

Executive Summary

The Route 710 Model Evaluation has been prepared to evaluate a Low Build Proposal proposed by the City of South Pasadena. The definition of the Low Build Proposal and the modeling assumptions are based upon an agreement reached by the modeling review committee during a meeting on October 18, 1995. Membership of the committee was composed of technical staff from cities in the Route 710 corridor and technical representatives from the Southern California Association of Governments (SCAG), California Department of Transportation (Caltrans) and the Los Angeles County Metropolitan Transportation Authority (MTA). A copy of the Summary Agreement is provided in Appendix G.

Effects on the Regional Transportation System

Effects on VMT, VHT, and Pollutants

The three scenarios for the year 2015 studied in this analysis are: No Build, Build, and Low Build. The key regional statistics evaluated are Vehicle Miles Traveled (VMT), Vehicle Hours Traveled (VHT), and Pollution. The three key pollutants are Total Organic Gases (TOG), Carbon Monoxide (CO), and Nitrous Oxides (NOx).

	Daily Vehicle Miles Traveled (in 1,000's)	Daily Vehicle Miles Traveled (in 1,000's)
No Build	439,036	20,331
Build	439,259	20,305
Low Build	439,347	20,354

The Build Alternative reduces VHT by 26,000 hours when compared to the No Build Alternative while the Low Build Proposal increases VHT by 23,000 hours over the No Build Alternative, The Low Build increases VMT by 0.07%, and the build increases VMT by 0.05%.

The table below outlines the effects of the Build and Low Build Proposals upon the regional burden of criteria pollutants: The effects are measured by the change in the daily regional pollutant burden for each pollutant relative to the No Build's value. The Build Alternative reduces TOG and CO while NOx increases. The Low Build Proposal increases. The Low Build Proposal increases the burden of TOG and CO while NOx burden is reduced slightly.

	Total Organic Gasses (Kg/day)	Carbon Monoxide (Kg/day)	Oxides of Nitrogen (Kg/day)
Build	-230	-1,011	+191
Low Build	+91	+532	-17

Effects on the Transit System

The primary effects of the Build and No Build Alternatives and Low Build Proposal on transit patronage within the region are outlined in the table below. The Build Alternative reduced regional transit use by

savings while simultaneously resulting in more efficient transit operation and potentially lower transit costs.

The Low Build Proposal reduces transit by 6,000 person trips per day or 0.5%. This is due to the adverse effects on bus service. Traffic calming on primary arterials used by the buses exacerbates the general levels of congestion especially in the city of Pasadena.

DAILY TRANSIT RIDERSHIP

	<i>Home-Work Transit Trips</i>	<i>Other Transit Trips</i>	<i>Total Transit Trips</i>	<i>Difference</i>	<i>Percent Difference</i>
No Build	585,853	722,020	1,307,873		
Build	581,377	716,676	1,298,053	9,820	-0.8%
low Build	582,863	718,916	1,301,779	6,094	-0.5%

Effects on Carpools

There is interaction between the three modes: Drive Alone, Carpool, and Transit. When use of one mode changes, the use of the other modes readjust, assuming the total person trips remain constant. The table below compares the impacts on Home to Work carpool trips. Home to Work carpools have historically been the focus of carpool policy, and is the carpool type about which the most empirical data exists. The Build Alternative adds 1,000 carpool trips to the system. The Low Build Proposal reduces carpool trips by 16,000. The percentage change in carpools between the No Build and the Low Build Proposals is small, but the absolute difference is fairly large, especially when compared against the No Build versus Build differences. The change results from lower speeds on the HOV network in the Low Build Proposal which when recycled through mode choice yield the 16,000 fewer carpool trips. This speed differential results from the redistribution of carpool trips on a number of HOV facilities

CHANGES IN DAILY DRIVE ALONE AND CARPOOL USE

	from No build to Build	from No Build to Low Build	from Low Build to Build
Drive Alone	+3,000	+18,000	-15,000
Carpool	+1,000	-16,000	+17,000

Effects on Freeway System

Effects on Route 710 Freeway

The effects on the Route 710 Freeway itself are outlined in the table below. The increase in traffic in the Low Build Proposal at the south end results from extending the freeway north from Valley Boulevard to Mission Road/Alhambra Avenue.

DAILY TRAFFIC VOLUMES ON ROUTE 710

	2015 Build			
	2015 No Build	Mixed Flow	HOV	2015 Low Build
Routes 134/210 Interchange	87,000	187,000	8,000	N/A
Huntington Drive	N/A	162,000	16,000	N/A
Hellman Avenue, Cal State LA	67,000	187,000	12,000	76,000

Effects on Surrounding Freeways

The Foothill Freeway (I-210) northwest of the Routes 134/210 Interchange (in effect an extension of Route 710) and the Route 710 south of the San Bernardino Freeway each show substantial increases in traffic volumes in the Build Alternative versus either the Low Build Proposal or No Build Alternative. Traffic volumes on the Route 710 south of the San Bernardino freeway (I-I 0), for example, increase by 56,000 vehicles per day. The Low Build Proposal by contrast, will reduce traffic volumes on the I-210 to the north. The Low Build Proposal increases volumes on the Route 710 south of the San Bernardino Freeway.

The Build Alternative will provide substantial relief to other nearby freeways. The Golden State Freeway (I- S) and the Glendale Freeway (SR-2) will experience drops of 23,000 to 29,000 vehicles per day. The Pasadena Freeway (SR-II 0) will experience a drop of 19,000 vehicles per day compared against the No Build Alternative. Along the Golden State Freeway (I-5), the drops are especially important since along the I-5, traffic demand in year 2015 runs above 400,000 vehicles per day in the No Build Alternative. The model also shows minor changes in volumes for other freeways in the Build Alternative with a small net reduction compared against either the No Build or Low Build Proposals.

The completion of the Route 710 freeway would provide faster access to the corridor for emergency vehicles. It will also provide additional alternate routes on the freeway system in the event of a disaster such as the Northridge Earthquake.

Effects on Arterial Streets

The effects on parallel city streets are shown for the three screen lines shown on the following tables. The Statistics from the screenlines show that the Build Alternative reduces traffic on these streets by 15% to 36%. Fremont Avenue will be especially adversely affected if the freeway is not built. Speeds on Fremont between Valley Boulevard and Huntington Drive will be between 5 and 10 mph during the morning and afternoon peak periods.

While Fremont Avenue would be most severely affected, because of the lack of alternate streets, other streets within the corridor would suffer additional congestion. Traffic demand along each of the

following streets would increase by over 10,000 vehicles per day over existing already congested conditions: Fair Oaks Avenue, Arroyo Parkway, Los Robles Avenue, Atlantic Boulevard, and Garfield Avenue.

Screen-Line south of California Boulevard.

In the period from 1995 to 2015, the city street volumes along this screen line increase by about 30% for both the No Build and the Low Build Proposal. By contrast, the Build Alternative reduces city street volumes by 6% over the same period. The table below shows base year and projected Average Daily traffic (ADT) volumes on a screenline parallel to and just south of California Boulevard in Pasadena.

Facility (Node)	1994 Ground Counts	2015 Adjusted ADT Projections		
		No Build	Build	Low Build
Orange Grove Boulevard	22,667	21, 680	16,275	20, 876
St. John Avenue	12,491	19,031	13,539	18,196
710 Freeway			169,714	
Pasadena Avenue	14, 325	19,509	14,032	19,679
Fair Oaks Avenue	31,445	39,745	28,817	41,822
Arroyo Parkway	40,991	61,518	43,828	64,834
Marengo Avenue	13,119	16,272	11,823	16,498
Los Robles Avenue	17,123	20,237	14,784	19,416
Total Volumes including Freeway			312,812	
Total Volumes without Freeway	152,161	197,992	143,098	200,321

Screen-Line North of Huntington Drive

Along the screenline running just north of Huntington Drive, the No Build Alternative will increase city street volumes by 39%. The Low Build Proposal increases city street volumes by 43%. The Build Alternative reduces city street volumes by 12% signaling significant congestion relief as shown in the table below.

Facility (Node)	1994 Ground Counts	2015 Adjusted ADT Projections		
		No Build	Build	Low Build
710 Freeway			171,934	
Fremont Avenue	21,769	17,890	13,498	17,914
Fair Oaks Avenue	22,325	35,263	21,662	36,454
Los Robles Avenue	18,788	34,279	20,357	35,443
Total Volumes including Freeway			227,451	
Total Volumes without Freeway	62,882	87,432	55,517	89,810

Screen-Line south of Valley Boulevard

The screen-line south of Valley Boulevard behaves somewhat differently from the two screen lines listed above, since it already has an existing section of Rte.710 Freeway. The Build and No Build Alternatives as well as the Low Build Proposal each will experience increases in volumes. The No Build Alternative will increase city street volumes by 34%. the Low Build Proposal increases them by 25%, and the Build Alternative by 14% (the least impact of any of the three as shown in the table below).

Facility (Node)	1994 Ground Counts	2015 Adjusted ADT Projections		
		No Build	Build	Low Build
710 Freeway	46,886	67,140	192,980	75,407
Fremont Avenue	25,078	45,232	38,359	42,031
Fair Oaks Avenue	42,931	50,029	42,427	46,489
Los Robles Avenue	39,421	49,086	41,628	45,613
Total Volumes including Freeway	154,316	211,487	315,394	209,540
Total Volumes without Freeway	107,430	144,347	122,414	134,133

Effects on Local Streets

The Low Build Proposal will cause heavy congestion on a number of city streets in the City of Alhambra and in the community of El Sereno.

The Low Build Proposal treats Alhambra and Pasadena differently. In Alhambra, the Build Alternative is extended north 1/4 mile to Mission Road/Alhambra Avenue. This clearly moves more regional traffic and relieves the Valley Boulevard/Fremont Avenue intersection.

The negative side is that the Low Build Proposal puts regional traffic on residential streets. For example, to the northeast, Concord Avenue and Westminster Avenue peak period speeds on the No Build and Build Alternatives are just below this free flow condition. In comparison, the Low Build Proposal drops the speeds, and adds significant through volumes.

To the northwest in El Sereno, the street system is circuitous with many streets outletting onto Alhambra Avenue. The Low Build Proposal attracts eight to nine thousand additional trips that migrate through the residential area of El Sereno. This is an example of the *traffic diffusion* described in the Multi-Modal Report of the City of South Pasadena.

In Pasadena, the Low Build Proposal will increase congestion by removing a section of existing freeway, and reducing free flow speeds and capacities on primary streets with *traffic calming*. The resulting congestion in turn slows travel speeds with the side effect that buses that use these streets are also slowed making bus patronage under the Low Build Proposal less attractive and explaining why total transit patronage under the Low Build Proposal will drop.

Costs & Benefits over 20 Year Period Public Agency Costs

The public agency cost for the Build Alternative in 1995 dollars is estimated at \$670 million, and the public agency cost of the Low Build Proposal is estimated at \$319 million in 1995 dollars.

Benefits and Benefit Cost Analysis

The table below outlines the benefit: cost ratios for the Route 710 at the corridor, study area and regional levels. The numbers in the table need some explanation. They represent the return on taxpayer investment for Route 710. A value of 1 means that a taxpayer investment of \$1 will yield \$1 in societal benefit. A value greater than 1 means benefits outweigh costs; a value between 0 and 1 means that the costs outweigh the benefits; and, a negative benefits to cost ratio means the taxpayer funds are being spent to implement a project that worsens system performance. The values for the Build Alternative are all greater than 1, and the values for the Low Build Proposal are all much less than 1. In fact, the Low Build

	Corridor	Study Area	Region
Build Alternative	2.20	1.16	1.62
Low Build Proposal	0.17	0.19	-1.25

Proposal's benefits to cost ratio at the regional level is negative. The above table summarizes the analysis prepared by Patrick De Corla-Souza of the Federal Highway Administration (FHWA).¹

DeCorla-Souza states:

"The results of the analysis provide convincing evidence that, from an economic standpoint, decision-makers can be assured that the net societal benefits of the Build alternative (reflecting benefits and costs accruing directly to the travelers as well as indirectly to the non-users) are far in excess of the cost to public agencies. On the other hand, the evidence from the analysis suggests that the Low Build alternative would in all likelihood result in a net economic loss to society. These conclusions hold true at the corridor and regionwide levels of analysis even under extreme discount rate assumptions and extreme assumptions about the value of travel time saved."

¹De-Corla Souza, Patrick (AICP) **The Costs and Benefits of Route 710 Alternatives.** Federal Highway Administration, HEP-20, Washington, DC, April, 1996.

Conclusions

The purpose and need for the project is to address the issues listed below. The table compares the performance of the Build Alternative and the Low Build Proposal relative to the No Build in terms of fulfilling specific local and regional transportation needs.

The Low Build Proposal proposes spending a significant amount of money (\$319 million) to get a negative or at best a negligible benefit in almost all the categories.

Transportation Issue	Build Alternative Resolves Issue?	Low Build Proposal Resolves Issue?
Reduce primary street congestion	YES	NO, Increases
Reduce local street congestion	YES	NO, Increases
Improved mobility & Accessibility	YES	NO
Complete freeway network	YES	NO
Complete HOV network	YES	NO
Promote carpool & van pool formation	YES	NO, decreases
Promote transit ridership	*MAYBE	NO, decreases
Reduce drive alone car trips	*MAYBE	NO, decreases
Reduce accident & fatality rates	YES	NO
Improve air quality	YES	NO

The central question that needs to be asked when assessing the impact of different alternatives and proposals, and the question that transportation demand modeling attempts to answer, is "How does implementing this particular project or scenario affect the operation of the transportation system?" In assessing these impacts, the comparison is always against the impact of doing nothing, or in our case, of implementing the No Build Alternative. From this perspective, the Build Alternative demonstrates specific advantages over the No Build Alternative. Specifically, the traffic flow on the streets within the corridor is less congested. Building the Route 710 also helps relieve some of the bottlenecks in north- south traffic through the region by relieving Route 5 through downtown Los Angeles and in the San

- Rerouting of existing express bus service to the new HOV lanes would increase transit ridership, and reduce drive alone vehicle trips. If this service is not implemented, the effects of the Build Alternative are negative for this issue.
- The Low Build Proposal increases the burden of TOG and CO while the NOx burden is reduced slightly. The NOx for the Build Alternative goes up slightly. This is not considered significant, however, since Federal Standards for NOx have been met in Los Angeles County since 1992. The State standard was exceeded only once at one station in 1993. (Ref. 1994 South Coast Air Quality Management Plan, SCAG). There are also small changes in PM10. For detailed information, see Appendices I and J.

Fernando Valley. By including a carpool lane within the project, the Route 710 also encourages carpool formation and reduces the number of regional drive alone trips.

By contrast, South Pasadena's Low Build Multi-Modal Proposal in many ways makes matters worse. Traffic along city streets in the corridor is more congested than when doing nothing at all. While the patronage of the Pasadena Blue Line goes up, overall transit usage goes down, and at best the Low Build does nothing or actually worsens the congestion on the freeways that remain. These results are outlined in the table on the previous page.