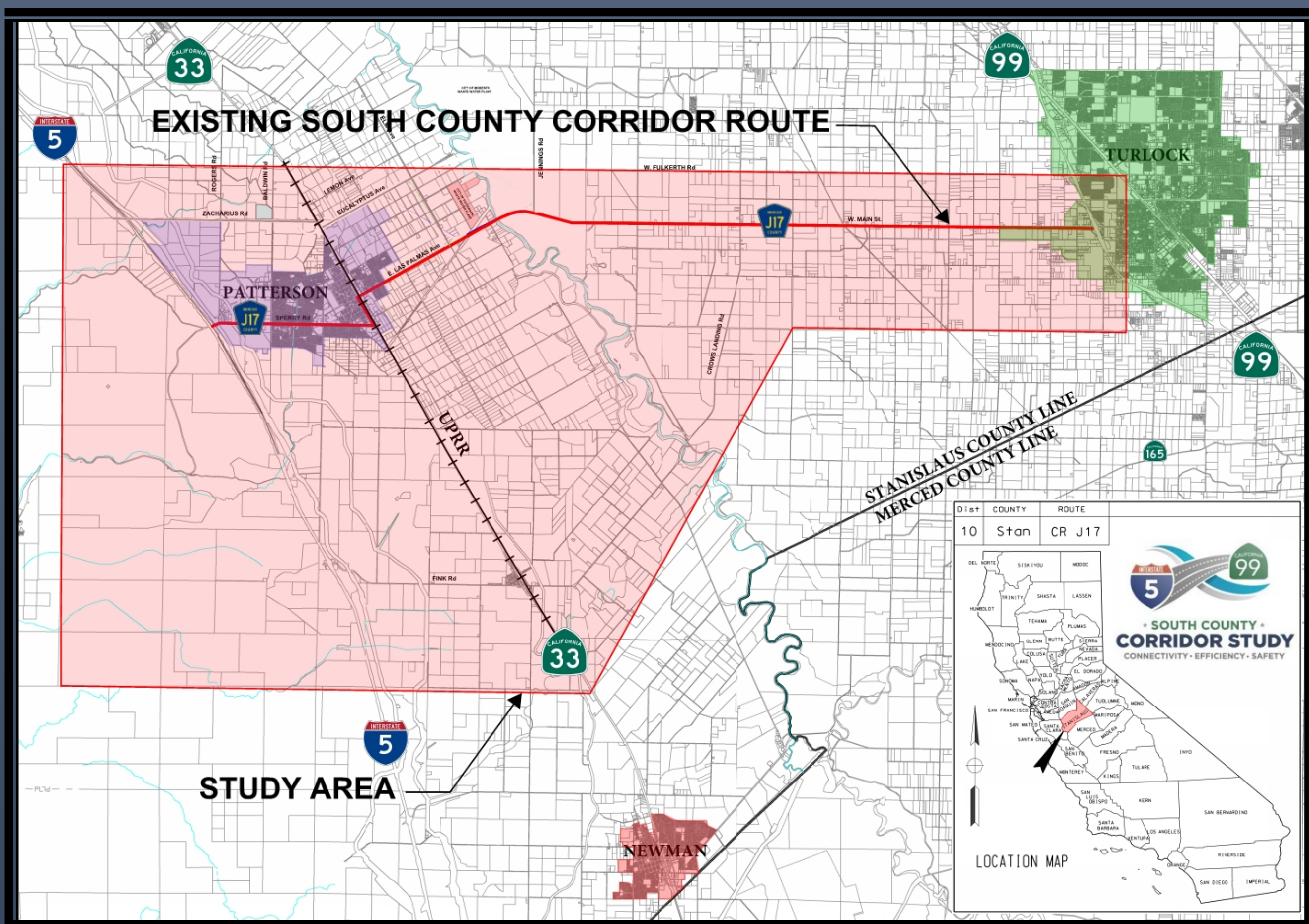
MAY 18, 2016

FINAL SOUTH COUNTY CORRIDOR FEASIBILITY STUDY



SUBMITTED TO:

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1. INTRODUCTION

The South County Corridor (SCC) Feasibility Study (Study) is a cooperative planning effort between the Stanislaus Council of Governments (StanCOG), Stanislaus County, and the Cities of Patterson, Turlock and Newman, with the objective to assess the feasibility of a new east-west four-lane divided expressway that would provide a more efficient and direct travel route between State Route 99 (SR 99), State Route 33 (SR 33) and Interstate 5 (I-5) in the southern part of Stanislaus County.

StanCOG is the Regional Transportation Planning Agency (RTPA) for the Stanislaus County region, which includes nine (9) incorporated cities and the County government. StanCOG and the four local jurisdictions within the vicinity of the SCC facility have coordinated on the development of this Study that analyzed potential alignments, identified feasible solutions to address local community and transportation needs as well as the needs of the region, and developed project development and implementation strategies. The purpose of this Study is to foster and promote a viable and vital expressway facility that would improve goods movement in the southern portion of the County, and promote a successful business climate, including the incorporation of appropriate, desirable land uses, which would increase investments and enhance the SCC area for all travel modes.

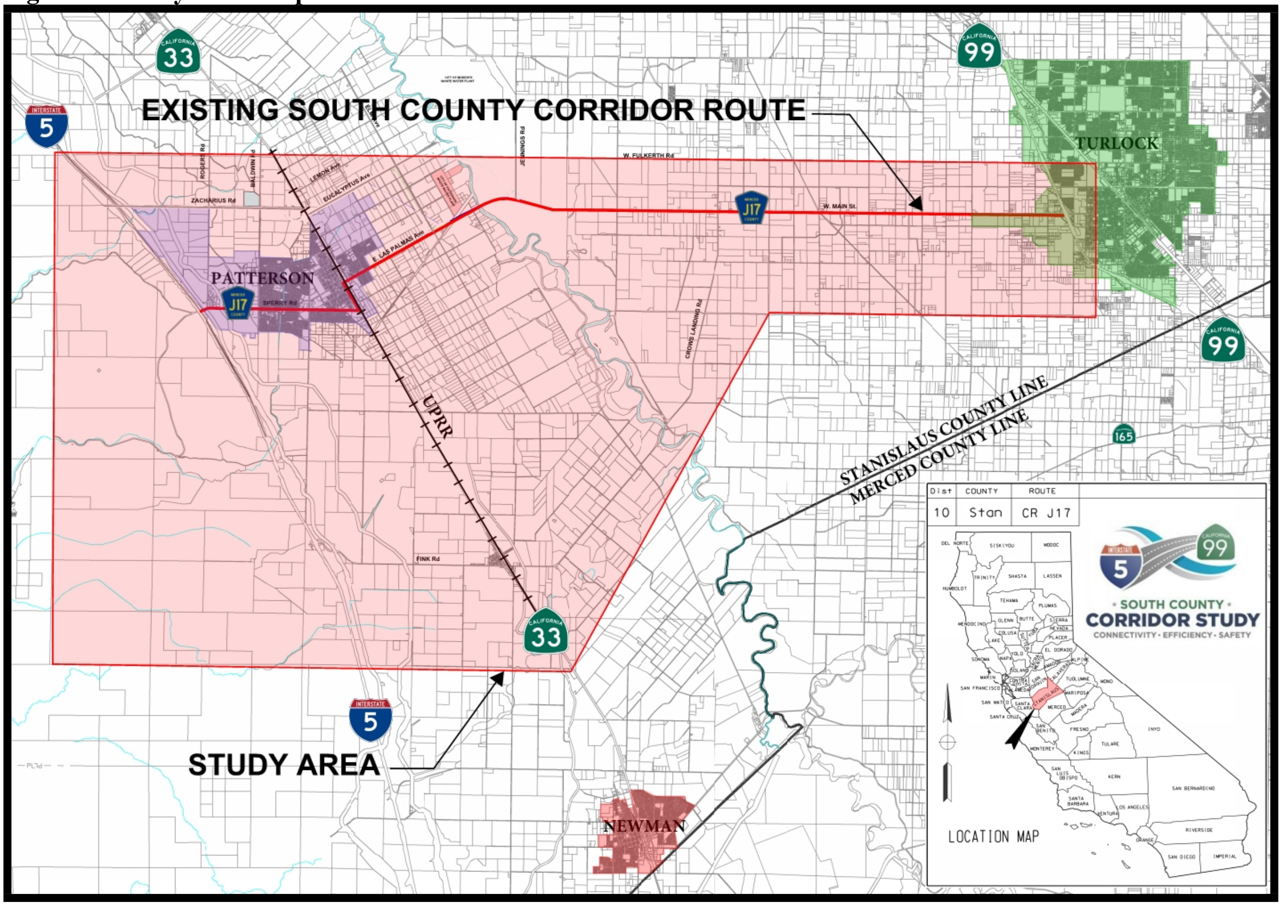
As shown in Figure 1, the study area runs between the City of Turlock and the cities of Patterson and Newman between SR 99 and I-5. The study area encompasses the existing SCC route, which begins at the SR 99/West Main Street Interchange in Turlock and terminates at the I-5/Sperry Avenue Interchange in Patterson. The existing SCC route encompasses West Main Street, East Las Palmas Avenue, SR 33, and Sperry Avenue. It begins along West Main Street, which converges with East Las Palmas Avenue west of Turlock. East Las Palmas Avenue crosses the San Joaquin River, extending west where it terminates at SR 33 and continues south along SR 33 to Sperry Avenue. Finally, the existing SCC route extends west along Sperry Avenue, terminating at the I-5/Sperry Avenue Interchange in Patterson. The study area offers a canvas for the examination of alternatives to the existing SCC route that would function as a bypass of the cities of Patterson and Newman.

2. BACKGROUND

Existing Facility

The existing corridor is part of the 39.7 mile County Route J17 (CR J17) established in 1960 that runs east-west through Stanislaus and Merced counties. CR J17 begins at the I-5/Sperry Avenue Interchange in Patterson and extends east where it overlaps SR 33 to East Las Palmas Avenue. East Las Palmas Avenue then crosses the San Joaquin River and converges with West Main Street. West Main Street then extends through Turlock crossing the SR 99/West Main Street Interchange to East Avenue, and from East Avenue to Oakdale Road, from Oakdale Road to Turlock Road, and from Turlock Road to its terminus at State Route 59 (SR 59). As shown in Figure 1, the section of CR J17 between SR 99 and I-5 is known as the existing SCC route and functions as an agricultural trade corridor that extends 18 miles between the Cities of Turlock and Patterson. This section of CR J17 is generally a two-lane highway through rural areas, although the facility has four-lane segments within the city limits of Turlock and three-lane segments within the city limits of Patterson. East Las Palmas Road on the east side of town is bordered by 100-year old palm trees that prevent widening the road.

Figure 1: Study Area Map



Project History

The need for an efficient and direct travel route between SR 99, SR 33, and I-5 in the southern part of Stanislaus County was first studied in 1989, when StanCOG began preparing its 1990 Regional Transportation Plan (RTP). In 1990, StanCOG went a step further and developed the Stanislaus County Regional Expressway Study identifying the need for the Patterson Bypass. In addition, the StanCOG 2035 Regional Transportation Plan/Sustainable Communities Strategy (RTP/SCS) identifies the SCC as a much needed regional and interregional corridor for the County.

3. PURPOSE AND NEED

Purpose:

The SCC is a planned east-west four-lane divided expressway connecting SR 99 to I-5 in the southern portion of Stanislaus County, bypassing the Cities of Patterson and Newman. The Study analyzes potential traditional and multi-modal corridor alignments that will enhance the east-west transportation link for all travel modes in the southern portion of Stanislaus County. Key goals of the Study are as follows:

- Provide for the efficient movement of goods and people for all modes of travel statewide
- Improve safety through roadway widening and improvements, limiting access to the expressway facility and divided traffic lanes
- Enhance local, regional, and statewide connectivity

- Improve air quality and noise
- Promote an increase in local and regional investments
- Support of General Plans applicable within the project limits
- Assess the feasibility, planned land use, transportation, and environmental issues
- Develop project development and implementation strategies

Need:

Stanislaus County is a vital hub for the movement of agricultural (farm to market) and other goods, both locally grown/produced and those that pass through the region, which links northern and southern California, as well as the Bay Area. The lack of an efficient and direct travel route between SR 99, SR 33, and I-5 in the southern part of Stanislaus County has become a pressing concern for the region.

Of primary concern is the amount of regional and interregional traffic generating congestion within the Patterson city limits and surrounding areas. The traffic congestion, noise, and related safety issues are of a larger concern to the region, which depends on an efficient and safe transportation system to deliver manufactured and agricultural goods both regionally and inter-regionally. In addition, the centrally located nature of Stanislaus County has made it an ideal location for the distribution of goods throughout the Central Valley. The SCC will be vital to the continued success of these industries.

Trucks encounter approximately ten traffic signals along Sperry Avenue, East Las Palmas Avenue, and West Main Street when traveling from I-5 to SR 99. Since Patterson is becoming a west side hub for commodity distribution, the existing corridor route is heavily used and is often congested.

4. CORRIDOR AND SYSTEM COORDINATION

Due to the large study area, which covers parts of unincorporated Stanislaus County, the Cities of Turlock and Patterson, and several state facilities (i.e. SR 99, SR 33, and I-5), the proposed new SCC route is subject to conforming to state, regional, and local planning efforts. Various corridor and system planning documents for Caltrans, StanCOG, Stanislaus County, and the Cities of Patterson, Turlock, and Newman were reviewed for the development of this Study to ensure the route alternatives do not preclude future planned transportation improvements. A complete list of the various corridor system planning documents reviewed for this Study are included in Appendix P.

In addition, rail, transit, and other alternative modes of travel planning were reviewed for the Study. However, rail and transit accommodations were not explicitly evaluated in this Study since transit and rail in the southern portion of the County have yet to be defined. Therefore, it is recommended that transit and rail accommodations are evaluated during the next phase of the project development process (i.e. Project Study Report) for the consideration of funding strategies, and to determine how transit and rail would be addressed in future project development phases.

5. DESIGN CRITERIA

Functional Characteristics

The selection of appropriate design criteria requires that the functional characteristics of the roadway be defined. Table 1 lists the proposed SCC functional characteristics for the development of alignment alternatives within the proposed study area.

Table 1: SCC Functional Characteristics

FUNCTIONAL CHARACTERISTICS		
Area Designation	**Functional Classification**	**Terrain**
Urban/Rural	Class C Expressway	Level

The alignments that were studied cross within the unincorporated areas of Stanislaus County, as well as the city limits of Patterson and Turlock. As noted in the following section, StanCOG, Stanislaus County, as well as the Cities of Patterson and Turlock, provide slightly different guidance in their General Plans and/or agency standards regarding the definition of a Class C expressway. For example, a Class C expressway in a rural environment can be different in an urban environment (e.g. use of open ditches in lieu of curb and gutter). Furthermore, it should be noted that since none of the alignments studied cross within the city boundaries of the City of Newman, neither its General Plan nor agency standards regarding the definition of a Class C Expressway were considered. Therefore, it may be determined that certain segments of the proposed new SCC may have different expressway elements that meet the General Plan needs of each local jurisdiction. The determination of which expressway element meets specific applicable agency standards was not the intent of this Study, but will be defined in future project development phases. The various descriptions of an expressway, as defined by the applicable local agency General Plans and/or agency standards, are described in the following section.

Class C Expressway

StanCOG

An expressway is a multilane, divided roadway with signal-controlled intersections and limited controlled access and egress.[1]

Stanislaus County

A Class C Expressway is a limited access-controlled road with traffic-controlled intersections at Major arterials and other Expressways. Intersections at Collector and Local roads may or may not be controlled by a traffic signal. The typical right-of-way is 110 or 135 feet (four or six lanes, respectively). On limited rights-of-way, Class C Expressways may be 100 feet for four lanes and 124 feet for six lanes.[2]

The County has designated the SCC as a limited access-controlled Principal Arterial road (formerly identified as a "Class C" Expressway) in the 2015 General Plan. The General Plan shows the SCC primarily as a four-lane facility. The one exception is between Carpenter Road and Faith Home Road where it is shown as a six-lane facility. Right of Way for a Class C Expressway is described in the General Plan as 110 feet for four-lane facilities and 135 feet for six-lane facilities. County Standards show urban expressways with a median, curb, gutter, and sidewalk. Rural expressways are shown with a median, swales, and no sidewalk. Intersections may be signal controlled at Expressways, as well as Principal or Minor Arterials. Intersections at Collector and Local roads may or may not be controlled by a traffic signal.

[1] *2014 StanCOG Regional Transportation Plan/Sustainable Communities Strategy (RTP/SCS) Appendix H*

[2] *Stanislaus County General Plan, Chapter 2 "Circulation Element"*

City of Patterson

Expressways serve the same function as arterial roadways, but provide capacity and safety advantages over arterials because they have higher design standards, greater access restrictions, and greater freedom from cross-traffic. Expressways are designed to remove longer-distance, through-traffic from arterials, freeing them to carry shorter distance trips. Expressways shall have 110-foot rights-of-way.[3]

The City of Patterson has designated the SCC as an expressway with 110 feet of right of way in the adopted General Plan. City standards show expressway with and without medians, curb, gutter, and a meandering or separated sidewalk.

City of Turlock

The City of Turlock recommended referencing the Westside Industrial Specific Plan (WISP) for the definition and right of way width of an expressway instead of the City of Turlock's General Plan. The WISP designates West Main Street as an arterial, where arterials are defined as expressways in the WISP. The specific plan shows a four-lane arterial on West Main Street between Washington Road and Tegner Road, and a six-lane arterial east of Tegner Road to SR 99. Right of way for the arterial is described as 110 feet for both the four- and six-lane facilities. The specific plan shows an arterial with a median, curb, gutter, and sidewalk.[4]

Design Criteria

The FHWA has designated thirteen (13) controlling criteria with a primary importance for safety in the selection of design standards. However, since structural capacity is not a geometric criteria, it was not included in this evaluation. In addition to these remaining twelve, we have added median width as a controlling criterion. The geometric controlling criteria shown in Table 2 were utilized in the development of the Study's roadway design criteria comparison table shown in Table 3.

Table 2: Geometric Controlling Criteria

GEOMETRIC CONTROLLING CRITERIA		
1. Design Speed	6. Horizontal Alignment	11. Superelevation
2. Lane Width	7. Vertical Alignment	12. Horizontal
3. Shoulder Width	8. Grades	13. Vertical Clearance
4. Median Width	9. Stopping Sight Distance	
5. Bridge Width	10. Cross Slopes	

Table 3 is a comparison table listing the requirements for these thirteen criteria as specified in AASHTO, HDM, SCSS, CTSSD, and CPSS guidelines and standards:

- AASHTO American Association of State Highway and Transportation Officials – A Policy on Geometric Design of Highways and Streets – 2011, 6th edition
- HDM Caltrans Highway Design Manual
- SCSS Stanislaus County Department of Public Works – Standards and Specification – 2014 Edition
- CTSSD City of Turlock Standard Specifications and Drawings – March 2008
- CPSS City of Patterson Standard Specifications and Improvement Standards – May 2011

[3] *Source: City of Patterson General Plan – Land Use, Circulation Plan Diagram and Standards*
[4] *Source: City of Turlock, The Westside Industrial Specific Plan*

Table 3: Design Criteria Comparison Table

		AASHTO		HDM		Stanislaus County[3]	City of Turlock	City of Patterson	Proposed SCC
		Rural	Urban	Rural	Urban				
1	*Design Speed, V (mph)*	60-75	30-60	70-80	50-70	55	45-50	HDM	60
2	*Minimum Lane Width (ft)*	12	11[2]	12	12	12	12	12	12
3	*Minimum Shoulder Width, inside/outside (ft)*	4 / 8	0-4 / 0-8	5-10 / 10	5-10 / 10	8-10 / 4-10	0 / 0-8	0 / 5-8	5 / 10
4	*Median Width (ft)*	12-30	0-10	62	36-62	8-20	16	0-16	38
5	*Bridge Width, undivided 4-lane (ft)*	36[1]	32[1]	39[1]	39[1]	-	-	-	-
6	*Horizontal Alignment*								
	Minimum Radius *(ft)*	1,000-1,790	188-1,000	2,100-3,900	850-2,100	HDM	HDM	1100	2200
	Minimum Radius, normally crowned	11,800-16,400	353-11,800	20,000	20,000	-	-	-	20,000
7	*Vertical Alignment*								
	Standard for Vertical Curvature	AASHTO	AASHTO	HDM	HDM	HDM	HDM	HDM	HDM
	Minimum Length of Vertical Curve *(ft)*	3V	3V	10V	10V	10V	10V	10V	10V
8	*Grades*								
	Profile Grade, Min. *(%)*	0.3	0.5	0.3	0.3	0.2	HDM	0.30	0.30
	Profile Grade, Max. *(%)*	3.0	8.0-5.0	3.0	3.0	10.0	HDM	HDM	4
9	*Stopping Sight Distance (ft)*	570-820	200-570	750-930	430-750	HDM	HDM	HDM	580 (HDM)
10	*Normal Cross Slope (%)*	1.5-2.0	1.5-3.0	2.0	2.0	2.0	2.0	2.0	2
11	*Superelevation*								
	Maximum Superelevation Rate *(%)*	12	12	10	10	HDM	HDM	HDM	10
	Superelevation Distribution	Method 5	Method 2 or 5	HDM	HDM	HDM	HDM	HDM	HDM
12	*Horizontal Clearances (ft)*	36-46	N/A	30	30	HDM	HDM	HDM	30
13	*Vertical Clearances (ft)*	16	16	16.5	16.5	HDM	HDM	HDM	16.5

[1]Individual structures for each direction
[2]12' preferred
[3]Includes City of Newman

6. ALTERNATIVE ANALYSIS

Screening Criteria and Performance Measures

The screening criteria developed and used to evaluate the alternatives in the Study were derived from the key goals of the Study identified in the "Purpose and Need" previously discussed. The performance measures for each criterion were drawn from the various preliminary studies summarized in the "Preliminary Studies" section of this Study and attached in the Appendix. Table 4 lists the screening criteria and performance measures used. The following is a description of each criterion and associated performance measures:

Criterion A – Provides an Efficient Movement of People:

- **Origin-Destination Travel Times:** The origin-destination of future travel times for each of the alternatives were analyzed originating from the SR 99/West Main Street interchange traveling westbound to three destinations based on the distribution of future traffic volumes.[5]

  1. I-5/Fink Road Interchange
  2. I-5/Sperry Avenue Interchange
  3. North Patterson at Zacharias

  The travel times were analyzed based on the fastest path from the SR 99/West Main Street interchange in Turlock to the three destinations. The percent change in travel times from SR 99 to I-5 were measured and scored.

- **Impact to Miles Traveled:** The impact to miles traveled for each of the alternatives was analyzed from the SR 99/West Main Street interchange traveling westbound to three destinations:

  1. I-5/Fink Road Interchange
  2. I-5/Sperry Avenue Interchange
  3. North Patterson at Zacharias

  The miles traveled were analyzed based on the shortest path from the SR 99/West Main Street interchange in Turlock to the three destinations and then compared to the mileage of the existing SCC route to determine the level of impact. The percent change in miles traveled for each alternative was measured and scored.

- **Average Daily Traffic (ADT) Impacts to Sperry Avenue:** The future ADT of Sperry Avenue in the No-Build condition was used as the baseline to measure against all alternatives.[6] This analysis was performed to measure the impacts to the congestion of Sperry Avenue, since one of the key goals of the proposed new SCC is to relieve congestion along the existing SCC route, which primarily occurs along Sperry Avenue. The percent change in ADT compared to the No-Build condition for each alternative was measured and scored.

- **Number of Road Connections:** This performance measure considers every road connection along each alignment because traffic operations are impacted by the number of access points to a facility regardless of whether they are signal controlled or not. However, for the sake of the

[5] *Existing and Future Traffic Conditions Report – Table 10, June 29, 2015 prepared by TJKM*
[6] *Existing and Future Traffic Conditions Report – Figures 3 through 7, June 29, 2015 prepared by TJKM*

cost estimate, only the intersections classified as a "major roadway"[7] were included for proposed signalization. The percent change in the number of road connections compared to the No-Build condition for each alternative was measured and scored.

Table 4: Screening Criteria and Performance Measures

Screening Criteria	Weight	Performance Measure
A. Provides an Efficient Movement of People	**7.0%**	• Origin-Destination Travel Times • Impact to miles traveled • Average Daily Traffic (ADT) Impacts to Sperry Road • # of road connections
B. Provides an Efficient Movement of Goods and Services	**10%**	• Increase in Truck % on W. Main Street • Impact to miles traveled
C. Enhances Local, Regional and Statewide Connectivity	**12%**	• Increase in Average Daily Traffic (ADT) • Impact to miles traveled
D. Improves Safety	**26%**	• Average Level of Service (LOS) per alignment • Average Daily Traffic (ADT) reduction on Sperry Rd due to traffic on new SCC • Impact to miles traveled
E. Improves Air Quality and Noise	**7.0%**	• # of sensitive buildings (i.e. schools, homes, etc.) within a 500-foot buffer • Supports existing local Agency multi-modal plans • Average Daily Traffic (ADT) reduction on Sperry Rd due to traffic on new SCC
F. Promotes an increase in Local and Regional Investments	**9.0%**	• Soils suitable for ease of construction • # of miles of alignment within a floodplain
G. Supports the Land Uses Designated in the General Plans	**8.0%**	• Increase in Average Daily Traffic (ADT) • # of miles within areas with land use designated as industrial, commercial or residential.
H. Minimizes Impacts to Environmental Resources	**9.0%**	• Biological Resources Vulnerability • Acres of Wetlands Impacted • Cultural Resources Vulnerability • Hazardous Sites • Acres of Farmlands Impacted
I. Cost Effectiveness	**12.0%**	• Cost Performance Index (Performance/Cost)
	100.0%	

[7] *Stanislaus County General Plan – Circulation Diagram*

Criterion B – Provides an Efficient Movement of Goods and Services:

- **Increased Truck % on West Main Street:** The future percentage of trucks on West Main Street under the No-Build condition was used as the baseline for comparing all alternatives.[8] This approach was taken to measure the impacts along West Main Street, since all alternatives utilize this segment of the corridor. The percent change in the percentage of trucks on West Main Street compared to the No-Build condition for each alternative was measured and scored.

Criterion C – Enhances Local, Regional, and Statewide Connectivity:

- **Increase in Average Daily Traffic (ADT):** The average future ADT of the existing SCC route in the No-Build condition was used as the baseline for comparing all alternatives.[9] This approach was used for measuring the impacts of the proposed conceptual alignments on the entire corridor. The results are expressed as a percent change in future average ADT.

Criterion D – Improves Safety:

- **Average Level of Service (LOS):** The LOS were given the following numerical values in order to obtain a quantitative result: (LOS A=1, LOS B=2, LOS C=3, LOS D=4, LOS F=5). As a result, the baseline (No-Build) LOS average was determined where all alternatives were scored relative to this baseline.[10] The percent change in average LOS was measured and scored. Increased average LOS denotes an increase in congestion. Studies have shown that increased congestion increases the number of congestion related accidents, such as rear end collisions.

Criteria E – Improves Air Quality and Noise:

- **Number of sensitive structures:** This performance measure tallies the sensitive receptors (schools, homes, etc.) within a 500-foot buffer on each side of the centerline along each alignment. Only one structure was counted per parcel.
- **Supports existing local agency multi-modal plans:** This performance measure totals the number of miles of planned Class 1, 2, or 3 bike facilities within an alternative.

Criteria F – Promotes an Increase in Local and Regional Investments:

- **Soils suitable for ease of construction:** This performance measure considers Soil Classification Numbers ranging from 1 to 4, which were assigned to the five different soil groups identified in the Preliminary Geotechnical Memorandum.[11] These ratings are based on the soil group's assumed strength and shrink-well potential properties presented in the USDA soil surveys that would affect their bearing capacity. The soil group with the lowest number (Rating 1) is identified to be the most favorable for local roads and streets. Subgrade soil types with coarser material (sand/gravel) will typically have higher R-values, and thus will require a thinner pavement section, which would be more economically favorable. The finer (clay/silt) materials typically have lower strength (lower R-Values) than the granular materials, and thus would require relatively thicker (i.e., more costly) pavement sections to support the predicted traffic loads. Additionally, the alignments founded on clay soils may be prone to larger shrink-swell potential, which may require mitigation and additional cost. The average Soil

[8] *Existing and Future Traffic Conditions Report – Table 9, June 29, 2015 prepared by TJKM*
[9] *Existing and Future Traffic Conditions Report – Figures 3 through 7, June 29, 2015 prepared by TJKM*
[10] *Existing and Future Traffic Conditions Report – Figures 3 through 7, June 29, 2015 prepared by TJKM*
[11] *Preliminary Geotechnical Memorandum – Table 3, June 30, 201 prepared by WRECO*

Classification Number was measured and scored for each alternative.

- **Number of miles of the alignment within a floodplain:** This performance measure tallies the number of miles an alignment is contained within a floodplain.[12] Alignments with lengthy roadway segments within floodplain areas were deemed to have potential higher mitigation costs.

Criteria G – Supports the Land Uses Designated in the General Plans:

- **Number of miles within areas with land use designated as industrial, commercial or residential:** This performance measure accounts for the number of miles an alignment is within a designated land use. The greater number of miles an alignment is contained within a land use area designated as industrial, commercial or residential were deemed to better support the General Plans due to assumed increase in development.

Criteria H – Minimizes Impacts to Environmental Resources:

- **Biological Resources Vulnerability:** This performance measure accounts for the number of listed species based on California Natural Diversity Database (CNDDB) records within a 500-foot buffer on each side of the centerline along each alignment. Alignments were scored based on the number of CNDDB occurrences, where an alignment with a low number of occurrences received a better score.
- **Acres of Wetlands in Buffer:** This performance measure tallies the number of acres an alternative is contained within a wetland located within a 500-foot buffer on each side of the centerline along each alignment. The greater acreage of wetland impacts, the lower the score of the alignment.
- **Cultural Resources Vulnerability:** A cultural resources vulnerability index (CV) was developed to assess potential effects to cultural resources within a 500-foot buffer on each side of the centerline along each alignment.
- **Hazardous Sites (Clean-up sites within buffer):** This performance measure considers the number of hazardous clean-up sites contained within a 500-foot buffer on each side of the centerline along each alignment. The greater number of sites, the lower the score of the alignment.
- **Farmland:** This performance measure accounts for the number of impacted acres of farmland outside of the existing public right of way and within a 500-foot buffer on each side of the centerline along each alignment.[13] All farmland designated as Important Farmland[14] was included. The Study does not involve an investigation of impacts on Williamsons Act[15] parcels; therefore, farmland was not included within the existing public right of way. Instead, only the farmland within the required new public right of way for each alternative was considered.

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[12] *Preliminary Hydrology, Floodplain, and Water Quality Technical Memo, August 3, 2015 prepared by WRECO*
[13] *Environmental Constraints Memorandum, June 25, 2015 prepared by LSA*
[14] *Important Farmland is defined as Prime Farmland, Unique Farmland, Farmland of Statewide Importance, and Farmland of Local Importance.*
[15] *The Williamson Act is a California law that provides relief of property tax to owners of farmland and open-space land in exchange for a ten-year agreement that the land will not be developed or otherwise converted to another use.*

Criteria I – Cost Effectiveness: A Cost Performance Index (CPI) was used as oppose to "cost" alone for this performance measure, due to the sensitivity of cost with all criteria. The CPI was employed, as it is an important methodology used in value engineering (VE) for defining a project's value. The primary goal of VE is to improve project value, which is similar to the goal of this Study (i.e. determine the value of a new SCC). VE defines "Project Value" as "Performance/Cost" per the Caltrans Value Analysis Team Leader Guide (2013), which is the CPI used in this Study. As in VE, the CPI is a means to quantify a project's value that is determined by comparing costs and performance (i.e. costs vs benefits) in way that can assist decision makers in making better decisions.

Paired Comparison Summary

To determine the weight of importance of each criterion, the Study used the paired comparison analysis method to provide a framework for comparing each criterion against all others, and helped to show the difference in importance between factors. Each stakeholder scored each criterion based on the difference in importance between other criterion, scoring from zero (no difference/same importance) to three (major difference/one much more important than the other). The paired comparison worksheet used for the Study is shown below in Table 5.

This process resulted in performance measures that are defendable and logical to the stakeholders. The results of the stakeholders' weighted criteria are presented in Table 6.

Level 1 Screening

Input from the first of three public workshops resulted in 97 conceptual alignment alternatives that span the entire length of the corridor study area, as shown in Figure 2. The 97 alternatives are comprised of various combinations of 31 individual conceptual roadway segments, as described in Table 7.

In order to efficiently evaluate these 97 conceptual alternatives, a two-step screening process was used – Level 1 Screening and Level 2 Screening. The 97 alternatives were evaluated during the Level 1 screening based on the criteria shown in Table 8.

The 97 conceptual alignment alternatives were sorted into 12 groups containing sub-groups of alternatives, as shown in Table 9. For example, Group 1 is comprised of the sub-group of alignment alternatives 1A, 1B, thru 1F, while Alternative 1A, for example, consist of segments 1, 12, 17, 18, and 19. With the exception of the No-Build alternative, the 12 groups of conceptual alternatives are color-coded.

A Level 1 Screening Analysis Matrix was developed to organize and tabulate the screening process. Alternatives in the Level 1 Screening were evaluated on how well they met the performance criteria specified in Table 8 according to the following point system:

1 = Disagree. Low/No improvement or unacceptable/negative impact
2 = Neutral. Moderate/Marginal improvement or tolerable impact
3 = Agree. High/Substantial improvement or acceptable/positive impact

For details of the scoring justifications and results, see the Level 1 Screening Analysis Matrix in Appendix A.

Table 5: Paired Comparison Worksheet

	Criteria	A	B	C	D	E	F	G	H	I
		Criteria / Relative Importance								
A	Provides an Efficient Movement of People									
B	Provides an Efficient Movement of Goods and Services									
C	Enhances Local, Regional and Statewide Connectivity									
D	Improves Safety									
E	Improves Air Quality and Noise									
F	Promotes an Increase in Local and Regional Investments									
G	Supports the Land Uses Designated in the General Plan(s)									
H	Minimizes Impacts to Environmental Resources									
I	Cost Effective									

Importance Rating: 1 = slightly more important; 2 = moderately more important; 3 = much more important

	Criteria	Total	Rank	Weight
A	Provides an Efficient Movement of People			
B	Provides an Efficient Movement of Goods and Services			
C	Enhances Local, Regional and Statewide Connectivity			
D	Improves Safety			
E	Improves Air Quality and Noise			
F	Promotes an Increase in Local and Regional Investments			
G	Supports the Land Uses Designated in the General Plan(s)			
H	Minimizes Impacts to Environmental Resources			
I	Cost Effective			
	Totals			

Instructions:

1. Within each of the blank cells under "Criteria/Relative Importance", compare the criteria in the row with the criteria in the column. Decide which of the two criterion is most important.
2. Enter the letter of the most important criteria in the cell. Then, enter your score of the difference in importance between the criterion per the following Importance Rating:
   - 1 = slightly more important
   - 2 = moderately more important
   - 3 = much more important

Table 6: Weighted Criteria

	Criteria	Newman	Patterson	StanCOG	Stanislaus	Turlock	Public	All Stakeholder Groups		
		Stakeholder Summary	Stakeholder Summary	Stakeholder Summary	Stakeholder Summary	Stakeholder Summary	Stakeholder Summary	Total	Rank	Weight
A	Provides an Efficient Movement of People	8	4	5	8	4	1	29.7	9	7%
B	Provides an Efficient Movement of Goods and Services	6	7	2	9	18	0	42.3	4	10%
C	Enhances Local, Regional and Statewide Connectivity	17	5	4	10	11	2	49.3	3	12%
D	Improves Safety	24	13	24	18	7	22	108.0	1	26%
E	Improves Air Quality and Noise	0	5	14	0	1	11	30.5	8	7%
F	Promotes an Increase in Local and Regional Investments	15	8	0	4	7	4	37.7	5	9%
G	Supports the Land Uses Designated in the General Plan(s)	3	4	12	2	9	5	34.5	7	8%
H	Minimizes Impacts to Environmental Resources	3	5	19	1	1	8	36.7	6	9%
I	Cost Effective	21	4	7	15	1	4	52.3	2	12%
	Totals	97	54	87	67	59	57	421.0		100%

Figure 2: Level 1 Screening - Map of Alternatives

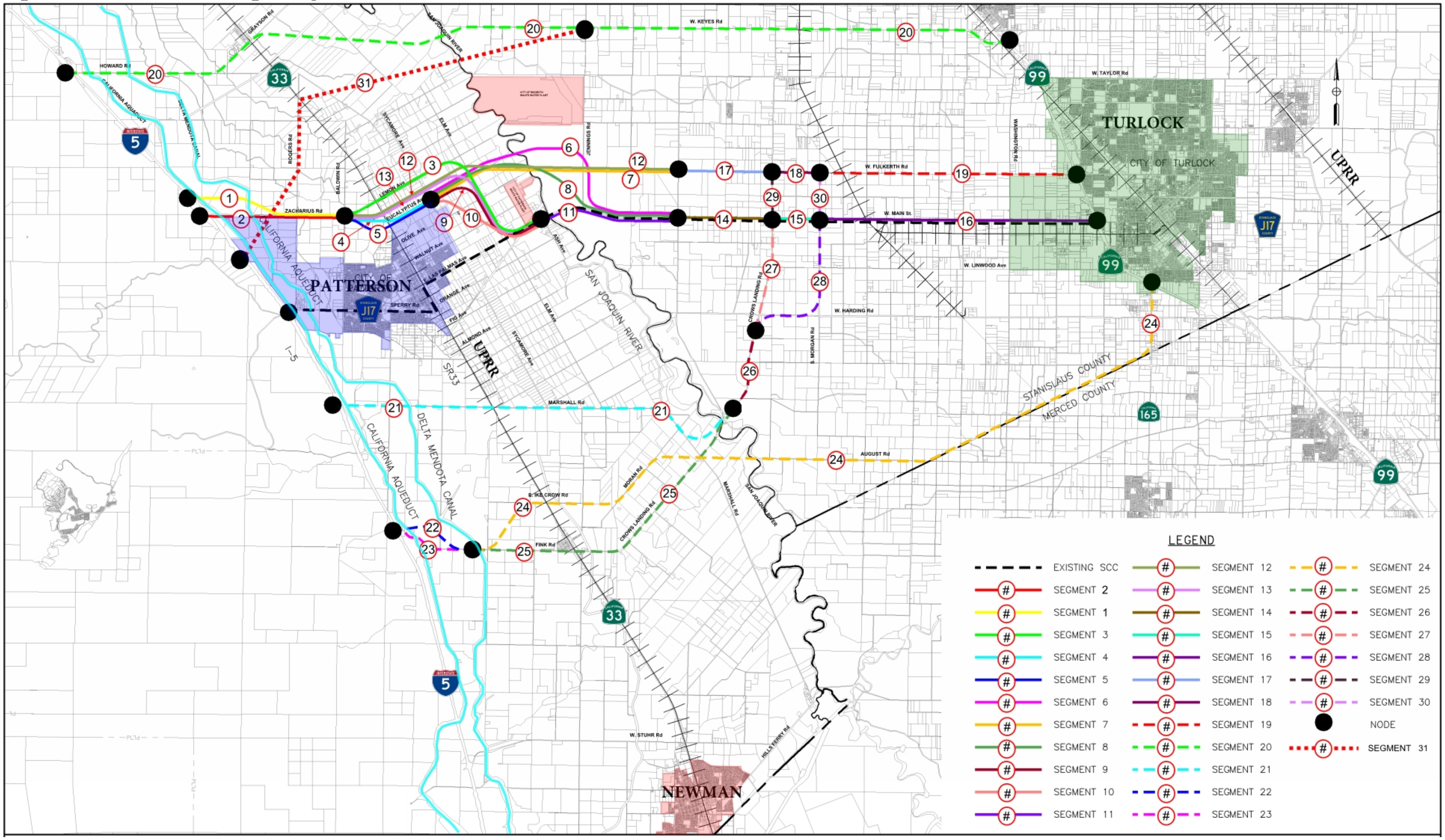


Table 7: Level 1 Screening - Segment Legend for Alternative Alignments

SEGMENT #	NAME OF ROAD	FROM	TO	miles	min
Existing	South County Corridor	I-5	SR99	18.6	23.6
1	New Road Connection/ Zacharias Road	I-5	Baldwin Rd	3.4	3.7
2	Zacharias Road	I-5	Baldwin Rd	3.1	3.3
3	Lemon Ave/ Elm Ave	Baldwin Rd	Ash Ave	5.2	5.7
4	Zacharias Road/ Eucalyptus Ave	Baldwin Rd	Sycamore Ave	1.9	2.1
5	Eucaplyptus Ave	Baldwin Rd	Sycamore Ave	2.1	2.2
6	Eucaplyptus Ave/ New Road/ Jennings Rd	Sycamore Ave	S Carpenter Rd	6.3	6.9
7	Eucaplyptus Ave/ New Road/ W Fulkerth Rd	Sycamore Ave	S Carpenter Rd	5.4	5.9
8	Eucaplyptus Ave/ New Road Connection	Sycamore Ave	S Carpenter Rd	5.7	6.2
9	Eucaplyptus Ave/ Elm Ave	Sycamore Ave	Ash Ave	3.0	3.2
10	New Road	Sycamore Ave	Ash Ave	2.5	2.8
11	Las Palmas Ave	Ash Ave	S Carpenter Rd	3.0	3.2
12	New Road/ W Fulkerth Rd	Baldwin Rd	S Carpenter Rd	7.3	8.0
13	New Road/ Elm Ave	Baldwin Rd	Ash Ave	5.1	5.5
14	E Main Ave	S Carpenter Rd	Crows Landing Rd	2.0	2.2
15	E Main Ave	Crows Landing Rd	S Morgan Rd	1.0	1.1
16	E Main Ave	S Morgan Rd	SR99	5.8	6.4
17	W Fulkerth Rd	S Carpenter Rd	Crows Landing Rd	2.0	2.2
18	W Fulkerth Rd	Crows Landing Rd	S Morgan Rd	1.0	1.1
19	W Fulkerth Rd	S Morgan Rd	SR99	5.4	5.9
20	Howard Rd/ Grayson Rd/ W Keys Rd	I-5	SR99	19.7	21.5
21	New Road Connection/ Marshall Rd	I-5	S Carpenter Rd	9.0	9.8
22	New Road Connection	I-5	Bell Rd	1.8	2.0
23	Fink Rd	I-5	Bell Rd	1.8	2.0
24	New Rd/ Ike Crow Rd/ Moran Rd/ August Rd/ SR165	Bell Rd	CA99	17.1	18.7
25	Fink Rd/ Crows Landing Rd	Bell Rd	S Carpenter Rd	7.0	7.6
26	Crows Landing Rd	S Carpenter Rd	W Harding Rd	1.8	2.0
27	Crows Landing Rd	W Harding Rd	E Main Ave	2.4	2.6
28	W Harding Rd/ S Morgan Rd	Crows Landing Rd	E Main Ave	3.3	3.6
29	Crows Landing Rd	E Main Ave	W Fulkerth Rd	1.0	1.1
30	S Morgan Rd	E Main Ave	W Fulkerth Rd	1.0	1.1
31	New Roadway Connection/ Rogers Rd	Zacharius Rd	W. Keyes Rd	10.3	11.2

Table 8: Level 1 Screening - Criteria

Criteria 1A: Purpose and Need & Key Project Goals	Criteria 1B: Constructability / Operational Feasibility
A. Most likely provides an efficient movement of goods and people for all modes of travel statewide.	A. Most likely minimizes environmental impacts and concerns (i.e. jobs, corridor demographics, homes, cultural resources, population growth and distribution projections, existing and future development)
B. Most likely improves safety through the roadway widening and improvements, limiting access to the expressway facility and divided traffic lanes.	B. Most likely reduces the amount of resources required to achieve improved conditions in the corridor by the utilization of existing local roads
C. Most likely enhances local, regional, interregional and statewide connectivity.	C. Not likely to require excessive cost to construct (i.e. floodplain impacts, right of way acquisitions, complex structures, etc.)
D. Most likely improves air quality and noise.	D. Not likely to result in an excessive reduction to County and State inventory of Important Farmland, Williamson Act Contracted lands, and active agricultural lands.
E. Most likely promotes an increase in local and regional investments.	E. Not likely to result in excessive relocations/real property acquistions of residential and/or businesses, or physically divide established communities.
F. Most likely promotes the support of General Plans applicable within the project limits (i.e. compatible with planned zoning and land uses).	
G. Most likely will reduce travel times within the corridor and the total vehicle-hours traveled in the corridor during peak traffic times	

Table 9: Level 1 Screening - Legend for Alternative Alignments

# of Alts	Alternative #		Segments							miles	min
1	NO-BUILD									18.6	23.6
2	1	A	1	12	17	18	19			19.1	20.8
3		B	1	12	17	18	30	16		20.5	22.4
4		C	1	12	17	29	15	16		20.5	22.4
5		D	2	12	17	18	19			18.8	20.5
6		E	2	12	17	18	30	16		20.2	22.0
7		F	2	12	17	29	15	16		20.2	22.0
8	2	A	1	3	11	14	15	16		20.4	22.3
9		B	1	3	11	14	15	30	19	21.0	22.9
10		C	1	3	11	14	29	18	19	21.0	22.9
11		D	2	3	11	14	15	16		20.1	21.9
12		E	2	3	11	14	15	30	19	20.7	22.5
13		F	2	3	11	14	29	18	19	20.7	22.5
14	3	A	1	13	11	14	15	16		20.2	22.1
15		B	1	13	11	14	15	30	19	20.8	22.7
16		C	1	13	11	14	29	18	19	20.8	22.7
17		D	2	13	11	14	15	16		19.9	21.7
18		E	2	13	11	14	15	30	19	20.5	22.4
19		F	2	13	11	14	29	18	19	20.5	22.4
20	4	A	1	4	6	14	15	16		20.5	22.3
21		B	1	4	6	14	15	30	19	21.0	22.9
22		C	1	4	6	14	29	18	19	21.0	23.0
23		D	1	4	8	14	15	16		19.9	21.7
24		E	1	4	8	14	15	30	19	20.4	22.3
25		F	1	4	8	14	29	18	19	20.4	22.3
26		G	2	4	6	14	15	16		20.1	22.0
27		H	2	4	6	14	15	30	19	20.7	22.6
28		I	2	4	6	14	29	18	19	20.7	22.6
29		J	2	4	8	14	15	16		19.5	21.3
30		K	2	4	8	14	15	30	19	20.1	21.9
31		L	2	4	8	14	29	18	19	20.1	21.9
32	5	A	1	5	6	14	15	16		20.6	22.5
33		B	1	5	6	14	15	30	19	21.1	23.1
34		C	1	5	6	14	29	18	19	21.2	23.1
35		D	1	5	8	14	15	16		20.0	21.8
36		E	1	5	8	14	15	30	19	20.6	22.4
37		F	1	5	8	14	29	18	19	20.6	22.4
38		G	2	5	6	14	15	16		20.3	22.1
39		H	2	5	6	14	15	30	19	20.8	22.7
40		I	2	5	6	14	29	18	19	20.8	22.7
41		J	2	5	8	14	15	16		19.7	21.5
42		K	2	5	8	14	15	30	19	20.2	22.1
43		L	2	5	8	14	29	18	19	20.2	22.1
44	6	A	1	4	7	17	18	19		19.1	20.8
45		B	1	4	7	17	18	30	16	20.5	22.4
46		C	1	4	7	17	29	15	16	20.5	22.4
47		D	1	5	7	17	18	19		19.2	21.0
48		E	1	5	7	17	18	30	16	20.6	22.5
49		F	1	5	7	17	29	15	16	20.7	22.5
50		G	2	4	7	17	18	19		18.8	20.5
51		H	2	4	7	17	18	30	16	20.2	22.0
52		I	2	4	7	17	29	15	16	20.2	22.0
53		J	2	5	7	17	18	19		18.9	20.6
54		K	2	5	7	17	18	30	16	20.3	22.2
55		L	2	5	7	17	29	15	16	20.3	22.2

Table 9: Level 1 Screening - Legend for Alternative Alignments (continued)

# of Alts	Alternative #		Segments	miles	min
56	7	A	1 4 9 11 14 15 16	20.1	21.9
57		B	1 4 9 11 14 15 30 19	20.6	22.5
58		C	1 4 9 11 14 29 18 19	20.7	22.5
59		D	1 5 9 11 14 15 16	20.2	22.0
60		E	1 5 9 11 14 15 30 19	20.8	22.7
61		F	1 5 9 11 14 29 18 19	20.8	22.7
62		G	2 4 9 11 14 15 16	19.8	21.6
63		H	2 4 9 11 14 15 30 19	20.3	22.2
64		I	2 4 9 11 14 29 18 19	20.3	22.2
65		J	2 5 9 11 14 15 16	19.9	21.7
66		K	2 5 9 11 14 15 30 19	20.4	22.3
67		L	2 5 9 11 14 29 18 19	20.5	22.3
68	7	A	1 4 10 11 14 15 16	19.7	21.4
69		B	1 4 10 11 14 15 30 19	20.2	22.1
70		C	1 4 10 11 14 29 18 19	20.2	22.1
71		D	1 5 10 11 14 15 16	19.8	21.6
72		E	1 5 10 11 14 15 30 19	20.3	22.2
73		F	1 5 10 11 14 29 18 19	20.4	22.2
74		G	2 4 10 11 14 15 16	19.3	21.1
75		H	2 4 10 11 14 15 30 19	19.9	21.7
76		I	2 4 10 11 14 29 18 19	19.9	21.7
77		J	2 5 10 11 14 15 16	19.5	21.2
78		K	2 5 10 11 14 15 30 19	20.0	21.8
79		L	2 5 10 11 14 29 18 19	20.0	21.9
80	9	A	20	19.7	21.5
81		B	31 20	19.1	20.9
82	10	A	21 26 27 29 18 19	20.5	22.4
83		B	21 26 27 15 30 19	20.5	22.4
84		C	21 26 27 15 16	19.9	21.8
85		D	21 26 28 30 19	20.5	22.4
86		E	21 26 28 16	19.9	21.7
87	11	A	22 24	19.0	20.7
88		B	23 24	18.9	20.7
89	12	A	22 25 26 27 29 18 19	20.4	22.2
90		B	22 25 26 27 15 30 19	20.4	22.2
91		C	22 25 26 27 15 16	19.8	21.6
92		D	22 25 26 28 30 19	20.3	22.2
93		E	22 25 26 28 16	19.78	21.6
94		F	23 25 26 27 29 18 19	20.34	22.2
95		G	23 25 26 27 15 30 19	20.33	22.2
96		H	23 25 26 27 15 16	19.76	21.6
97		I	23 25 26 28 30 19	0.0	0.0
98		J	23 25 26 28 16	0.0	0.0

It is to be noted that none of the alignments containing Segment 19 (i.e. W. Fulkerth Rd from S. Morgan to SR 99) advanced from the Level 1 Screening. Since Fulkerth Road is Turlock's main east-west thoroughfare in the community, the City of Turlock asserts that to bring the SCC and citywide traffic to the Fulkerth Road/SR 99 interchange may overload its capacity. The City of Turlock also asserts that bringing the SCC through the Main Street/SR 99 interchange would most likely not result in the same traffic demands, as would the Fulkerth Road/SR 99 interchange.

Level 2 Screening

From the Level 1 Screening, the alternatives with the highest scores were advanced to the Level 2 screening, which resulted in the reduction of the 97 alternatives to 18. This reduction allowed more focused studies to be used as part of the Study. The Preliminary Studies were based on these 18 alternatives. A map of the individual 18 alternatives is located in Appendix C. A Level 2 Screening Analysis Matrix was developed to analyze the 18 alternatives that resulted from the Level 1 Screening. The Level 2 Screening Analysis Matrix tabulates and organizes the screening criteria, weighting, and performance measures previously established in order to evaluate the feasibility of the 18 alternatives relative to one another. Appendix B provides the detailed inputs and scoring associated with the Level 2 Screening Analysis Matrix. The performance measures were quantified utilizing data from the following studies provided in the Appendix:

- Existing and Future Conditions Traffic Report (Appendix I)
- Preliminary Environmental Constraints Technical Memo (Appendix J)
- Preliminary Geotechnical Memorandum (Appendix K)
- Preliminary Hydrology, Floodplain, and Water Quality Study Technical Memo (Appendix L)

The performance measures were weighted utilizing the Pair Comparison Method previously described. Each alternative was then evaluated based on the screening criteria and performance measures according to the following point system:

1 = Bottom Range (<25% of performance score)
2 = Low Range (26% - 50% of performance score)
3 = Middle Range (51% - 75% of performance score)
4 = Top Range (76% - 100% of performance score)

Table 10 summarizes the Level 2 results of the 18 alternatives along with their respective estimated construction costs.

Table 10: Level 2 Screening - Ranking Summary

Alternative	1B	1C	1E	1F	2A	2D	3A	3D	4A
Ranking	3	4	13	15	14	18	2	12	17
Cost ($MIL)	$261.3	$264.9	$272.6	$264	$268.4	$273.1	$268.8	$273.5	$269
Alternative	**4D**	**6B**	**6C**	**7A**	**7G**	**10C**	**10E**	**12E**	**12H**
Ranking	1	9	11	10	16	6	5	6	6
Cost ($MIL)	$265.8	$277.9	$277.2	$272.6	$269.5	$228.7	$224.5	$219.8	$215

Table 11 lists the "Top 10" ranking alignments from the Level 2 Screening.

Table 11: Level 2 Screening - Top 10 Alignments

Alternative	1B	1C	3A	4D	6B	7A	10C	10E	12E	12H
Ranking	3	4	2	1	9	10	6	5	6	6
Cost ($MIL)	$261.3	$264.9	$268.8	$265.8	$277.9	$272.6	$228.7	$224.5	$219.8	$215

In summary, the top ten ranking alignments are comprised of six northern alignments and four southern alignments. These 10 alternatives were presented to the public for review and comment at the third group of public workshops. A map of the individual top 10 alternatives is located in Appendix D. Table 12 summarizes some of the key features of these 10 alternatives.

The results of the Level 2 alternative analysis were carefully reviewed to understand the outcome. As part of this review, it was noted that Alternative 4A was ranked 17th, while 4D was ranked first, despite the fact that the alternatives appear to be very similar in many cases.

Table 12: Key Features of Top 10 Alternatives

Key Features	Unit	1B	1C	3A	4D	6B	7A	10C	10E	12E	12H
Alignment Length	miles	20.2	20.5	19.9	19.5	20.2	19.8	19.9	19.9	19.8	19.8
Important farmland impacted	acres	2966	2983	2934	3126	2982	2955	1806	1859	1871	1759
Right of way acquisitions	acres	209	214	181	174	173	162	156	156	147	129
Buildings impacted (schools, homes, businesses, etc.)	each	160	179	200	177	170	202	173	153	224	244
Increase/Decrease of traffic congestion on Sperry Ave	%	-26%	-26%	-8%	-8%	-26%	-8%	+4%	+4%	-8%	-8%
Increase in Truck Volumes on W. Main Street	%	237%	237%	191%	191%	237%	191%	105%	105%	122%	122%
New roads required	miles	7.9	8.2	5.3	4.8	4.2	3.3	2.6	2.6	1.8	0
Alignment within areas with land use designations as industrial, commericial, or residential	miles	8	8	8	7	7	7	3	3	3	3
Wetlands impacted	acres	114	113	38	44	122	38	57	57	66	71
Decrease in number of local road connections	%	45%	45%	39%	45%	41%	39%	25%	30%	23%	18%
Alignment within a floodplain	miles	4	4	5	7	5	6	5	5	4	4
Estimated Construction Cost ($Millions)	$MIL	$203.9	$206.1	$218.9	$218.0	$230.2	$228.2	$185.7	$181.6	$179.3	$179.4
Estimated Right of Way Cost ($Millions)	$MIL	$57.4	$58.8	$49.9	$47.9	$47.7	$44.4	$43.0	$42.9	$40.5	$35.6
Est. Construction Cost (includes right of way)	$MIL	$261.3	$264.9	$268.8	$265.9	$277.9	$272.6	$228.7	$224.5	$219.8	$215.0

This difference is attributed to the additional 0.6-mile length of Alternative 4A. The length of each alternative was used in the performance measure for "Impact to miles traveled" and, as a result, 4A was ranked significantly lower than 4D. In addition, the cost similarities of 4A and 4D require further explanation as well. The cost of 4A is approximately $4 million greater than 4D, which is expected, since it is 0.6-mile longer and requires additional right of way. Maps of alignments 4A and 4D can be viewed in the "Map of Top 10 Alternatives" in Appendix D.

The rankings of Alternatives 1B and 1C also require further explanation due to the two 90-degree intersections contained within their alignments that connect to Fulkerth Road. Intuitively, it is not expected that any alignment with two 90-degree intersections would perform well as the third and fourth ranked alternatives, but the performance measures do not account for such geometric features. In addition, the 90-degree geometric features were based on public input while recognizing that the project is in the early planning and conceptual schematic stage. However, it should be noted that the 90-degree intersections in these two alignments are conceptual and could be replaced with smooth horizontal curves that would be more in line with the results of the alternative analysis. This concept should be evaluated in future project development phases of the project (e.g. during the Project Study Report (PSR) and/or the Project Approval and Environmental Document (PA&ED) phases) to ensure that a feasible and efficient design is employed.

7. COST ESTIMATES

The cost estimates developed for the Study include construction and right of way costs only. No support costs (e.g. PSR, PA&ED, and Final Design) are included. Table 13 provides a summary of the cost estimates for the top 18 alternatives. The highest estimated cost alternative is 6B at $277.9 Million. The lowest cost alternative is 12H at $215 Million.

Table 13: Alternative Cost Estimate Summary

# of Alternatives	Alternative	Cost
1	1B	$261,280,000
2	1C	$264,950,000
3	1E	$272,630,000
4	1F	$264,060,000
5	2A	$268,390,000
6	2D	$273,110,000
7	3A	$268,830,000
8	3D	$273,550,000
9	4A	$269,030,000
10	4D	$265,840,000
11	6B	$277,930,000
12	6C	$277,220,000
13	7A	$272,640,000
14	7G	$269,500,000
15	10C	$228,700,000
16	10E	$224,520,000
17	12E	$219,810,000
18	12H	$214,990,000

For this Study, the associated cost estimates for each alternative are justified as follows:

- Excavation – Excavation costs included roadway and intersection costs for the structural section only. Excavation for the interchanges was not included as part of roadway excavation, but incorporated under each applicable structure, as shown in the cost estimates in Appendix N "Alternative Cost Estimates".
- Bridge structures – The cost for all bridge structures were based on the Caltrans 2015 Comparative Bridge Costs and sound engineering judgement.
- Undercrossing structures – The cost for all undercrossing structures were based on the Caltrans 2015 Comparative Bridge Costs and sound engineering judgement.
- Right of Way Acquisition – Right of way required for each alignment was estimated and an assigned value per acre was obtained by the Stanislaus County Assessors Maps.
- Environmental Mitigation – Mitigation cost cannot reasonably be assessed with the limited data that was available for the Study. Environmental mitigation for such things as biological and cultural resources can be very costly. Therefore, we have attempted to capture such unknown costs, such as mitigation measures, in the contingencies, which is currently set at 50%, per the Caltrans PDPM Chapter 20 Section 2 Article 2. These costs will be explored in greater detail as part of the PA&ED phase.

The Study employed costs associated with the SR 99/West Main Avenue Interchange Project Study Report-Project Development Support (PSR-PDS), SR 99/Kiernan Interchange Project, and other interchange projects to assist in the development of the cost estimates for the proposed new interchange at I-5. The cost estimate for a new interchange at I-5 is similar to the proposed SR 33 and Union Pacific Railroad (UPRR) overcrossings, because at these locations SR 33 and UPRR would function as interchanges. The grade separations at SR 33 and UPRR would need to provide access to the new SCC via an interchange configuration.

Site conditions and grade differences at I-5 have been accounted for in our cost estimates. The grade difference between Northbound I-5 and Southbound I-5 is reflected properly within the reasonableness of a feasibility study, since survey data is not available. The new interchange at I-5 assumes an undercrossing in lieu of an overcrossing, because we assume constructability issues related to the overcrossing would be the more costly alternative. Therefore, all excavation/borrow costs for the interchanges are included under each applicable structure, as shown in our cost estimates. We have assigned an estimated cost of $20 million to cover costs related to the interchanges only (i.e. earthwork, ramps, ramp intersections, etc.). To help verify the reasonableness of the developed costs for the interchanges, the 2012 bid results associated with the SR 99/Kiernan interchange were used as a basis for comparison. The average bid for the SR 99/Kiernan interchange was $26 million, which included additional work for road reconstruction outside of the limits of the interchange's footprint, where approximately $15 million can be attributed to the interchange alone (i.e. bridge, ramps, ramp intersections, earthwork, etc.). This cost falls within the range of average costs for basic interchanges. Approximately $4 million of the $15 million is attributed to the bridge alone for the SR 99/Kiernan interchange. As the structural elements in our cost estimates only cover the cost of the structure (i.e. $3.1 M), $20 million was added to bring the interchange cost to a more reasonable level ($23 million) to address the issues of large excavations, constructability issues, retaining walls to minimize right of way acquisitions and farmlands impacts, etc. This cost should include all typical items to construct a fully functional interchange.

The existing I-5/Fink Road interchange was estimated as a replacement. The existing I-5/Fink

Road undercrossings are currently three-spans with columns on each side of the existing two-lane Fink Road that travels beneath it. The existing I-5/Fink Road interchange would not accommodate the planned four-lane expressway and would need to be replaced in its entirety. There would be extensive stage construction required to replace these undercrossings (e.g. I-5 traffic northbound and southbound crossovers with one lane open to both northbound and southbound directions). The extent of the costs associated with complex staging cannot be determined during this Study; therefore, the Study assumes a common magnitude of cost with all interchanges at I-5, which have their own specific high cost related issues (e.g. $20 million). In addition, there are commercial development land use designations on both sides of the interchange; therefore, it was estimated that the expressway would extend under I-5 to the southbound on and off ramps. This allows the worst-case scenario to be captured in this feasibility study per Caltrans Project Development Procedures Manual (PDPM), Chapter 20, Section 2, Article 2 "Project Feasibility Cost Estimate" (2014).

Regarding signalization costs, only intersections with a classification as a major road were included for proposed signalization, per the County's General Plan – Circulation Diagram.

The Caltrans PDPM, Chapter 20, Section 2, Article 2 recommends contingencies between 30 and 50 percent during the feasibility study phase. A 50 percent contingency was used for this Study.

In addition, the Caltrans PDPM, Chapter 20, Section 2, Article 2 states that "existing facilities thought to be adequate may become inadequate because of changes to standards, new data, further deterioration prior to construction, or other factors". Therefore, the Study assumes the full replacement of the existing roadways. Costs for bridge removal, although minor, have been added to the cost estimate. Costs for any export materials are included in the 50 percent contingency used for our estimates.

8. COMMUNITY INVOLVEMENT

Three public workshop groups were planned and executed for the Study in each of the Cities of Newman, Patterson, and Turlock, resulting in a total of nine (9) workshops conducted for this Study. In addition, presentations of the draft and final Study were presented to various StanCOG Committees, StanCOG Policy Board, Stanislaus County Board of Supervisors, and the City Councils of the Cities of Newman, Patterson, and Turlock.

Workshop Group 1

The first group of workshops was held in Patterson, Newman, and Turlock at the following dates and locations:

Workshop Group 1	
Date	**Location**
January 14, 2015	**City Council Chambers - Newman**
January 15, 2015	**City Council Chambers - Turlock**
January 28, 2015	**Hammon Senior Center - Patterson**

The first workshops were intended to provide a project introduction, as well as gather input on the purpose and need statement and initial conceptual alignments. As a result of public input, 97 alternatives were generated. The Stanislaus Valley Vision website with a Virtual Workshop received over 3,000 visits and has generated seven new alignments. The first outreach meeting in Newman had approximately 20 participants. Turlock had a slightly smaller number. The Patterson outreach meeting had approximately 70 participants. Overall, the feedback on the outreach itself was very positive.

Participants were able to review the preliminary conceptual routes and suggest alternatives at two stations. Tracing paper was provided for people to draw their own conceptual alignments for consideration. Dot stickers were also made available to allow the public to express their preferences, opinions, or input on the conceptual alignments depicted on display boards.

Workshop Group 2

The second group of workshops was held in Newman, Patterson, and Turlock at the following dates and locations:

Workshop Group 2	
Date	**Location**
April 28, 2015	**Hammon Senior Center - Patterson**
April 29, 2015	**City Council Chambers - Newman**
April 30, 2015	**City Council Chambers - Turlock**

This second group of workshops was intended to gather public input on the screening criteria and performance measures for the evaluation of alternative alignments utilizing a pair comparison approach. During the workshop, the public was asked to rank six criteria in order of overall importance. The overall results from the public outreach are summarized below:

1. Improve Safety (50%)
2. Improve Air Quality and Noise (19%)
3. Minimize Impacts to Environmental Resources (15%)
4. Promotes an Increase in Local and Regional Investments by supporting the General Plan(s) applicable within the project (8%)
5. Cost Effective (8%)
6. Enhances Connectivity, Providing Efficient Movement of Goods and Services (Locally, Regionally and Statewide) (0%)

This priority ranking did vary from city to city. The major difference in Patterson was that "Improve Air Quality and Noise" was ranked number 1.

In Newman, "Enhances Connectivity, Providing Efficient Movement of Goods and Services (locally, regionally, and statewide)" was ranked number 2 and "Improve Air Quality and Noise" was ranked last.

The only other concern expressed at the public meetings by both Patterson and Newman residents was on the topic of goods movement, specifically truck traffic and how they were being accounted for in the Study. Residents wanted to ensure the project addressed where truck traffic was originating from and where it was going.

Workshop Group 3

The third and final group of workshops was held in Newman, Patterson, and Turlock at the following dates and locations:

Workshop Group 3	
Date	**Location**
September 1, 2015	**City Council Chambers - Turlock**
September 2, 2015	**Hammon Senior Center - Patterson**
September 3, 2015	**City Council Chambers - Newman**

This third group of workshops was intended to gather public input on the results of the alternative analysis. The public was presented with the top 10 conceptual alignments to review and provide a ranking of their top three alternatives. The public's results are summarized as follows:

- Results of public voting at the Public Workshop in Newman:
  - 1st Choice: 4D (score of 70)
  - 2nd Choice: 12H (score of 68)
  - 3rd Choice: 12E (score of 60)
- Results of public voting at the Public Workshop in Patterson:
  - 1st Choice: 1B (score of 46)
  - 2nd Choice: 4D (score of 38)
  - 3rd Choice: 12H (score of 36)
- Results of public voting at the Public Workshop in Turlock:
  - 1st Choice: 4D (score of 54)
  - 2nd Choice: 3A (score of 26)
  - 3rd Choice: 7A (score of 22)
  - 3rd Choice: 12H (score of 22)
- Results of public voting online:
  - 1st Choice: 4D
  - 2nd Choice: 7A
  - 3rd Choice: 1B

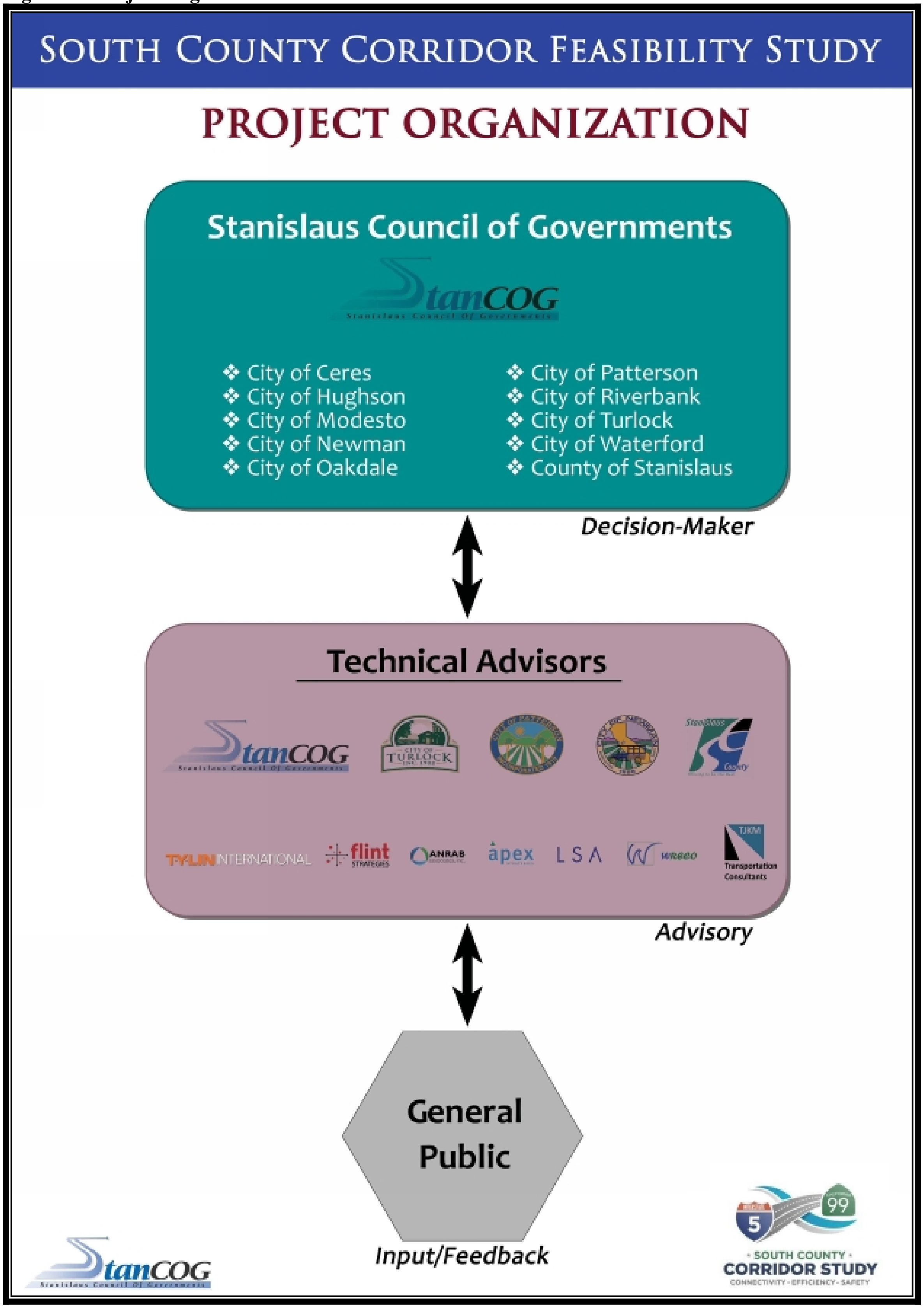
Other Outreach Efforts

Presentations to local clubs such as Rotary and Lions Clubs have been conducted throughout the Study's development. These smaller efforts also include the Chamber of Commerce, Farm Bureau, and more targeted outreach for the Spanish-speaking residents of the County.

9. PROJECT DEVELOPMENT TEAM

The Project Development Team (PDT) for this Study consisted of representatives from StanCOG, Stanislaus County, the cities of Patterson, Newman, and Turlock, and the consultant team. For a list of individual PDT members, see Appendix O. As illustrated in Figure 3, the PDT functioned as the Technical Advisors to StanCOG for the Study while incorporating public input and feedback.

Figure 3: Project Organization



10. PRELIMINARY STUDIES

Traffic Analysis

The traffic analysis was based on the 18 SCC conceptual alignments resulting from the Level 2 Screening analysis. In order to provide a comparative analysis of the alignments selected to be included in the feasibility analysis, the traffic analysis aggregated the 18 Level 2 alternatives into four alternative corridors for the year 2035: Alternatives 0, 1, 2, 3 and 4, where Alternative 0 is designated as the existing route. The four alternative corridors begin at the West Main Street/SR 99 interchange in the City of Turlock and proceed westerly to various I-5 connections near the City of Patterson. The corridors are described as follows:

Alternative 0 – Sperry Avenue Corridor: The existing travel route between SR 99 and I-5 follows W. Main Street in Turlock to Las Palmas Avenue, to SR 33, then to Sperry Avenue in Patterson.

Alternative 1 – Fink Road Corridor: Between SR 99 and I-5, follows W. Main Street in Turlock to Crows Landing Road, south on Crows Landing Road to SR 33, where the street name changes to Fink Road and terminates at the existing I-5/Fink Road Interchange.

Alternative 2 – Marshall Road Corridor: Between SR 99 and I-5, follows W. Main Street in Turlock to south on South Morgan Road to west on Harding Road to south on Crows Landing Road to west on Marshall Road, where Marshall Road currently ends at Ward Avenue. This alignment continues west on a proposed new alignment and terminates at a proposed new interchange connection at I-5.

Alternative 3 – Zacharius Road Corridor: Between SR 99 and I-5, follows W. Main Street in Turlock to Las Palmas Avenue, north along Elm Avenue to west on Eucalyptus Avenue to SR 33, where it connects to Zacharius Road. Continues on the existing Zacharius Road alignment to a proposed new interchange connection to I-5.

Alternative 4 – Fulkerth Road Corridor: Between SR 99 and I-5, follows W. Main Street in Turlock to South Morgan Road, north to Fulkerth Road, then west on Fulkerth Road, which terminates at Vivian Road. Continues through farmland on a proposed extended alignment of Fulkerth Road to a new proposed San Joaquin River bridge crossing. West of the river, the alignment continues westerly until it connects to Eucalyptus Avenue, where it connects to Zacharius Road. Continues on the existing Zacharius Road alignment to a proposed new interchange connection to I-5.

Existing Traffic Conditions:

The existing traffic data was provided by Stanislaus County, the City of Turlock, the City of Patterson, and ongoing studies of the proposed Crows Landing Industrial Business Park (CLIBP) to determine ADT, truck percentages, traffic collision rates, and existing LOS. The existing traffic data illustrated in Table 14 for each segment shows the ADT, LOS, truck percentages, average speeds, segment length in miles, and the collision rate per million vehicle-miles of travel. Collisions rates were obtained from the Statewide Integrated Traffic Records System (SWITRS) database. Of the 30 segments shown in Table 14, 19 segments had available data, 10 did not have available data, and three of the segments are proposed new alignments, thus having no data.

Existing Accident Data

Collisions reported at study roadway segments were obtained from the SWITRS database for a period of three years from January 2012 to December 2014. There was no accident data available for Alternative 0 – Sperry Avenue Corridor. An accident summary of the remaining alternative corridors is as follows:

- *Alternative 1 – Fink Road Corridor:* As shown in Table 15, the total number of collisions in the Fink Road alternative corridor is 26, with Fink Road, between I-5 and Carpenter Road, having 76 percent of the collisions. Of the collisions, the dominant type was hitting a fixed object. There were 13 total injuries and one fatality.
- *Alternative 2 – Marshall Road Corridor:* As shown in Table 16, the total number of collisions in the Marshall Road alternative corridor is 20. Marshall Road had 15 total collisions, mostly broadside and hitting a fixed object. In this alternative, there were a total of 13 injuries and one fatality on Crows Landing.

Table 14: Existing Traffic Data By Segment[16]

Segment #	Miles	# of lanes	Count Date	ADT Total	Segment LOS	Collision Rate	Speed	Truck %
1	3.1	2	2010	150	A	3.93	-	11.6
2	3.4	-	New Alignment					
3	5.2	2	Not Available				-	-
4	1.9	2	Not Available				-	-
6	6.3	2	Not Available				-	-
7	5.4	2	2014	1500	B	0.34	47	11.9
8	5.7	2	Not Available				-	-
9	4.5	2	2005	9550	D	0.56	-	-
11	3	2	2009	9800	D	0.00	47	11.9
12	7.3	-	New Alignment					
13	5.1	-	New Alignment					
14	2	2	2014	4800	C	0.10	43	14.1
15	1	2	2015	6600	B	0.00	53	7.8
16	5.8	2	2015	7700	D	0.00	49	-
17	2	2	Not Available				-	-
18	1	2	Not Available				-	-
21	9	2	2014	150	A	10.15	-	5.25
22	1.8	2	Not Available				-	-
23	1.8	2	2014	1400	A	6.89	-	17.9
25	7	2	2014	2050	B	0.06	-	14.9
26	1.8	2	2015	6700	C	0.38	-	-
27	2.4	2	2014	5250	C	0.07	-	13.9
28	3.3	2	Not Available				-	-
29	1	2	Not Available				-	-
30	1	2	Not Available				-	-
31	28	4	2013	42500	C	0.42	65	24.9
32	14.5	2	2013	9600	C	2.42	65	9.5
33	1	6	2013	102000	E	0	65	26
34	3.3	6	2013	81000	C	0	65	26
35	1.8	6	2013	87000	D	2.75	65	26
36	1.6	6	2013	77000	C	3.46	65	26
37	3.2	2	2013	11563	D	1	45	18

[16] *Existing and Future Traffic Conditions Report – Figure 1, June 29, 2015 prepared by TJKM*

Table 15: Alternative 1 - Fink Road Corridor Accident Data[17]

Segment #	Intersection	From	To	Total	Collision Type									Injury	Fat.
					Head On	Side Swipe	Rear end	Broad -side	Hit Object	Ped	Bike	Over-turned	Other		
23	Fink Rd.	I-5	Bell Rd.	19	0	3	2	1	9	0	0	4	0	8	0
25	Fink Rd./ Crows Landing Rd.	Bell Rd.	S. Carpenter Rd.	1	0	0	1	0	0	0	0	0	0	0	0
26	Crows Landing Rd.	S. Carpenter Rd.	W. Harding Rd.	5	1	0	0	0	3	0	0	1	0	4	1
27	Crows Landing Rd.	W. Harding Rd.	E. Main Ave.	1	0	0	0	0	0	0	0	1	0	1	0
			Totals	**26**	**1**	**3**	**3**	**1**	**12**	**0**	**0**	**6**	**0**	**13**	**1**

Table 16: Alternative 2 - Marshall Road Corridor Accident Data[18]

Segment #	Intersection	From	To	Total	Collision Type									Injury	Fat.
					Head On	Side Swipe	Rear end	Broad-side	Hit Object	Ped	Bike	Over-turned	Other		
21	Marshall Rd.	I-5	S. Carpenter Rd.	15	0	2	0	6	5	1	0	1	0	9	0
26	Crows Landing Rd.	S. Carpenter Rd.	W. Harding Rd.	5	1	0	0	0	3	0	0	1	0	4	1
			Totals	**20**	**1**	**2**	**0**	**6**	**8**	**1**	**0**	**2**	**0**	**13**	**1**

[17] *Existing and Future Traffic Conditions Report – Table 3, June 29, 2015 prepared by TJKM*
[18] *Existing and Future Traffic Conditions Report – Table 4, June 29, 2015 prepared by TJKM*

- *Alternative 3 – Zacharias Road Corridor:* As shown in Table 17, the total number of collisions in the Zacharias Road alternative corridor is 34. Collisions were distributed throughout the segments between Zacharias Road to Eucalyptus Avenue/Elm Avenue. Most of the collisions were due to broadside and hitting a fixed object. In this alternative, there were a total of 16 injuries and five fatalities.
- *Alternative 4 – Fulkerth Road Corridor*[19]*:* As shown in Table 18, the total number of collisions in the Fulkerth Road alternative corridor is 41. Since the segments are very similar to Alternative 3, the same collisions were recorded west of Fulkerth Road. East of Carpenter Road, there were eight accidents, which were due to broadside and hitting fixed objects. There were more injuries in the section east of Carpenter Road. In this alternative, there were a total of 29 injuries and seven fatalities.

Due to a lack of available accident data, a comprehensive analysis between alternatives for collision data for future conditions is not provided. In general, the proposed alignment segments under existing conditions are two-lane roadways. Per the Caltrans Collision Data on California State Highways,[20] the statewide collision rate for two and three lane roadways is 1.78 per million vehicles per mile (MVM). With all alternatives, except for the No-Build alternative (i.e. the existing alignment), the proposed improvement would convert the two-lane roadways to four-lane expressways. There is not a strong relationship between existing and future conditions, road characteristic differences, and proposed new roads in the alternatives. Therefore, it can be assumed, the collision rate under the Caltrans standard for a four-lane expressway would be similar to the statewide collision rate of 0.63 MVM, thus an improvement to the two-lane roadway existing SCC route.

Existing Commute Patterns

In the San Joaquin Valley, the counties of San Joaquin, Stanislaus and Merced serve as bedroom communities for many people seeking affordable owner occupied housing within automobile commuting range of the Bay and Sacramento areas. Stanislaus County has experienced an estimated 3.5 percent growth in population since the 2010 census,[21] with an approximate population of 532,000 people. In addition, the county is considered an international agricultural business powerhouse, with farmers in the county exporting more than 133 commodities to 102 countries around the world[22]. Paired together, the movement of people and goods throughout the county produces significant travel on the roadways to get around within the region and throughout California. As shown in Figure 4, the general distribution of existing traffic originating from Turlock heading west is 10 percent to the south on I-5, 45 percent to the north on I-5, and 45 percent to Patterson. As shown in Figure 5, the general distribution of existing traffic originating from northbound I-5 is nine percent to Turlock using Crows Landing Road and 91 percent to Patterson. Finally, as shown in Figure 6, the general distribution of existing traffic originating from southbound I-5 is 43 percent to Turlock and 57 percent to Patterson using the existing SCC route.

[19] *Existing and Future Traffic Conditions Report – Table 6, June 29, 2015 prepared by TJKM*
[20] *State of California Division of Transportation System information Collision Data on California State Highways (Road Miles, Travel, Collisions, Collision Rates)*
[21] *Existing and Future Traffic Conditions Report, June 29, 2015 prepared by TJKM*
[22] *Existing and Future Traffic Conditions Report, June 29, 2015 prepared by TJKM*

Table 17: Alternative 3 - Zacharias Road Corridor Accident Data[23]

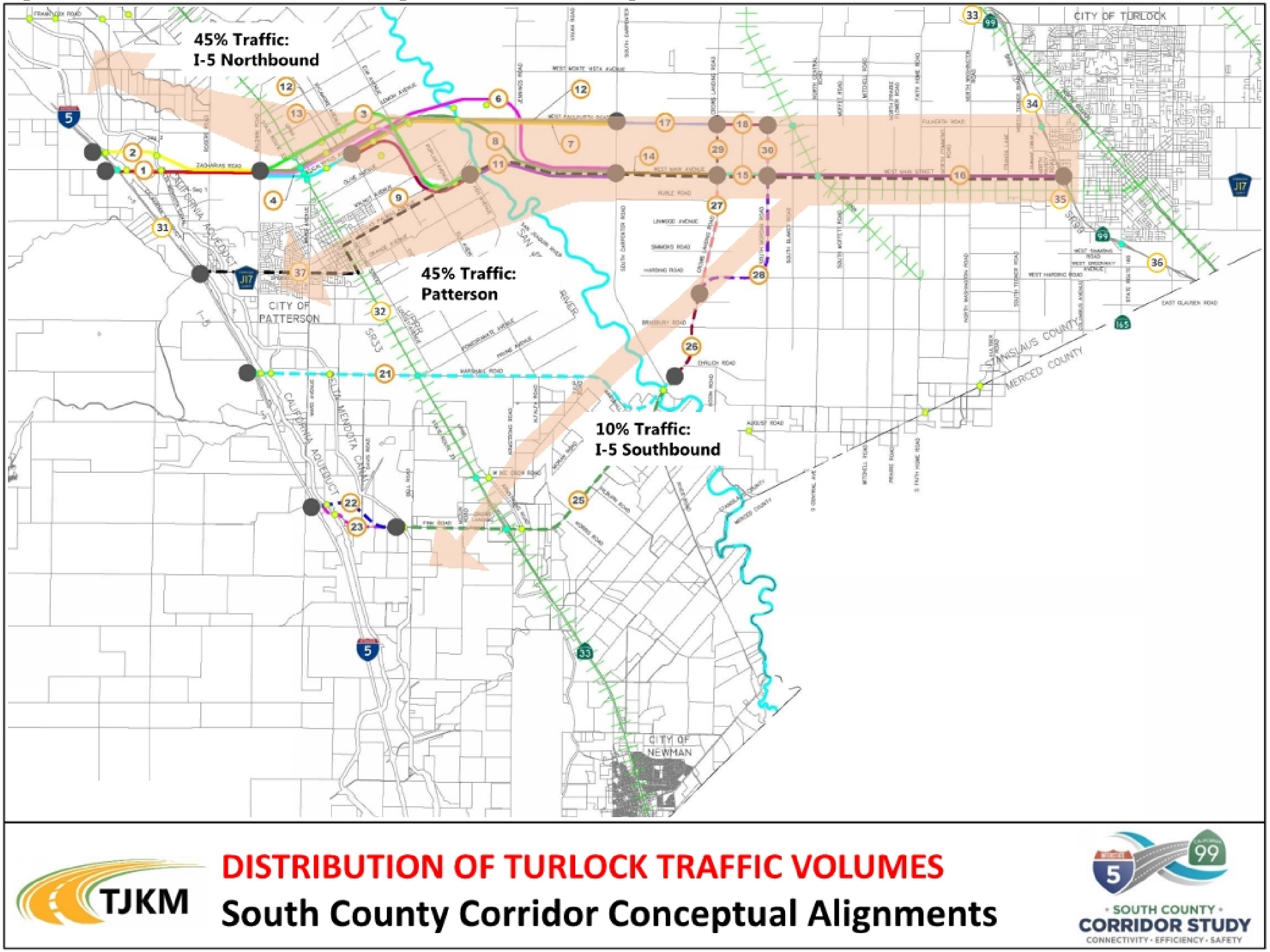
Segment #	Intersection	From	To	Total	Collision Type									Injury	Fat.
					Head On	Side Swipe	Rear end	Broad-side	Hit Object	Ped	Bike	Over-turned	Other		
1	Zacharias Rd.	I-5	Baldwin Rd.	2	0	0	0	0	2	0	0	0	0	1	0
2	New Road Connection/ Zacharias Road	I-5	Baldwin Rd.	2	0	0	0	0	2	0	0	0	0	1	0
3	Lemon Ave./ Elm Ave.	Baldwin Rd.	Ash Ave.	6	0	1	1	1	2	0	0	1	0	4	0
4	Zacharias Road/ Eucalyptus Ave.	Baldwin Rd.	Sycamore Ave.	3	0	0	0	1	2	0	0	0	0	6	1
6	Eucalyptus Ave./ Jennings Rd.	Sycamore Ave.	S. Carpenter Rd.	6	0	1	2	3	0	0	0	0	0	1	1
7	Eucalyptus Ave./ W Fulkerth Rd.	Sycamore Ave.	S. Carpenter Rd.	3	0	1		2	0	0	0	0	0	1	1
8	Eucalyptus Ave.	Sycamore Ave.	S. Carpenter Rd.	6	0	1	2	3	0	0	0	0	0	1	1
9	Eucalyptus Ave./ Elm Ave.	Sycamore Ave.	Ash Ave.	5	0	1	0	3	0	0	0	1	0	1	1
11	Las Palmas Ave.	Ash Ave.	S. Carpenter Rd.	0	0	0	0	0	0	0	0	0	0	0	0
14	E. Main Ave.	S. Carpenter Rd.	Crows Landing Rd.	1	0	0	0	1	0	0	0	0	0	0	0
Totals				**34**	**0**	**5**	**5**	**14**	**8**	**0**	**0**	**2**	**0**	**16**	**5**

[23] *Existing and Future Traffic Conditions Report – Table 5, June 29, 2015 prepared by TJKM*

Table 18: Alternative 4 - Fulkerth Road Corridor Accident Data

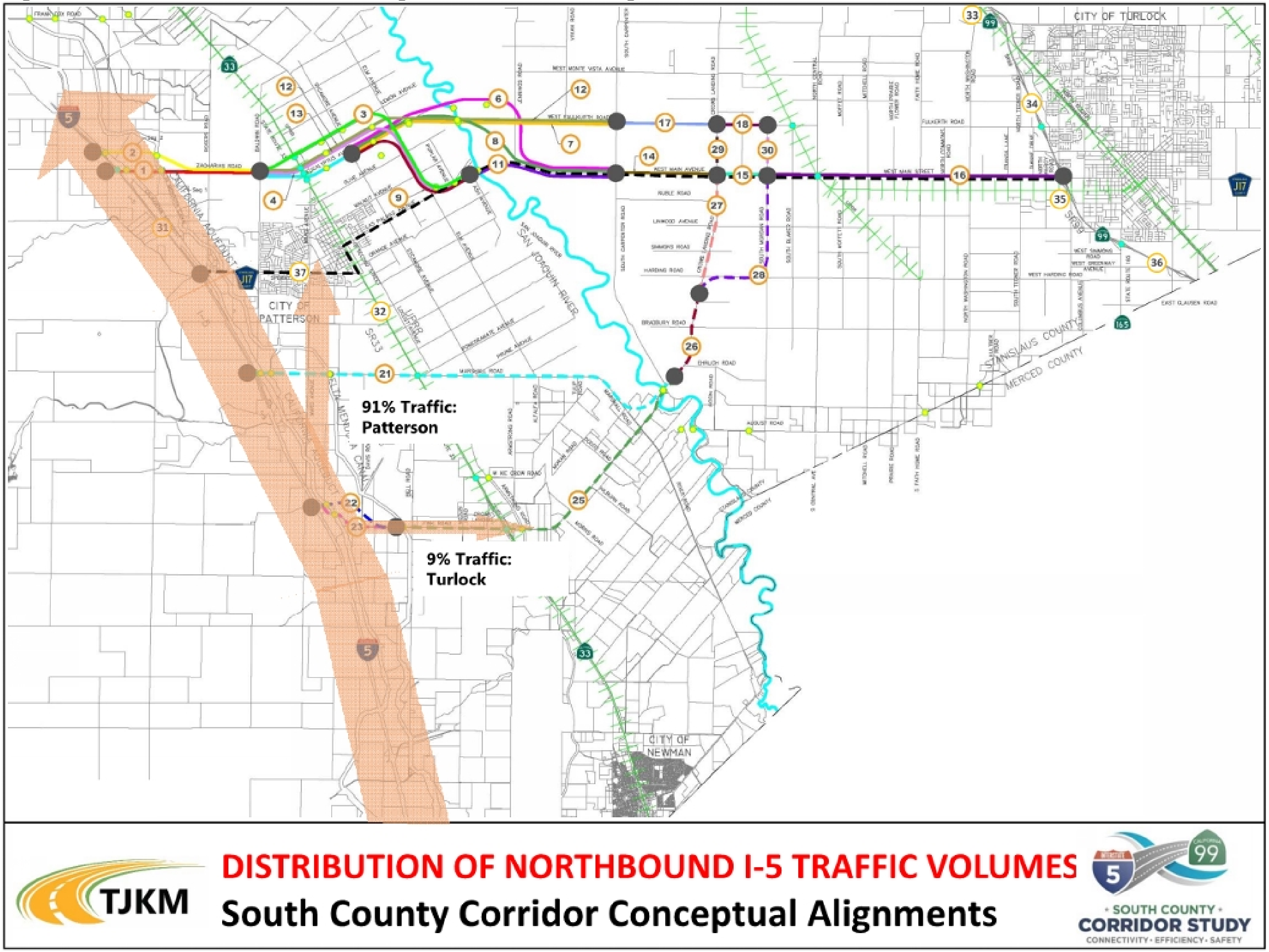
Segment #	Intersection	From	To	Total	Collision Type									Injury	Fat.
					Head On	Side Swipe	Rear end	Broad-side	Hit Object	Ped	Bike	Over-turned	Other		
1	Zacharias Rd.	I-5	Baldwin Rd.	2	0	0	0	0	2	0	0	0	0	1	0
2	New Road Connection/ Zacharias Road	I-5	Baldwin Rd.	2	0	0	0	0	2	0	0	0	0	1	0
3	Lemon Ave./ Elm Ave.	Baldwin Rd.	Ash Ave.	6	0	1	1	1	2	0	0	1	0	4	0
4	Zacharias Road/ Eucalyptus Ave.	Baldwin Rd.	Sycamore Ave.	3	0	0	0	1	2	0	0	0	0	6	1
5	Eucalyptus Ave./ Jennings Rd.	Sycamore Ave.	S Carpenter Rd.	6	0	1	2	3	0	0	0	0	0	1	1
6	Eucalyptus Ave./ W Fulkerth Rd.	Sycamore Ave.	S Carpenter Rd.	3	0	1		2	0	0	0	0	0	1	1
7	Eucalyptus Ave.	Sycamore Ave.	S Carpenter Rd.	6	0	1	2	3	0	0	0	0	0	1	1
8	Eucalyptus Ave./ Elm Ave.	Sycamore Ave.	Ash Ave.	5	0	1	0	3	0	0	0	1	0	1	1
12	New Road/ W Fulkerth Rd.	Baldwin Rd.	S Carpenter Rd.	3	0	0	0	1	2	0	0	0	0	6	1
13	New Road/ Elm Ave.	Baldwin Rd.	Ash Ave.	5	0	0	0	2	2	0	0	1	0	7	1
Totals				**41**	**0**	**5**	**5**	**16**	**12**	**0**	**0**	**3**	**0**	**29**	**7**

Figure 4: General Distribution of Existing Traffic Volumes – Origin Turlock[24]



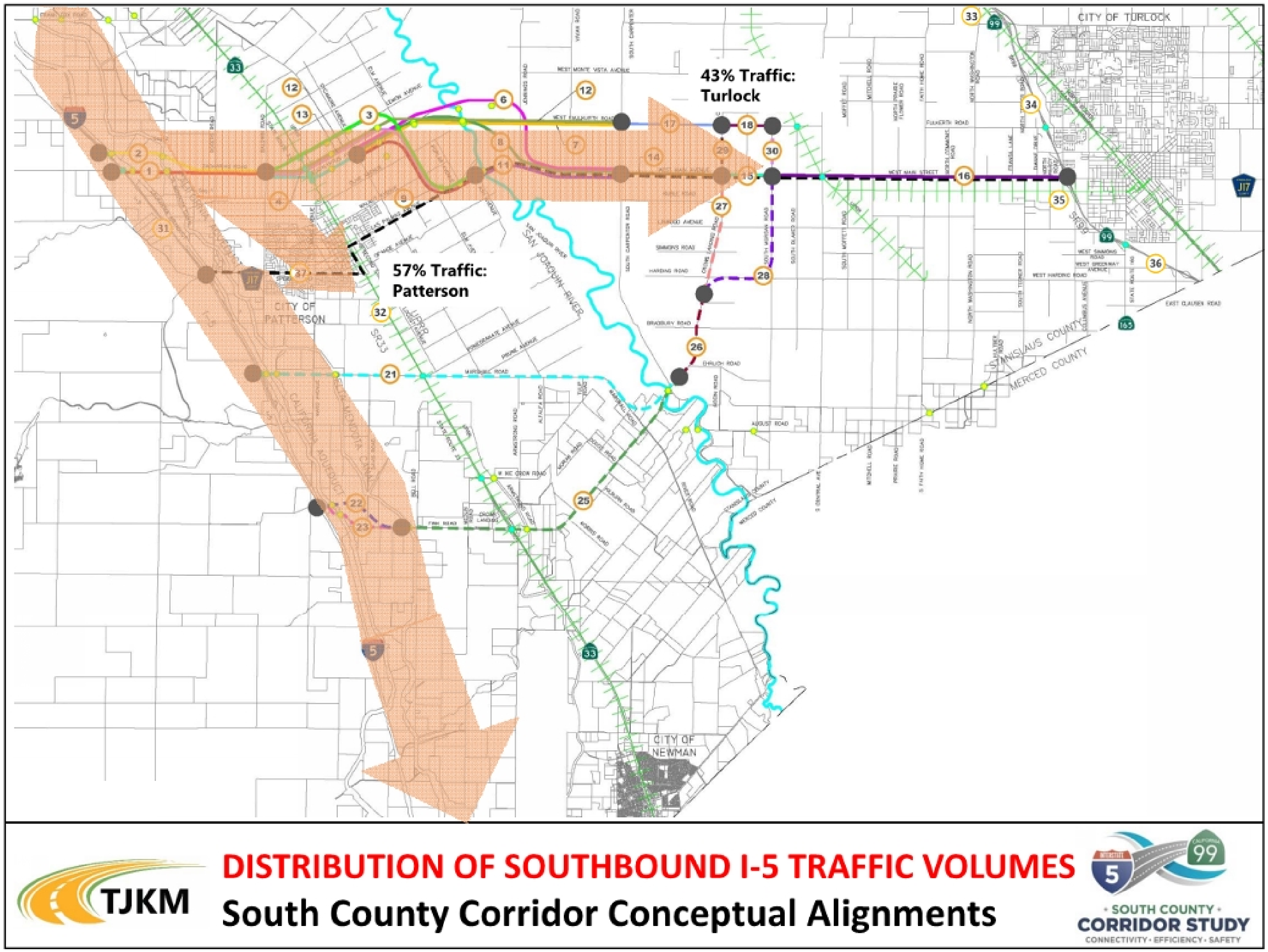
[24] *Existing and Future Traffic Conditions Report, Figure 2, June 29, 2015 prepared by TJKM*

Figure 5: General Distribution of Existing Traffic Volumes – Origin Northbound I-5[25]



[25] *Existing and Future Traffic Conditions Report, Figure 2A, June 29, 2015 prepared by TJKM*

Figure 6: General Distribution of Existing Traffic Volumes – Origin Southbound I-5[26]



[26] *Existing and Future Traffic Conditions Report, Figure 2B, June 29, 2015 prepared by TJKM*

People Movement

Per the University of the Pacific Eberhardt School of Business Forecasting Center Report (2014) entitled "*An Analysis of Commuting Patterns in the North San Joaquin Valley* (NSJV)", 77 percent of Stanislaus County residents work within the county, 11 percent work outside of the county but in the NSJV, nine percent commute to the Bay Area, and three percent commute to other locations, such as east of the NSJV, the Sacramento area, or other areas south of the NSJV. The characteristics of the three cities in the South County Corridor are represented below:

- In the City of Turlock, 29% of its employed residents work in Turlock, 14% of its residents work in Modesto, and 1% travel to work in Patterson and Newman.
- In Patterson, 12% of its employed residents work in Patterson, 6% work in Modesto, 2% of its residents work in Turlock, and less than 1% work in Newman.
- In Newman, 8% of its employed residents work in Newman, 5% in Modesto, 3% in Turlock, and 3% in Patterson.

Goods and Services Movement[27]

Trucking is the dominant goods movement mode in the San Joaquin Valley where nearly 500 million tons of goods were moved in 2007. Given Stanislaus County's central location, the most important truck routes in the area, as well as in San Joaquin Valley, are SR 99 and I-5. These two facilities serve as primary corridors for moving goods and services between southern and northern California, as well as internationally from British Columbia, Canada to Baja California, Mexico. In 2007, the San Joaquin Valley Regional Planning Agencies drafted the San Joaquin Valley Goods Movement Action Plan. The plan identified the goods movement characteristics in the region, existing conditions, air quality, projects, and forecasted trends. The San Joaquin Valley Interregional Goods Movement Plan, completed in 2013, identified a future preferred goods movement system for the area implemented through a comprehensive interregional strategy.

Though the north-south corridors are important, east-west routes throughout the San Joaquin Valley are just as critical for inter-regional movement and pertinent in connecting the main arteries with I-5 and SR 99. Near the study area, SR 132 to the north and SR 140 to the south are also east west connectors. Since connecting to I-5 or SR 99 on these routes would add extra travel either over 10 miles north or south, trucks use West Main Street (i.e. existing SCC route) and other roadways as the direct connection between the cities of Turlock, Patterson, and Newman, thereby confirming a need for a new SCC alternative.

Figure 7 details the 2013 Annual Average Daily Truck Traffic on the California State Highway System for I-5, SR 33 and SR 99. Approximately 25 percent of the total vehicles are trucks on I-5, 10 percent on SR 33, and between 12 to 16 percent on SR 99. Of the truck traffic, five-axle trucks are dominant on I-5 and SR 99, while two-axle trucks are in the majority along SR 33.

[27] *Existing and Future Traffic Conditions Report, June 29, 2015 prepared by TJKM*

Figure 7: 2013 Project Highways Annual Average Daily Truck Traffic and Percentage[28]

Rte. #	Description	County	Truck AADT	Total Truck %	2 Axle		3 Axle		4 Axle		5 Axle	
					Vol.	% of AADT Total	Vol.	% of AADT Total	Vol.	% of AADT Total	Vol.	% of AADT Total
5	Junction Route 580 West	SJ	9052	24.80	1494	16.50	190	2.10	108	1.20	7260	80.20
5	Junction Route 140 East	MER	10044	24.90	1653	16.46	210	2.09	118	1.17	8063	80.20
33	Crows Landing, Crows Landing/Fink Road	STA	290	9.50	134	46.20	63	21.70	11	3.90	82	28.20
99	Modesto, Hatch Rd./9th	STA	12414	12.05	3288	26.49	662	5.33	302	2.43	8162	65.76
99	Faith Home Rd. (Keyes)	STA	12270	12.09	2640	26.49	550	4.48	222	1.81	8858	72.19
99	Taylor Road	STA	13040	16.30	3363	25.79	686	5.26	296	2.27	8695	66.68

AADT-Average Annual Daily Traffic
Vol. – Volume

Future Conditions:
The traffic forecasting model used for the Study with a base year of 2012 and forecast year of 2035 was the StanCOG CLIBP traffic forecasting model, which covers the three county areas of San Joaquin, Stanislaus, and Merced.

Traffic Forecast Results

Alternative 0 – Sperry Avenue Corridor: Figure 8 illustrates 2035 traffic volumes of the existing alignment along West Main Street to Sperry Avenue. As a two-lane roadway, 2035 volumes would vary from approximately 17,750 vehicles per day (vpd) near Turlock to approximately 18,150 vpd at Crows Landing Road. When the alignment meets Las Palmas Avenue near Patterson, the 2035 projected volumes increase to 36,150 vpd due to the access to SR 33, and to 26,600 vpd at Sperry Avenue.

Alternative 1 – Fink Road Corridor: Figure 9 illustrates 2035 traffic volumes of Fink Road, if constructed as a four–lane expressway. The 2035 volumes would vary from approximately 26,300 vpd near Turlock to approximately 25,000 vpd at Crows Landing Road. When the alignment turns south onto Crows Landing Road, over 20,000 vpd continue on West Main Street toward Patterson. On Crows Landing Road, the volumes are an average of 21,000 vpd south of West Main Street and north of Marshall Road. South of Marshall, the volumes drop to about 11,000 to 15,000 vpd range to the I-5 interchange.

Alternative 2 – Marshall Road Corridor: The Marshall Road alignment corridor, shown in Figure 10, is not effective at carrying traffic from SR 99 to I-5, even with a new interchange at I-5. Traffic volumes are similar to those in the Fink Road alignment corridor (Figure 9) until the alignment shifts onto Marshall Road. It appears most traffic is destined for CLIBP, and does not

[28] *Existing and Future Traffic Conditions Report, Table 8, June 29, 2015 prepared by TJKM*

use this corridor to reach I-5. Because the major destinations of cross-county traffic are either Patterson itself or destinations along I-5 to the north, this corridor does not attract through traffic.

Alternative 3 – Zacharias Road Corridor: Figure 11 shows that this corridor directs traffic from Turlock to Patterson on West Main Street until west of the San Joaquin River. At this point, traffic bound for I-5 north splits onto the expressway corridor with a large amount of traffic continuing towards Patterson. Future traffic volumes range from 28,500 vpd near Turlock to over 49,000 vpd crossing the San Joaquin River Bridge. At Las Palmas Avenue to I-5, the remaining volumes range between 11,000 to 14,000 vpd.

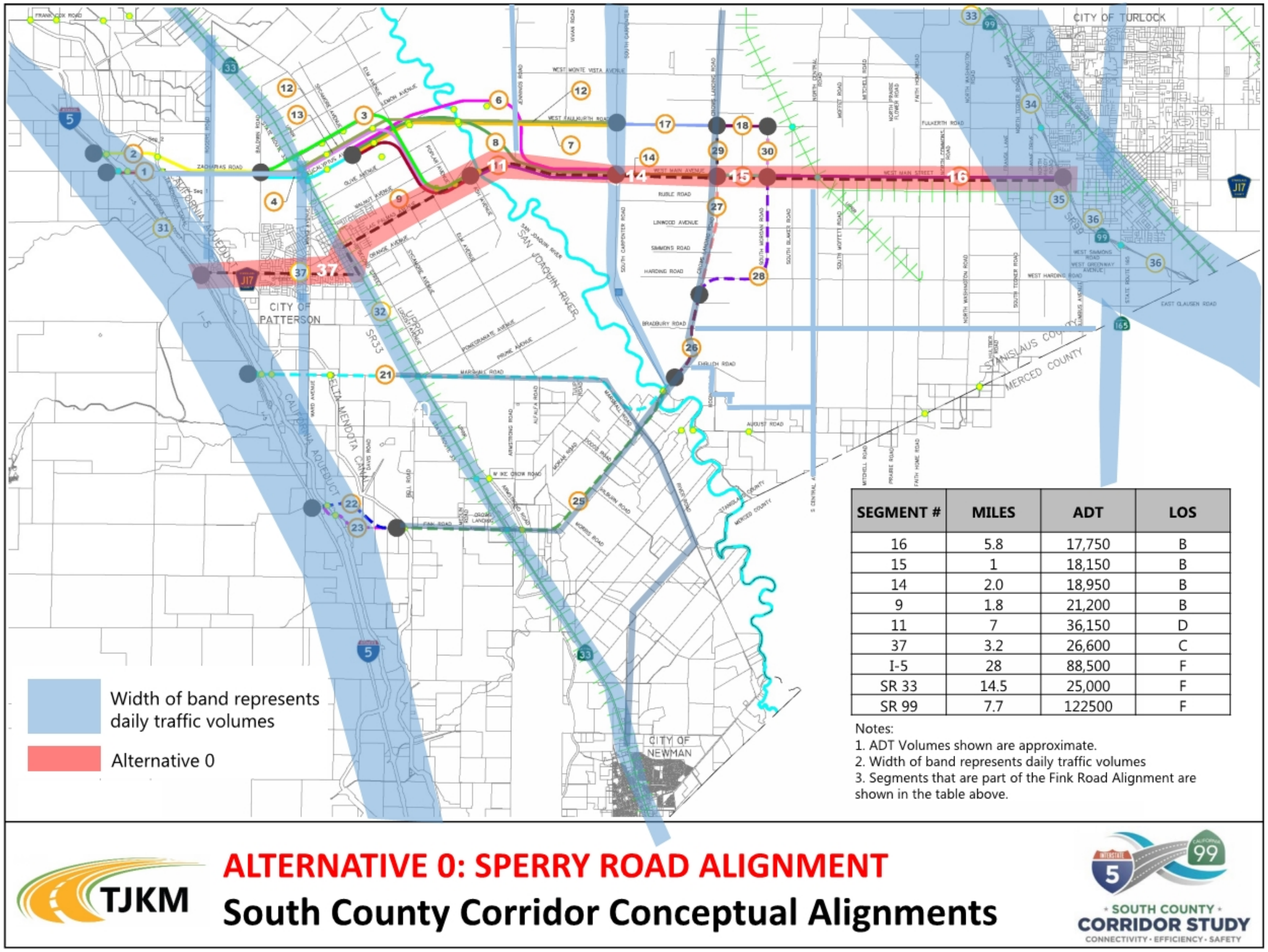
Alternative 4 – Fulkerth Road Corridor: As illustrated in Figure 12, the Fulkerth Road alignment corridor shifts the main access points to Patterson from Las Palmas Avenue to the Fulkerth Road corridor itself. Volumes as high as 46,000 vpd are attracted to Fulkerth Avenue as it crosses the river on a new bridge, while traffic on Las Palmas Avenue drops to approximately 13,000 vpd. This alignment would increase the traffic demand on the north-south entrances into Patterson from the new alignment, rather than along the traditional east-west access.

Truck Volumes

Trucks are the main source of goods movement in the San Joaquin Valley. Though Stanislaus County's population is anticipated to increase over time and become denser in the established incorporated areas, agricultural land uses will remain the same.

Table 19 provides future forecasted truck volumes and percentages by alternative corridors at locations along the alignment. Three locations along each alternative corridor were reviewed to get a general sense of truck traffic along each alignment. West Main Street remained a common location, as it is the segment that remains constant for all alternative corridors. Alternative corridors 3 and 4 have higher truck percentages for West Main Street, as well as for the new Zacharias Road extension, most likely due to the direct path from SR 99 to I-5.

Figure 8: Future Traffic Volumes - Alternative 0 - Sperry Avenue Corridor[29]



SEGMENT #	MILES	ADT	LOS
16	5.8	17,750	B
15	1	18,150	B
14	2.0	18,950	B
9	1.8	21,200	B
11	7	36,150	D
37	3.2	26,600	C
I-5	28	88,500	F
SR 33	14.5	25,000	F
SR 99	7.7	122500	F

Notes:
1. ADT Volumes shown are approximate.
2. Width of band represents daily traffic volumes
3. Segments that are part of the Fink Road Alignment are shown in the table above.

[29] *Existing and Future Traffic Conditions Report, Table 3, June 29, 2015 prepared by TJKM*

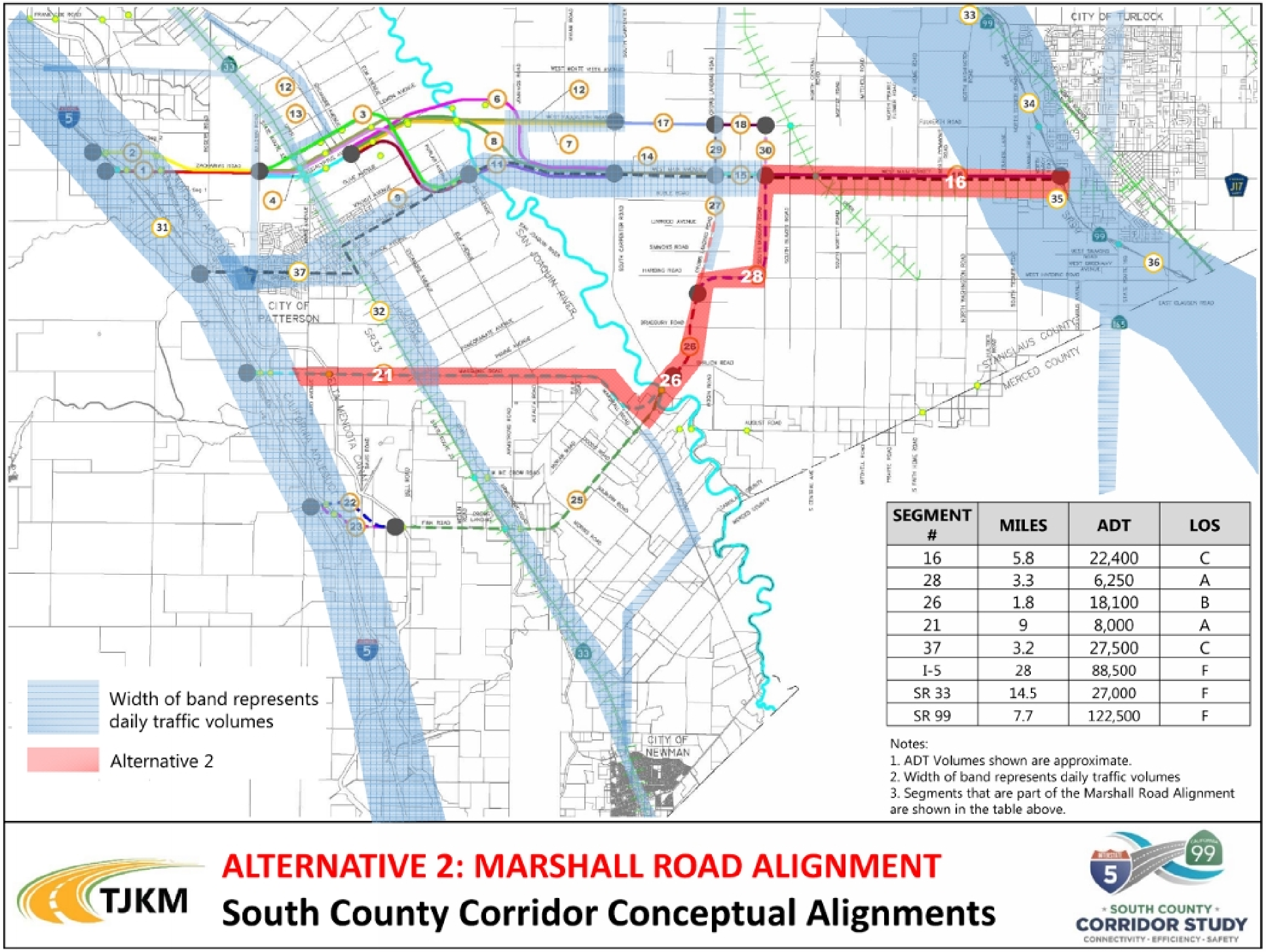
Figure 9: Future Traffic Volumes - Alternative 1 - Fink Road Corridor[30]

SEGMENT #	MILES	ADT	LOS
16	5.8	26,300	C
15	1	25,050	C
27	2.4	20,750	B
26	1.8	21,200	B
25	7	15,100	B
22	1.8	11,900	A
37	3.2	24650	C
I-5	28	87,000	F
SR 33	14.5	22,500	F
SR 99	7.7	120,850	F

Notes:
1. ADT Volumes shown are approximate.
2. Width of band represents daily traffic volumes
3. Segments that are part of the Fink Road Alignment are shown in the table above.

[30] *Existing and Future Traffic Conditions Report, Table 4, June 29, 2015 prepared by TJKM*

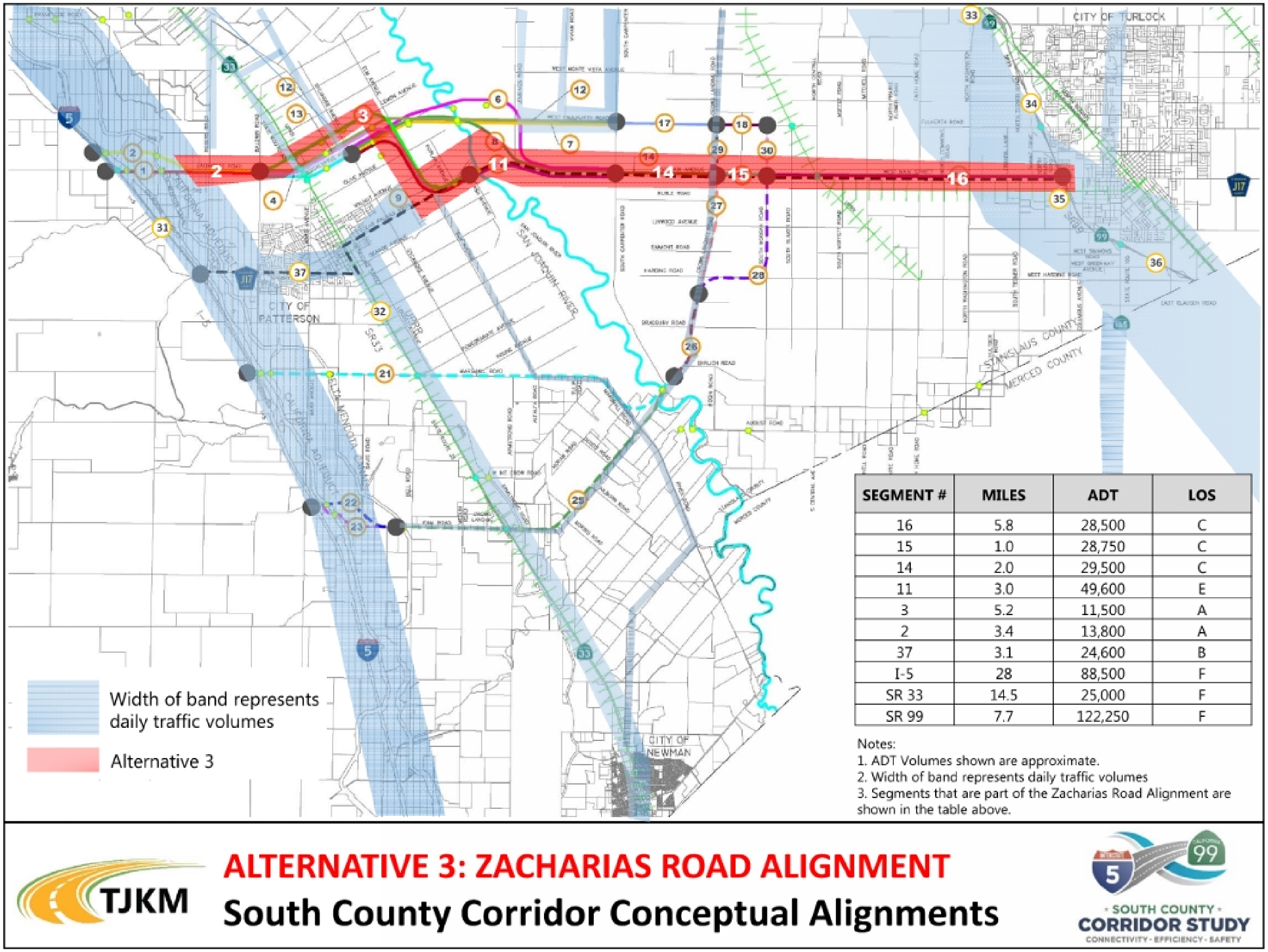
Figure 10: Future Traffic Volumes - Alternative 2 - Marshall Road Corridor[31]



SEGMENT #	MILES	ADT	LOS
16	5.8	22,400	C
28	3.3	6,250	A
26	1.8	18,100	B
21	9	8,000	A
37	3.2	27,500	C
I-5	28	88,500	F
SR 33	14.5	27,000	F
SR 99	7.7	122,500	F

[31] *Existing and Future Traffic Conditions Report, Table 5, June 29, 2015 prepared by TJKM*

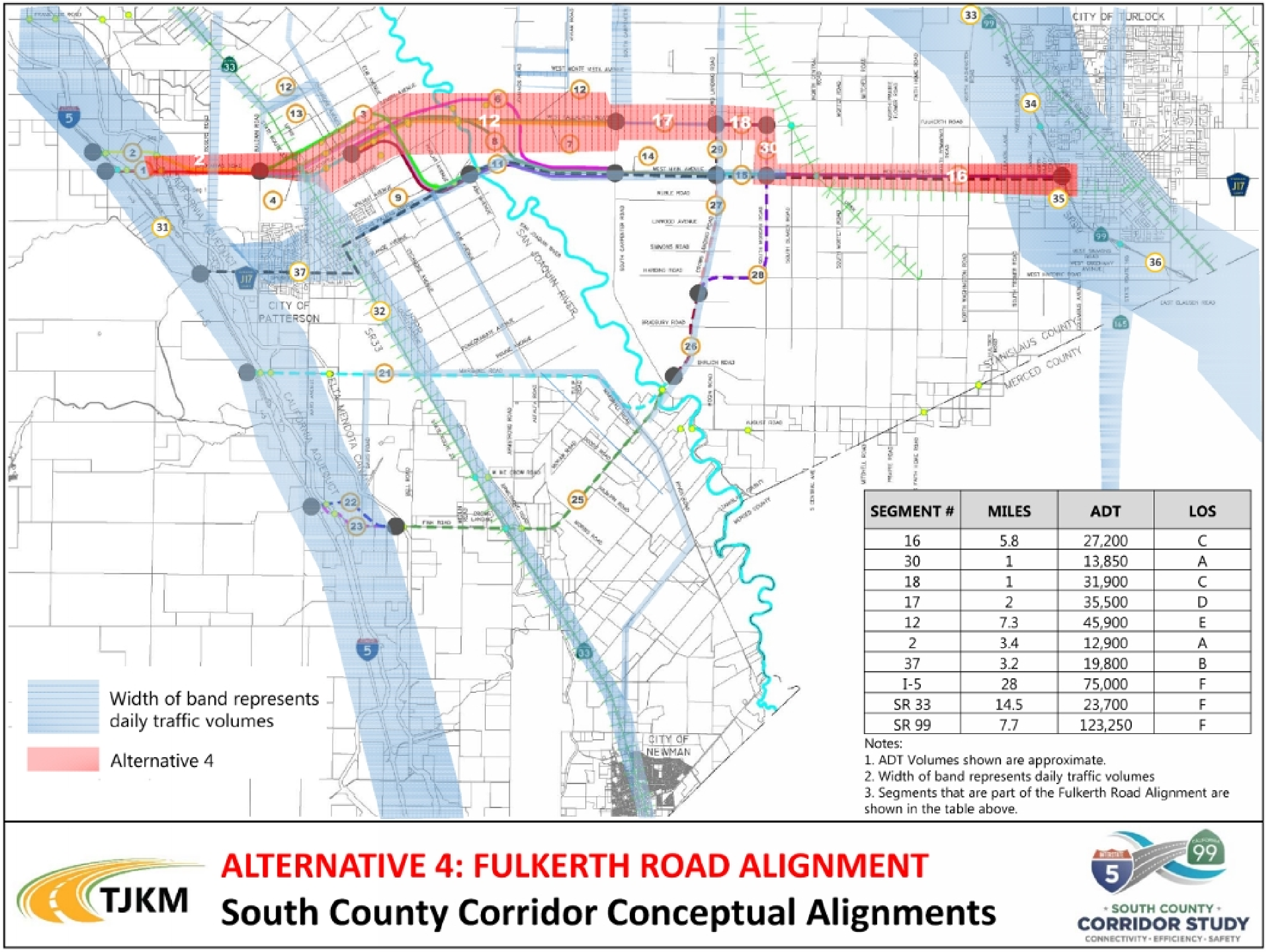
Figure 11: Future Traffic Volumes - Alternative 3 - Zacharias Road Corridor[32]



SEGMENT #	MILES	ADT	LOS
16	5.8	28,500	C
15	1.0	28,750	C
14	2.0	29,500	C
11	3.0	49,600	E
3	5.2	11,500	A
2	3.4	13,800	A
37	3.1	24,600	B
I-5	28	88,500	F
SR 33	14.5	25,000	F
SR 99	7.7	122,250	F

32 *Existing and Future Traffic Conditions Report, Table 6, June 29, 2015 prepared by TJKM*

Figure 12: Future Traffic Volumes - Alternative 4 - Fulkerth Road Corridor[33]



SEGMENT #	MILES	ADT	LOS
16	5.8	27,200	C
30	1	13,850	A
18	1	31,900	C
17	2	35,500	D
12	7.3	45,900	E
2	3.4	12,900	A
37	3.2	19,800	B
I-5	28	75,000	F
SR 33	14.5	23,700	F
SR 99	7.7	123,250	F

Notes:
1. ADT Volumes shown are approximate.
2. Width of band represents daily traffic volumes
3. Segments that are part of the Fulkerth Road Alignment are shown in the table above.

33 *Existing and Future Traffic Conditions Report, Table 7, June 29, 2015 prepared by TJKM*

Table 19: Future Forecasted Truck Volumes by Alternative Corridor[34]

Alternative #	Location	ADT	Truck ADT	Truck %
Alternative 0	West Main Street	17,750	3,100	17.5
	Las Palmas Avenue	36,150	4,600	12.7
	Sperry Avenue	26,600	4,400	16.5
Alternative 1	West Main Street	26,300	5,600	21.3
	Crows Landing	21,200	6,600	31.1
	Fink Road	15,100	3,700	24.5
Alternative 2	West Main Street	22,400	4,100	18.3
	South Morgan Road	6,250	1,300	20.8
	Marshall Road	8,000	1,200	15.0
Alternative 3	West Main Street	28,500	9,550	33.5
	Las Palmas Avenue	49,600	11,550	23.3
	Zacharias Road	13,800	5,500	39.9
Alternative 4	West Main Street	27,200	11,300	41.5
	West Fulkerth Road	45,900	9,100	19.8
	Zacharias Road	12,900	5,550	43.0

Travel Time Analysis

Future travel times for each of the alternatives were analyzed traveling westbound from the West Main Street /SR 99 interchange in Turlock to three destinations based on the distribution of traffic volumes shown on Figure 4:

1. West Main Street/SR 99 Interchange to Fink Road/I-5 Interchange
2. West Main Street/SR 99 Interchange to Sperry Avenue/I-5 Interchange
3. West Main Street/SR 99 Interchange to North Patterson at Zacharias

The travel times were analyzed based intuitively on the fastest path from Turlock to the different destinations. Table 20 details the travel times by alternative corridor and path.

Table 20: Travel Times by Alternative Corridor[35]

Destination (westbound from the Turlock Interchange)	Travel Time, Minutes				
	Alt 0	Alt 1 Fink	Alt 2 Marshall	Alt 3 Zacharias	Alt 4 Fulkerth
Fink Road/I-5	24.1	22.2	28.3	26.7	28.0
Sperry Avenue, (Central Patterson)	27.9	28.1	26.1	26.2	25.9
North Patterson at Zacharias/I-5	30.2	29.5	28.4	25.8	27.5

As depicted in Table 20, travel times varied by alternative. Per the future forecasted travel times, Alternative 1 to Fink Road shows the fastest travel time. For accessing Central Patterson, Alternative 4 has the fastest travel time, and to north of Patterson, Alternative 3 was the fastest. It should be noted that varying travel times and delays take into account the conversion of a two-lane

[34] *Existing and Future Traffic Conditions Report, Table 9, June 29, 2015 prepared by TJKM*
[35] *Existing and Future Traffic Conditions Report, Table 10, June 29, 2015 prepared by TJKM*

roadway to a four-lane expressway.

Environmental Constraints Analysis

The Study analyzed potential effects on several topics: Agricultural Resources, Air Quality, Biological Resources, Cultural Resources, Community Impacts, Hazardous Materials, Paleontology, and Visual Resources. In most cases, impacts were based on a 500-foot buffer on each side of centerline. Cultural resources, however, were analyzed based on a study area that includes all parcels adjacent to the alignment.

Agricultural Resources

The alternatives presented in this Study all have the potential to reduce County and State inventory of Important Farmlands (i.e. Prime Farmland, Unique Farmland, Farmland of Statewide Importance, and Farmland of Local Importance), Williamson Act Contracted lands, and active agricultural lands. Preliminary review of land use and zoning within the study area indicates that a majority of the parcels adjacent to or within the roadway segments are currently under agricultural production and under Williamson Act Contracts that would need to be canceled through the non-renewal process set forth by the California Department of Conservation. Review of the Stanislaus County General Plan Land Use Element and Zoning Ordinance indicate that the majority of the parcels adjacent to the proposed alternative's roadway segments in rural areas are designated as Agriculture land use and zoned as General Agriculture District (A-2).

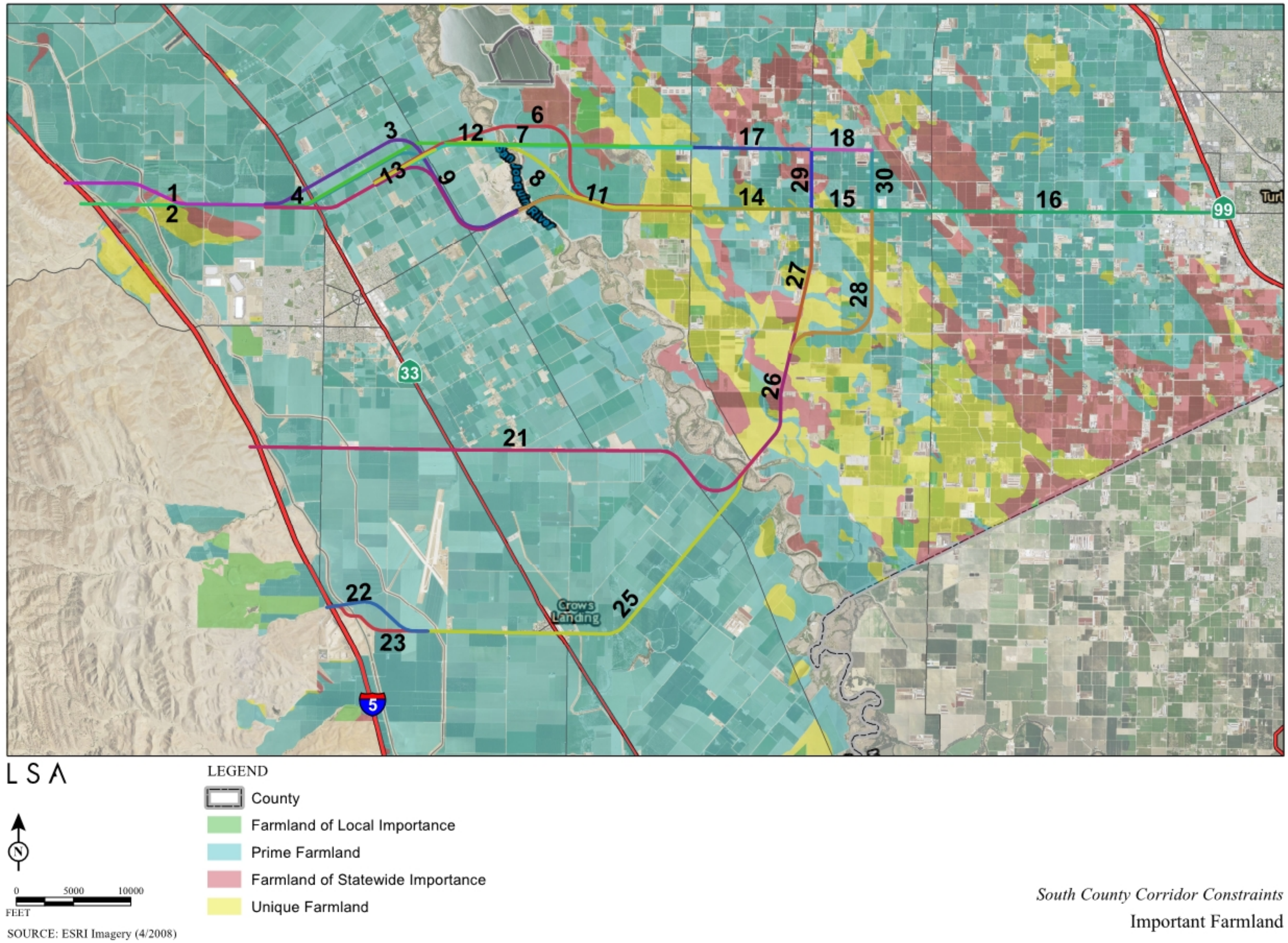
To analyze impacts on important farmland, the 2012 Stanislaus County farmland data was used, which was edited to remove roads and existing public right-of-ways. Acreages were then calculated that would be affected by each alternative. As shown in Figure 13, the majority of the roadway segments are adjacent to or go through all categories of Important Farmland as designated by the California Department of Conservation's Division of Land Resource Protection, Farmland Mapping and Monitoring Program (FMMP). With implementation of the roadway segments, Important Farmland would be lost and the County and State inventory would be depleted. All alternatives will impact more than 900 acres of Important Farmland. However, some alternatives will impact more farmland than others.

Implementation of the proposed Project would more than likely result in the direct and indirect conversion of agriculturally productive land to urbanized land uses. In order to determine the Project's impact on parcels designated as agricultural land uses and/or zoned as agriculture, and the potential for direct and indirect conversion of agriculturally productive lands to an urbanized use, a project-specific agricultural resources evaluation, including evaluating roadway alignment and distance of setbacks, would be required during the PA&ED project development phase of the proposed Project.

Air Quality

The Project is subject to the air quality requirements established by the San Joaquin Valley Unified Air Pollution Control District (SJVUAPCD). However, the design of the proposed Project is not known at this time and, therefore, it cannot be determined whether the Project would exceed local, State, and federal air quality standards. In order to determine if construction and operation of the proposed Project would affect air quality emissions, a project-specific air quality evaluation would be required during the PA&ED project development phase of the proposed Project.

Figure 13: Important Farmland Map[36]



[36] *Preliminary Environmental Constraints Technical Memo, Figure B, June 25, 2015, prepared by LSA*

Biological Resources

Special Status Species. All of the alternatives will have impacts to at least some special status species. In the Preliminary Environmental Constraints Technical Memo prepared by LSA (see Appendix J), the proximity of each alignment to the California Natural Diversity Database (CNDDB) occurrences were analyzed and used for the evaluation of alternatives. Further biological studies and permitting will be required during future project development phases (i.e. environmental clearance and final design phases).

Wetlands. In the Preliminary Environmental Constraints Technical Memo (see Appendix J), the proximity of each alignment to wetlands were analyzed and used for the evaluation of alternatives. All alternatives will impact more than five acres of wetlands, likely requiring implementation of the NEPA/404 Integration Process. However, some alternatives will potentially impact more wetlands than others.

Cultural Resources

For this Study, cultural resources are defined as archaeological resources, built environment resources, geoarchaeological resources, and Tribal Cultural Resources. Impacts to cultural resources by each alternative were analyzed and used for the evaluation of alternatives. The analysis of cultural resources included previous determinations of eligibility as a National Register of Historic Places (NRHP), which poses a much larger constraint to the project alternative than those resources that are currently unevaluated due to a significant increase in the necessary documentation and the higher likelihood of mitigation measures.

Community Impacts

Community Character and Cohesion and Relocations and Real Property Acquisition. All alternatives were evaluated in relationship to its potential for residential relocations, real property acquisitions of residential units and/or businesses, as well as physically dividing an established community. Consequently, a Community Impact Assessment and compliance with the Uniform Code Act during the environmental clearance phase of the Project will be required.

Noise. Noise-sensitive land uses are locations where people reside or where the presence of unwanted sound could adversely affect the use of the land. Residences, schools, hospitals, guest lodging, libraries, churches, nursing homes, auditoriums, concert halls, amphitheaters, playgrounds, and parks are considered noise-sensitive uses. The proposed alternative could increase noise levels at sensitive receptors along the alignments. When the design is finalized, a more detailed noise level analysis may be necessary. However, for the purposes of the Study, the impacts of each alignment on sensitive receptors were estimated as the impacts on structures and communities within a 500-foot buffer on each side of the centerline along each alignment.

Environmental Justice. The design of the proposed Project is not known at this time and, therefore, it cannot be determined whether the Project would affect minor, moderate, or substantial numbers of minority or low-income populations. In order to determine if the proposed Project would affect minority or low-income populations, a project-specific environmental justice evaluation would be required during the PA&ED project development phase of the proposed Project.

Growth. Implementation of the proposed Project would more than likely induce growth to rural areas of Stanislaus County where existing parcels are under agricultural production. In order to determine the magnitude and potential inducement of growth in the area due to Project implementation, a project-specific growth evaluation would be required during the PA&ED project development phase of the proposed Project.

Land Use

The majority of the parcels surrounding the alternative alignments are currently used for rural residential or agricultural uses. Implementation of the proposed Project would more than likely result in the direct and indirect conversion of agriculturally productive land to urbanized land uses. Because the proposed design for the Project is not known at this time, it cannot be determined whether the Project would result in development of incompatible uses.

Hazardous Materials

All alternatives will likely require further Hazardous Materials Initial Site Assessment and potentially further studies during the PA&ED project development phase. The majority of the cleanup sites were located near Turlock. However, a few sites, mostly gas stations and agricultural uses, are located in the rural area near the proposed alignments.

Paleontology

All of the Project's alternatives are underlain by Marine Sedimentary Rocks Quaternary Deposits, which are sensitive for the presence of paleontological resources. However, the presence of paleontological resources cannot be confirmed or denied without further studies to be performed during the PA&ED project development phase.

Visual Resources

Interstate 5 is the only officially designated State Scenic Highway in Stanislaus County. The proposed Project is intended to link with I-5 and would not affect the scenic resources of the State Scenic Highway. The project will not affect the Stanislaus County General Plan's identified scenic resources. However, the Project has the potential to affect the scenic character of the area. A project-specific evaluation would be required during the PA&ED project development phase.

Geotechnical

The Study performed a preliminary assessment of geotechnical related roadway construction costs associated with the various soil types presented in the United States Department of Agriculture (USDA) Soil Surveys of Stanislaus County (USDA, 2007 and 2014). By overlaying the USDA soil survey maps with the proposed alignment alternatives, five different soil groups are identified to be present: sandy loam and loamy sand, loam, gravelly clay loam, and clay loam. Ratings ranging from 1 to 4 were assigned to the four different soil groups based on the soil group's assumed strength and shrink-swell potential properties that would affect their vehicle load bearing capacity.

The clay type soils were given the highest rating of four (4) because they are relatively the least favorable for local road and street use. Subgrade soil types with finer material (clay/silt) will typically have lower R-values, and thus will require a thicker pavement section to support the predicted traffic loads, which would be the least economically favored. The coarser (sand/gravel) materials were given the lowest rating of one (1) because they typically have higher strength (higher R-Values) than the finer material and thus would require relatively thinner (i.e., less costly) pavement sections to support the predicted traffic loads. Additionally, the alignments founded on clay soils may be prone to larger shrink-swell potential, which may require mitigation at an added cost.

For an illustrative summary of the soil types in relationship to the alternative alignments, see the Preliminary Geotechnical Memorandum in Appendix K. Table 21 provides the relative percentages of the proposed alternative alignment segments that are within the various USDA soil classifications.

Table 21: Proposed Roadway Segments and USDA Soil Classification[37]

Segment No.	Length of Segment (mile)	Miles of Roadway per USDA Classification				% Segment per USDA Classification			
		Loamy Sand/ Sandy Loam	Loam	Gravelly Clay Loam	Clay Loam	Loamy Sand/ Sandy Loam (Rating 1)[1]	Loam (Rating 2)[1]	Gravelly Clay Loam (Rating 3)[1]	Clay Loam (Rating 4)[1]
0[2]	18.6	11.7	2.6	2.2	2.1	63%	14%	12%	11%
1	3.1	0.0	0.0	3.1	0.0	0%	0%	100%	0%
2	3.4	0.0	0.0	3.4	0.0	0%	0%	100%	0%
3	5.2	0.0	0.0	1.7	3.5	0%	0%	33%	67%
4	1.9	0.0	1.9	0.0	0.0	0%	100%	0%	0%
6	6.3	4.3	0.0	0.0	2.0	68%	0%	0%	32%
7	5.4	3.3	0.0	0.0	2.1	61%	0%	0%	39%
8	5.7	3.6	0.0	0.0	2.1	63%	0%	0%	37%
9	3.0	0.0	0.0	0.0	3.0	0%	0%	0%	100%
11	3.0	2.7	0.0	0.0	0.3	90%	0%	0%	10%
12	7.3	3.3	1.8	0.0	2.2	45%	25%	0%	30%
13	5.1	0.0	0.0	1.7	3.4	0%	0%	33%	67%
14	2.0	2.0	0.0	0.0	0.0	100%	0%	0%	0%
15	1.0	1.0	0.0	0.0	0.0	100%	0%	0%	0%
16	5.8	5.8	0.0	0.0	0.0	100%	0%	0%	0%
17	2.0	2.0	0.0	0.0	0.0	100%	0%	0%	0%
18	1.0	1.0	0.0	0.0	0.0	100%	0%	0%	0%
21	9.0	0.2	0.0	0.0	8.8	2%	0%	0%	98%
22	1.8	0.0	0.0	0.0	1.8	0%	0%	0%	100%
23	1.8	0.0	0.0	0.0	1.8	0%	0%	0%	100%
25	7.0	0.1	0.0	0.0	6.9	1%	0%	0%	99%
26	1.8	1.8	0.0	0.0	0.0	100%	0%	0%	0%
27	2.4	2.4	0.0	0.0	0.0	100%	0%	0%	0%
28	3.3	3.3	0.0	0.0	0.0	100%	0%	0%	0%
29	1.0	1.0	0.0	0.0	0.0	100%	0%	0%	0%
30	1.0	1.0	0.0	0.0	0.0	100%	0%	0%	0%

Water Quality and Hydrology

Floodplain Impacts

Executive Order 11988 (Floodplain Management) directs all federal agencies to avoid, to the extent possible, long- and short-term adverse impacts associated with the occupancy and modification of floodplains, and to avoid direct and indirect support of floodplain development

[37] *Preliminary Geotechnical Memorandum, Table 4, June 30, 2015 prepared by WRECO*

wherever there is a practicable alternative. Therefore, the alternative alignments were analyzed based on their impacts to the 100-year floodplain within the study area. The potential risk associated to floodplain impacts with the implementation of the proposed Project includes, but is not limited to: 1) change in land use, 2) change in impervious surface area, 3) fill inside the floodplain, and/or 4) change in the 100-year water surface elevation. All alignments have the potential to support incompatible base floodplain development that will encourage, allow, serve, or otherwise facilitate incompatible base floodplain development, such as commercial development or urban growth. Figure 14 illustrates the floodplain impacts from the proposed alternative alignments based on the 100-year floodplains within the study area. Table 22 identifies the approximate number of miles and percentage of each alignment segment crossing a 100- year floodplain.

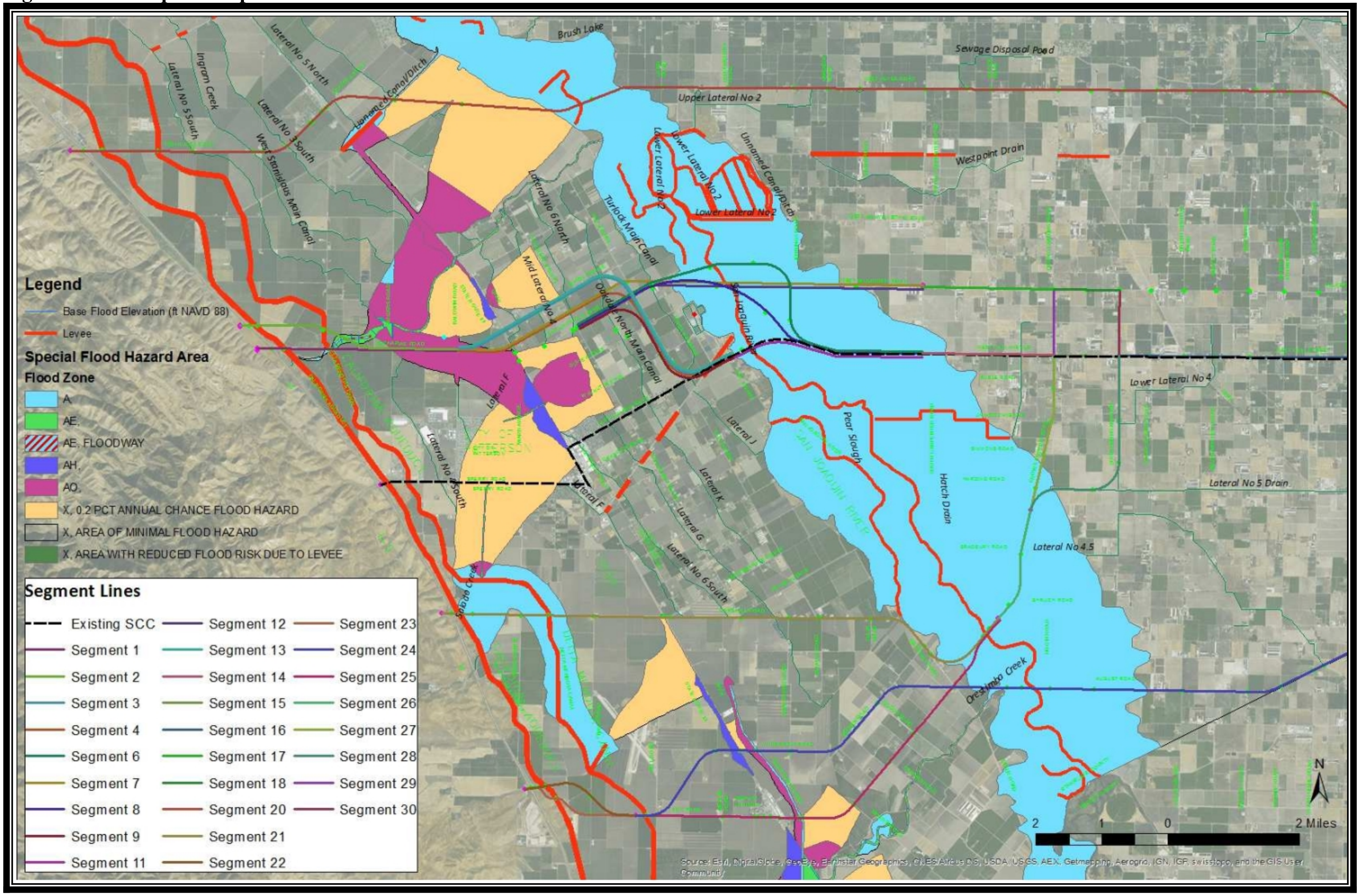
Widening, realignment, or modification of the existing SCC, or the construction of new segments of roadway, has the potential to result in additional fill and increases to floodplain water surface elevations. There would be expected fill within the floodplains where the proposed SCC routes anticipate widening of existing roadways or construction of new roadways along existing floodplains. Fill within the floodplains may also occur where bridge structures would not be able to clear span floodplains, therefore footings, piers, and abutments would be placed within the creeks and floodplains. The impacts to the floodplains within the study area by these various project features were analyzed and used to evaluate the alternative alignments

City of Modesto Water Quality Control Facility

The alignments evaluated in this Study do not directly impact the City of Modesto Water Quality Control Facility, located at 7001 Jennings Road, where the southern boundary is approximately two miles north of North Main Avenue. However, as shown in Figure 15, the City of Modesto will be installing a 42-inch irrigation recycled water pipeline. It will connect to the existing City of Modesto's River Outfall pump station located just south of the City's Water Quality Control Facility and east of the San Joaquin River, runs along Lemon Avenue and Zacharias Road, then outfalls into the Delta Mendota Canal (DMC). The water will be treated recycled water and construction is planned to begin August 2016. Figure 15 also shows the City of Turlock is planning to install a recycled water line from the City of Modesto's River Outfall Pump Station. From the pump station, it would run east of the river to Jennings Road, south on Jennings Road to West Main Avenue, east on West Main Avenue to South Carpenter Road, then south on South Carpenter Road connecting to the Harding Drain Bypass Pipeline. Turlock's planned recycled water line is currently in the planning phase.

The City of Modesto obtained the water rights (Wastewater Change Petition WW0077) from the Environmental Protection Agency State Water Resources Control Board (SWRCB) to construct a 42-inch recycled water pipeline. The Turlock Irrigation District (TID), Westlands Water District (Westlands), and various canneries in the area protested, but the protest was dropped on the condition that there would be no change to the wastewater land use of certain parcels within the land area bordered by the southern border of the City's Water Quality Control Facility, Jennings Road, Las Palmas Road, and the San Joaquin River.

Figure 14: Floodplain Impacts[38]



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[38] *Preliminary Hydrology, Floodplain, and Water Quality Technical Memo, Figure 6, August 3, 2015 prepared by WRECO*

Table 22: Miles of Alignment Segment Crossing a 100-year Floodplain[39]

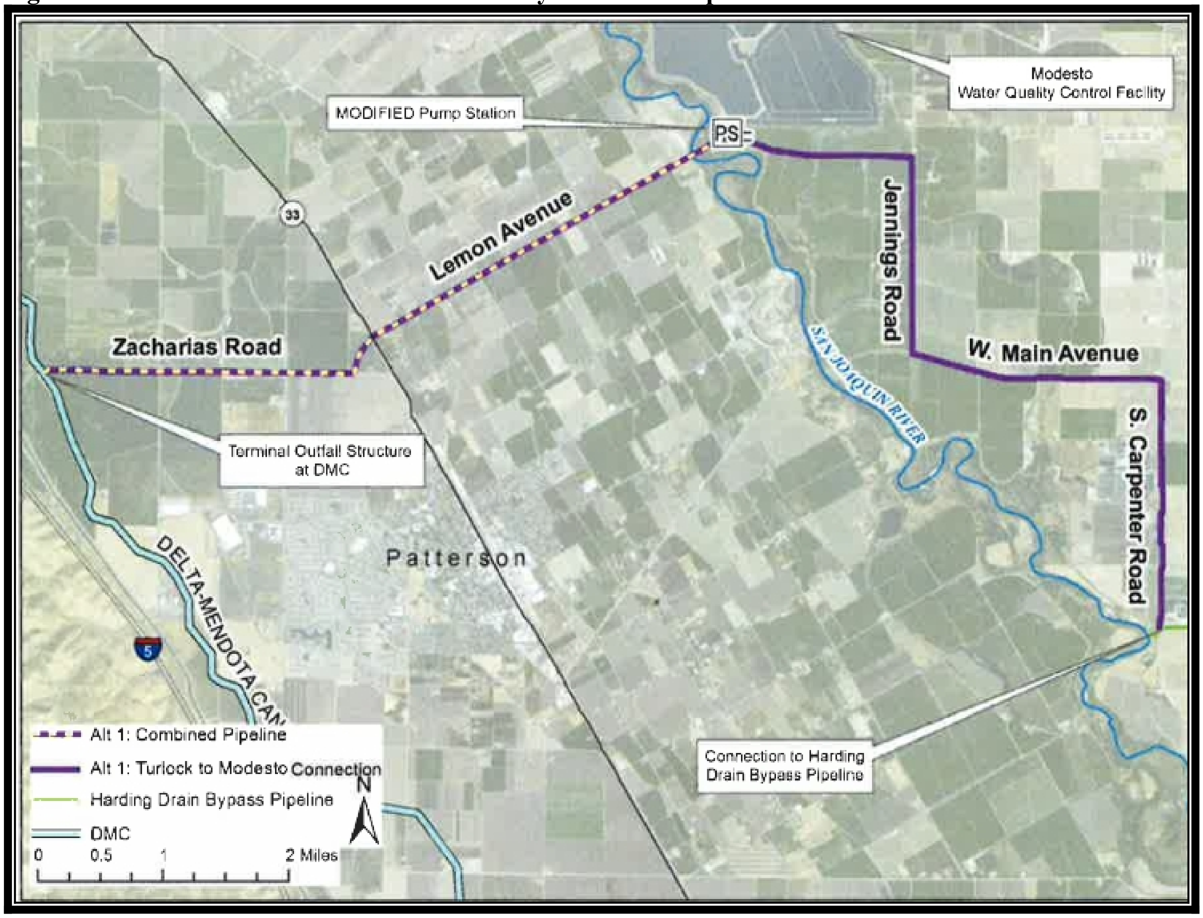
Segment No.	100-Year Floodplain Zone (miles)					Total Miles within 100-Year Floodplain	Length of Segment (mile)	% Segment within 100-Year Floodplain
	A	AE	AE floodway	AH	AO			
Existing	3.3			0.1		3.4	6.7	51%
1	0.1	0.1			1.0	1.2	3.1	39%
2		0.2	0.1		1.0	1.3	3.4	38%
3					0.3	0.3	5.2	6%
4					0.9	0.9	1.9	47%
6	4.7					4.7	6.4	73%
7	2.6					2.6	5.4	48%
8	4.1					4.1	5.7	72%
9						0	3.0	0%
11	3.0					3	3.0	100%
12	2.6				0.5	3	7.3	41%
13					0.7	0.7	5.1	14%
14	0.4					0.4	3.5	11%
15						0	1.0	0%
16						0	5.8	0%
17						0	2.0	0%
18						0	1.0	0%
21	2.5					2.5	9.0	28%
22						0	1.8	0%
23						0	1.8	0%
25	1.0				0.1	1.1	7.0	16%
26	2.1					2.1	2.1	100%
27	0.7					0.7	2.4	29%
28	0.5					0.5	3.3	15%
29						0	1.0	0%
30						0	1.0	0%

The City of Modesto filed Wastewater Change Petition WW0077 with the SWRCB on July 31, 2014, which provided the list of conditioned City of Modesto owned parcels, as shown in Figure 16 and listed as follows:

- Assessor's Parcel Nos. 022-001-002, 022-001-004, 022-001-005, 022-003-002, 022-004-001, 022-004-002, 022-004-003, and 058-001-001 (Jennings Ranch), containing 2,530 acres, more or less, and referred to as "Jennings Ranch" or "Modesto Ranch".[40]

[39] *Preliminary Hydrology, Floodplain, and Water Quality Technical Memo, Table 1, August 3, 2015 prepared by WRECO*
[40] *Wastewater Change Petition WW0077 filed by City of Modesto with State Water Resources Control Board, July, 31, 2014*

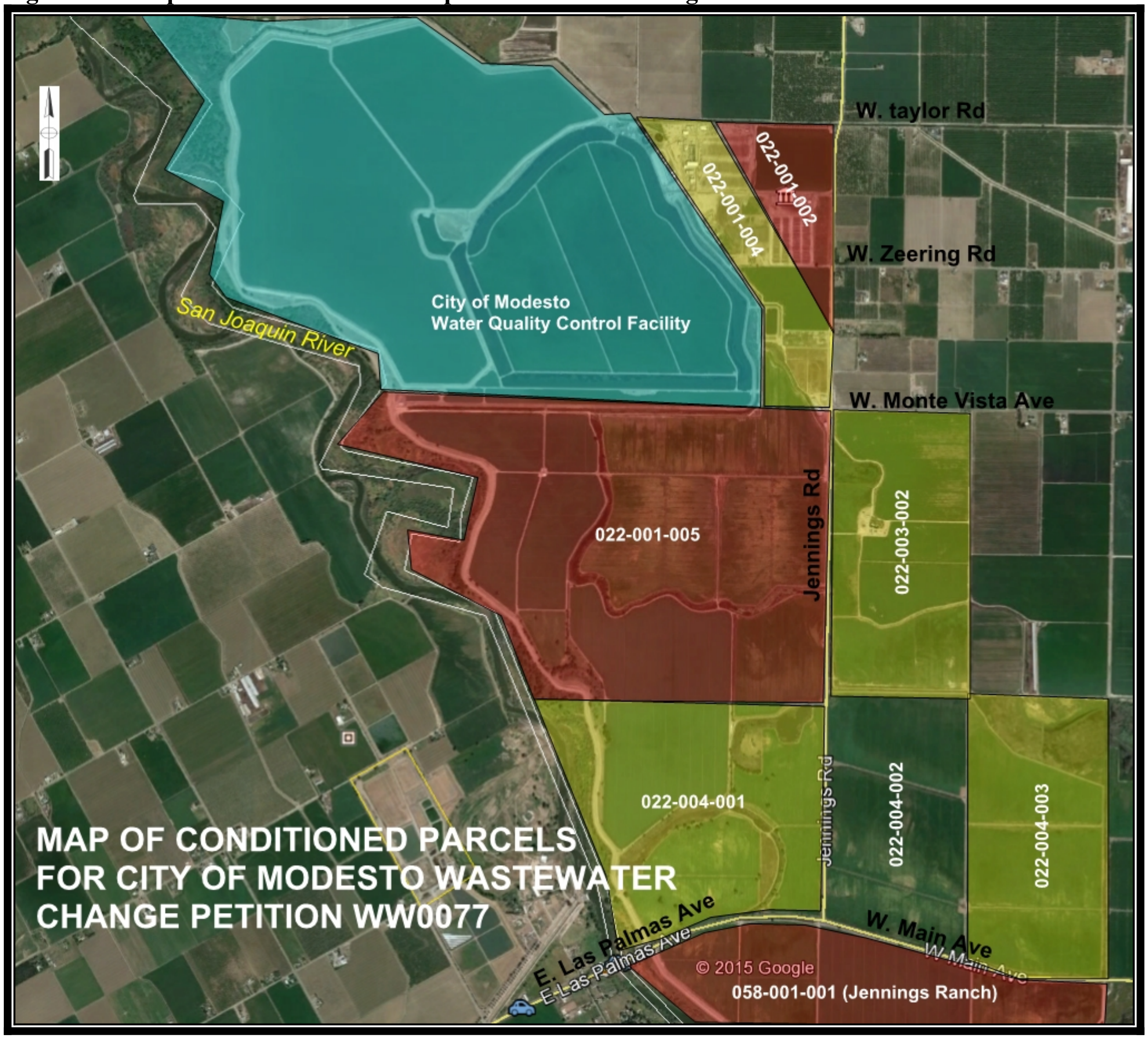
Figure 15: Cities of Modesto and Turlock Recycled Water Pipeline[41]



The Wastewater Change Petition WW0077 also states that the wastewater use requirement for these parcels shall not be reduced if the City of Modesto sells, conveys, exchanges, or otherwise transfers any of these parcels. These parcels are currently being used by the TID, Westlands, and the various canneries in the area for cannery process water. These organizations will most likely not be in favor of any SCC alignment (e.g. Alternative 4D) that impacts these parcels. Unfortunately, during the development of the Study's alternative analysis, the conditions outlined in the Wastewater Change Petition WW0077 were not available to be incorporated into the evaluation of alternatives. Therefore, in the Project Study Report (PSR), Alternative 4D or any variation that impacts these parcels would need to evaluate the potential significant mitigation costs, which may include land replacement among other associated mitigation costs.

[41] *North Valley Regional Recycled Water Program, Figure 1-2 "Alternative 1 – Combined Alignment Alternative", May 2015*

Figure 16: Map of Conditioned Parcels per Wastewater Change Petition WW0077



City of Patterson Waste Water Treatment Plant Percolation Area

The alignments evaluated in this Study do not directly impact the City of Patterson Waste Water Treatment Plant located on Poplar Avenue. However, the City's Waste Water Percolation Area that extends 40 acres north of Olive Avenue would be impacted and have a significant environmental impact on water quality. Several of the alignments evaluated in this Study directly impact this percolation area and must be thoroughly addressed during subsequent project development phases.

Right of Way Impacts

The right of way impacts are based on a 135-foot proposed right of way width for a six-lane expressway. In order to avoid precluding future widenings, a right of way width for a six-lane expressway was used in lieu of a four-lane expressway. The existing public right of way width was assumed a constant 80 feet. Table 23 summarizes the right of way impacts for the 18 alternatives evaluated in the Level 2 screening analysis. Alternative 12H has the least impacts to right of way for acquisitions, as well as farmland impacts, because it is the only alternative that utilizes existing roads (i.e. West Main Street, Crows Landing Road, and Fink Road) in its entirety.

Alternative 1C has the greatest proposed right of way acquisitions, while Alternative 4D has the greatest impacts to farmland.

Table 23: Right of Way Impacts

Alternative	Alternative Length (miles)	Length within Existing Right of Way (miles)	Length outside Existing Right of Way (miles)	Proposed Right of Way Acquisitions (acres)	Important Farmland Impacted[1] (acres)
1B	20.2	12.3	7.9	209	2966
1C	20.5	12.3	8.2	214	2983
1E	20.2	12.3	7.9	209	3027
1F	20.5	12.3	8.2	214	3044
2A	20.1	16.0	4.1	171	2663
2D	20.4	16.0	4.4	176	2721
3A	19.9	14.7	5.3	181	2934
3D	20.2	14.7	5.6	187	2995
4A	20.1	15.7	4.5	175	3062
4D	19.5	14.8	4.8	174	3126
6B	20.2	16.0	4.2	173	2982
6C	20.2	16.0	4.2	173	2999
7A	19.8	16.4	3.3	162	2955
7G	20.1	16.4	3.6	167	3019
10C	19.9	17.3	2.6	156	1806
10E	19.9	17.3	2.6	156	1859
12E	19.8	17.9	1.8	147	1871
12H	19.8	19.8	0.0	129	1759

[1] *Preliminary Environmental Constraints Technical Memo - Study Data Table, LSA.*
Excludes Public right of way. Impacts are within 500' buffer on each side of alignment centerline

11. PROJECT FUNDING STRATEGIES

Traditional funding sources are not available. Therefore, financial investing by the public in the form of a sales tax measure is the best form of funding available. It should be noted that environmental issues such as air quality are driving the cap and trade industry. Since Stanislaus County is designated as an EPA County Nonattainment Area, the County heavily relies on agriculture that adds to the air quality issues within the County, which is equivalent to the air quality in some of the southern California counties. In addition, Stanislaus County is subject to the same air quality requirements as southern California. Therefore, until the County can become self-reliant and tell its own story regarding its transportation needs utilizing its own resources, it is going to be very difficult to see projects like the SCC come to fruition. It is evident that the state is coming to an end on its funding sources available for transportation infrastructure. Therefore, a reliance on the STIP is not sufficient because it is estimated at about $600 million per year to meet the transportation demands of a state, which is comprised of about 38 million people. The competition for STIP funds is fierce between environmental and mobility. Therefore, counties must take control of their own destinies, which Self-Help Counties are doing to fund the solutions to their mobility demands.

Funding for the Stanislaus County SCC project is more than amassing the resources to build the project. Funding strategies are inextricably linked with the decisions on project phasing, project delivery, and procurement methods. Since all four elements impact one another, a decision on project phasing needs to incorporate project delivery, which in turn drives procurement, and having the available funding to complete the phase enables delivery.

Developing the South County Corridor project will require finesse to balance the mobility and accessibility goals of StanCOG's 2014 Regional Transportation Plan/Sustainable Community Strategy (RTP/SCS) with its other stated goals, such as sustainable development, economic and community vitality, health and safety, and environmental quality. As a result, other objectives to be realized with the Corridor will likely yield other funding opportunities, as well as playing a role in the phasing and delivery methods.

The funding strategies for the South County Corridor are essentially in two camps: the first is a traditional, pay-as-you go approach to the project in which StanCOG gathers enough resources to initiate Project Approval and Environmental Documentation (PA&ED), then more resources for Plans Specifications and Estimates (PS&E), and then waits for sufficient funding for right-of-way acquisition and construction. The second approach is to pursue alternative delivery and funding options, such as design-build or some form of public-private partnership that attempts to secure delivery earlier combined with repayment over time. At this point, both overall strategies would work for completing the entire project. However, phasing the project may make one strategy more attractive than the other, depending on the initial phase StanCOG pursues.

A traditional, pay-as-you go approach is a common and less risky way to fund and deliver the project. As mentioned above, this approach would entail StanCOG amassing funds for discrete delivery phases. This approach also means that the entire project will likely take more than ten years to complete. If history is any guide, the boom and bust cycles of transportation funding suggest that the traditional approach could result in an even longer time to complete.

Presently the South County Corridor project has no official standing. It is not part of the StanCOG 2014 RTP/SCS. It is not part of the StanCOG 2015 Federal Transportation Improvement Program (FTIP). Short of amending the project into both the RTP/SCS and the FTIP within the next three years, the earliest the project could be programmed is in the 2018 RTP/SCS and 2019 FTIP. Both the RTP/SCS and FTIP assume existing local, state, and federal funding, which currently do not look to yield sufficient resources to pay for the entire South County Corridor project. However, these existing sources could potentially be tapped for the PA&ED and PS&E phases of the project.

One particular bright note on potential federal funding is the creation of the new Nationally Significant Freight and Highway Projects discretionary grant program in the recently adopted Fixing America's Surface Transportation (FAST) Act. This new federal transportation authorizing legislation makes support of freight projects a priority for the first time. The Nationally Significant Freight and Highway Projects program includes funding for small and rural freight highway projects, a category for which the South County Corridor would appear to be eligible. Having the SCC included in the FTIP will be essential to tapping into these federal freight funds.

Pursuing private sector involvement in the delivery of the SCC is an option, should StanCOG wish to proceed with the SCC on a more expedited schedule. Involving the private sector as a delivery and funding/financing partner can help provide more schedule and funding certainty than the traditional approach. All design-build (DB); design-build-operate (DBO); and design-build-finance-operate-and-maintain (DBFOM) contracts require contractors to agree to a guaranteed price and schedule— or suffer significant financial penalties for increased cost and delays.

An important aspect of alternative delivery and funding/financing is that the lifecycle costs of the facility are brought into the overall project delivery and financing plan. The availability payments paid to the contractor are based on the contractor's meeting specific operations and maintenance performance metrics. The contractor has incentive to ensure that the facility is in excellent condition in order to receive the milestone payments. By taking on the responsibility for lifecycle costs, the contractor is looking to build a facility that can be maintained easily. Traditional approaches often delay consideration of maintenance and rehabilitation until years after the facility is open.

The key to making alternative delivery and funding/financing work is two-fold: having a funding stream that can be pledged over time to repay the contractor for its work. So- called availability payment schemes generally last 30 to 50 years. The second key is ensuring that environmental clearance is achieved with a minimum amount of engineering design required.

The Regional Transportation Impact Fee and targeted developer fees—either discretely or combined in an Enhanced Infrastructure Financing District or Mello Roos District—could serve as the funding stream to cover availability payments. In addition, local option road charges would be another good source of availability payments. Moreover, should Stanislaus County voters approve a transportation sales tax measure, funds available to the SCC could be managed to support availability payments.

Project Delivery Strategies and Funding Sources

For a project the scale of the South County Corridor, it is essential that a mix of delivery strategies are explored as early in the project development process as possible. Table 24 lists a variety of project delivery methodologies available for consideration. Table 25 lists funding sources that can be applied to the project delivery strategy. These funding approaches are not mutually exclusive. In fact, it is likely that several may be viable for different aspects of the Corridor, especially if the Corridor becomes a program with a suite of project phases. As Table 24 shows, nearly all of the funding sources can be applied to the various project delivery approaches. As previously described, specific funding approaches will work better than others depending on the phasing, delivery and procurement methods StanCOG wants to pursue.

Should StanCOG decide take the SCC to the next phase, which would most likely be the PSR phase, that PSR-PDS effort should examine further both the traditional and alternative delivery and funding strategies. Given that the SCC will likely be implemented during or after California transitions from gas tax to road charges to pay for transportation, StanCOG would be well served during the next phase to evaluate these funding approaches with this future in mind.

Table 24: List of Project Delivery Strategies

	Traditional	Design-Build	DBFOM	Concession
Funding Approach	Pay as You Go	Pay as You Go, with Pay Over Time Option	Pay Over Time	Pay Over Time
Schedule Impact on Project Delivery	Uncertain	Certain	Certain	Certain
Lifecycle Cost Considerations	Often not considered	Included	Included	Included
Risk Transfer	None, on agency	Shared	Primarily on Contractor	On Concessionaire

Table 25: Sources of Funding Applied to Delivery Approaches

Funding Source	**DBB**	**DB**	**DBFOM**	**Concession**
Local Funding	X	X	X	X
State Grant Funding	X	X	X	X
Federal Grant Funding	X	X	X	X
Regional Transportation Impact Fee	X	X	X	X
Targeted Developer Fees	X	X	X	X
Sales Tax Measure	X	X	X	X
CA Active Transportation Program (ATP)	X	X	X	X
CA Trade Corridors	X	X	X	X
CA Transit Capital	X	X	X	X
Road Charges	X	X	X	X
Vehicle Registration Fee	X	X	X	X
Express Lanes (HOT)		X	X	X
Community Facility District	X	X	X	X
Enhanced Infrastructure Fin District	X	X	X	X
CA Infrastructure Bank Revolving Loan	X	X	X	X
TIFIA		X	X	X

Abbreviations:
- DBB: Design-Bid-Build
- DB: Design-Build
- DBFOM: Design-Build-Finance-Operate- Maintain
- Concession: Toll Road
- TIFIA: Transportation Infrastructure Finance and Innovation Act

12. PROJECT DEVELOPMENT TIMELINE

The SCC Feasibility Study is a preliminary step in the overall project development process. The goal of the study is to determine feasible alignments that satisfy the project purpose and need, as well as additional alignments to be considered for further examination in a PSR. Figure 17 below shows the typical Caltrans project development process that must be followed for any federal-aid project in California. Although the SCC is not on the State Highway System (SHS), because the proposed alternatives may require a new or modified interchange to I-5, the typical Caltrans project development process may apply.

13. FHWA COORDINATION

The proposed SCC will most likely be considered a High Profile Project (HPP) in accordance with the current Federal Highway Administration (FHWA) and Caltrans Joint Stewardship and Oversight Agreement (Agreement). The goal under the Agreement is to identify HPPs and FHWA approval and involvement early in the Project Initiation Document (PID) (i.e. Project Study Report) phase or the Local Assistance "Authorization to Proceed" milestone for Preliminary Engineering.

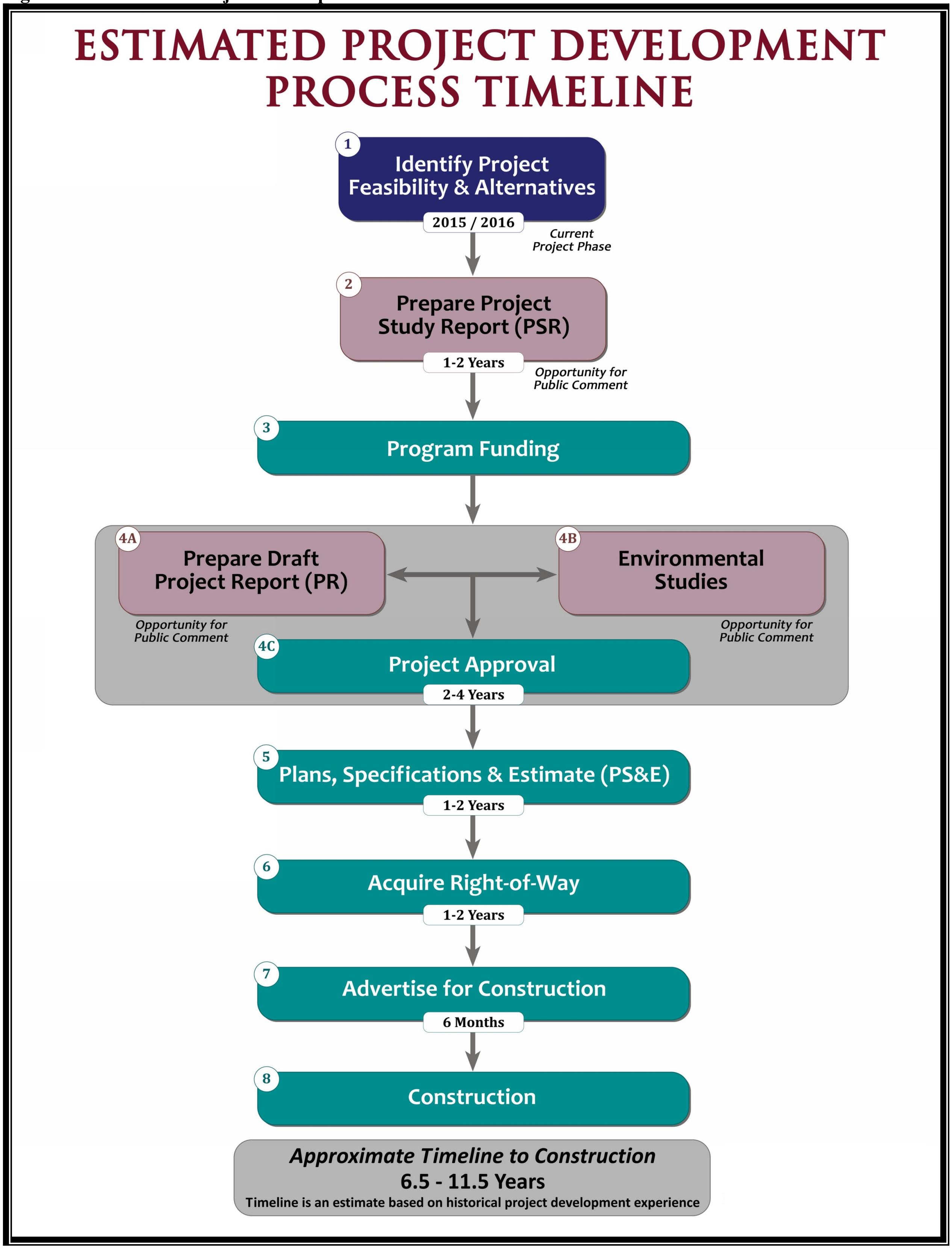
The Agreement states "Caltrans and the FHWA will jointly determine which projects are considered to be HPPs." For the proposed SCC, the HPP determination will be made by Caltrans District 10 in conjunction with the FHWA. Per the Agreement, one of the criteria for a project to be considered an HPP is an interstate project containing one or more of the following:

- Design exceptions relating to the 13 controlling criteria defined by FHWA
- New or modified interchange on an interstate
- Innovative contracting method projects with Federal funds

Because all alternatives identified in this feasibility study will either require a new or modified access point to I-5, the proposed SCC will most likely be designated as an HPP. If not selected as an HPP, then it will be considered as a Delegated Project and Caltrans will have approval authority for all aspects of a Federal-aid project, except those that may not be delegated by federal law. For the Delegated Projects, FHWA will verify compliance with federal regulations via annual program and process reviews.

However, regardless of whether the proposed SCC is identified as an HPP or Delegated Project, the FHWA must give conceptual approval to a new or modified connection to an Interstate freeway prior to PSR approval, or if PSR approval must be given first, it will be on an at risk basis and subject to FHWA conceptual approval. FHWA's conceptual approval must be initiated by the submittal of an FHWA "Determination of Engineering and Operational Acceptability" request.

Figure 17: Estimated Project Development Process Timeline



14. OTHER CONSIDERATIONS

Farm Equipment Accommodations

During the development of this Study, some of the stakeholders asserted that bikes may not be a huge emphasis along the SCC, but farm equipment along the SCC should be thoroughly considered during the PSR. The PSR should consider a shared farm equipment/bike lane, since farm equipment would be heavily impacted along this corridor.

15. FINAL RECOMMENDATIONS

Recommended Alternatives

Based on the alternative analysis performed, as well as input from the PDT and the public, this Study concludes that it is feasible to advance into the next project development phase for the development of a new South County Corridor four-lane divided east-west expressway, which would provide a more efficient and direct travel route between SR 99, SR 33 and I-5 in the southern portion of Stanislaus County. As a result, the Study recommends the following three (3) feasible alternatives to advance to the next project development phase for further examination:

- Alternative 4D
- Alternative 7A
- Alternative 12H

These recommended alternatives 4D, 7A, and 12H, account for two northern alignment options and one southern alignment option, which are depicted in Figure 18, Figure 19, and Figure 20, respectively. The two northern alignments extend from the City of Turlock to the west to a location northwest of the City of Patterson and primarily follow the existing West Main Avenue to Eucalyptus Avenue to Zacharias Road to I-5. The southern alignment extends from the City of Turlock to the west along West Main Avenue but proceeds southwest via Crows Landing Road and then west on Fink Road to the I-5/Fink Road Interchange, northwest of the City of Newman. The three alternative alignments are described in greater detail below:

- Alternative 4D extends from the City of Turlock, beginning at the SR 99/West Main Avenue Interchange, to the west along West Main Avenue. It continues to a new roadway connection beginning at Jennings Road to the northwest with a new bridge crossing over the San Joaquin River, west onto Eucalyptus Avenue to Zacharias Road. It then proceeds to a new roadway connection to the northwest where it terminates at a new interchange at I-5.
- Alternative 7A extends from the City of Turlock, beginning at the SR 99/West Main Avenue Interchange and proceeds to the west along West Main Avenue, similar to Alternative 4D. It then proceeds west along Las Palmas Avenue crossing over the San Joaquin River, north onto Elm Avenue, west onto to Eucalyptus Avenue, and then follows Zacharias Road to a new roadway connection to the northwest where it terminates at a proposed new interchange at I-5.
- Alternative 12H extends from the City of Turlock, beginning at the SR 99/West Main Avenue Interchange, to the east along West Main Avenue to Crows Landing Road. It continues south along Crows Landing Road where it follows Fink Road and terminates at the I-5/Fink Road Interchange.

It should be noted that these recommended alternatives do not preclude other alignments from being considered that were not identified in this Study or represent a slight variation of one of the advancing alternatives. For example, Alternative 3A is a slight variation of Alternative 7A, and

12E is a slight variation of 12H. During the development of a PSR, a consideration could be given to examine a new alterative that alters Alternatives 7A and/or 12H to incorporate features from Alternatives 3A and 12E, respectively.

The alternative analysis resulted in Alternative 4D as the top ranked alternative, and it was, overwhelmingly, the highest-ranking alternative based on public input, as well. However, as discussed in the "Water Quality and Hydrology" section of this Study, during the development of the Study's alternative analysis, the conditions outlined in the SWRCB Petition WW0077 filed by the City of Modesto for their planned recycled water pipeline were not available to be incorporated into the evaluation of alternatives. As a result, Alternative 4D would face significant challenges related to water rights due to the requirements and conditions that were placed on the land use by the SWRCB. In addition, Alternative 4D could potentially encounter significant opposition from various organizations that currently use the land, significant mitigation costs, and significant challenges associated with acquiring the right of way. Therefore, the impacts to the City of Modesto Water Quality Control Facility must be thoroughly considered during the PSR to ensure that Alternative 4D and similar alignments are viable alternatives. The potential impacts of Alternative 4D to the City of Modesto Water Quality Control Facility represent a possible fatal flaw in its viability that will need careful consideration moving into the next phase.

Although the alternative analysis resulted in Alternative 3A as the second highest ranked alternative, it was not recommended for advancement for further examination due to its similarity to Alternative 7A (ranked 10th), which best mimics the alignment identified in the City of Patterson's General Plan. The only difference in alignment features between these alternatives is that Alternative 3A proposes a new segment of road between Eucalyptus Avenue and Lemon Avenue, while Alternative 7A utilizes the existing alignment of Eucalyptus Avenue. The Level 2 Screening Analysis Matrix shown in Appendix B shows that the performance scores for 3A and 7A differed in the performance measure related to soils classifications that were suitable for ease of construction in Criteria F. Alternative 3A scored slightly higher due to better soils, which increased the structural section costs for 7A. This performance measure caused a significant difference in their rankings. In addition, as previously stated, a slight variation of Alternative 7A that incorporates 3A is not precluded from being considered in the next phase.

Although the technical analysis supports Alternatives 1B, 1C, and 6B as feasible alternatives with rankings of 3rd, 4th, and 9th, respectively, they all utilized Fulkerth Road. Fulkerth Road is not an improved facility for the most part and was not viewed favorably by the PDT and public. Therefore, input from the PDT and the public has led to the recommendation of not advancing such alternatives into the PSR for further study.

Although the technical analysis supports Alternatives 10E and 10C as feasible alternatives with rankings of 5th and 6th, respectively, due to constructability concerns related to a new interchange at I-5, these alternatives were not recommended for advancement for further study. At the location where Alternatives 10E and 10C would connect to I-5, the existing I-5 northbound and southbound profiles have an approximate 10-foot elevation difference between them, along with a 75-foot elevation difference between northbound I-5 and the California Aqueduct. Such constraints present constructability, environmental and cost concerns that were not able to be fully determined in this Study. Because these constraints are unique to these two alternatives, they were recommended not to be advanced for further evaluation in the next project development phase.

Alternatives 12E and 12H, ranked #7 and #8, respectively, from the alternative analysis where 12H is the only southern alignment recommended for advancement. One of the intended purposes of this feasibility study was to be a regional study; therefore, the advancement of alternative 12H is consistent with this goal. There were a total of seven southern alignments evaluated in the Study. Alternative 12H is also consistent with Stanislaus County's General Plan, which converts Crows Landing Road to an expressway from the City of Ceres to the existing I-5/Fink Road Interchange. In fact, Stanislaus County has recently initiated a Crows Landing Corridor Planning Study to evaluate transportation connectivity issues and conceptual improvements along Crows Landing Road between I-5, SR 33, and SR 99 in the southwestern portion of the County leading up to the planned CLIBP area. In addition, the alternative analysis, as well as the public input, both supported 12H as one of the top three most viable alternatives for advancing into the PSR.

Project Initiation Document

The Study recommends that the Project should advance to the next project development phase in the preparation of PSR for a new SCC east-west four-lane divided expressway in the southern portion of the County. The PSR is a programming document and must be approved before the SCC Project can be listed as a candidate for State Transportation Improvement Program (STIP), Federal Statewide Transportation Improvement Program (FSTIP) and Federal Transportation Improvement Program (FTIP) funds. A PSR is a document that meets statutory and California Transportation Commission (CTC) requirements for STIP, FSTIP, and FTIP candidate projects. A PSR-lite is similar to a PSR-PDS, which only programs the funds for the support costs for the environmental phase (PA&ED) and limits the level of detail and analysis in evaluating the alternatives. During PA&ED, the Project Report (PR) will program the support costs for PS&E, ROW support and acquisitions, construction management, as well as the capital costs (i.e. construction and right of way). However, there is concern that a PSR-lite or PSR-PDS may not provide any different results than the feasibility study due to the limited analysis provided by such documents compared to a standard PSR. Therefore, the PSR is the recommended Project Initiation Document (PID) or programming document for the next project development phase. Since the PSR programs the support and capital costs for all future project development phases, the required analysis to evaluate alternatives must be completed to a sufficient level of detail to determine which alignments are to be advanced into the PA&ED phase. Furthermore, a PSR will not only place StanCOG in a stronger position to program state funding, but potential federal funding through the Fixing America's Surface Transportation (FAST) Act's new Nationally Significant Freight and Highway Project and National Highway Freight Program sections, as noted in the "Project Funding Strategies" section of this Study.

Figure 18: Alternative 4D

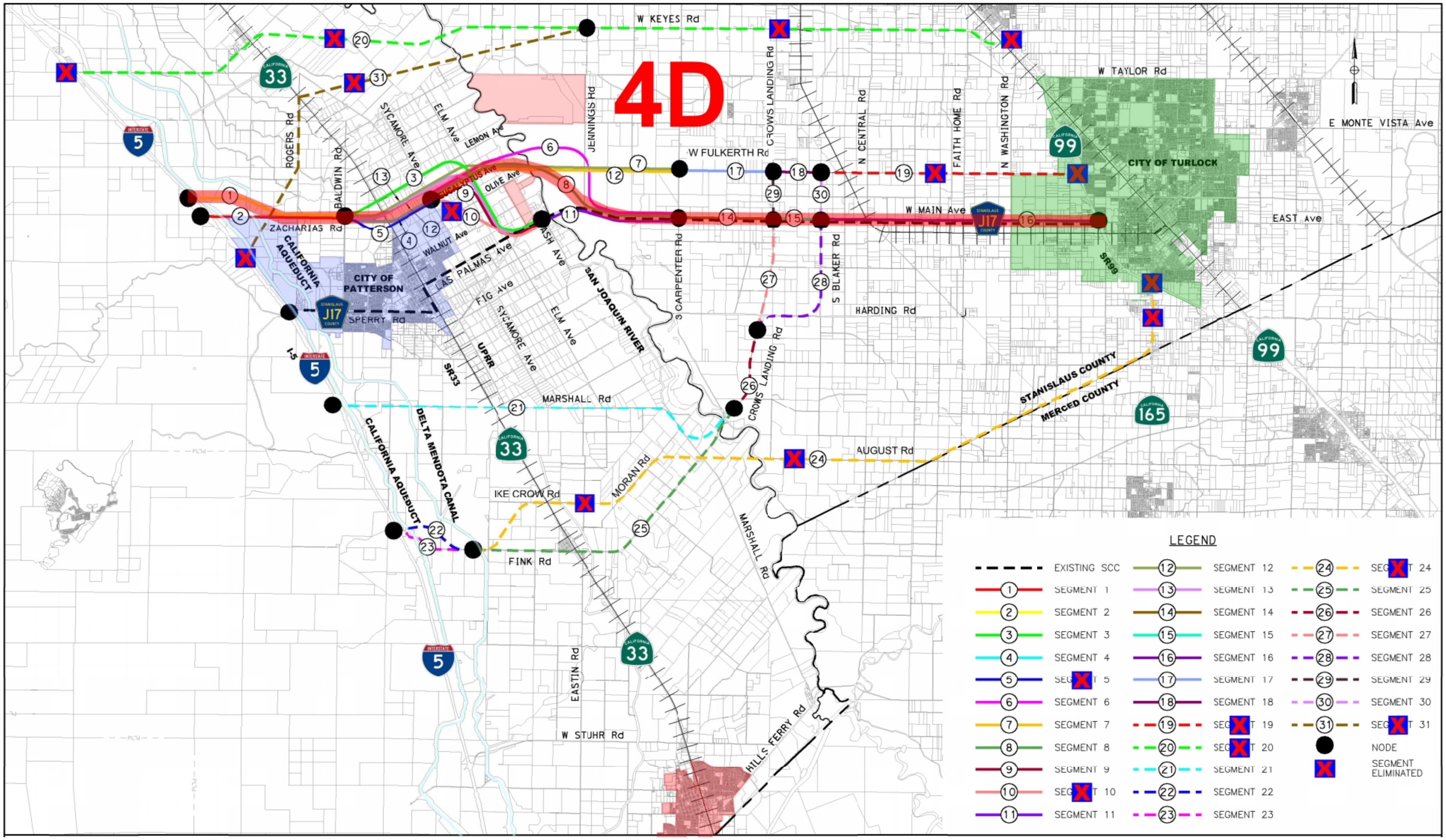


Figure 19: Alternative 7A

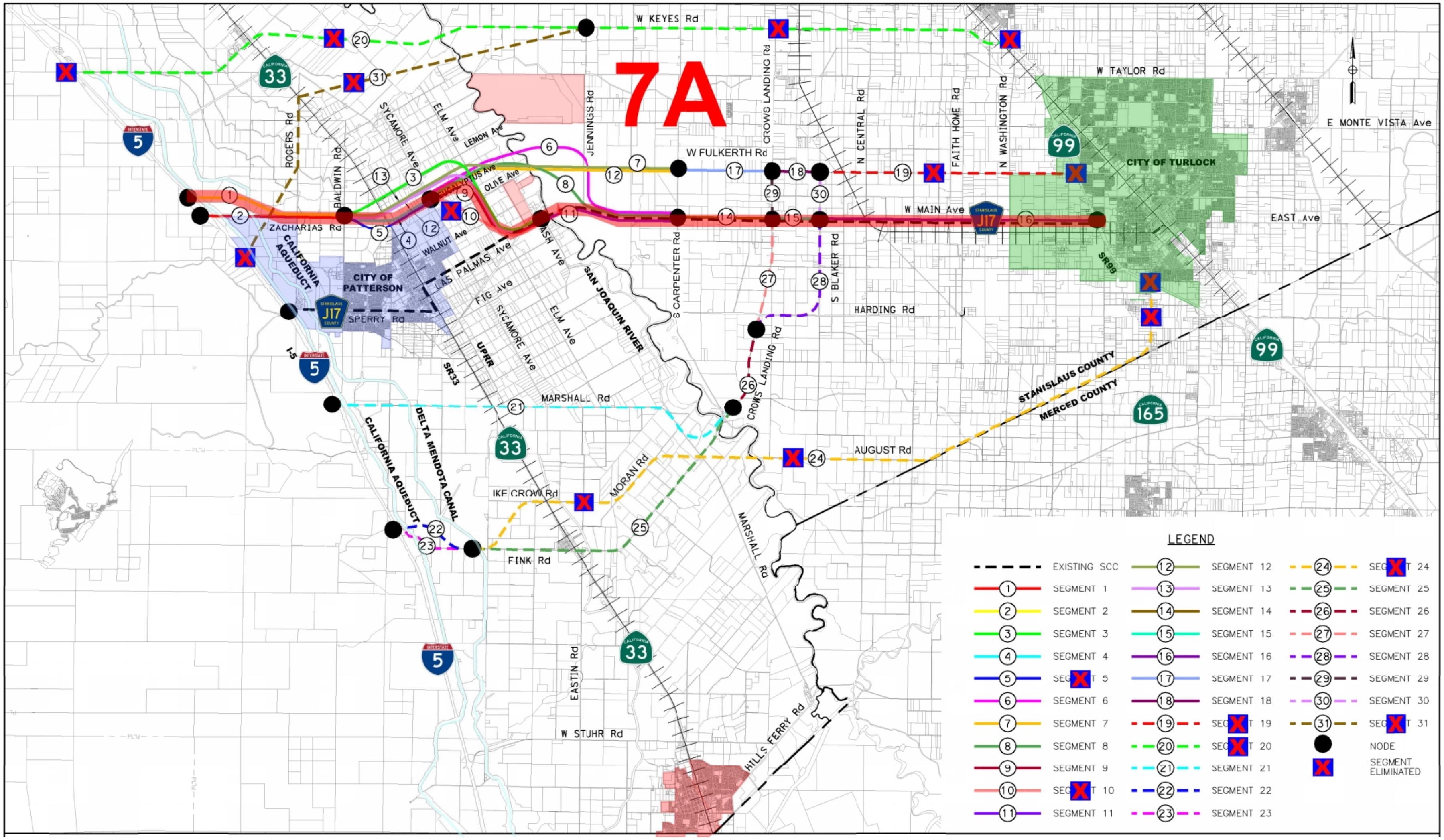
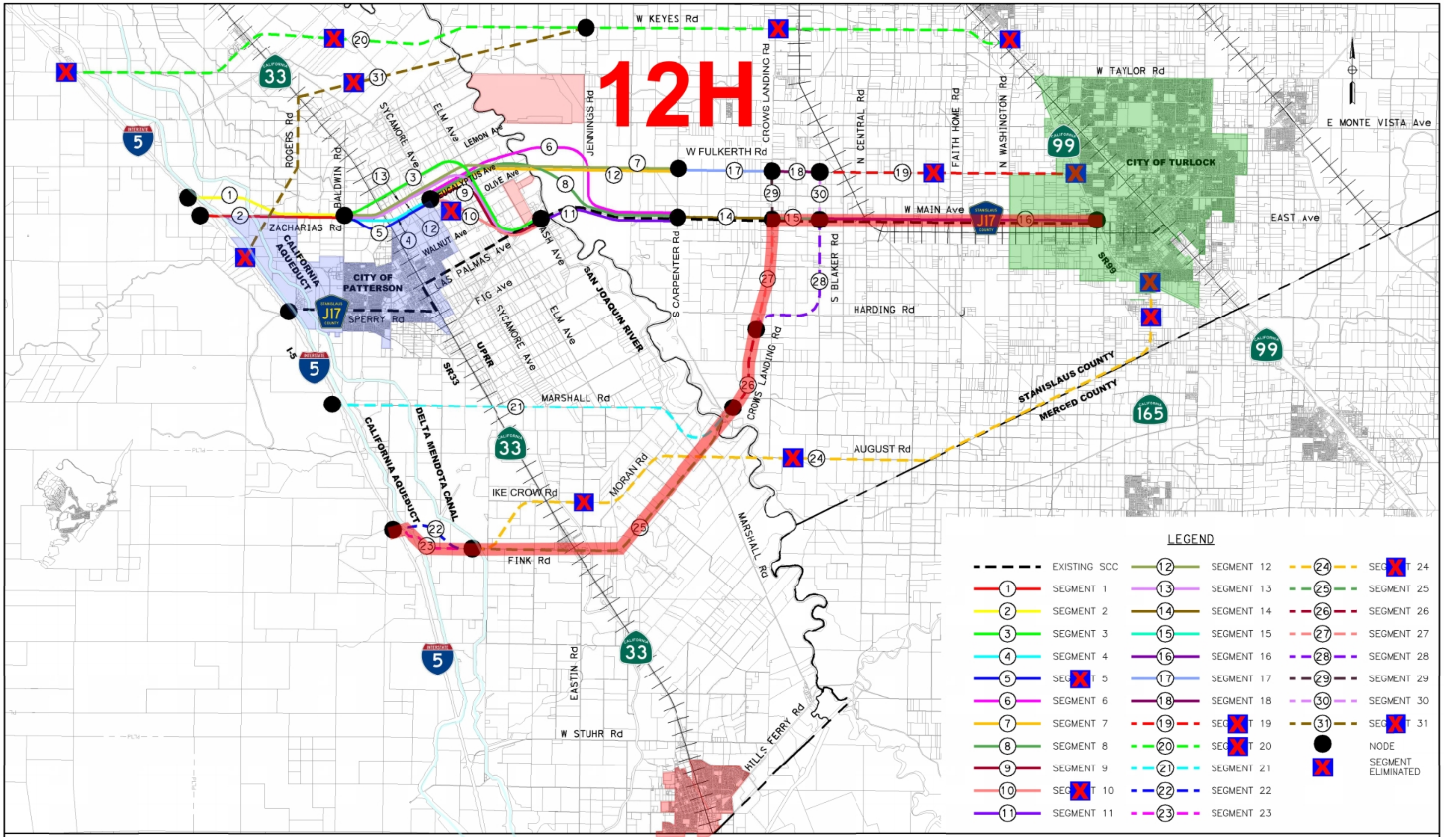


Figure 20: Alternative 12H



16. APPENDIX

A. Level 1 Screening Analysis Matrix (97 Alternatives)
B. Level 2 Screening Analysis Matrix (18 Alternatives)
C. Maps of 18 Alternatives for Level 2 Screening
D. Maps of Top 10 Alternatives
E. Public Workshop #1 Materials
F. Public Workshop #2 Materials
G. Public Workshop #3 Materials
H. Public Comments
I. Existing and Future Traffic Conditions Report – TJKM
J. Preliminary Environmental Constraints Technical Memo – LSA
K. Preliminary Geotechnical Memorandum – WRECO
L. Preliminary Hydrology, Floodplain, & Water Quality Technical Memo – WRECO
M. Funding Strategies Memorandum – ANRAB
N. Alternative Cost Estimates
O. Project Development Team Members
P. List of Corridor and System Planning Documents