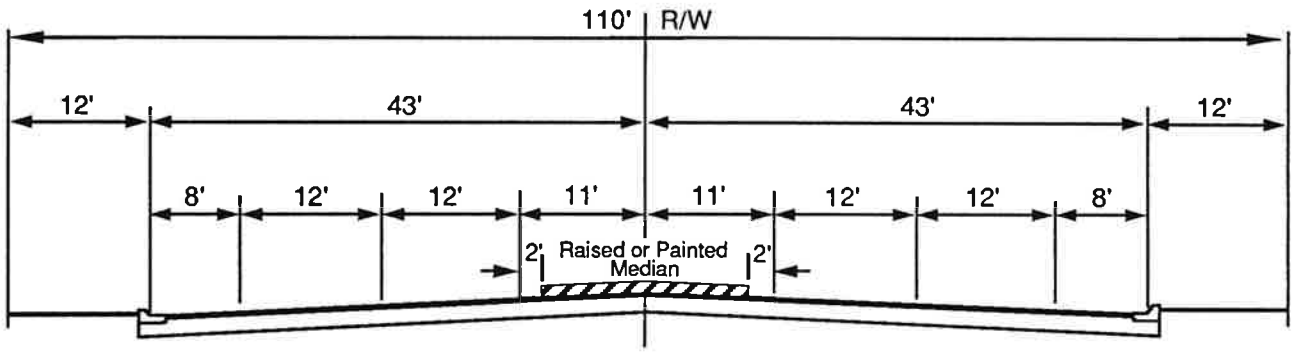
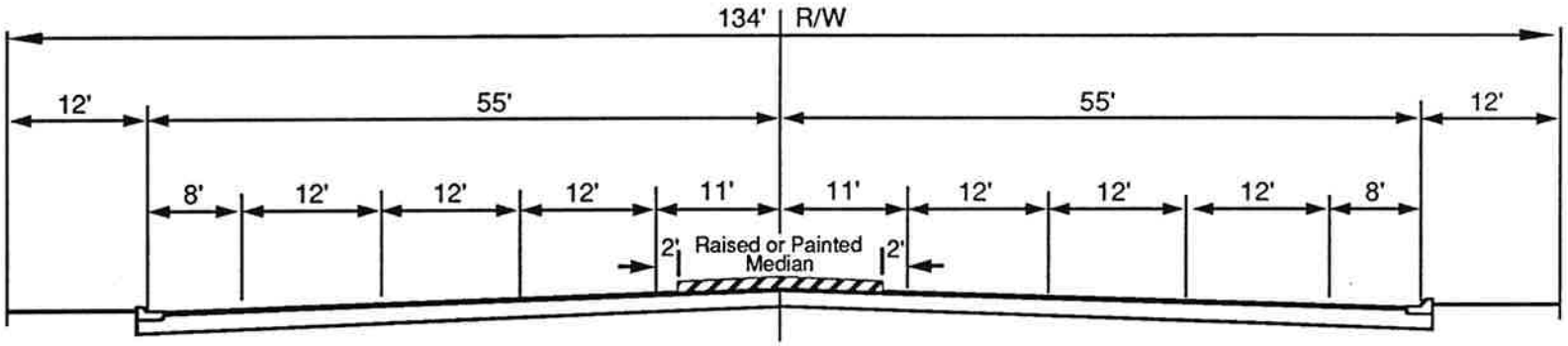
2 Stanislaus County General Plan, 1987.

Figure 1
Typical Expressway Cross Section



4 Lane Expressway



6 Lane Expressway

A six-lane expressway requires an additional 24 feet for traffic lanes, and require a total right-of-way of 134 feet.

For high-design expressways, additional right-of-way is required at major cross-streets for turn-lane channelization or interchanges. At-grade intersections require about 134 feet of right-of-way for four-lane expressways and about 158 feet for six-lane expressways. Grade-separated interchanges can require up to 200 feet of right-of-way within about 1,000 feet in each direction from the cross street. Such interchanges also significantly restrict access to parcels within 1,000 feet of the cross street.

2. Capacity Benefits of Different Classes of Expressway

For planning purposes, the variety of different expressway design concepts can be considered as three generic classes. Table 2 presents the principal features of each class. Figures 2 and 3 illustrate the three concepts.

Class A is the highest-level design. It prohibits access to/from driveways and minor streets and has full interchanges at major cross streets. It is similar to a full freeway, but its interchanges and design-speeds are reduced from Caltrans and FHWA freeway standards. A Class A expressway has a mainline design speed of 50 to 55 miles per hour and interchange ramp speeds of 25 to 30 mph, compared with a full freeway with 70 mph design speeds and 35 to 40 mph ramps.

Class B expressways have restricted access from driveways and minor side streets, but they do not have interchanges. Major cross street intersections are signalized with multiple turn lanes. The expressway receives 65% to 75% of the traffic signal "green time", and therefore 65% to 75% of the intersection capacity. Consequently, Class B expressways have 30% to 50% more capacity than major arterials with the same number of lanes.

Class C expressways have minor access restrictions, but allow left-turns to/from occasional collector streets. Major intersections are signalized, with 55% to 65% of the green time. Class C expressways are similar to major arterial streets, but their access controls and preferential

Table 2

EXPRESSWAY DESIGN CLASSES

Access Control[1]	Class A	Class B	Class C
Driveways	None	None	Right-Turn-Only
Collector Streets	None	Right-turn-only	Left-Turn Staging in Median
Major Streets	Interchange	Signalized	Signalized
Speed	50-55	45-50	40-45

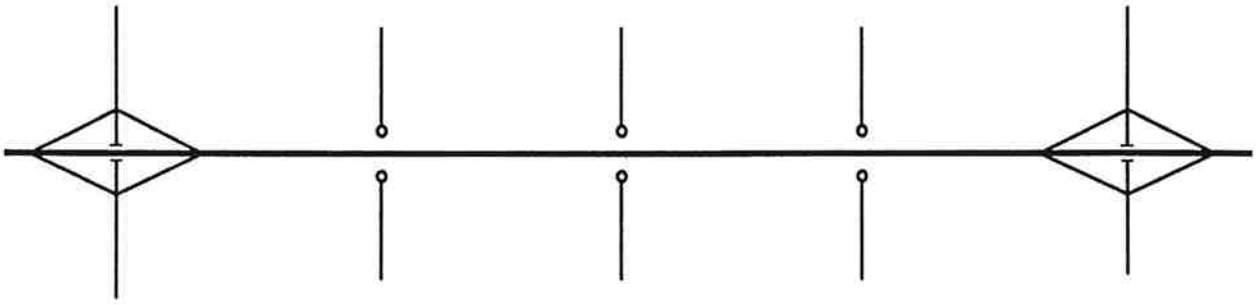
	Class A		Class B		Class C	
	4-lane	6-lane	4-lane	6-lane	4-lane	6-lane
Capacity (ADT)						
Capacity - Maximum	60,000	90,000	50,000	75,000	45,000	65,000
Capacity - @ LOS C/D	48,000	72,000	40,000	60,000	36,000	52,000
Right-of-Way						
Mid-Block[2]	110'	134'	110'	134'	110'	134'
Intersections	175'	200'	134'	158'	134'	158'

1 See Figures on following pages

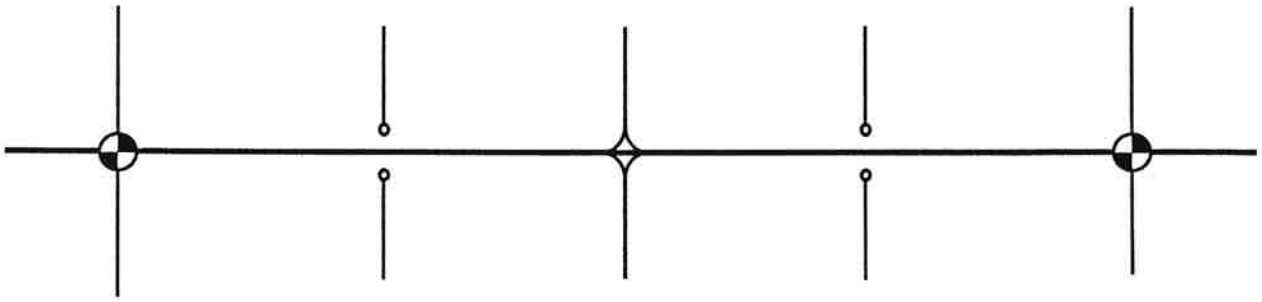
2 If built to Caltrans standards, additional right-of-way would be required

Figure 2
Expressway Design Classes

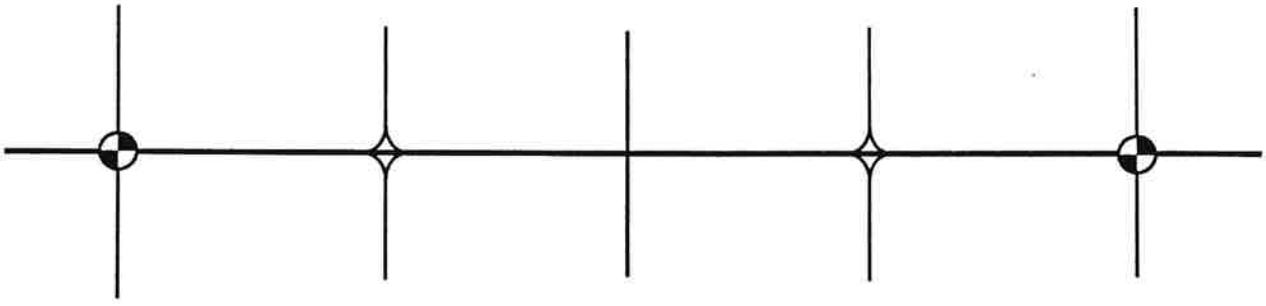
Class A



Class B

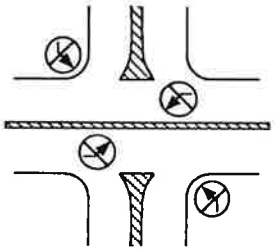
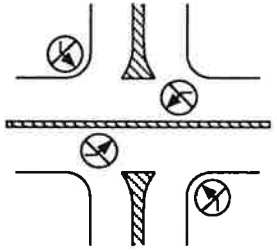
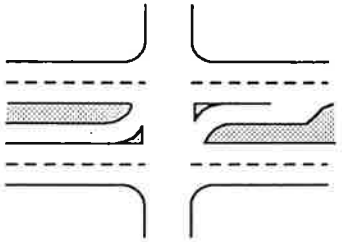
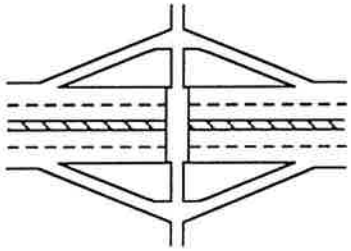
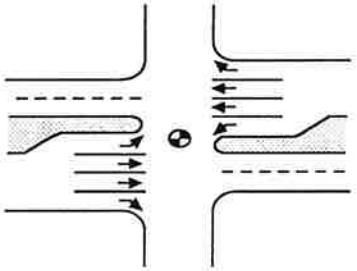
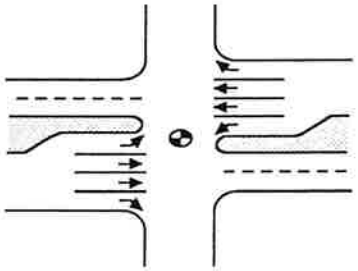


Class C



This diagram illustrates levels of side-street and driveway access permitted on a one-mile section of typical Class A, Class B and Class C expressways, see next figure for greater detail on individual types of access.

Figure 3
Expressway Access Management

Type of Access Point	Minimum Spacing along Expressway (if permitted at all)	Typical Design of Access Point		
		Class A Expressway	Class B Expressway	ClassC Expressway
Driveway	>300ft.	(Not Permitted)	(Not Permitted)	
Collector	1/4-1/2 mi.	(Not Permitted)		
Arterial	1 mi.			

treatment at intersections give them about 20% more capacity than an arterial with the same number of lanes.

Any of the three generic expressway types can be constructed as either four-lane and six-lane facilities. A regional expressway can include a mix of expressway classes and four-lane and six-lane widths.

III. CANDIDATE EXPRESSWAYS

Earlier phases of this study identified 26 candidate corridors for consideration as components of a regional expressway system. The candidate identification process included the following steps:

1. Review of current SAAG Regional Transportation Plan (RTP), Caltrans STIP, RDP and Route Concept Reports, and adopted local county and city circulation plans.

2. Review of recent SAAG corridor studies.

3. Discussions with the Regional Expressway Study Advisory Committee, SAAG Technical and Citizens committees and the SAAG Policy Board.

4. Preliminary 2010 traffic demand analysis for the combined Stanislaus and San Joaquin region .

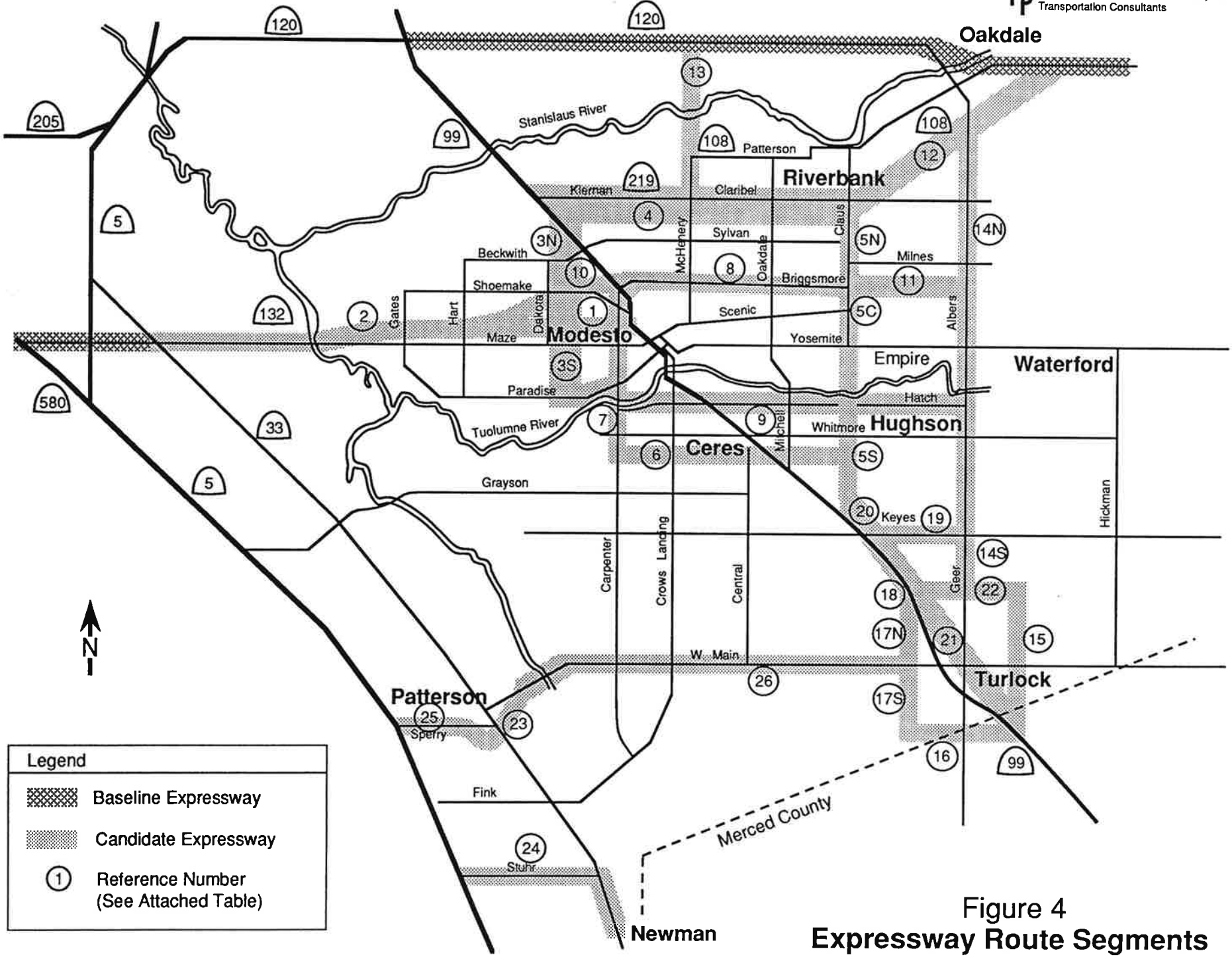
5. Further discussions with the study committee, SAAG committees and SAAG Board, (resulting in approximately 20 corridors).

6. Discussions with Planning and Public Works officials of several jurisdictions for clarification of local issues.

7. Refinement of corridors by the consultant, including extending certain corridors for system continuity purposes and segmenting certain corridors for ease of analysis and data presentation.

8. Election by the SAAG Policy Board to add east/west expressway capacity in the south western portion of the county; along the West Main and Sperry Road corridors.

The resulting set of 26 candidate corridors is shown in Figure 4. Several of the corridors have been divided into segments for system prioritization and phasing analysis. The corridor routes and segments are identified by name and limits in Table 3.



Legend

- Baseline Expressway
- Candidate Expressway
- (1) Reference Number (See Attached Table)

Figure 4
Expressway Route Segments

Table 3

CANDIDATE EXPRESSWAYS

Map Ref.	Route	Limits
1.	Route 132 (Stage 1)[1]	Route 99 to Dakota or Nebraska
2.	Route 132 (Stage 2)[1]	Dakota or Nebraska to San Joaquin Co.
3N.	Dakota Corridor (North)[2]	Route 99 to Kansas Route 132
3S.	Dakota Corridor (South)[2]	Route 132 to Paradise Road/Carpenter
4.	Kiernan Corridor[3]	Dakota Corridor[2] to Claus
5S.	Faith Home	Route 99 to Hatch
5C.	Claus/Garner	Hatch to Briggsmore
5N.	Claus	Briggsmore to Claribel or Pelandale
6.	Service Road	Faith Home to Carpenter
7S.	Carpenter (South)	Service to Hatch
7C.	Carpenter (Central)	Hatch to Route 132
7N.	Carpenter (North)	Route 132 to Route 99
8.	Briggsmore Avenue	Route 99 to Claus
9W.	Hatch Road (West)	Carpenter to Faith Home
9E.	Hatch Road (Eastt)	Faith Home to Geer/Albers
10.	Briggsmore Extension West[4]	Route 99 to Dakota Corridor
11.	Briggsmore Extension East[5]	Claus to Albers
12.	Oakdale/Riverbank Bypass	Claus/Claribel to Bypass 120/108
13.	McHenry Avenue	Kiernan Corridor to Escalon Bypass
14.	Geer/Albers Road	Turlock (Zeering) to Oakdale/Riverbank Bypass
15.	Waring/Verduga Corridor	Zeering to Route 99
16.	Harding Avenue	Route 99 to Washington Road
17.	Washington Road	Harding to Taylor Road
18.	Taylor Road Interchange	Washington to Golden State
19.	Keyes Road	Route 99 to Geer Road
20.	Golden Gate Extension	Keyes to Faith Home
21.	Golden State Boulevard	Keyes through Turlock
22.	Taylor or Zeering Road	Golden State to Waring
23.	Patterson Bypass	San Joaquin River to Sperry Road
24.	Stuhr Corridor	Route 33 at Oristimba to Stuhr/I-5
25.	Sperry Road	Patterson Bypass to I-5
26.	West Main	Washington San Joaquin River (Poplar Ave.)

[1]On existing Caltrans freeway right-of-way just south of Kansas Avenue

[2]Dakota Avenue or Morse/Nebraska

[3]Pelandale or Kiernan

[4]New freeway overcrossing (without ramps), from Briggsmore near Sisk Road to shoemake Avenue near Brink Avenue. Expressway on Shoemake or MID Lateral No. 3 to Nebraska or Dakota.

[5]Along MID Lateral No. 3