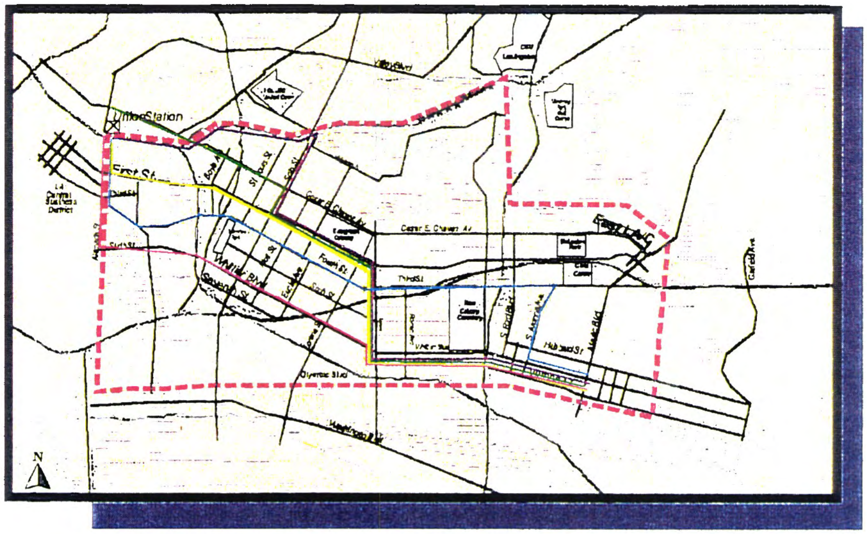
1998 RTP Transit Restructuring Evaluation

East Los Angeles



Transit Corridor Technical Report

July 1998

Southern California Association of Governments

41881822

This report is a compilation of analysis (with some refinement) of technical work completed as part of the development of the 1998 Regional Transportation Plan.

Mission Statement

Leadership Vision Progress

Leadership, vision and ***progress*** which promote economic growth, personal well-being, and livable communities for all Southern Californians.

The Association will accomplish this Mission by:

- Developing long-range regional plans and strategies that provide for efficient movement of people, goods and information; enhance economic growth and international trade; and improve the environment and quality of life.
- Providing quality information services and analysis for the Region.
- Using an inclusive decision-making process that resolves conflicts and encourages trust.
- Creating an educational and work environment that cultivates creativity, initiative, and opportunity.

The preparation of this report was financed in part through grants from the United States Department of Transportation—Federal Highway Administration and the Federal Transit Administration—under provisions of the Intermodal Surface Transportation Efficiency Act of 1991. Additional financial assistance was provided by the California State Department of Transportation.

Southern California **Association of Governments**
818 West 7th Street, 12th Floor, Los Angeles, California 90017-3435
213.236.1800
www.scag.ca.gov

Regional Council Members

TABLE OF CONTENTS

<u>**List of Exhibits**</u>

Tables/Figures

EXECUTIVE SUMMARY

The East Los Angeles Transit Report addresses potential public transportation improvements in a unique area of Los Angeles County. East Los Angeles, and adjacent Boyle Heights section of the City of Los Angeles are characterized by a large and growing population (over 212,000 people per the 1990 census, expected to grow to 275,000 by 2020) of predominantly Hispanic ethnic background, a high percentage of recent immigrants, relatively large population density, significantly higher percentage of poor people, and relatively high transit use and transit dependence. In the study area, over 19% of workers use the bus to get to work (as compared to 6.8% for Los Angeles County as a whole), and percentages of carpooling and walking to work are higher than elsewhere.

The 1998 Regional Transportation Plan (RTP) includes Actions that SCAG will work with the transportation commissions and transit operators to evaluate restructuring of existing transit service to provide more efficient transit services; that the region will construct exclusive transit corridors to minimize travel time and increase ridership levels, and develop a demand responsive Smart Shuttle system to enhance centers access.

This report draws from the knowledge gained through the RTP process and provides base information related to transit restructuring in the East Los Angeles Area in an effort to assist MTA in its current efforts to develop the Transit Restructuring Plans for all areas of the county. The purpose of this report is to provide a preliminary investigation of potential public transit improvements in the study area--including an East Los Angeles Transit Corridor (scheduled for implementation per the Plan by 2010), that could improve transit service to the users in the study area, improve access to major activity centers, and enhance the communities served, while reducing operating costs and improving service productivity. The information presented in this report is largely based on the work performed in

East Los Angeles and Boyle Heights are served by a substantial number of bus routes, primarily operated by the Los Angeles County MTA, and organized in a grid pattern. There are approximately 40,000 daily transit weekday boardings, with several very heavily used bus transit corridors, including lines operating on Soto Street, E. Cesar Chavez Avenue, First Street, Whittier Boulevard, and Olympic Boulevard. Most of the heaviest bus routes carry passengers in an east-west direction. The average speed for all of the bus routes in the area is 12.9 MPH, and average passenger trip length for users ranges from one to three miles, depending upon the route. Cost per passenger-mile varies widely within the study area by route, ranging from 26 cents/passenger-mile for Line 18 to $ 2.30 per passenger-mile for Line 250/253.

Major deficiencies in the existing bus system are that some routes are overcrowded during peak periods, while other routes are highly underutilized. There may be a substantial gap between where service is provided and where some of the highest demand exists. Most person trips to key activity centers within the study area require at least one transfer, resulting in longer and less convenient trips than is desirable.

The LACMTA, after conducting an extensive series of studies on subway route alternatives, recommended a preferred Red Line East Side Extension, which was included in the MOS 3 and MOS 4 phases of Metro Rail expansion. Current funding limitations make it virtually impossible however that the Red Line can be extended to East Los Angeles within the next several decades.

Thus far there has been very little work done on cheaper surface transitway or light rail alternatives by MTA or its predecessor agencies (except for an Olympic Blvd. light rail study some years ago). For this reason, the present study has suggested three transit alternatives: the first of these, the Intermediate Transit Restructuring Alternative, has five at-grade transit corridor alternatives, and two additional transit alternatives. The transit corridors include an El Monte Busway/Soto Street alternative, an E. Cesar Chavez alternative, a First Street alternative, a Fourth Street alternative, and a Whittier Boulevard alternative.

All of these transit corridor proposals would link Whittier/Atlantic in East Los Angeles with LA Union Station in downtown LA. A bus transitway technology option is considered for all of these, and light rail is considered as a second technology option for all but the El Monte Busway alternative.

Two further transit alternatives are advanced: an Interconnectivity/Linkage Alternative, which would link nearby HOV lanes with the bus service and enhance north-south bus system connectivity as well as east-west service; and a Centers Access Alternative, which would develop major transit centers at area activity centers including commercial areas, colleges and universities, and hospitals. Combinations of these alternatives are of course possible.

The at-grade transitway or light rail corridors would run through retail commercial and residential areas, and would require taking arterial highway lanes to create new transit medians, necessitating removal of on-street parking in these locations and its replacement with off-street community parking lots. The transit corridors would use transit signal preemption and signal priority strategies to speed up service to the extent feasible.

Consideration is given to through-routing of transitway bus services to other major activity centers, including those in downtown Los Angeles; with regard to the light rail technology option there are opportunities to tie in an East Los Angeles corridor line with the Pasadena and Long Beach Blue Line segments via an Alameda Street connection, allowing sharing of maintenance facilities to reduce capital costs. Some initial cost estimates are provided for the various corridor alternatives.

No specific alternative, corridor alignment, or technology is recommended. The purpose of the study is to identify issues and provide information which will be helpful in future work on transit improvements in the East Los Angeles/Boyle Heights study area.

1.0 INTRODUCTION

In April 1998, the Southern California Association of Governments (SCAG), adopted the Regional Transportation Plan (RTP). This Regional Transportation Plan provides a vision of what the regions transportation system may look like in 2020 and is the basis for Federal programming and funding decisions affecting the region. While the RTP establishes the framework for regional and subregional investment decisions, specific projects and corridor investments are decided at the County level through the transportation commissions, and in the case of Los Angeles County, by the MTA.

The RTP, developed through a two-year bottom-up planning process, identified many challenges the region faces in meeting the current and future transportation needs of the people and businesses throughout Southern California. The RTP identifies regional trends that have heightened awareness of the need for transportation investments which are cost-effective, environmentally friendly, and multi-modal. Most notable among the trends are projections that:

- Population will grow by 43% from 15.6 million to 22.4 million people
- Employment will grow by 61% from 6.6 to 10.6 million jobs
- Commute times will double due to congestion
- Financial capacity to maintain the existing system and make all desired new investments is insufficient..

Given the trends noted above, the RTP identifies major goals and objectives to help guide program, corridor, and project investments in the five-county region. These are summarized below.

1.1 Major Objectives of the RTP

- Meet the regional and subregional mobility and access needs of increased employment and population while reducing congestion to 1990 levels of performance or better and enhancing goods movement

- Ensure that transportation investments are cost effective, protect the environment, promote energy efficiency, and enhance the quality of life

- Serve the transportation needs of everyone including the transit dependent, elderly, handicapped, and disadvantages for safe, reliable, and economical service.

- Develop regional transportation solutions that complement subregional transportation systems and serve the needs of subregions, cities, and communities.

- Promote transportation strategies that are innovative and market based, encourage new technologies and support the Southern California economy.

Building from the knowledge gathered through the RTP process, this report attempts at articulating the issues and problems related to transit restructuring, specifically in the East Los Angeles area, and identify potential alternative solutions that are worth pursuing further through a more detailed analysis.

1.2 Context For the Study

During the course of RTP development, the persistent funding difficulties facing the Los Angeles County Metropolitan Transportation Authority (LACMTA) became well known in Washington, D.C. and Sacramento and the agency was directed by its Federal and State funding partners to develop a Rail Recovery Plan. This Recovery Plan was developed to show that the MTA could meet its funding commitments to the Federally funded portion of its rail system; in the first instance--that of the Red Line subway extension to North Hollywood. During the development of the Recovery Plan and subsequent drafts to it, it became apparent that the MTA could not fund all of the rail, and particularly subway, construction originally intended. In January 1998, the MTA Board voted to suspend planning, engineering, and construction work on three rail lines. These segments include one light rail line and two subway segments: The Pasadena Blue Line (a light-rail line from Union Station in Los Angeles to Pasadena); and the subway segments to the Mid-Cities area of the City of Los Angeles; and the East Side Extension which would go east of Union Station to Atlantic Avenue through East Los Angeles.

Further complicating the MTA's financial troubles are the Court Ordered Consent Decree which places certain requirements on the MTA with respect to bus service including relieving overcrowded buses and restrictions on MTA's discretion over bus fare levels. The suspension of rail construction combined with the Consent Decree has caused much upheaval at the MTA, and prompted much scrutiny over MTA's financial affairs by the California Transportation Commission, the State legislature, the Federal Transit Agency in Washington, D.C., and the region's Congressional delegation.

Regional transit restructuring is an integral component of the RTP and involves the MTA perhaps more than any other transit operator due to the scope of MTA's services and the size of Los Angeles County. In the process of developing the RTP, considerable effort was invested in studying regional transit restructuring issues. The development of Operational Plans for transit restructuring should be consistent with the RTP to ensure continuity the regional transit network. The development of such Operational Plans can benefit tremendously from the information and ground work laid out in developing the RTP.

1.3 Purpose of the Study

The need to provide timely, efficient and customer friendly transit in the area is very obvious. The challenge is to identify the most effective, efficient and practical means of delivering the needed services that will ensure significant improvement in mobility, accessibility and equity in getting to opportunities for the people in the area. In light of recent development and persisting funding difficulties, the proposed East Side Extension of Metro Red Line has become all but unrealistic. This reality presents a new opportunity to consider a host of transportation investments in the East Side Corridor that will meet the needs of residents and businesses. This is what has prompted SCAG to take a serious look at potential solutions immediately that will address the deficiencies in the existing transit system in East Los Angeles. The purpose of this study is to document the supporting data and explore potential alternatives that will meet the mobility accessibility and equity goals of the population within the study area, in the absence of East Side Extension of Metro Red Line. The purposes, goals and objectives of this effort are as follows:

1. To identify and document transit needs and deficiencies in existing transit system in East Los Angles.

2. To put forth preliminary information on investment options for the development of a transit system in the East Side.

3. To raise policy and other issues the MTA may wish to consider in a detailed analysis in this corridor.

4. To develop a policy framework for implementing a transit corridor that will enhance the mobility, accessibility and equity in providing transportation services to the residents of East Los Angles.

5. To frame the future development of any transit system in East Los Angeles within the regional context of RTP to ensure regional continuity of our transit system.

The study purpose does not include identification of a preferred investment strategy or set of investments. It would be the ultimate responsibility of MTA to develop and implement a preferred alternative. It is hoped that this review will assist the MTA in their efforts and serve to jump-start the investment analysis MTA is about to initiate.

1.4 Study Area

The communities of East Los Angles are located east of the Central Business District (CBD) of Los Angeles, generally bounded by the Interstate 5 to the west and south, Interstate 10 to the north and Interstate 710 to the east (see Exhibit 1.1). The study area is roughly bounded by Alameda Street to the west, Interstate 10 to the north, Interstate 710 to the east for northerly portion and Atlantic Boulevard to the east for southerly portion and Olympic Boulevard to the south (see Exhibit 1.2). The study area includes the communities of Boyle Heights, City Terrace and East Los Angeles and it is comprised of approximately 36 census tracts. The shape of the study area was determined by a combination of factors including sphere of influence of the target communities as well as the transit corridors considered, location of major institutions, and shapes of census tracts within the study area.

The study area population is characterized by disproportionate share of transit dependent population of predominantly Hispanic (91%) origin. Approximately 20% of the population within the study area depend on transit system to access work opportunities as compared to approximately 6% for the county of Los Angeles and less than 3% for the SCAG region. A detailed discussion of the socio-economic characteristics of the area is provided in Chapter 2.

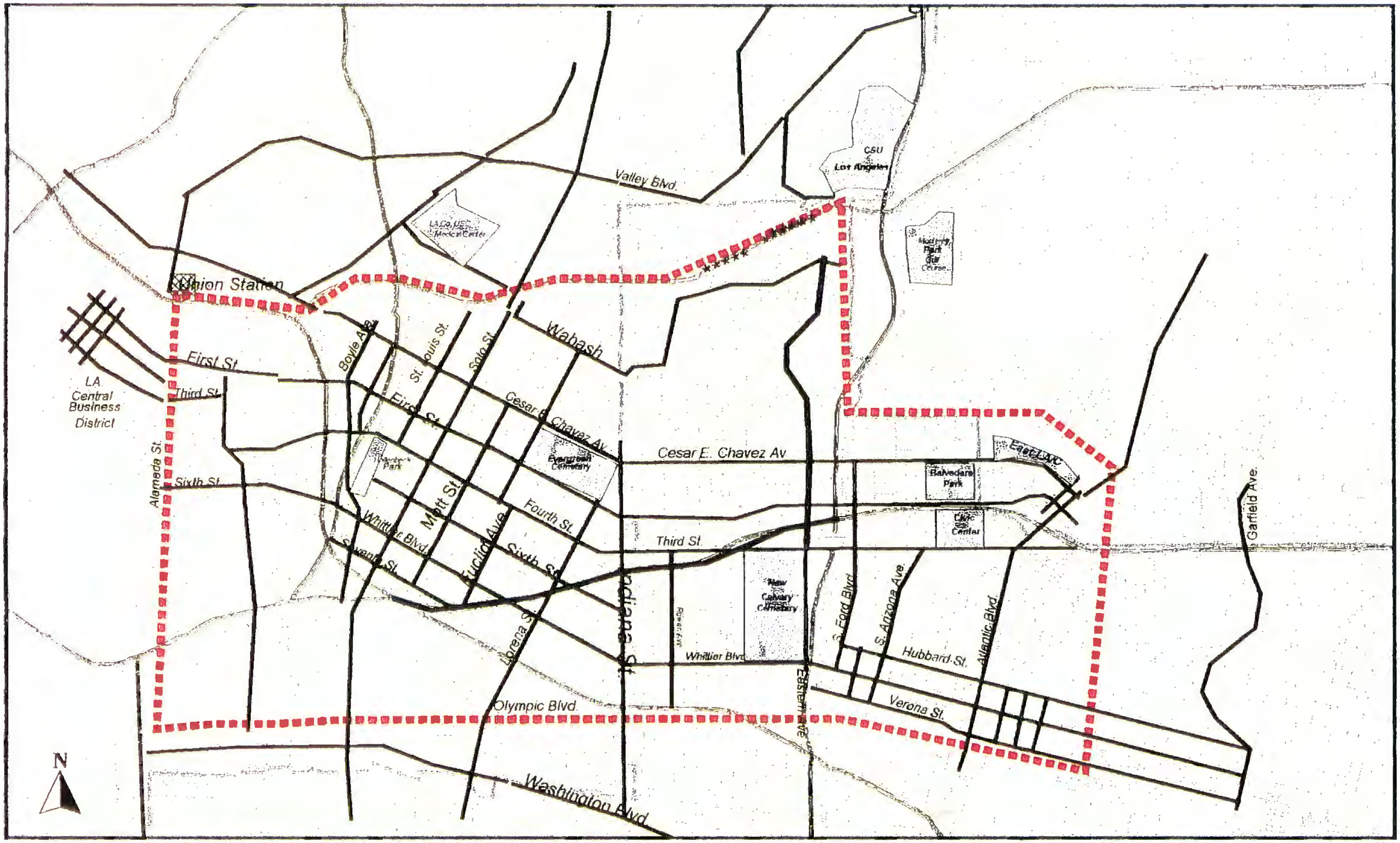


Exhibit 1.1

Study Area

Transit Corridor Report
East Los Angeles
July 1998

LEGEND

Boundary

1.5 Methodology

The study has four major components. The first part of the study focuses on **identifying the transit system customers** and their transit needs by studying existing socio-economic composition, where people work, shop and go for recreational opportunities. The second part focuses on **analyzing the existing transit system**, primarily the MTA network of buses. Performance of existing network of buses is analyzed based on bus ridership count survey data obtained from MTA and relevant reports that have been prepared in the past. Existing deficiencies in the system and unmet transit needs are identified based on the preceding analysis. The third part of the study focuses on **identifying viable transit corridor alternatives** that could potentially meet the transit needs of the area. Opportunities, constraints and major issues for each of the alternatives are explored. The fourth and the last part of the study is devoted to **studying the potential performance of each of the alternatives** in terms of benefit, cost, potential impacts on local arterial streets etc.

Throughout this Study, we must keep the following goals and objectives in mind:

- Our purpose is to develop a policy framework for implementing a transit corridor that will enhance mobility, accessibility and equity intransportation services provided to the residents of East Los Angeles.

- The future development of any transit system in East Los Angeles must be placed in the context of the RTP to ensure continuity throughout the regional transit system.

2.0 PROJECT SETTING

The following sections describe who the potential transit customers are, their travel behavior, existing transit service available, and existing land use and traffic conditions.

2.1 Transit System Customers

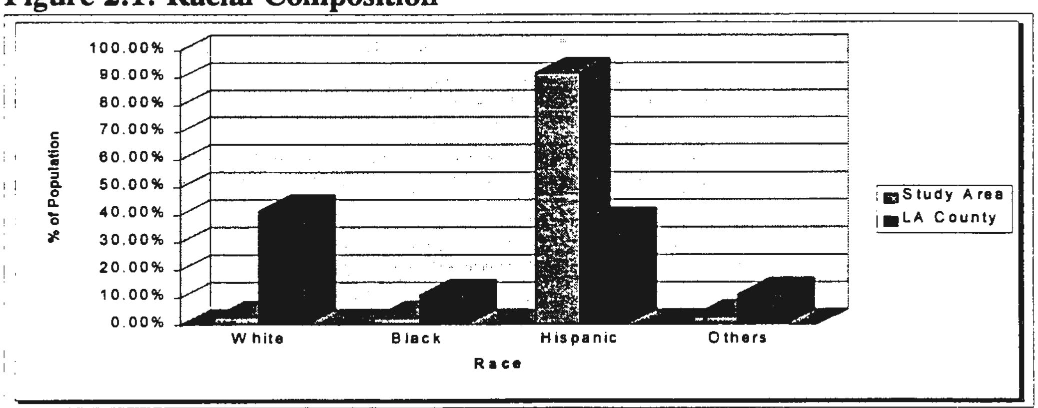
2.1.1 Characteristics of Study Area Population

According to the 1990 census data, there were 212,370 people living in the study area, which represented approximately 2.40% of Los Angeles County's total population, and 1.45% of the SCAG region. Generally, the racial makeup of this area is predominantly Hispanic. People of Hispanic origin represent over 91% of the population within the area as compared to only 41% for the County of Los Angeles (See Fig 2.1). In general, it may be noted that higher proportion of Hispanic population utilize public transportation compared to any other ethnic group.

Table 2.1 Population Profile

	Study Area		Los Angeles County		SCAG Region	
Population	Number	%	Number	%	Number	%
	212,370		8,859,763		14,661,213	
% of LA County		2.40%				
% of SCAG		1.45%				
Race						
White	6,051	2.85%	3,633,534	41.01%	7,309,770	50.25%
Black	5,857	2.76%	945,874	10.68%	1,172,954	8.06%
Hispanic	193,891	91.30%	3,200,361	36.12%	4,670,903	32.11%
Others	6,571	3.09%	975,010	11.00%	1,392,586	9.57%
foreign born persons						
	109,951	50.10%	2,894,653	32.67%		
Persons < 25 years old						
	111,500	50.81%	3,378,156	38.13%		

Figure 2.1: Racial Composition



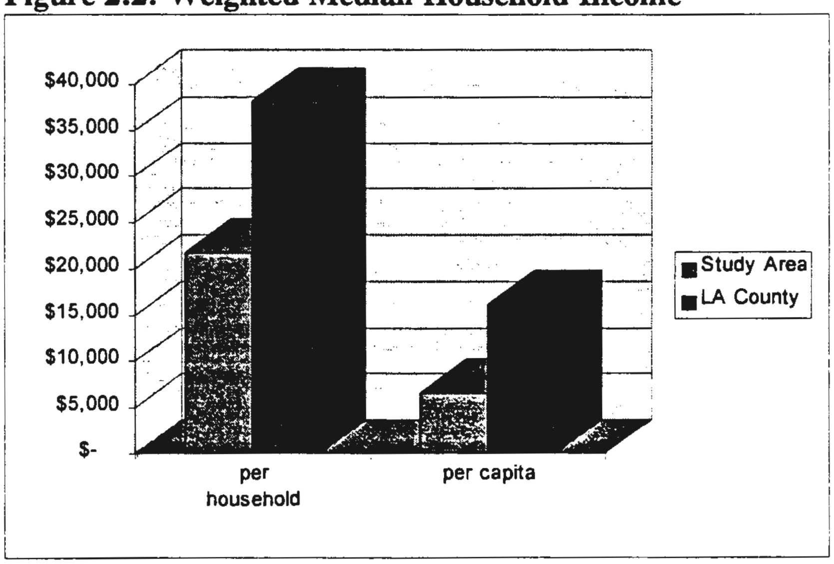
Source: 1990 Census Data

Furthermore, Immigrants (predominantly from Latin America), who tend to be less likely to afford a private car, form a large share of the study area population. Over 50% of the people in the area were foreign-born as compared to 32.7% for the County of Los Angeles. The study area also had higher proportion of younger population compared to the region. Specifically, people under 25 years of age formed 51% of the population within the study area as compared to 38% in the county (See Table 2.1).

2.1.2 Income

The study area was also found to be significantly poorer than that of the region. Households in the study area had a weighted income of $21,664, which amounted to only 55% of the of the County's weighted median household income. The disparity is even wider when compared in terms of per capita income due to the fact that the household size (4.47 persons per household) is much larger for the study area than that for the county (2.92 persons per household). The wieghted per capita income of $6,428 for the area amounted to only 40% of the county's weighted per capita income See Fig 2.2).

Figure 2.2: Weighted Median Household Income



Source: 1990 Census Data

2.1.3 Employment and Occupation

According to the 1990 census data, there were about 102,000 jobs in the study area, which represented 2.20% of Los Angeles County's total jobs, and 1.44% of the SCAG region. However, there were only 72,000 people in the area with jobs. The unemployment rate for the area was 12.65% as compared to 7.37% for the county. Representative job categories in this area were administrative support (15.41%), professional specialty (14.69%), precision production (11.95%), and Machinist Assemblers (11.46%) (See Table 2.2). On the other hand, one-third of residents in the area work in the manufacturing industry (18.59% for non-durable goods and 14.92% for durable goods) (See Table 2.3). Table 2.3a shows a comparison of existing jobs in the area to the occupation of the residents. The table clearly shows that the proportions of jobs of the residents are significantly different from the jobs available in the area. **This mismatch in existing jobs in the area and the jobs of the residents is indicative of the need of the residents to commute outside the area for work.**

Table 2.2 Existing Employment by Type (Employment Based)

Executive, Administrative	Professional Specialty	Technicians	Sales	Administrative Support	Private Household	Protective Services
9,601	14,325	3,299	8,760	15,032	1,045	2,475
9.85%	14.69%	3.38%	8.98%	15.41%	1.07%	2.54%

Other Service Occupations	Farming, Forestry	Precision Production	Machinist Assemblers	Transportation & Material Moving	Handlers Helpers	Armed Forces
9,870	930	11,649	11,180	4,602	4,615	133
10.12%	0.95%	11.95%	11.46%	4.72%	4.73%	0.14%

Source: 1990 Census Data

Table 2.3 Occupation of Residents

Agriculture	Mining	Construction	Manufac. of Non Durable Goods	Manufac. of Durable Goods	Transportation	Communication and Public Utilities	Wholesale
996	28	4,184	13,388	10,745	3,104	969	4,789
1.38%	0.04%	5.81%	18.59%	14.92%	4.31%	1.35%	6.65%

Retail	Finance, Insurance	Business and Repair Services	Personal Services	Entertainment Services	Health Servises	Education Services	Other Services	Public Administration
11,507	2,442	4,248	2,636	1,035	3,922	3,501	2,833	1,592
15.98%	3.39%	5.90%	3.66%	1.44%	5.45%	4.86%	3.93%	2.21%

Source: 1990 CTPP Data

Table 2.3a: Comparison of Existing Jobs to Residents Occupation

	Executive, Administrative	Professional Specialty	Technicians	Sales	Administrative Support	Private Household	Protective Services
Occupation of Residents	4.55%	5.14%	1.71%	7.41%	15.02%	1.17%	1.14%
Existing Jobs	9.85%	14.69%	3.38%	8.98%	15.41%	1.07%	2.54%

	Other Service Occupations	Farming, Forestry	Precision Production	Machinist Assemblers	Transportation & Material Moving	Handlers Helpers	Armed Forces	Total
Occupation of Residents	12.76%	1.60%	13.24%	22.50%	5.27%	8.39%	0.11%	72,000
Existing Jobs	10.12%	0.95%	11.95%	11.46%	4.72%	4.73%	0.14%	102,000

Source: 1990 Census Data

Education is a major factor influencing occupation choices as well as income level. The education level of the study area is significantly lower than that of county. According to 1990 census data, approximately one-third (34.58%) of the population in the area did not have a high school diploma, while only 18.54% did not have it in Los Angeles County. Moreover, 8.35% of the population in the area were not proficient in English, which was almost double that of Los Angeles County (4.4%).

Relatively higher unemployment rate for the area could be attributed to a number of reasons. Lack of means to access job opportunities is arguably one of the reasons. Almost a quarter of households in the area did not own a car, compared to only 11.16% in the county of Los Angeles (See Table 2.4). Households with only one vehicle represented 38.69% of all households in the study area. Average number of workers per household was 1.5 workers, which suggested that around half of the households had at least 2 workers per household. Therefore, the two-worker households owning only one vehicle, which appear to represent a large proportion of the households, are further limited in their mobility and accessibility needs for employment.

Table 2.4 Household by Vehicles Available - Household Number

Vehicle Numbers	0	1	2	3	4	5	6	7+
Households	11,044	18,369	12,003	4,105	1,293	491	110	56
%	23.26%	38.70%	25.28%	8.65%	2.72%	1.03%	0.23%	0.12%

Source: 1990 CTPP Data

2.1.4 Population and Employment Growth Trend

Between 1990 and 2020, the population of the study area is projected to grow by 29.39%, compared to 26.09% for Los Angeles County. On the other hand, employment is projected to grow by 47.59% between 1990 and 2020 within the study area, compared to only 26.09% for Los Angeles County. **Therefore, it can be reasonably argued that travel demand will increase dramatically in the area due to this dramatic increase in population and employment.** (See Table 2.5)

Table 2.5 Population & Employment Forecast

Year	1990	2000	2010	2015	2020	1990-2020
Population						
Study Area	212,370	228,155	249,127	261,021	274,786	29.39%
LA County	8,859,763	9,824,802	10,870,223	11,512,254	12,250,641	38.27%
% of LA County	*2.40%*	*2.32%*	*2.29%*	*2.27%*	*2.24%*	
Employment						
Study Area	100,741	131,098	140,260	144,698	148,996	47.90%
LA County	4,616,155	4,562,589	5,227,909	5,515,825	5,820,511	26.09%
% of LA County	*2.18%*	*2.87%*	*2.68%*	*2.62%*	*2.56%*	

Source: SCAG Forecast

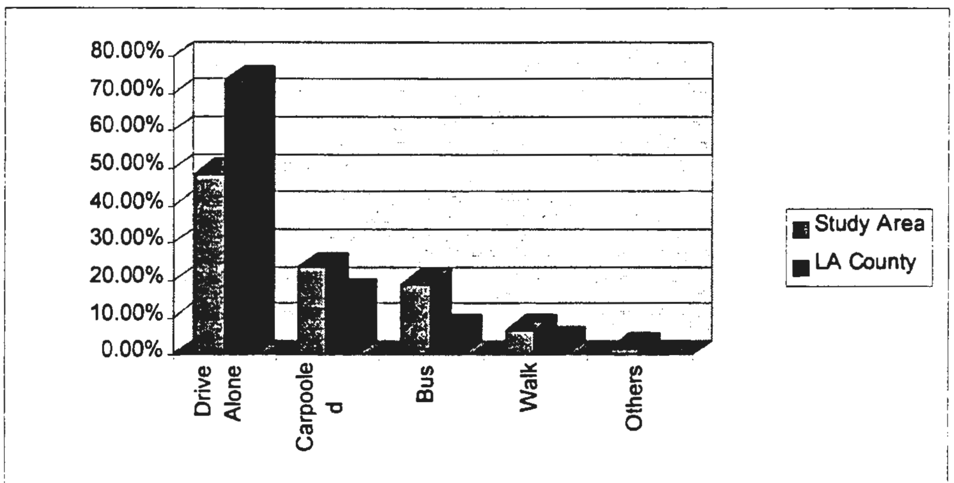
2.2 Travel Behavior and Mode Choice

2.2.1 Mode Choice by Workers (place of residence)

In Los Angeles County, about three-quarter of the commuters drove alone in 1990, while 16% carpooled, 6.8% took the bus, and 4% walked. The travel behavior in the study area appears to be significantly different in comparison with that of Los Angeles County. Only 48.53% of workers in the study area drove alone, while 23.62% carpooled, 19.23% took the bus, and 6.7% walked. The proportion of workers who took the bus was almost as high as three times that of Los Angeles County. (See Table 2.6)

Table 2.6 Mode Choice of Workers (by Place of

	Study Area	LA County
Drive Alone	48.53%	73.40%
Carpooled	23.62%	16.29%
Bus	19.23%	6.80%
Walk	6.70%	3.51%
Others	1.92%	0.00%



Source: 1990 CTPP Data

The higher percentage of carpool in this area may be attributed to two factors. First, as mentioned in the previous section, significant proportion of households in the area either do not own a vehicle or own only one vehicle. Second, the existing transit service does not meet the demand and expectation of the people, suggesting a strong need for significant improvements to the public transit system in the area.

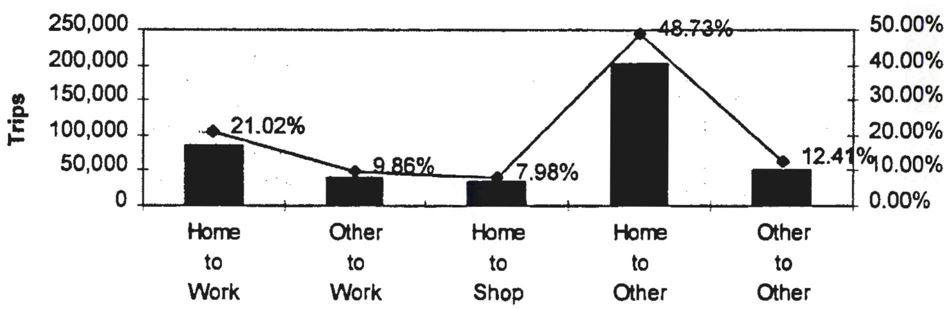
2.2.2 Trip Purpose

According to SCAG's origin-destination survey data collected in 1991, the total number of trips originating in the study area is about 420,000, which represents 2.02% of all trips originating in Los Angeles County. Work trip is not the dominant trip purpose. In the study area, 30% of daily trips are work trips (home-work 21.02%, other-work 9.86%), while 33% in the Los Angeles County. In terms of home-to-work trips, 82.32% are made by autos, and 17.68% by transit. This result is similar to the analysis based on census data which showed 19.23% of workers are bus riders. (See Table 2.7)

Table 2.7 Trip Originated in the Study Area by Purpose

Home to Work	Other to Work	Home to Shop	Home to Other	Other to Other
86,604	40,615	32,897	200,787	51,128
21.02%	9.86%	7.98%	48.73%	12.41%

Source: SCAG Origin and Destination Survey



In terms of non-work trip purpose, including home-to-shop, home-to-other, and other-to-other, auto trips account for 40%-50% of trips, transit trips represent less than 10%, and walk trips account for 38%-51% of trips. For all trips, 57.16% are auto trips, while 8.45% are transit, and 33.8% are walk trips. The high percentage of walk trips is reasonable. According to 1990 National Personal Transportation Survey (NPTS) data, central cities, with 30 percent of the worker population, have 38 percent of the walkers (Pisarski, 1992). The NPTS also indicates that walkers tend to have work trips of less than half a mile. The high percentage of walk trips may result from many reasons, for example, high bus fares for low-income people, inconvenient transit system, and high-density mixed land use, but walk is the mode with least mobility and accessibility.

In our study area, 51.28% of home-to-other trips and 44.2% of home-to-shop trips are walk trips, implying mobility limitations for residents, limiting their activities within neighboring areas. (See Table 2.8) **Therefore, any enhancement to the public transportation system in the area will increase mobility, and expand accessibility to jobs and other opportunities.**

Table 2.8 Mode Choice by Trip Purpose

	CAR/VAN/ PICK-UP	TRANSIT	WALK	OTHER	TOTAL
Home -Work	71,296	15,308	0	0	86,604
	82.32%	17.68%	0.00%	0.00%	100.00%
Other - Work	38,273	0	2,343	0	40,616
	94.23%	0.00%	5.77%	0.00%	100.00%
Home - Shop	16,821	1,534	14,542	0	32,897
	51.13%	4.66%	44.20%	0.00%	100.00%
Home - Other	82,068	12,880	102,004	1,970	198,922
	41.26%	6.47%	51.28%	0.99%	100.00%
Other - Other	25,975	4,920	19,738	496	51,129
	50.80%	9.62%	38.60%	0.97%	100.00%
Total	234,433	34,642	138,627	2,466	410,168
	57.16%	8.45%	33.80%	0.60%	100.00%

Source: SCAG Origin and Destination Survey

2.3 Existing Transit Service

This Report looks at the existing transit service to help understand the needs and travel patterns of the East Side transit riders today. Also, any future alternative transit corridor must fully integrate and incorporate existing patterns of transit use and be designed to encourage new ridership to maximize cost effectiveness and other benefits of transit use. The Local transit needs of the study area is currently served primarily by the Los Angeles County MTA network of Bus Routes (See Exhibit 2.4). Additional local service to major activity centers is provided by the City of Montebello Municipal Bus Lines. These Muni Lines run along 4th Street and Atlantic Boulevard. A number of Express Bus Lines also run along the freeways surrounding the study area. Most of these Express Lines operate on the El Monte Busway and do not provide direct access for transit users within the study area.

2.3.1 Route Description

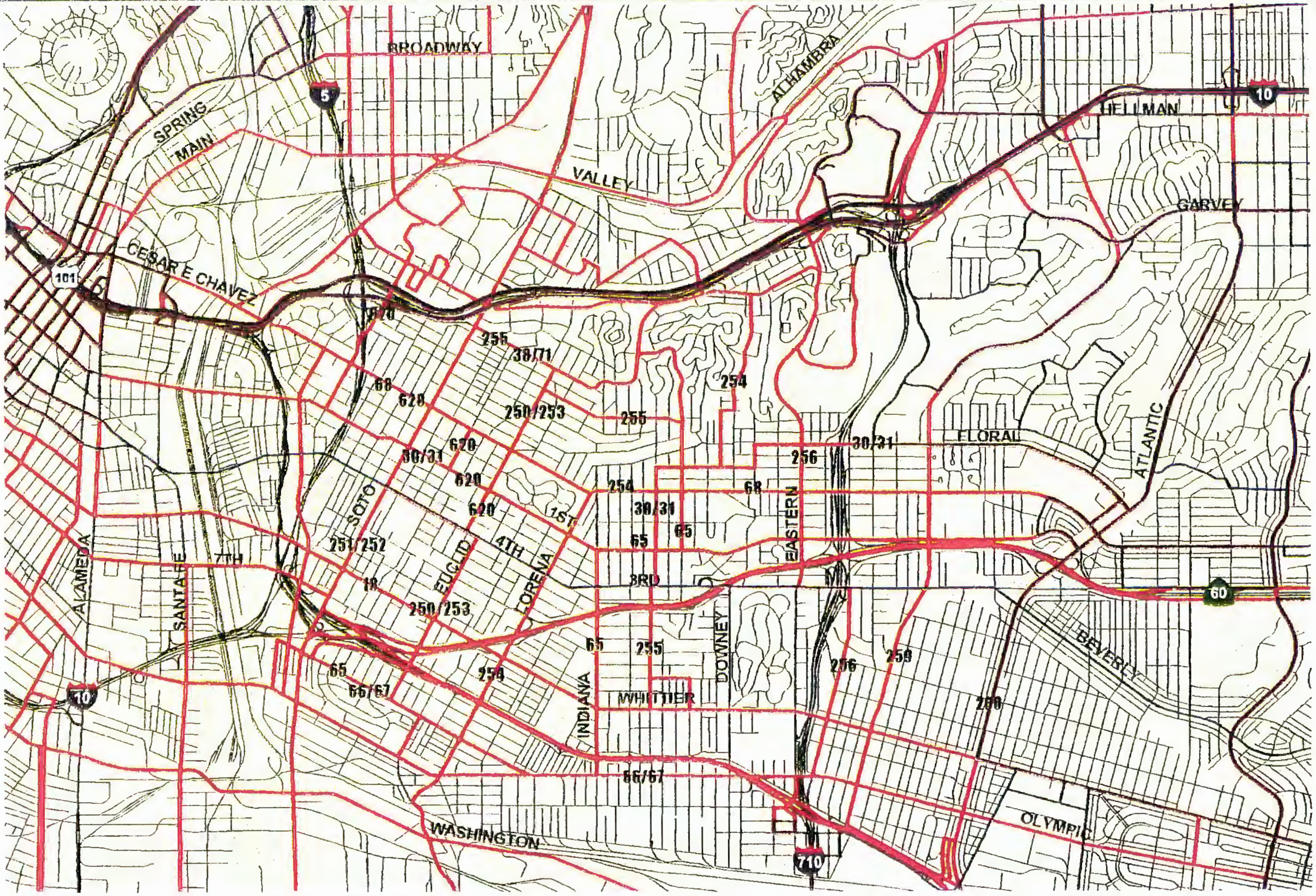
Most of the MTA bus routes that run through the study area have terminuses outside the study area. That is, the routes originate and terminate outside the study area with the exception of Route 620, which circulates mostly within the study area. Major routes that serve the area are Route 18 along Whittier Boulevard, Route 30/31 along 1st Street, Routes 66/67 and 65 along Olympic Boulevard, Route 68 along Cesar Chavez Avenue, and Route 251/252 along Soto Street. A summary of the routes are presented in Table 2.9.

Table 2.9: Major MTA Bus Routes Service Profile

No.	Route No.	Route thru Study Area	Terminus	Service Time	Peak Hr Hdwy (min)	Mid day Hdwy (min)	Service Hours
1	68	Cesar Chavez	WT: W.L.A. Transit Center ET:Montebello Town Center Mall	4:10-23:42	10	20	19.5
2	30/31	1st Street	WT: Pico Blvd / Rimpau Blvd ET:Atlantic Blvd / Cesar Chavez	24 Hours	8	15	24
3	18	Whittier Boulevard	WT: Wilton Place / 5th Street ET:Montebello Metrolink Station	4:47-23:42	8	8	19
4	65	Olympic, Indian, Gage, City Terrace Dr	WT: Washington / Figuroa ET:Cal State LA	5:42-21:29	20	45	16
5	66/67	Olympic Boulevard	WT: Wilton Place / 5th Street ET:Montebello Metrolink Station	4:33-0:46	2	10	20
6	251	Soto Street	NT: Avenue 28 / Idell ST:Long Beach / I-105	4:32-23:30	5	10	19
7	252	Soto Street	NT: Huntington / Monterey ST:Long Beach / I-105	4:32-23:30	5	10	19

Source: MTA Bus Schedules

WT=Western Terminus, ET=Eastern Terminus, NT=Northern Terminus, ST=Southern Terminus



Transit Corridor Study
East Los Angeles

Existing Bus Routes Exhibit 2.4

Mta
Muni's

SOUTHERN CALIFORNIA
ASSOCIATION of GOVERNMENTS

6/18/98

2.3.2 Ridership

Table 2.10 summarizes the week day daily boarding for existing Local Bus Services provided by MTA within the study area. Daily boarding for a particular route simply represents the total number of people that got on any bus on that route during a 24 hour period of observation and it should reflect total number of tickets purchased at the fair box on the route. There are approximately 40,000 daily transit boarding on a weekday within the study area, while the total daily boarding on all routes that operate through the area is about 160,000. In the table, a number of routes have been combined due to inter-connections. The highest daily boarding is on Lines 251/252 which run along Soto Street within the study area. All other high boarding lines run east-west within the study area. These major service route boarding are further summarized in Table 2.11 by streets. Cesar Chavez Avenue, 1st Street, Whittier Boulevard and Olympic Boulevard provide east-west alignment for the busiest routes within the study area. Therefore, it is evident that most of the east-west flow of transit passengers within and through the study area occur along these four primary arterials. On the other hand, most of the north-south flow of transit passengers occur along Soto Street alone. The pattern of existing transit service uses is further illustrated in Exhibit 2.5.

Table 2.10 MTA Weekday Bus Daily Boardings

No.	Bus No.	Typ. Peak Headway (Minutes)	Typ. M-day Headway (Minutes)	**Daily Boardings (w/n Study Area)**	No. of Stops (W/n Study Area)	**Line Boarding Total**	Total No. of Stops
1	18	8	8	**6,220**	26	**26,630**	169
2	30/31	8	15	**4,910**	29	**32,350**	131
3	38/71	20	14	**610**	17	**9,120**	92
4	65	20	45	**2,300**	38	**3,870**	58
5	66/67	2	10	**5,990**	36	**25,290**	85
6	68	10	20	**5,440**	27	**17,680**	104
7	250/253	50	40	**440**	19	**690**	43
8	251/252	5	10	**7,080**	13	**18,190**	118
9	254	65	65	**740**	25	**2,090**	98
10	255	45	50	**620**	22	**1,060**	45
11	256	35	50	**700**	23	**2,850**	124
12	259	25	35	**830**	11	**2,260**	84
13	260	15	20	**2,350**	9	**14,720**	121
14	620	10	15	**2,030**	9	**2,490**	14
	Total			**40,260**	304	**159,290**	1286

Source: Daily boardings have been summarized from MTA Profile Boarding Data compiled for each Line in 1996 and 1997. Total boarding for each line was estimated based on data obtained for one direction only and rounded off to nearest tens. Headways were obtained from MTA Line Timetables.

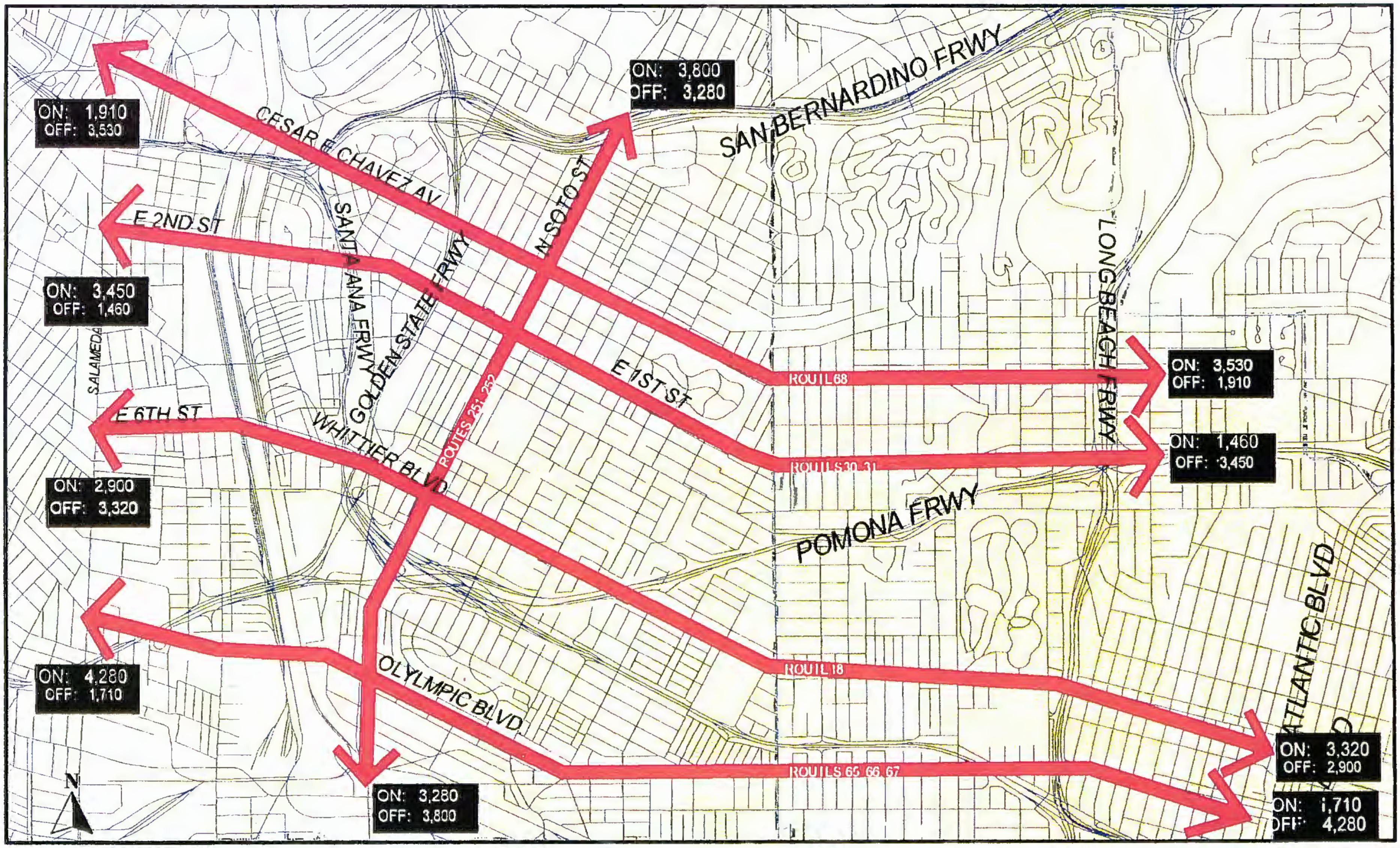


Exhibit 2.5

Existing Transit Usage Pattern

Transit Corridor Report

East Los Angeles

July 1998

LEGEND

Existing Transit Route

Number of passengers (on and off boardings)

The south/east bound routes along Olympic Boulevard, namely Routes 65 and 66/67, have more people alighting (see Appendix) them. For example, approximately 4280 people alight within the study area as opposed to approximately 1710 people boarding on south/east bound Route 66/67 within the study area. Route 30/31 along 1st Street also has more people alighting on the east bound service as compared to people boarding. Route 18 along Whittier Boulevard has a more balanced boarding and alighting in both direction. On the other hand, Route 68 along Cesar Chavez Avenue has more alighting on north/west bound service than boarding.

Highest daily boarding of approximately 7700 occur on the routes on Soto Street. (See Table 2.11) Busiest Bus Stop, by far, is at Whittier Boulevard and Soto Street where approximately 2600 boarding occur on all routes. (See Table 2.12)

Table 2.11: Boardings by Major Streets

No.	Street	Orientation	Major Routes	Daily Boardings
1	Cesar Chavez Avenue	E-W	68	5,440
2	1st Street	E-W	30,31	4,910
3	Whittier Boulevard	E-W	18	6,220
4	Olympic Boulevard	E-W	65,66/67	6,630
5	Soto Street	N-S	251/252,620	7,670
	Total			30,870

Source: Daily boardings have been summarized from MTA Profile Boarding Data co each Line in 1996 and 1997.

Table 2.12: Daily Boardings at four Busiest Stops

No.	Stop	Routes	Boardings	Alightings	Total Boardings
1	Cesar Chavez/Soto	68 NB, 620 NB	760	1,040	**1,800**
2	Whittier/Soto	18 EB, 251&252 SB	1,660	950	**2,610**
3	1st/Soto	30&31 EB, 251&252 SB	760	1,300	**2,060**
4	Whittier/Atlantic	260 SB	350	450	**800**

Source: Daily boardings have been summarized from MTA Profile Boarding Data compiled for each Line in 1996 and 1997.

2.3.3 Mobility

Total length of bus routes within the study area is approximately 30 miles and the total number of stops is 304. Approximate average speeds of the busses were estimated by measuring the distance between two farthest stops within the study area on each route and the scheduled time difference between the stops. Table 2.14 summarizes the average speed for each route. The average speed ranges from 7.8 miles per hour (mph) on Route 620, which provides circulation primarily within the study area, to 15.9 mph on Route 260 along Atlantic Boulevard. Average speed of all the routes is 12.9 mph. Average Passenger Trip Length is summarized in Table 2.13. **It should be noted that these speeds are based on scheduled times and may not accurately account for traffic conditions today. Thus, in reality, the speeds could be slower than these estimates.**

Table 2.13: Average Passenger Trip Length

Line	Passengers	Passenger Miles	Avg. Pas. Trip (Miles)
18	26,630	65,227	**2.45**
30/31	32,354	70,853	**2.19**
38/71	9,124	22,285	**2.44**
65	3,870	10,244	**2.65**
66/67	25,290	71,224	**2.82**
68	17,676	46,268	**2.62**
250/253	694	974	**1.40**
251/252	18,190	51,207	**2.82**
254	2,086	5,983	**2.87**
255	1,060	2,094	**1.98**
256	2,854	10,084	**3.53**
259	2,262	5,938	**2.63**
260	14,718	53,583	**3.64**
620	2,492	3,200	**1.28**

Source: MTA Bus Ridership Survey Data

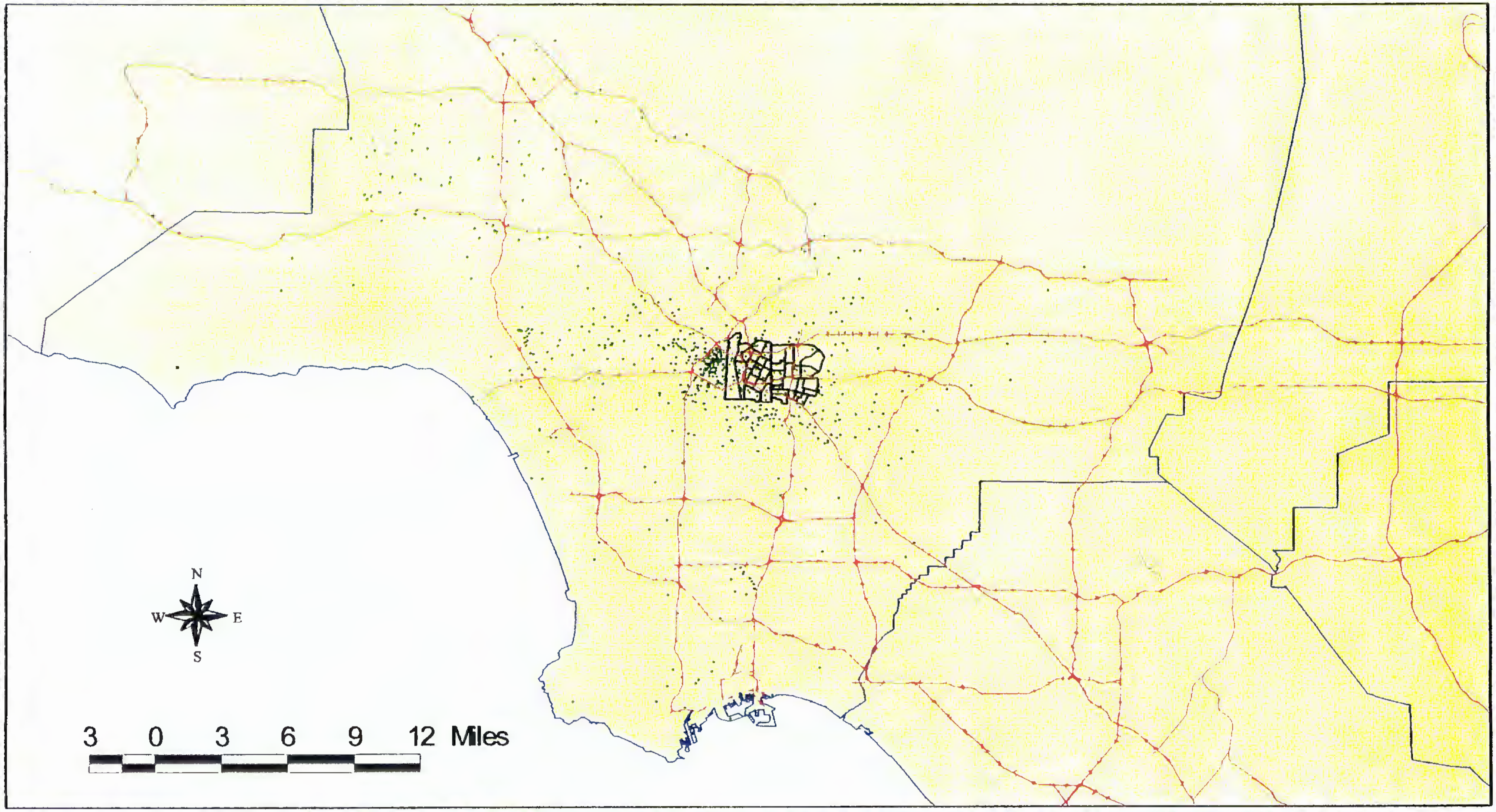
Table 2.14 Average Speed on Existing Routes

Route	From		To		Time (Min)	Distance (Miles)	Average Speed (mph)	The First Bus	The Last Bus	Daily Service Frequency
18	WHITTIER/ATLANTIC	7:05	WHITTIWE/SOTO	7:23	18	3.74	12.5	4:47	23:42	204
30/31	1ST/EASTERN	8:55	1ST/SOTO	9:06	11	2.34	12.7	24 hours		212
65	OLYMPIC/SOTO	8:31	CSULA-STOP	9:01	30	6.03	12.1	5:42	21:29	60
66/67	OLYMPIC/SOTO	8:00	OLYMPIC/ATLANTIC	8:16	16	3.83	14.4	4:33	0:46	292
68	CESAR CHAVEZ/SOTO	8:27	CESAR CHAVEZ/ATLANTIC	8:42	15	3.93	15.7	4:10	23:42	174
71	MARENGO/SOTO	8:52	CSULA-STOP	9:02	10	2.49	14.9	4:41	22:30	100
251/252	SOTO/1ST	8:19	SOTO/WHITTIER	8:27	8	1.53	11.5	4:32	23:30	190
253	8TH/LORENA	8:13	WABASH/EVERGREEN	8:25	12	2.59	12.9	6:06	19:30	42
254	LORENA/OLYMPIC	8:15	HAZARD/CITY TERRACE	8:31	16	3.83	14.4	4:40	19:30	36
255	HEBERT/WHITTIER	8:00	WABASH/EVERGREEN	8:16	16	2.97	11.1	5:10	20:05	42
256	EASTERN/CHAVEZ	8:00	CSULA-STOP	8:08	8	1.44	10.8	5:45	21:30	48
258/259	TELEGRAPH/ATLANTIC	8:12	MEDNIK/CHAVEZ	8:23	11	2.64	14.4	5:09	19:00	64
260	ATLANTIV/GARVEY	8:50	ATLANTIC/WHITTIER	9:03	13	3.45	15.9	4:31	22:30	122
620	STATE/SHERIDAN	9:00	4TH/EVERGREEN	9:14	14	1.82	7.8	8:58	17:51	80-100

Source: MTA Bus Schedules — Average Speed 12.9

Exhibits 2.2 and 2.3 represent the destination of trips within the county of Los Angeles that originated in the study area by all transportation modes and by buses only, based on the 1990 CTPP data. Each dot on the exhibit represents 20 trips. While the trips are distributed throughout the county, significant volume of trips are concentrated within the CBD of Los Angeles, suggesting a strong travel demand in this corridor.

A typical trip on MTA bus from Cesar Chavez Avenue and Lorena Street, which lies approximately around the center of the study area to, say, Civic Center (Temple and Main) in Downtown, Los Angeles would most likely involve at least one transfer. This distance is approximately 3.5 miles and assuming average speed of 12.9 mph and average transfer time of 10 minutes, the trip would take approximately 26 minutes. It would only take a little more than twice this time to walk the distance at normal walking pace. The same trip would require less than 7 minutes in a private automobile.



Destination of Work Trips Originating in Study Area (By Bus)

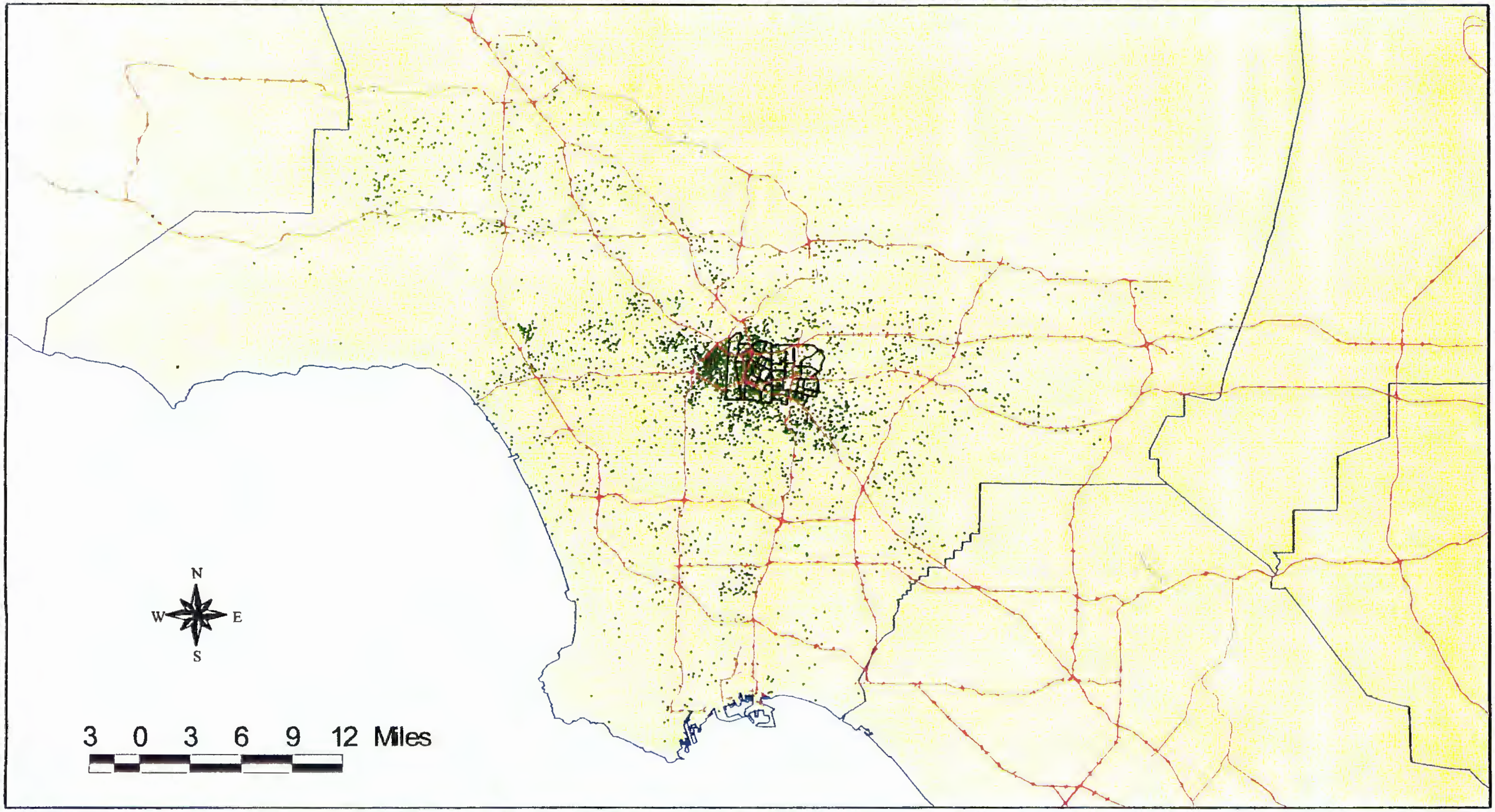
Exhibit 2.3

LEGEND

- Freeways
- Selected Census Tract

Census Tract

- 1 Dot = 20 Trips
- County



Destination of Work Trips Originating in Study Area (All Modes)

Exhibit 2.2

LEGEND

- Freeways
- Selected Census Tract
- Census Tract
  - 1 Dot = 20 Trips
- County

Source: 1990 CTPP data.

2.3.4 Operational Efficiency

The bus routes were evaluated for operational cost efficiency based on available data obtained from MTA and U.S. Department of Transportation (DOT), Federal Transportation Authority (FTA). According to the Transit Profile Data maintained for MTA by U.S. DOT, average operation cost per revenue hour (operation hour) for MTA was $92.45 in 1994. Adjusting for inflation and rounding off, average operational cost per revenue hour of $100 is used to perform the analysis for this study. Total daily revenue hours were estimated from the MTA Bus Time Tables and the total daily passenger-miles were obtained from the MTA ridership survey data for each of the routes. Cost per passenger mile was estimated for each route simply by dividing the daily operational cost by the daily passenger-miles. Operational cost efficiency of each route operating within the study area is depicted in the Table 2.15. Clearly, cost per passenger-mile is very closely related to the total number of boardings. Accordingly, the most cost efficient routes are 30 and 31, operating on 1st Street and 18, operating on whittier Boulevard within the study area. Incidentally, these are also the busiest routes. By the same token, 250 and 253 are the least cost efficient routes, which also happen to have the lowest daily boardings of all the routes operating in the area.

Table 2.15: Estimated Cost per Passenger-Mile on Existing Routes

Route	Average Trip Length	Dai;y Passengers	Passenger-Miles	Daily Service Frequency	Route Duration (Minutes)	Daily Operation Cost	Cost per Passenger-Mile
18	2.45	26,630	65,227	204	50	$17,000	$ 0.26
30/31	2.19	32,354	70,853	212	60	$21,200	$ 0.30
38/71	2.44	9,124	22,285	100	80	$13,333	$ 0.60
65	2.65	3,870	10,244	60	52	$5,200	$ 0.51
66/67	2.82	25,290	71,224	292	63	$30,660	$ 0.43
68	2.62	17,676	46,268	174	93	$26,970	$ 0.58
250/253	1.40	694	974	42	32	$2,240	$ 2.30
251/252	2.82	18,190	51,207	190	69	$21,850	$ 0.43
254	2.87	2,086	5,983	36	79	$4,740	$ 0.79
255	1.98	1,060	2,094	42	37	$2,590	$ 1.24
256	3.53	2,854	10,084	48	81	$6,480	$ 0.64
258/259	2.63	2,262	5,938	64	58	$6,187	$ 1.04
260	3.64	14,718	53,583	122	111	$22,570	$ 0.42
620	1.28	2,494	3,200	90	31	$4,650	$ 1.45

Source: MTA Bus Service Data. Operation Cost is assumed as $100 per Operation Hour.

2.3.5 Deficiencies in the Existing System

From the proceeding analysis, it is clear that some of the routes are very heavily utilized while some are highly underutilized. Specifically, Routes 68, 30, 31, 66, 67, 251 and 252 are very heavily utilized. On most of these routes, peak hour headways are between 5 to 8 minutes. Route 66, 67 has a peak hour headway of just 2 minutes. During the peak hours, overcrowding is a serious problem on these routes. Serious overcrowding and deficient service has resulted in lawsuit filed against MTA as mentioned earlier. It should be noted that most of the overused bus routes are oriented east-west with the exception of routes 251 and 252. Underutilized routes within the area are 250, 253, 254, 255, 258, 259 and 620. Many of these under performing routes were also identified for restructuring in the RTP. **Therefore, it is fair to argue that there is a considerable gap between where the service is provided and where the highest demands exist. Any attempt at restructuring existing transit service will need to address this issue adequately.**

Another deficiency in the existing system is the limited access available to some of the key areas. For example, accessing the Los Angeles Civic Center, Union station, or most parts of CBD that attracts a large number of trips from the area (See Exhibit 2.2) requires at least one transfer, thus requiring unreasonably long time to access these key areas. An efficient dedicated Right-of-Way transit system connecting Union station with the study area can address much of this problem.

Limited mobility is yet another deficiency of the existing system. As described earlier, Civic Center of Los Angeles can be accessed from the heart of East Los Angeles, a distance of 4 to 5 miles, only in about half the time it takes to walk the distance. **There is an urgent need to improve transit mobility in the area.**

2.4 Existing Land Use

Land Use within the study area is mostly characterized by commercial, light industrial and residential uses. Along most of these existing bus routes, land use may be characterized as light to heavy commercial uses, which attract more non-work trips than work trips. However, it should be noted that Olympic Boulevard, which forms southerly boundary of the study area, has significant stretches of light industrial use, primarily to the west of Indiana Street, which attract more work trips.

The land use intensity, measured as land use density, of the study area is much higher than that of the Los Angeles County as well as the SCAG region. The population density of the study area is 15,169 persons per square mile, which is 6.5 times of Los Angeles County and 37 times of the SCAG region. Similarly, the employment density of the study area is 7,196 persons per square mile, which is 6 times of Los Angeles County and 36.5 times of the SCAG region. It is not unreasonable because the study area is in the proximity of downtown Los Angeles. High density is a promising condition for public transit service.

Representative employment by industry were Service (35.95% in study are, 35.90% in Los Angeles County), Manufacturing (24.51%, 19.07%), Retail (15.98%, 15.70%), and Whole Sale (10.41%, 6.98%). The table also shows land use intensity of major industries of the study area as higher than that of the Los Angeles County. The employment density of Wholesale in the study area is 8.8 times of the Los Angeles County, followed by Manufacturing (7.6 times), Service (6.5 times), and Retail (6 times).

The intensive land use coupled with high transit dependency makes this area very attractive for investment in a more efficient transit corridor that could serve as the backbone of the transit system in the area.

Transit Corridor Study
East Los Angeles

Existing Land Use Exhibit 2.1

- Low Density Residential
- Medium to High Density Residential
- Commercial
- Public Facilities
- Transportation & Utilities
- Agriculture
- Industrial
- Extraction
- Water & Floodways
- Open Space & Recreation
- Vacant
- Under Construction

SOUTHERN CALIFORNIA
ASSOCIATION of GOVERNMENTS

6/18/98

2.5 Existing Traffic Conditions

The study area is characterized by high population density and high employment density, which leads to high volumes of trip generation and dense use of the existing road facilities. Table 2.16 and Exhibit 2.6 show the current traffic volumes of streets in the area. The data indicate that there are over 10,000 vehicles each day passing Whittier Boulevard or Cesar Chavez Avenue or Soto Street.

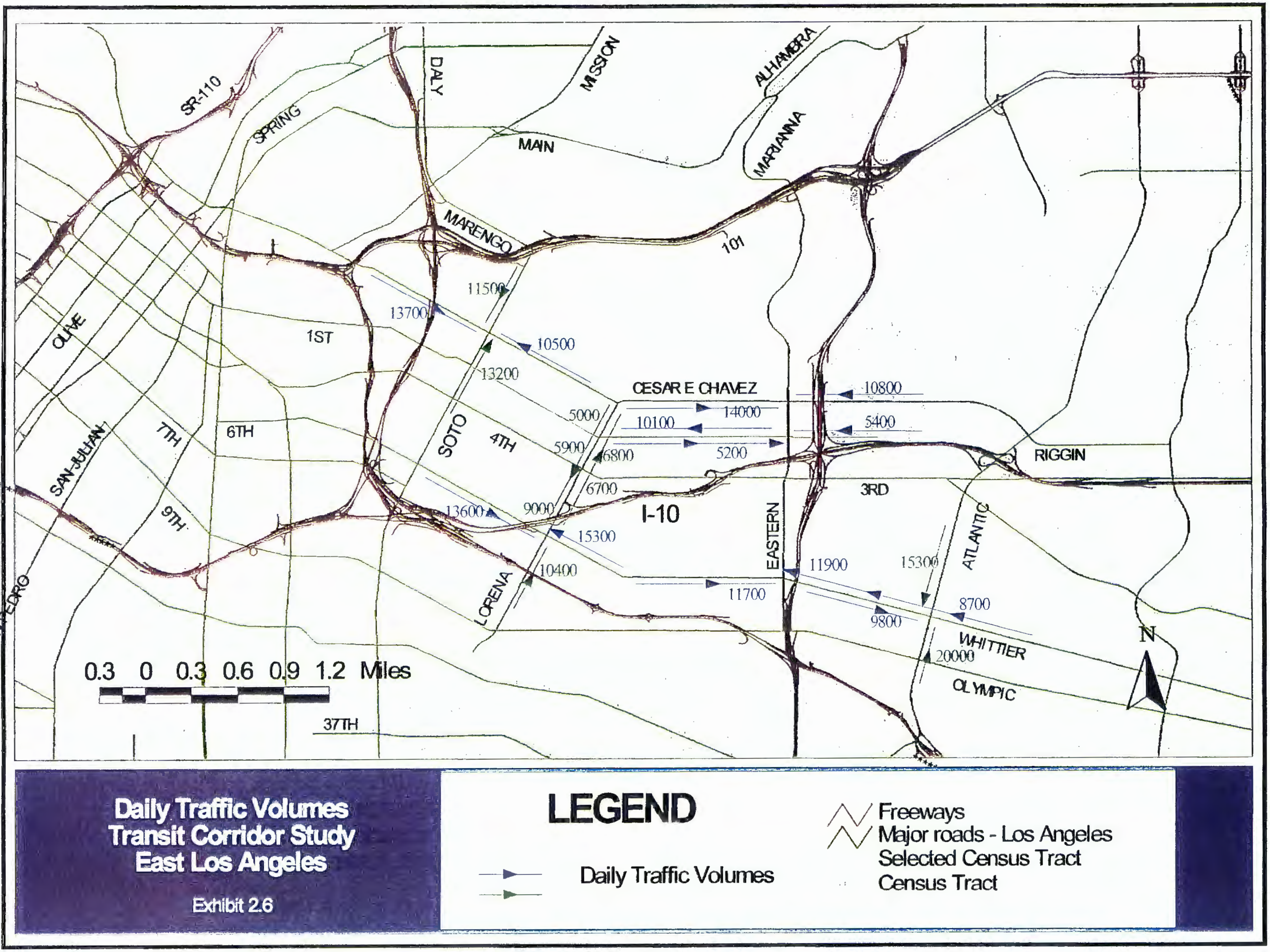
Table 2.16: Daily Traffic Volumes

No.	Location	EB	WB	NB	SB	Total
1	Cesar Chavez @ Boyle	6,100	8,500			14,600
2	Cesar Chavez @ Soto	13,700	10,500			24,200
3	Cesar Chavez @ Ford	8,900	8,600			17,500
4	Cesar Chavez @ Mednik	7,600	6,500			14,100
5	Cesar Chavez @ Eastern	14,000	10,800			24,800
6	1st Street @ Boyle	8,200	7,800			16,000
7	1st Street @ Lorena	10,500	10,100			20,600
8	1st Street @ Indiana	6,100	5,800			11,900
9	1st Street @ Eastern	5,200	5,400			10,600
10	1st Street @ Ford	5,400	5,000			10,400
11	1st Street @ Mednik	5,000	4,700			9,700
12	4th Street @ Boyle	10,600	10,800			21,400
13	4th Street @ Hewit	11,000	11,500			22,500
14	4th Street @ Indiana	4,400	8,300			12,700
15	3rd Street @ Eastern	12,400	11,300			23,700
16	Whittier @ Lorena	13,600	15,300			28,900
17	Whittier @ Indiana	9,700	10,600			20,300
18	Whittier @ Eastern	11,700	11,900			23,600
19	Whittier @ Ford	10,800	10,900			21,700
20	Whittier @ Arizona	11,000	10,500			21,500
21	Whittier @ Atlantic	9,800	8,700			18,500
22	Soto @ Cesar Chavez			13,200	11,500	24,700
23	Lorena @ 1st Street			6,800	5,000	11,800
24	Lorena @ 4th Street			6,700	5,900	12,600
25	Lorena @ Whittier			10,400	9,000	19,400
26	Arizona @ Whittier			4,600	4,100	8,700
27	Atlantic @ Whittier			20,000	15,300	35,300

Source: County and City of Los Angeles (Bet. 1993 and 1997)

The area is surrounded by major freeways and major interchanges which discharge some of the freeway traffic onto local streets, specially when the freeways are backed up. The average peak hour traffic volumes are about 1000 between 7 am and 9 am. The traffic volumes of the busiest streets can be as high as 2200 to 2500 during morning peak. Furthermore, many buses serving this area and the automobiles interfere with each other.

A dedicated right-of-way transit system through any of the streets in the area will have a significant impact on local traffic. A further study is recommended to assess the full impact of any transit way on local traffic.



Daily Traffic Volumes Transit Corridor Study East Los Angeles

Exhibit 2.6

3.0 POTENTIAL SOLUTIONS

3.1 Transit Demand/Capacity Analysis

The RTP 98, described earlier in the Introduction, has spelled out an initial Performance Goal for Daily Ridership on East Los Angeles Transit Corridor as 76,000 by the year 2010. Furthermore, it should be noted that the Final Environmental Impact Statement for the for Metro Red Line East Side Extension, adopted in September 1994, projected a daily boarding of 100,000 for this line. Given, the high percentage of transit dependent population and high usage of existing transit services, particularly along east/west corridors, these figures are not unreasonable.

On the other hand, it is useful to provide a preliminary assessment of what the capacity limitations are from the supply side. The following table is an analysis of potential passenger capacity by modes (Exclusive Busway and Light Rail). (Based on right-of-way limitations, these modes appear to be the only ones plausible for consideration in the area.) Clearly, given the holding capacity of each type of vehicle, headway is the primary variable in determining the daily passenger carrying capacity of each mode. Headways of 5 and 2 minutes are considered. For light rail option, a headway of 2 minutes would be extremely difficult, if not impossible, and therefore it is not considered as an option.

Headway Constrained Analysis

5-MIN PEAK HEADWAY

	Cap/veh	Pass/Veh		# Of Veh	Pass/train		Hours of Ops			Daily Capacity
		Peak	Off-Peak		Peak	Off-Peak	Peak	Mid-day	Night	
Bus	65	80	50	1	80	50	8	5	7	**25560**
Lt Rail	72	110	60	3	330	180	8	5	7	**89280**

2-MIN PEAK HEADWAY

	Cap/veh	Pass/Veh		Vehicles	Pass/train		Hours of Ops			Daily Capacity
		Peak	Off-Peak		Peak	Off-Peak	Peak	Mid-day	Night	
Bus	65	80	50	1	80	50	8	5	7	**48600**

ASSUMPTIONS:

1) Articulated Buses are assumed
2) Bus Ridership lower than demand so assume passenger service up to capacity
3) Light Rail ridership estimates above demand so assume 80,000 daily riders as an attainable level.
4) Standard Bus and Articulated Bus mix has been assumed as 50/50.
5) Headway assumed for mid-day and night are 5 and 10 minutes respectively.

The first column of the above table represents seating capacity of a single car of each mode. The second column represents peak-hour capacity of each car, which is considered as approximately 20% over the seating capacity. The third column represents an average off-peak ridership, which is assumed as approximately 80% of the seating capacity. The next column, which is the number of vehicles, simply indicates the number of vehicles per each train. The next two columns, column 5 and 6, represents total passengers per each train. The next three columns are assumed operation hours for the three periods of a day. The last column shows the daily capacity for each mode based on the above assumptions. Understandably Light Rail Option has the highest carrying capacity.

The peak hour as well as off-peak hour carrying capacities assumed at 120% and 80% of the seating capacity, respectively, have room for slight upward adjustment, so that the range of daily carrying capacity for the Busway option could be reasonably assumed as 30,000 to 50,000. The range for daily carrying capacity of the Light Rail Option could be argued as 80,000 to 100,000. However, the daily carrying capacity (volume) should be distinguished from daily boarding. Passenger volume represents the number of passengers in the vehicle at a given time, where as the boarding represents the number of passengers that get on at a given stop. Therefore, the more stops there are the more total boarding may be expected as compared to the total line volume. For the proposed transit route, majority of the trips could be assumed as through trips to the terminal stations so that the total boarding may be assumed to be only slightly higher than the carrying capacity.

Based on the above consideration, it is fairly reasonable to assume potential daily ridership for busway is bound by the daily carrying capacity, the upper limit for which appear to be about 50,000. On the other hand, the light rail option is not bound by the carrying capacity, so that a reasonable ridership may be considered as 80,000 as discussed above.

3.2 Potential Alternatives

Due to the extensive amount of work done on the Regional Transportation Plan (RTP), SCAG is quite well aware of the scale of the problems faced by the MTA, the public officials, and the citizens residing on the East Side. Thus, SCAG developed three conceptual alternatives and one of them have been detailed into five alignment options as baselines for policy makers to start the discussion and debate leading to a decision in the Transit Reevaluation.

The conceptual alternatives include: (1) The Intermediate Transit Restructuring Option; (2) The Interconnectivity/Linkage Alternative; and (3) The Centers Access Alternative. A fourth option was created as a mix/merge alternative by combining elements of any or all of those described above into a separate, discrete alternative. Each of the conceptual alternatives is described briefly in the following paragraphs. In the next subsection the Intermediate Transit Restructuring Alternative is detailed in terms of alignments, technologies, and other considerations.

3.2.1 The Intermediate Transit Restructuring Alternative

In concept the Intermediate Transit Restructuring Alternative would represent a continuation of the guidway concept from Union Station to East Los Angeles. It would address the needs of the transit riders by developing one or more surface or elevated lines that would operate from Union Station east to vicinity of Whittier Boulevard and Atlantic. The technology could be light rail, conventional bus, articulated high capacity bus, or trolley bus. The alignment would require a right-of-way that would be substantially changed from on-street conditions of today, even though vehicles could operate in mixed mode with the automobile and other vehicles. Exhibit 3.1 shows this conceptual alternative for five potential alignments..

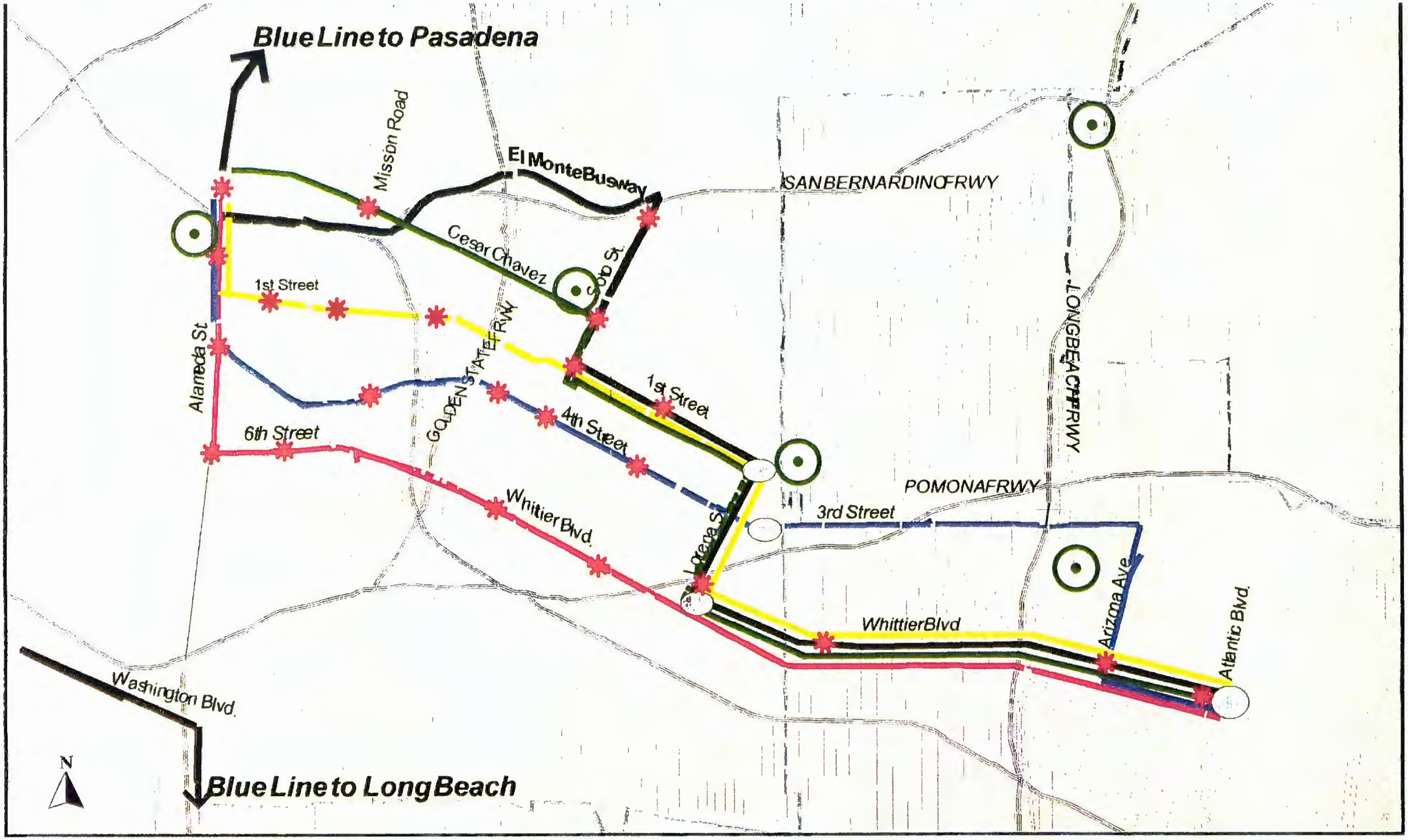


Exhibit 3.1

Route Alternatives

Transit Corridor Report

East Los Angeles

July 1998

LEGEND

- El Monte Busway
- Cesar Chavez
- 1st. Street
- 4th Street
- Whittier Blvd.
- Park and Ride
- Transit Stop
- Smart Shuttle Centers

The Intermediate Transit Restructuring Alternative would require the development of a series of restructuring packages to be implemented every two or three years which would continuously upgrade the services and the system serving East Los Angeles. For example, transit stops along the alignment might be upgraded to stations with low level platforms, amenities, lighting, and pedestrian facilities. The packages would focus on priority needs identified from the initial detailed planning and preliminary engineering studies. Over a short period of time significant changes and improvements would be made in the transit services and systems to meet the needs of the users and to accomplish cost effective transit investment policies.

A detailed description of alignments for 5 alternatives, that appear most viable based on existing conditions, will be presented in detail later.

3.2.2 The Interconnectivity/Linkage Alternative

In concept the Interconnectivity/Linkage Alternative would represent an approach that would move the transit services of the various operators in the direction of user "transparency" while building new transit assets on the East Side that connect it directly to regional systems. Specifically, new bus ramps would be constructed to the I-10, 710, and 60 freeways. Exclusive bus lanes on Soto and Whittier would be built to tie surface operations to the busway ramps. The important need for improved north/south transit services would be addressed as a major component of this alternative as well as the east/west improvements. In addition, the alternative would focus on the importance of linking bus services as efficient feeders to the Metro Link and the new and extended HOV lanes on the 710 and 60 freeways as well as the extended El Monte Busway. This concept is depicted in Exhibit 3.1b below.

In addition to service restructuring and route changes, this alternative would focus on immediate user side improvements such as a common fare card, electronic transfers, timed transfer stations, and a large number of passenger amenities. The alternative has the capability to significantly increase ridership if the linkages and interconnectivity components of the option are emphasized and the users become convinced that the end result is a benefit for all transit riders.

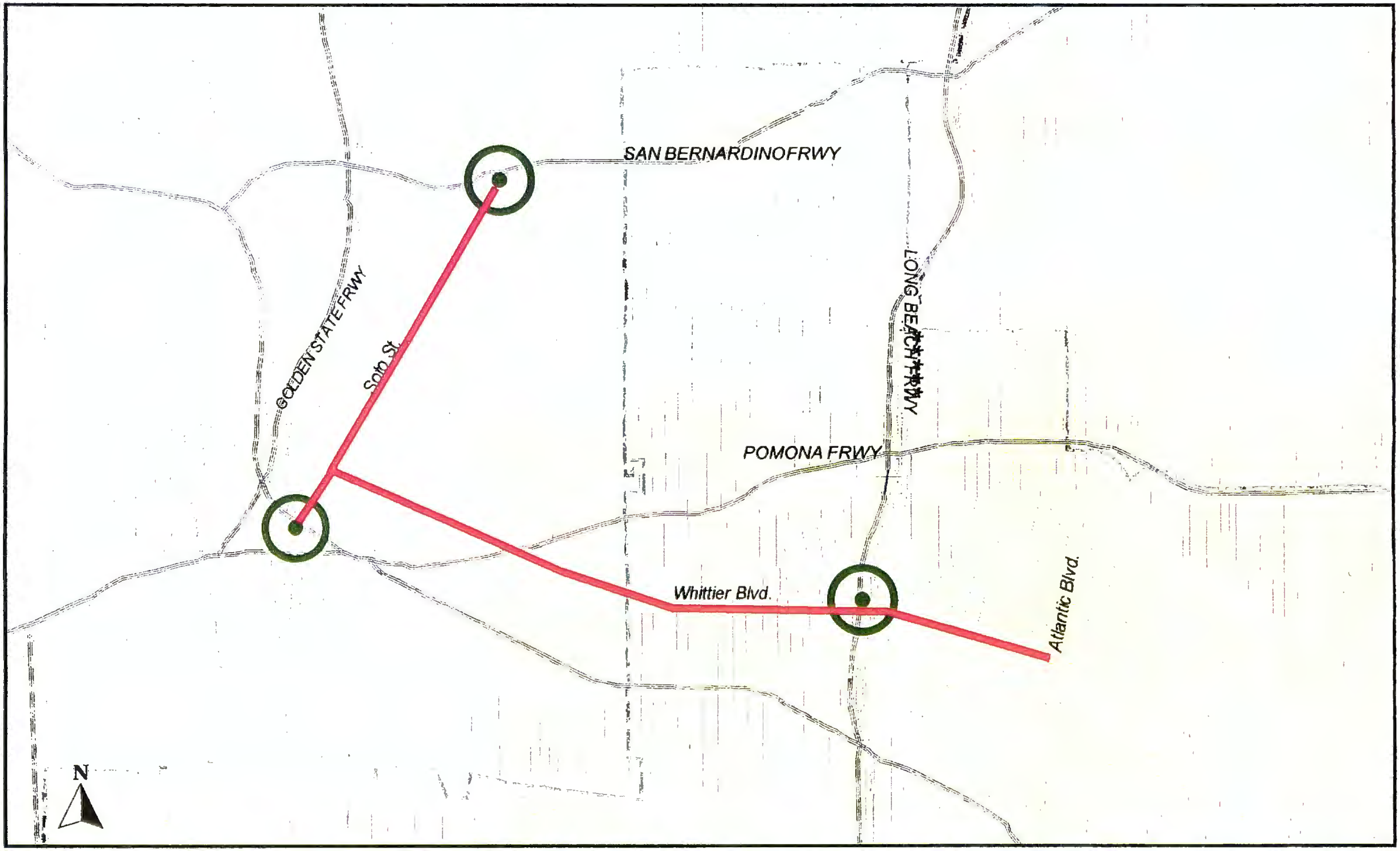


Exhibit 3.1b

Inter-Connectivity / Linkage Alternative

Transit Corridor Report

East Los Angeles
July 1998

LEGEND

Proposed surface improvement for connectivity w/existing regional system

Proposed connection to existing bus service

3.2.3 The Centers Access Alternative

In contrast to the first two concepts, the Centers Access Alternative would begin to make significant changes in the focus of the current MTA transit system. For at least 40 years the bus operations in East Los Angeles have been viewed by the MTA and its predecessors as a service connecting the East Side to the Downtown where transfers are necessary to go elsewhere. This alternative would change that fundamental concept by emphasizing changes to the transit network to move transit lines to the major activity centers in and adjacent to East Los Angeles. It means developing a service system that best meets the needs of the East Los Angeles transit riders as opposed to first meeting the priorities of the regional operator. It may mean that north/south and reverse peak service are among the most important new services to be established to make the option a viable alternative. For example, direct services to the major commercial centers, the universities and community colleges, the hospital areas, and other centers would become important priorities. Both transit lines on fixed routes and demand response, smart shuttles on flexible routes would provide direct services to these centers. The alternative is shown in concept in Exhibit 1.3c.

In addition to major service changes, this alternative would emphasize capital investments in transit terminals and transit centers at each of the major activity centers. For example, major transit terminals located in the vicinity of 1st and Lorena, at Ford/Atlantic along Whittier would be a valuable asset to further enhance the commercial centers as well as their historical attractions. Similarly, major transit terminals located at the college and the university, at the USC medical complex would be important additions to the transit infrastructure. In addition, to providing a valuable facility for transit riders these terminals could become a major focus of new joint development opportunities to further enhance the job generation and economic development of these centers.

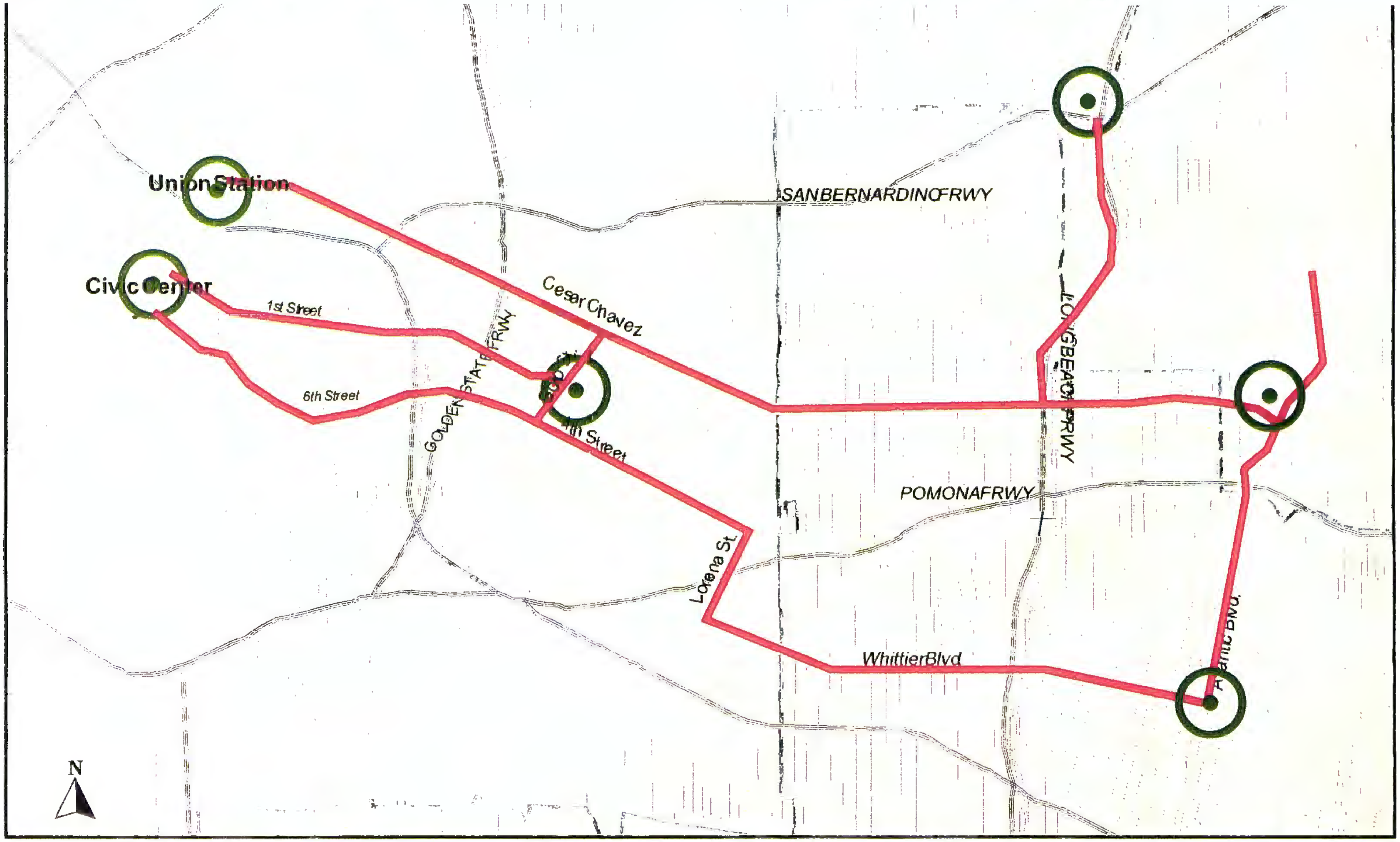


Exhibit 3.1a

Centers Access Alternatives

Transit Corridor Report

East Los Angeles

July 1998

LEGEND

Proposed Access Routes

Key Activity / Transit Centers

3.2.5 Alternative Alignment Descriptions

The following describes right-of-way conditions for the five alternatives looked at in detail, with notes on land use and topography where appropriate to understanding the potential for developing a transit corridor on each. Comments will be made on the number of lanes along the alignments, and whether lanes are designated for parking all-day, or off-peak only. It will be noted that many of the alternatives use some common segments; and that all alternatives serve East Los Angeles at Whittier/Arizona. Table 3.1 summarizes Potential Opportunities and Constraints on existing arterials in area.

Table 3.1: Opportunities and Constraints on Potential Arterials

No.	Street	Street Orientation	No. of Lanes	On-Street Parking Impact	Pk Hr Parking Restrict'n	Speed Limit (mph)	Maximum Grade (%) (Approx)	Potential Utility Relocat'n	Primary Land Use	Other Remarks
1	Cesar Chavez Avenue	E-W	5 to 6	Yes	Yes	upto 35	5	Yes	Comm*	
2	1st Street	E-W	6	Yes	Yes	upto 35	5	Yes	Comm/Res	
3	4th Street	E-W	6	Yes	Yes	upto 35	5	Yes	Comm/Res	
4	3rd Street	E-W	6	Yes	Yes	upto 35	5	Yes	Comm/Res	
5	Whittier Boulevard	E-W	6 to 7	Yes	Yes	upto 35	0	Yes	Comm.	
6	Olympic Boulevard	E-W	7	Yes	No	upto 35	0	Maybe	Comm/Ind	
7	Alameda Street	N-S	Over 7	Yes	Yes	upto 35	0	Maybe	Comm/Ind	
8	Soto Street	N-S	6	Yes	Yes	upto 35	7	Yes	Comm/Res	
9	Lorena Street	N-S	6	Yes	No	upto 35	5	Yes	Res	
10	Indiana Street	N-S	6	Yes	No	upto 35	5	Yes	Res	
11	Arizona Street	N-S	7	Yes	No	upto 35	0	Maybe	Res	
12	Atlantic Boulevard	N-S	6+	Yes	Yes	upto 35	0	Maybe	Comm	

Source: Field Survey and SCAG Land Use Data Base

Note: * Residential East of Evergreen

Five alignment alternatives have been considered: (A) El Monte Busway/Soto Street; (B) E. Cesar Chavez; (C) First Street; (D) Fourth Street; and (E) Whittier Boulevard. A bus transitway alternative is considered for all five alternatives; light rail transit is considered for the Cesar Chavez, 1st Street, 4th Street, and Whittier Blvd. alternatives. (See the Appendix for a detailed description of the technologies and their potential application to the study area.)

Table 3.3: Comparison of Alternatives

Alt. No.	Alignment	Technology Options	Length (Miles)	No. of Stations / Stops	No. of Park and Rides	No. of Signal Priority/ Preemption	No. of access Controlled Intersections	Max No.of St Pkngs spaces Impacted	Approx. Gradient	Potential Utility Relocation	Traffic Rerouting	Potential Impact on Existing Bridges (Approx)	Other Improvement	Remarks
1	**El Monte Bus Way**: Starting at Union, Station easterly on El Monte Bus Way to Soto, Southerly on Soto to 1st St, Easterly on 1st St to Lorena, Southerly on Lorena to Whittier, and Easterly on Whittier to Atlantic	Exclusive Busway	2.11on Exst Bswy+5.33 on Surface St for Total=7.44	8	3	37	32	890	Soto-7% 1st St-5% Lorena-5%	Yes	Extensive		On-Ramp and Off-Ramp to Existing Busway at Soto + St Improvements	Widening of underpass at Lorena/4th or rerouting of traffic
2	**Cesar Chavez Av**: Starting at Union Station, easterly on Cesar Chavez to Soto, Southerly on Soto to 1st St, Easterly on 1st Street to Lorena, Southerly on Lorena to Whittier, and easterly on Whittier to Atlantic	Exclusive Busway or Light Rail	6.64	8	3	42	35	1250	Cesar C-5% 1st St-5% Lorena-5%	Yes	Extensive	LA River-1500' I-10 O.P.-1000' Rte 60 O.P.-500'	Street Improvements including reconstruction of sidewalks	Widening of underpass at Lorena/4th or rerouting of traffic
3	**1st Street**: Starting at Union Station, Southerly on Alameda to 1st St, Easterly on 1st St to Lorena, Southerly on Lorena to Whittier, and Easterly on Whittier to Atlantic	Exclusive Busway or Light Rail	7.2	11	3	42	30	920	1st St-5% Lorena-5%	Yes	Extensive	LA River-2000' Rte 60 O.P.-500'	Street Improvements including reconstruction of sidewalks	Widening of underpass at Lorena/4th or rerouting of traffic
4	**4th Street**: Starting at Union Station, Southerly on Alameda to 4th Street, Easterly on 4th Street to Arizona, Southerly on Arizona to Whittier, and Easterly on Whittier to Atlantic.	Exclusive Busway or Light Rail	7.03	11	2	42	28	910	4th St-5% Lorena-5%	Yes	Extensive	LA River-2500' I-710 O.P.-750'	Street Improvements including reconstruction of sidewalks	
5	**Whittier Boulevard**: Starting at Union Station, Southerly on Alameda to Whittier, and Easterly on Whittier to Atlantic Boulevard	Exclusive Busway or Light Rail	6.37	11	2	40	26	1070	Relatively Flat	Yes	Extensive	LA River-4000'	Street Improvements including reconstruction of sidewalks	Widening of underpass at Lorena/4th or rerouting of traffic

Regardless of the technology used, the right-of-way would be provided by taking several lanes from arterial streets, and operating at-grade with traffic signals and some measure of signal preemption or priority for the transit facility. The typical maximum speed of the arterials in the study area is 35 MPH; most of the arterials considered are about six lanes wide (four through lanes with additional space for parking on both sides), although several arterial segments are seven lanes wide (with a median turn lane in addition to through and parking lanes). Some basic characteristics of the arterials considered in the transit corridor alternatives are presented in Table 3.1.

All of the alternatives would begin at LA Union Station and end at Whittier/Atlantic in East Los Angeles. The following is a brief description of the alternatives:

Alternative A, El Monte Busway/Soto Street, would follow the El Monte Busway to the USC Medical Center, and (with new ramp connections) then run down Soto Street through Boyle Heights to First Street. It would proceed east on 1st to Lorena, and run down Lorena to Whittier Blvd. It would continue east along Whittier Blvd. to East Los Angeles. Only a bus transitway is considered for this alternative.

Alternative B, E. Cesar Chavez, would run north along Alameda Street from Union Station to E. Cesar Chavez, and proceed east across the Cesar Chavez bridge into Boyle Heights, passing the White Medical Center. It would turn south at Soto and go down the Soto Street hill to First Street. It would proceed east on 1st to Lorena, and run down Lorena to Whittier Blvd. It would then continue east along Whittier Blvd. to East Los Angeles. Both a bus transitway and light rail are considered for this alternative.

Alternative C, First Street, would run south along Alameda Street to Little Tokyo, and proceed east along First Street, crossing the 1st Street bridge to reach Boyle Heights. It would pass by the south end of the White Medical Center and continue east along 1st, to Lorena. It would then run down Lorena to Whittier Blvd. and would continue east along Whittier Blvd. to East Los Angeles. Both a bus transitway and light rail are considered for this alternative.

Alternative D, Fourth Street, would run south along Alameda Street (passing by Little Tokyo) to 3rd Street, and quickly transition to the 4th Street Bridge. It would proceed east along 4th Street to about Indiana, where it would transition to 3rd Street. It would then run east along 3rd to Mednick/Arizona near the East Los Angeles Civic Center. It would go down Arizona to Whittier Blvd. to access the East Los Angeles commercial center, and turn east on Whittier, ending at Whittier/Arizona. Both a bus transitway and light rail are considered for this alternative.

Alternative E, Whittier Boulevard, would run south along Alameda Street (passing by Little Tokyo) to 6th Street, and turn east along Whittier Blvd., crossing over to the south end of Boyle Heights using the Whittier Blvd. bridge. It would proceed east along Whittier Blvd. all the way to East Los Angeles. Both a bus transitway and light rail are considered for this alternative.

Table 3.3 provides a summary comparing these alternatives. A more detailed description of available right-of-way and other information on the alternatives is included in the Appendix. This is followed by Appendix sections on applications of the transit technologies considered to the study area, and on operational characteristics for transit lines using these alignments.

3.2.5 Route Combinations and Routing Opportunities

Through-routing from an East Los Angeles Corridor transitway or rail line to other regional services is important, as it would permit transit patrons to have a more direct trip, minimizing transfers and reducing travel time and inconvenience. Time has not permitted a detailed evaluation of which MTA bus routes would be subject to a through-routing plan involving a bus transitway, because there are a large number of bus routes in the study area, and numerous other routes immediately to the northwest, west, and southwest that might be involved in a through-routing plan.

Bus routes in East Los Angeles that would probably be funneled onto a transitway include those using Whittier blvd., First, E. Cesar Chavez, Soto Street, $4^{th}/3^{rd}$ (Montebello bus lines), and quite possibly many other routes including but not limited to those that use portions of Lorena, Eastern, Arizona, Atlantic, and Olympic. In terms of destinations that could be served west of Boyle Heights and East Los Angeles, major CBD-area points would include the financial district, the major commercial shopping area along Broadway, the Garment District, the Produce Market, the civic center area, and Olvera Street/ Union Station/Chinatown.

Some routes could continue through to the area west of the CBD including major corridors including Pico, 7^{th} Street, and 3^{rd} Street, serving not only close-in destinations such as the Alvarado neighborhood but points as distant as West Los Angeles. Some other routes might be extended past the LA Trade Tech College to the USC/Coliseum area, connecting also with the Long Beach Blue Line. Yet lines using parts of the transitway might be extended to points like the USC Medical Center, Lincoln Heights, Highland Park, and the Silver Lake area, with some routes connecting with the Pasadena Blue Line as well as the Red Line at Union Station.

Smart shuttles would also be able to use an East Los Angeles transitway, pending capacity being available (i.e. where available capacity is not completely taken up by limited stop, through bus routes) and where it would make sense in terms of origin-destination pairs. It is assumed that shuttles would probably not be using the transitway for direct service between Union Station or other points in the LA CBD and points in Boyle Heights and East Los Angeles, as these trips are assumed to be made on regular buses.

In the case of light rail, there are opportunities to tie in an East Los Angeles corridor with both the Pasadena and Long Beach Blue Line segments, permitting the expense of building a new maintenance facility specifically for the Pasadena Light Rail Line to be avoided, by using the Blue Line shops in North Long Beach and the Red Line shops along the LA River. This would involve building a link along Alameda Street from the Washington Station of the Long Beach Line to LAUPT, the southern end of the Pasadena line. The operational plan without this link is depicted in Exhibit 3.2. With this Alameda Street link in place, through-routing of some service between Pasadena and Long Beach becomes possible (Exhibit 3.3).

Exhibit 3.2 LRT Blue Line Operations Without Downtown Connector

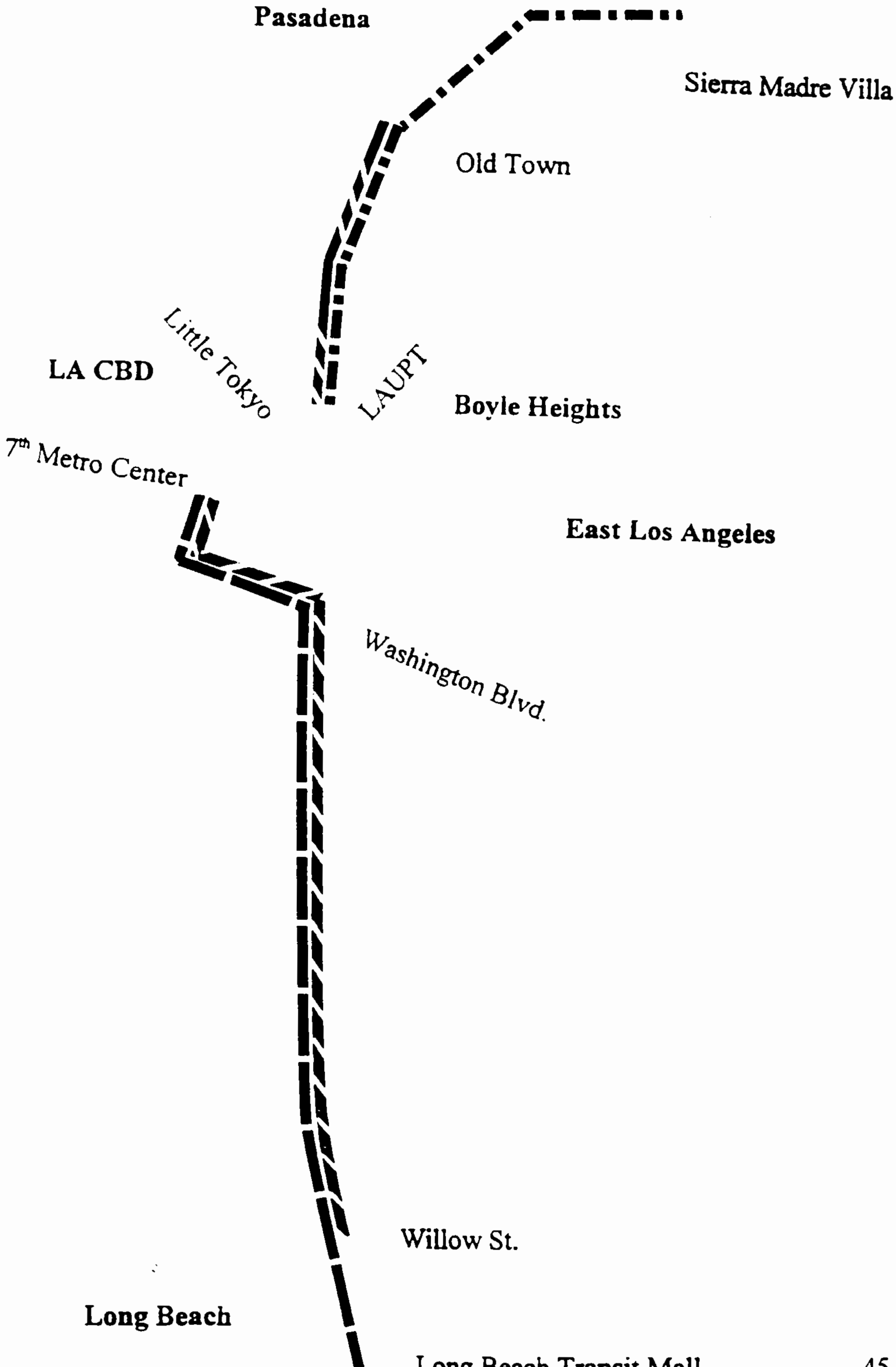


Exhibit 3.3 LRT Blue Line Operations With Service/Maintenance Connector

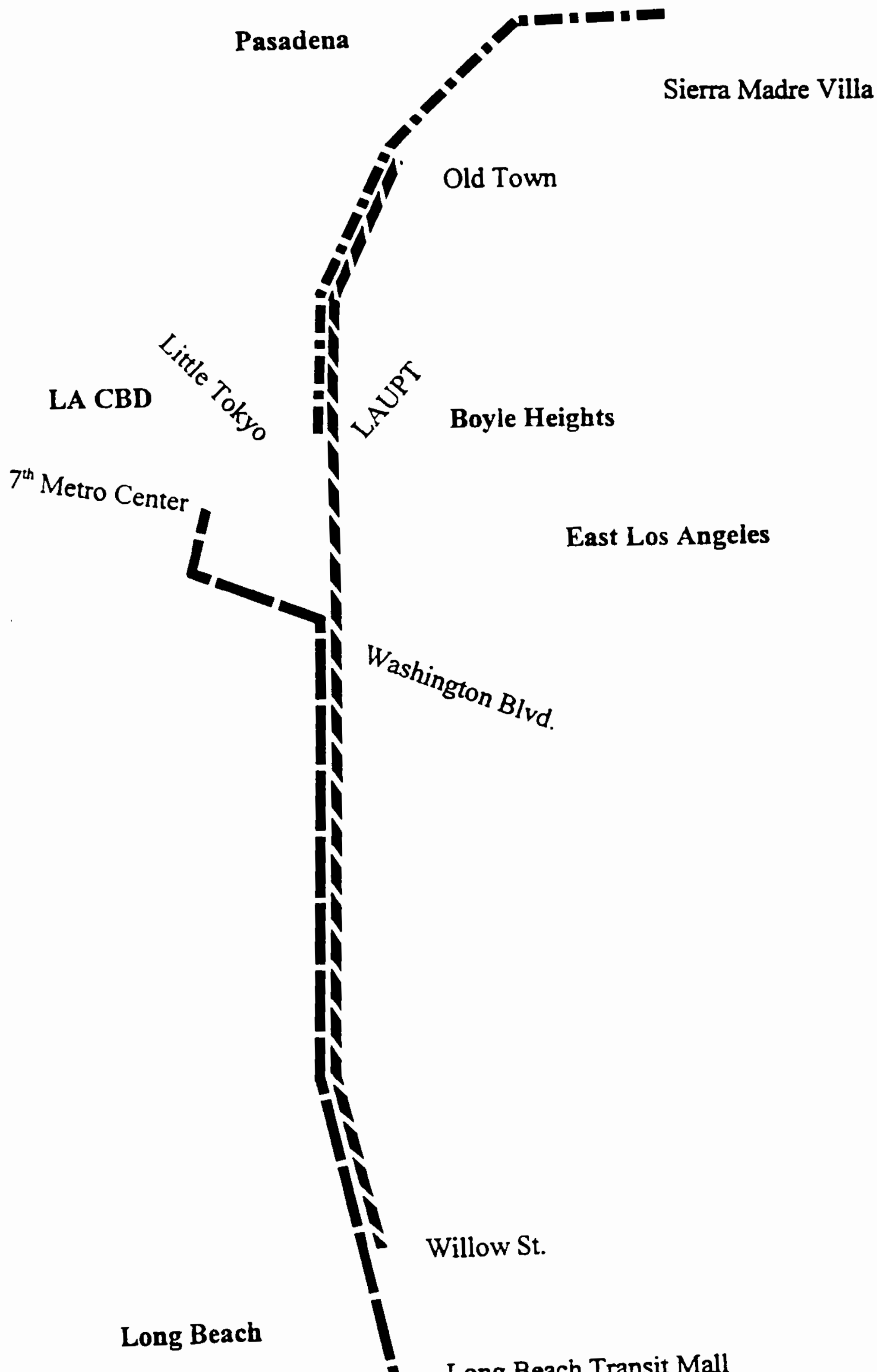


Exhibit 3.4 LRT Operations With An East Los Angeles Service, Scenario 1

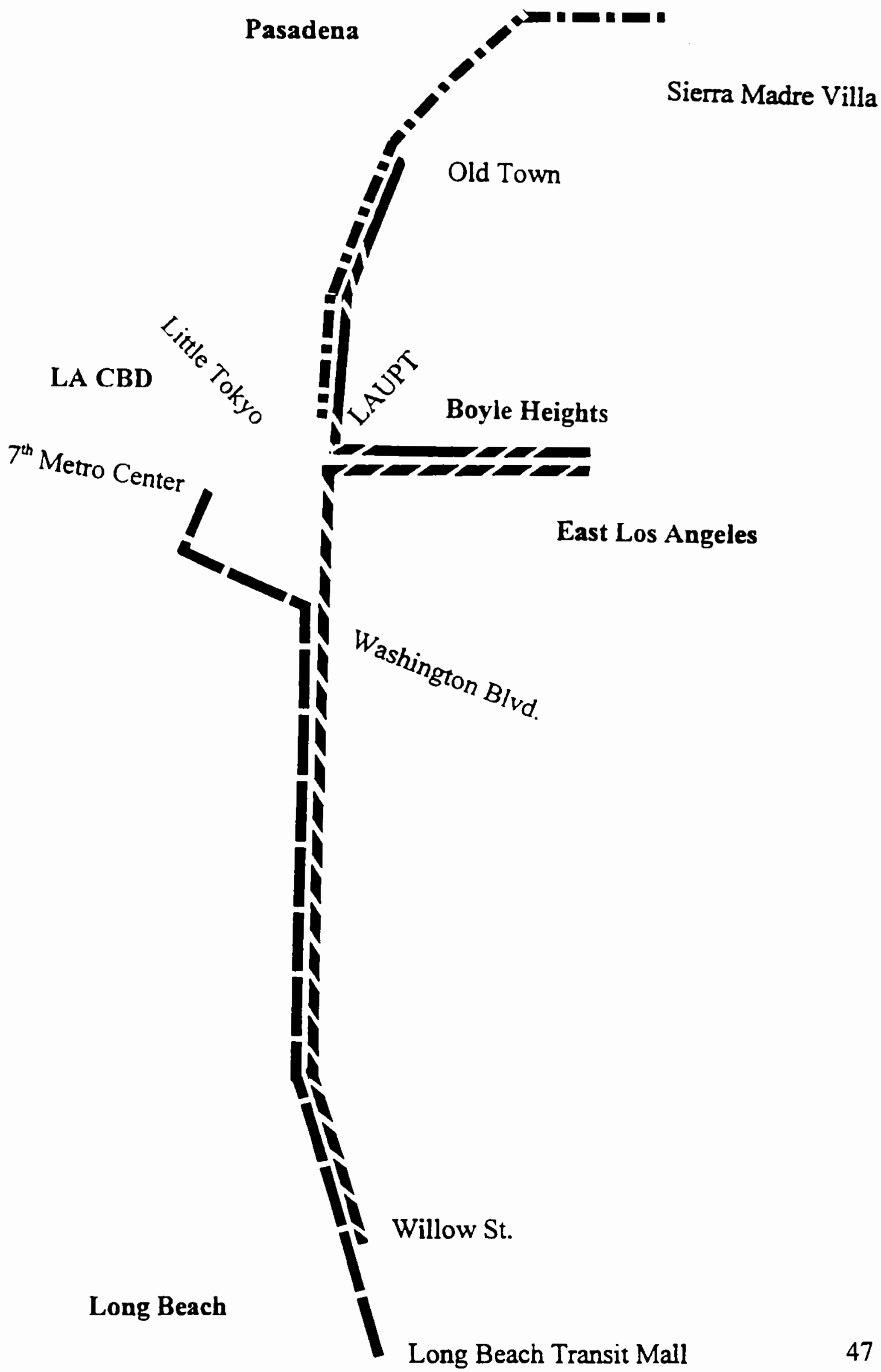


Exhibit 3.5 LRT Operations With An East Los Angeles Service, Scenario 2

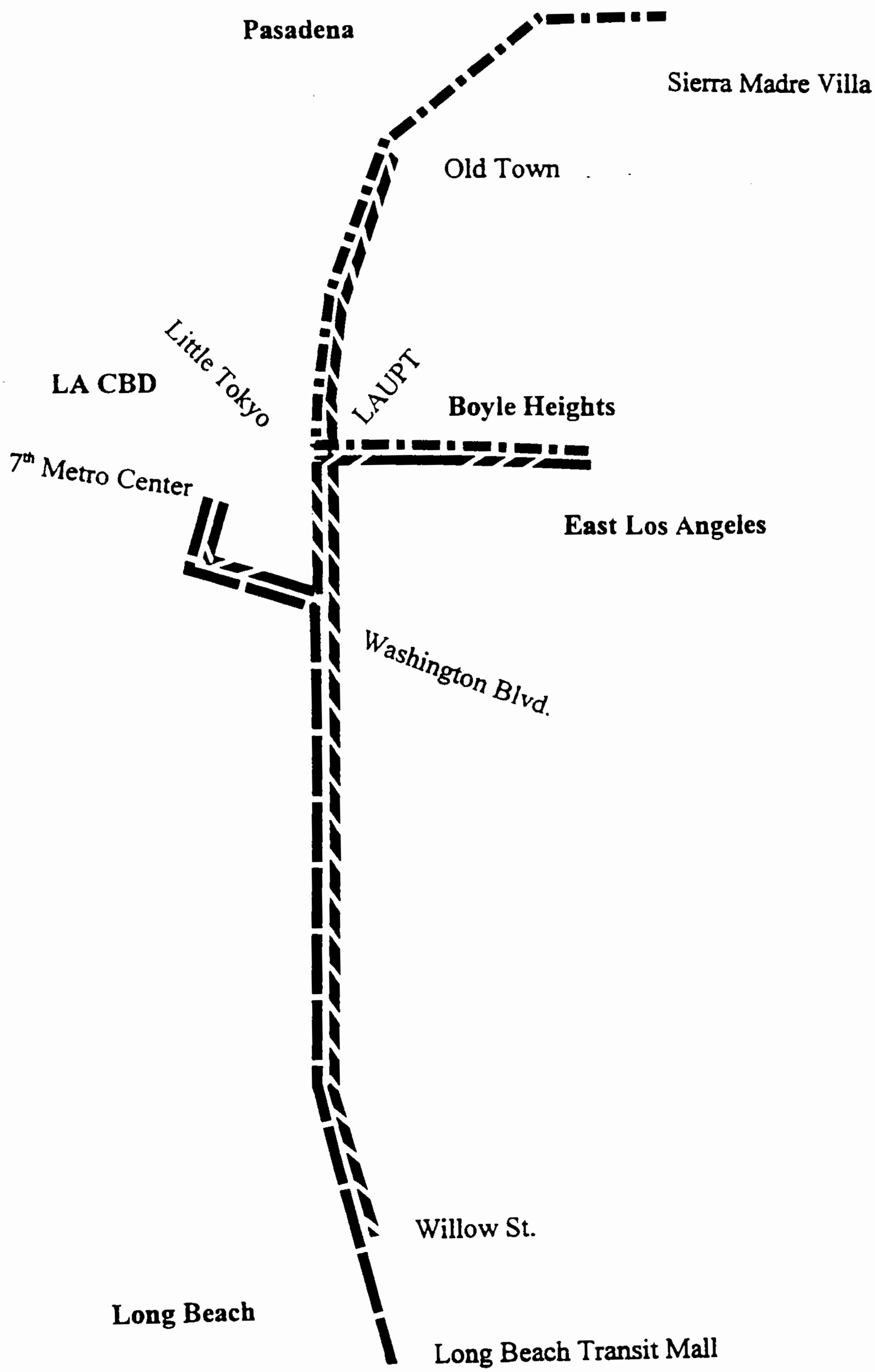


Exhibit 3.6 LRT Operations With a Little Tokyo Extension, Scenario 1

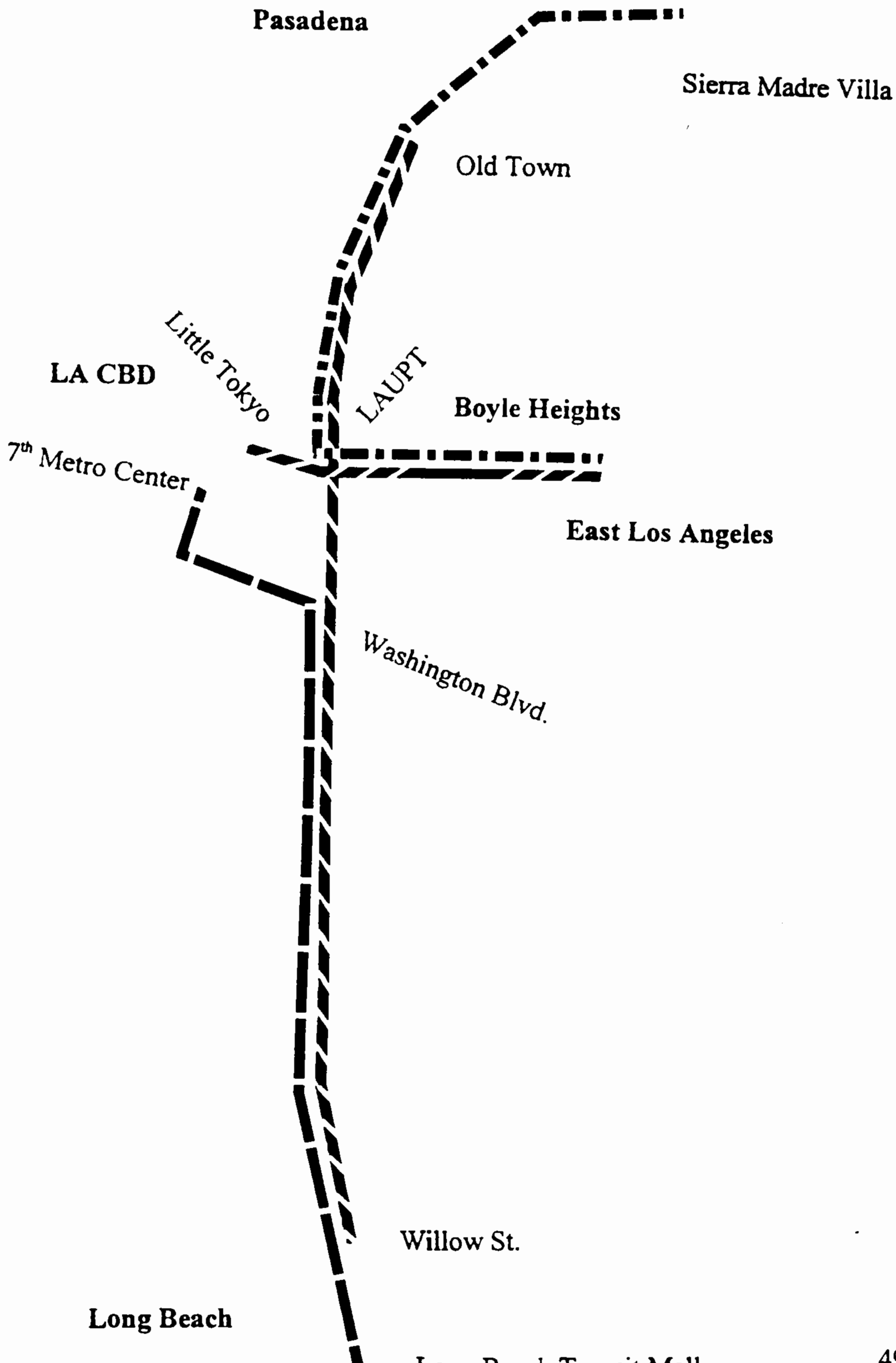


Exhibit 3.7 LRT Operations With a Little Tokyo Extension, Scenario 2

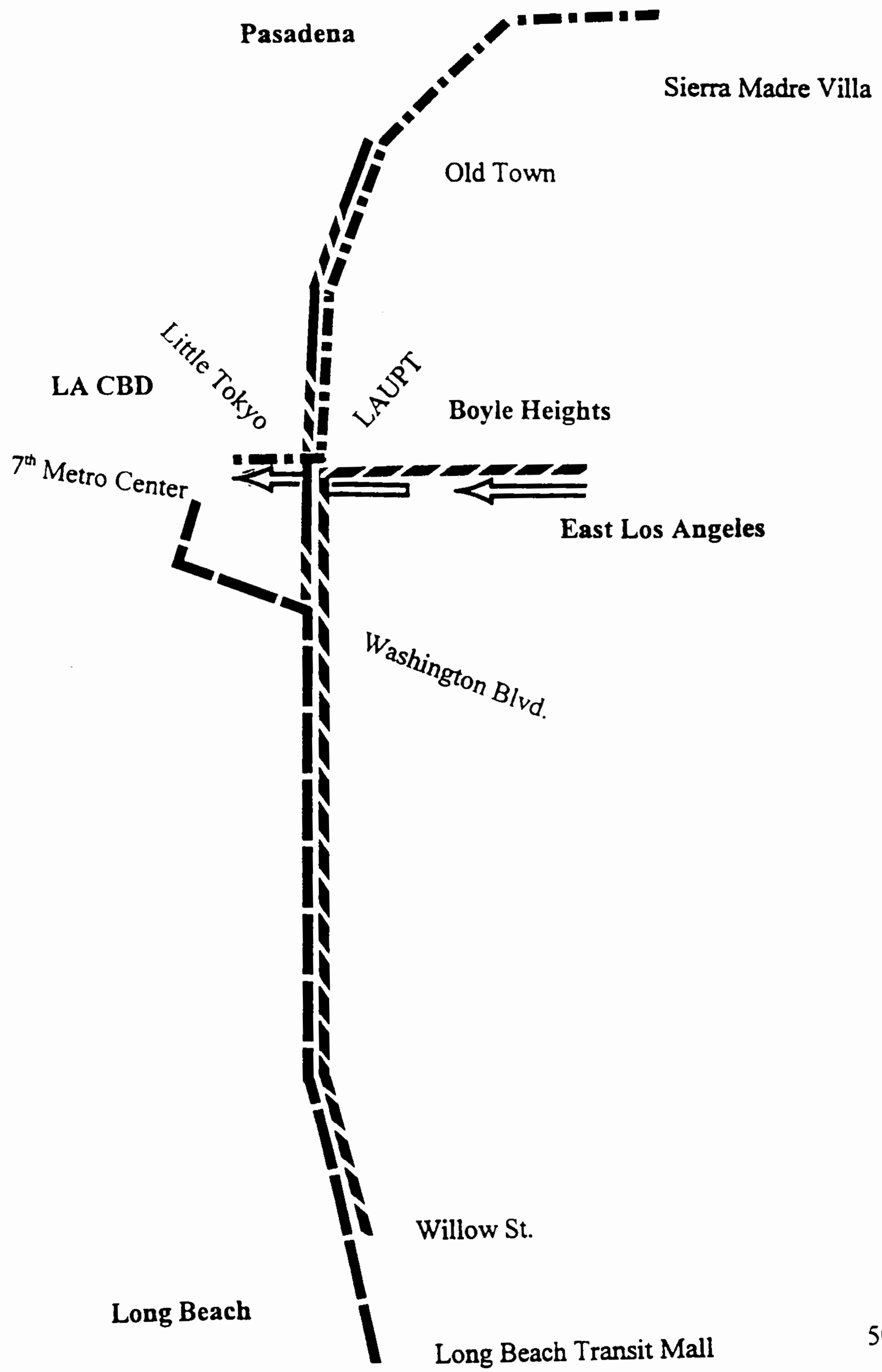


Exhibit 3.8 LRT Operations With a CBD Loop, Scenario 1

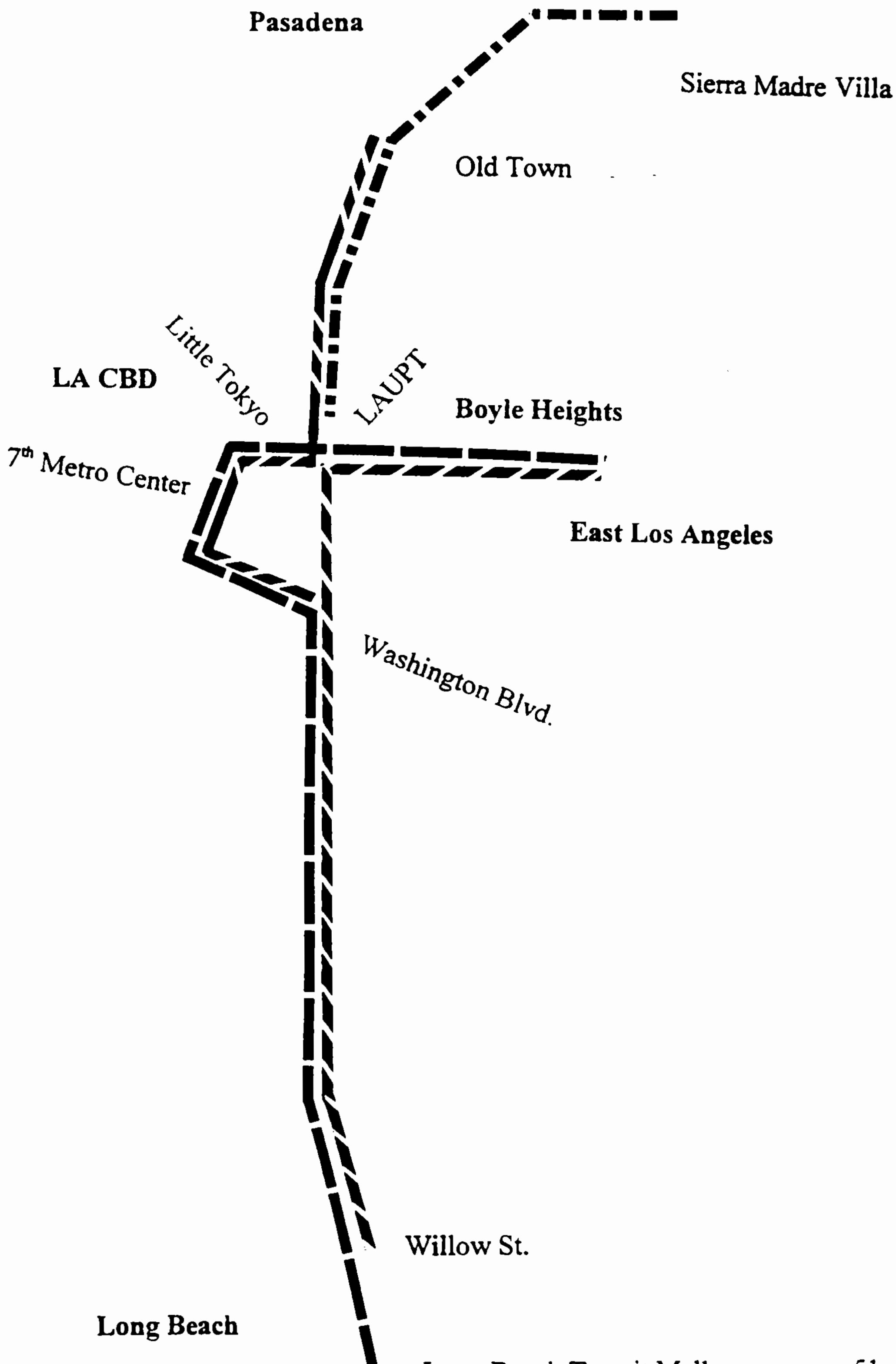


Exhibit 3.9 LRT Operations With a CBD Loop, Scenario 2

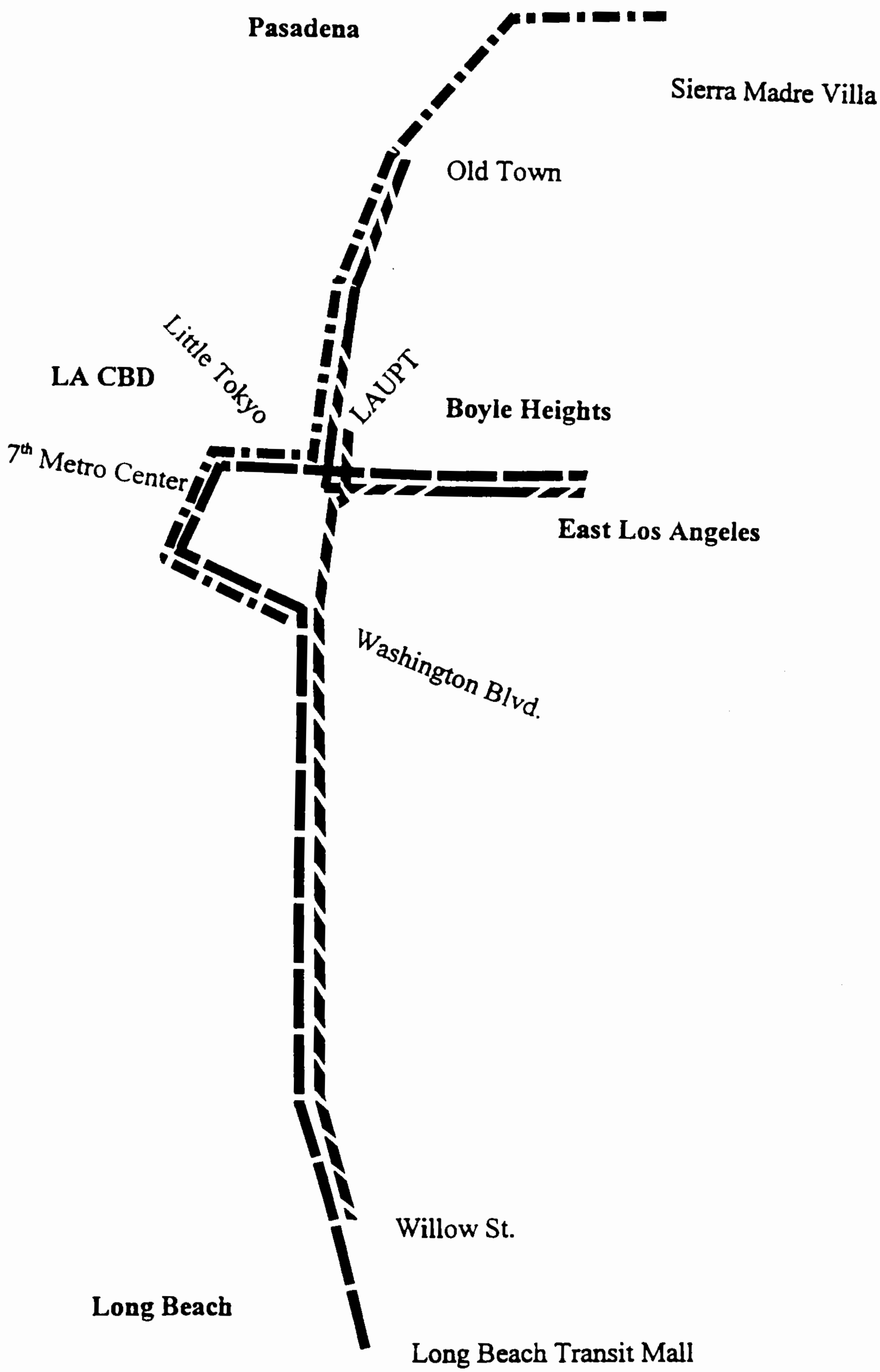
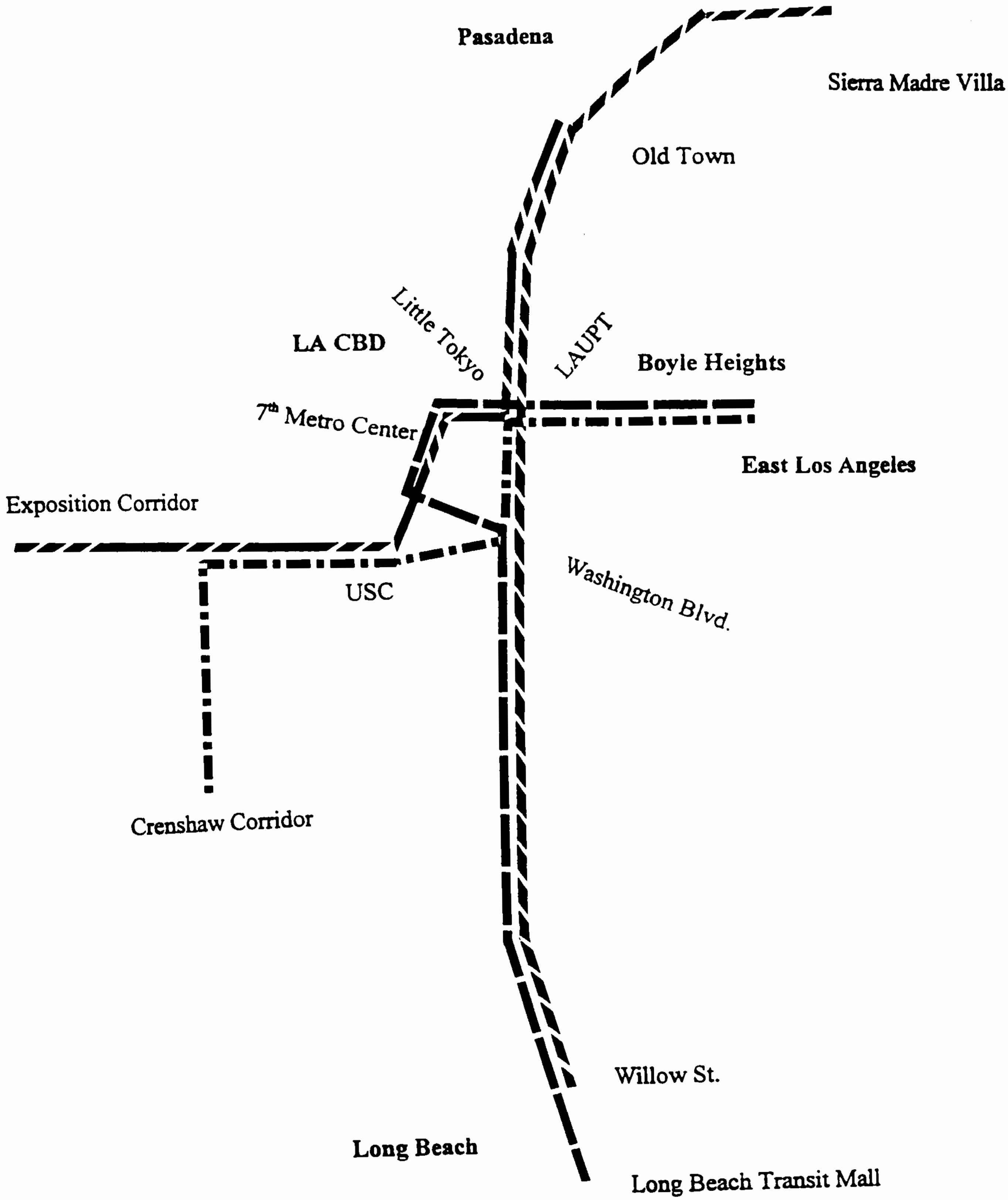


Exhibit 3.10 LRT Operations Adding Exposition/Martin Luther King and Crenshaw Corridors



With the addition of an East Los Angeles light rail line, operations through to Pasadena and Long Beach from Boyle Heights and East LA become possible (Exhibit 3.4). Exhibit 3.5 also shows a route from East LA to 7th Metro Center passing the LA Trade Tech College. An extension of the East Los Angeles line west along 2nd and/or 3rd Streets, perhaps in transit mall configuration, directly past Little Tokyo to the Civic Center and the north end of the Broadway retail commercial section is indicated in Exhibit 3.6 and 3.7. Use of the 2nd or 3rd Street highway tunnel from Hill St. to the financial district would permit such a line to be extended south to 7th/Metro Center, completing a loop around downtown (Exhibit 3.8 and 3.9). Finally, in the event all of this were done, and the Exposition and Crenshaw Corridors were implemented as LRT, still other through-routing possibilities involving the East Los Angeles line are possible (Exhibit 3.10).

The Appendix includes further detail on these light rail routing alternatives and on the rights-of-way that could be used in their implementation.

3.3 Smart Shuttle Network/Park-and-Ride

Smart Shuttle Network must be developed as an integral component of all of the alternatives. Smart Shuttles are demand responsive mode of transporting people over a short distance between transit centers and activity centers utilizing compact and efficient vehicles ranging from shared ride taxi to 12-passenger shuttles. Smart Shuttles should connect significant activity centers, concentrated residential areas etc. within a 3 to 4 mile radius and feed the transit corridor in order to maximize the benefits of the system. Based on cursory field survey, four locations are identified for developing Smart Shuttle Centers (See Exhibit 3.1). The proposed locations are vicinities of Los Angeles County Medical Center, Cesar Chavez Avenue and Lorena Street, Whittier Boulevard and Atlantic Boulevard, and the residential communities of City Terrace.

Another component that will enhance the usage of the proposed transit corridor is the adequate provision for Park and Ride along the corridor. Parking can be very expensive and sometimes impossible in most parts of CBD. Add to that, the horrible traffic condition on the freeway as well as surface streets leading to downtown, specially during peak hours, could make the proposed transit corridor very attractive to a lot of drive alone motorists, provided the transit corridor operates efficiently and adequate parking is available at convenient transit stops. For the proposed transit corridor, Park and Ride facility should be planned at the terminus of the transit corridor and at least one midway in between.

4.0 POTENTIAL PROJECT PERFORMANCE

Performance of each alternative is primarily based on comparative cost analysis. It should be emphasized that the sole purpose of providing the preliminary cost estimates for each alternative, here, is to compare the performance of each alternative. These figures should not be used in any way for programming or budgeting purpose. Table 4.1 presents a summary of preliminary project parameters and cost estimates for each of the alternative. These costs are based on a cursory synthesis of available data for similar projects developed by various governmental agencies in the U.S. Operation and Maintenance (O&M) cost of $0.21 and $0.42 per passenger-mile have been used for Buses and Light Rails respectively. Higher O&M cost for rail is primarily due to the fact that the replacement cycles are faster and the replacement costs are higher. As a result, in general, buses appear to perform better on a total cost per passenger-mile basis. However, it should be noted that the busway is assumed to operate at or near capacity, where as the light rail is assumed to operate well below its potential capacity. Therefore, if the demand increases with the operation, which is very possible , based on the experience on Long Beach Blue Line, the cost per passenger-mile could come down significantly. For every ten thousand increase in ridership on Light Rail, total cost per passenger-mile will decrease by about 5 cents.

Other performance measures that could be evaluated are mobility, accessibility and equity issues. Although it has not been quantified here, any one of these alternatives will improve the general mobility, accessibility and equity issues that have been historically neglected in this area. Further evaluation will be necessary to quantify and fully analyze the performance of these important issues.

Table 4.1: Preliminary Cost Comparison of Alternatives

Alt. No.	Alignment	Technology Options	Length (Miles)	Track	Stations / Stops	Park and Rides[1]	Signal Priority/ Preemption[2]	On-street Parking Replacement	Other Improvement	Rolling Stock	Annual Operations & Maintenance (per pass. mile)[4]	Capital Cost	Annual Operations Cost	Amortization of Capital Cost	Total Cost (Capital+OM)	Estimated Cost per Pas-Mile4
	Capital Cost Assumptions	Busway (Light Rail)		$25M/mile ($41M/mile)	$915,000	$2.16M	$25,000	$3,000 per space[3]	Light Rail Maintenance Facility $100M	$350,000, $425,000 articulated		includes all construction costs				
	Operations & Maintenance Assumptions	Busway (Light Rail)		included in passenger mile cost	$6,000	$120,000	no additional cost	$110 per space	included in passenger mile cost	included in passenger mile cost	$0.21 ($0.42)		includes operations, maintenance, rehabilitation and replacement	assume 30 years of O&M		
A	El Monte Bus Way	Exclusive Busway	2.11on Exst Bswy+5.33 on Surface St for Total=7.44	$133,250,000	$7,320,000	$6,480,000	$925,000	$2,670,000	use existing facilities	$15,500,000	$15,300,000	$166,145,000	$17,300,000	$10,807,898	$28,107,898	$ 0.39
B-1	Cesar Chavez Avenue	Exclusive Busway	6.64	$166,000,000	$7,320,000	$6,480,000	$1,050,000	$3,750,000	use existing facilities	$15,500,000	$15,300,000	$200,100,000	$17,300,000	$13,016,705	$30,316,705	$ 0.42
B-2	Cesar Chavez Avenue	Light Rail	6.64	$272,240,000	included in per mile cost	$6,480,000	$1,050,000	$3,750,000	$100,000,000	included in per mile cost	$46,600,000	$283,520,000	$48,600,000	$18,443,260	$67,043,260	$ 0.60
C-1	1st Street	Exclusive Busway	7.2	$180,000,000	$10,065,000	$6,480,000	$1,050,000	$2,760,000	use existing facilities	$15,500,000	$15,300,000	$215,855,000	$17,300,000	$14,041,584	$31,341,584	$ 0.43
C-2	1st Street	Light Rail	7.2	$295,200,000	included in per mile cost	$6,480,000	$1,050,000	$2,760,000	$100,000,000	included in per mile cost	$46,600,000	$305,490,000	$48,600,000	$19,872,430	$68,472,430	$ 0.62
D-1	4th Street	Exclusive Busway	7.03	$175,750,000	$10,065,000	$4,320,000	$1,000,000	$2,730,000	use existing facilities	$15,500,000	$15,300,000	$209,365,000	$17,300,000	$13,619,403	$30,919,403	$ 0.42
D-2	4th Street	Light Rail	7.03	$288,230,000	included in per mile cost	$4,320,000	$1,000,000	$2,730,000	$100,000,000	included in per mile cost	$46,600,000	$296,280,000	$48,600,000	$19,273,310	$67,873,310	$ 0.61
E-1	Whittier Boulevard	Exclusive Busway	6.37	$159,250,000	$10,065,000	$4,320,000	$1,000,000	$3,210,000	use existing facilities	$15,500,000	$15,300,000	$193,345,000	$17,300,000	$12,577,286	$29,877,286	$ 0.41
E-2	Whittier Boulevard	Light Rail	6.37	$261,170,000	included in per mile cost	$4,320,000	$1,000,000	$3,210,000	$100,000,000	included in per mile cost	$46,600,000	$269,700,000	$48,600,000	$17,544,255	$66,144,255	$ 0.60

Notes: The estimates provided are gross approximation of probable costs involved with each alternative and should be used only for comparative purpose

1) Assumes 720 parking spaces, twice the average Green Line station parking.

2) Assumes City of Los Angeles signal improvement/coordination program implementation.

3) Since parking is replacement for on-street takes O&M is responsibility of local jurisdiction.

4) Daily ridership estimates from 30,000 to 50,000 (used 50,000) for busway and 60,000 to 80,000 (used 76,000) for light rail.

5) Average trip length is assumed to be 4 miles.

Appendix A

MTA Bus Ridership Data

MTA BUS SERVICE

EAST LOS ANGELES - LINE 18 EASTBOUND

	STOPS	ON	OFF	ON BOARDS
1	6TH/MATEO	88	131	3315
2	WHITTIER/BOYLE	122	145	3292
3	SOTO	1029	448	3873
4	ORME	99	115	3857
5	CANULES	41	55	3843
6	EUCLID	274	243	3874
7	FRESNO	30	40	3864
8	LORENA	209	303	3850
9	SPERCE	184	141	3893
10	ESPERANA	58	91	3860
11	INDOANA	243	305	3798
12	DITMAN	200	194	3812
13	EASTMAN	179	169	3822
14	HERBERT	299	221	3900
15	DOWNEY	181	167	3914
16	BRANNICK	8	12	3910
17	EASTERN/WHITTIER	11	7	3914
18	OLYMPIN/EASTERN	0	4	3910
19	FORD	16	19	3907
20	McBRIDE	10	21	3896
21	ARIZONA	17	34	3879
22	FETTERLY	4	11	3872
23	FRAZER	9	7	3874
24	VANCOUVER	9	16	3867
25	ATLANTIC/OLYMPIC	3	21	3849
26	GOODRICH	64	358	3555
		3320	2899	

1. Total passengers for the line:	13315
2. Total number of stops for the line:	169
3. Total number of stops for the study area:	26
4. Survey Date:	40398

MTA BUS SERVICE

EAST LOS ANGELES - LINE 30, 31 EASTBOUND

	STOPS	ON	OFF	ON BOARDS
1	1ST/CUMMINGS	53	157	2799
2	CHICAGO	87	179	2707
3	SOTO	452	729	2420
4	MOTT	178	319	2279
5	EVERGREEN	83	156	2206
6	FRESNO	37	118	2125
7	LORENA	61	192	1994
8	INDIANA	100	262	1832
9	DITMAN	44	175	1701
10	ROWAN/1ST	97	90	1708
11	ROWAN/MICHIGAN	1	33	1676
12	ROWAN/BROOKLYN	62	208	1530
13	ROWEN/DOZIER	17	57	1490
14	HANNEL/GAGE	27	22	1495
15	HANNEL/RECORD	23	29	1489
16	HANNEL/HAZARD	23	18	1494
17	HANNEL/BRANNICK	9	26	1477
18	BRANNICK/FLORAL	12	30	1459
19	FLORAL/MARIANNA	6	42	1423
20	FLORAL/EASTERN	31	38	1416
21	FLORAL/HUMPHREYS	11	13	1414
22	FLORAL/FORD	0	1	1413
23	FLORAL/MCDONNELL	2	21	1394
24	FLORAL/DANGLER	1	6	1389
25	FLORAL/MEDRIK	40	93	1336
26	FLORAL/WOODS	0	6	1330
27	FLORAL/HILLSIDE	1	32	1299
28	FLORAL/VALLEY VIS	0	54	1245
29	FLORAL/CREST VISTA	0	341	904
		1458	3447	

1. Total passengers for the line:	16177
2. Total number of stops for the line:	131
3. Total number of stops for the study area:	29
4. Survey Date:	100797

MTA BUS SERVICE

EAST LOS ANGELES - LINE 65 EASTBOUND

	STOPS	ON	OFF	ON BOARDS
1	OLYMPIC/SOTO	90	76	524
2	ORME	32	19	537
3	CAMULOS	29	5	561
4	DACOTAH	21	16	566
5	CGRANDE VIS	37	30	573
6	LORENA	29	45	557
7	SPENCE	14	14	557
8	MIRASOL	1	12	546
9	CALADA	21	7	560
10	LOS PALOS	4	27	537
11	INDIANA/OLYMPIC	74	38	573
12	LCE	5	6	572
13	WHITTIER	133	77	628
14	HUBBARD	27	59	596
15	6TH ST	11	28	579
16	5TH ST	14	22	571
17	3RD ST	22	50	543
18	1ST ST	27	67	503
19	1ST/DITMAN	17	30	490
20	ROWAN	101	38	553
21	GAGE/1ST	6	17	542
22	MICHIGAN	4	8	538
23	CESAR CHAVES	76	58	556
24	HAMMEL	47	18	585
25	BLANCHARD	23	51	557
26	HARRIS	1	37	521
27	EASTMAN	1	71	451
28	POMEROY/CITY TER	6	94	363
29	CITY TERR/ROWAN	4	34	333
30	HERBERT	1	45	289
31	BOMMIE BCH	0	19	270
32	HAZARD	5	31	244
33	VAN PELT	3	25	222
34	LAFLER	0	16	206
35	EASTERN/CITY TERR	2	11	197
36	RAMONA	7	36	168
37	PASEO R C/ST UNT	1	125	44
38	CAL STATE BUS STA	0	44	0
		896	1406	

1. Total passengers for the line:	1935
2. Total number of stops for the line:	58
3. Total number of stops for the study area:	38

4. Survey Date: 42197

MTA BUS SERVICE

EAST LOS ANGELES - LINE 250/253 NORTHBOUND

	STOPS		ON	OFF	ON BOARDS
1	8TH ST	LORENA	48	0	48
2	8TH ST	CONCORD	25	0	73
3	8TH ST	CGRANDE VIS	31	0	104
4	8TH ST	EUCLID	15	1	118
5	EUCLID	GARNET	14	2	130
6	EUCLID	7TH ST	3	1	132
7	EUCLID	7TH ST	3	1	132
8	EUCLID	WHITTIER	36	26	142
9	EUCLID	GUIRADO	1	1	142
10	EUCLID	6TH ST	8	11	139
11	EUCLID	5TH ST	6	2	143
12	4TH ST	EVERGREEN	12	8	147
13	EVERGREEN	1ST ST	16	29	134
14	EVERGREEN	CESR CHAVZ	9	26	117
15	EVERGREEN	MALABAR	3	17	103
16	EVERGREEN	BLANCHARD	2	4	101
17	WABASH	EVERGREEN	15	31	85
18	WABASH	MOTT	7	2	90
19	SOTO	WABASH	3	18	75
			257	180	

1. Total passengers for the line:	347
2. Total number of stops for the line:	43
3. Total number of stops for the study area:	19
4. Survey Date:	11698

MTA BUS SERVICE

EAST LOS ANGELES - LINE 255 SOUTHBOUND

	STOPS		ON	OFF	ON BOARDS
1	HERBERT	WHITTIER	94	0	94
2	WHITTIER	HERBERT	1	0	95
3	WHITTIER	EASTMAN	18	0	113
4	WHITTIER	ROWAN	17	0	130
5	ROWAN	PRINCETON	18	2	146
6	ROWAN	LANFRANCO	19	1	164
7	ROWAN	EAGLE	2	0	166
8	ROWAN	3RD ST	17	7	176
9	ROWAN	1ST ST	59	40	195
10	ROWAN	MICHIGAN	0	2	193
11	ROWAN	CESAR CHVZ	48	20	221
12	GAGE	HAMMEL	12	13	220
13	GAGE	BLANCHARD	2	15	207
14	BLANCHARD	ROWAN	9	14	202
15	BLANCHARD	DITMAN	4	20	186
16	BLANCHARD	ALMA	4	18	172
17	BLANCHARD	FRESNO	5	8	169
18	BLANCHARD	BLADES	4	7	166
19	BLANCHARD	EVERGREEN	4	9	161
20	WABASH	EVERGREEN	39	30	170
21	WABASH	MOTT	9	5	174
22	WABASH	SOTO	2	21	155
			387	232	

1. Total passengers for the line:	530
2. Total number of stops for the line:	45
3. Total number of stops for the study area:	22
4. Survey Date:	72297

MTA BUS SERVICE

EAST LOS ANGELES - LINE 256 NORTHBOUND

	STOPS		ON	OFF	ON BOARDS
1	OLYMPIC	EASTERN	13	1	46
2	FORD	MINES	16	0	62
3	FORD	WHITTIER	153	9	206
4	FORD	HUMPHREYS	4	4	206
5	FORD	6TH ST	8	6	208
6	FORD	5TH ST	9	7	210
7	FORD	4TH ST	2	1	211
8	3 RD ST	FORD	10	8	213
9	3 RD ST	HUMPHREYS	10	0	223
10	EASTERN	3RD ST	20	3	240
11	EASTERN	GLEASON	0	4	236
12	EASTERN	1ST ST	14	9	241
13	EASTERN	MICHIGAN	0	1	240
14	EASTERN	CSR CHAVEZ	51	15	276
15	EASTERN	HAMMEL	2	3	275
16	EASTERN	FLORAL	17	20	272
17	EASTERN	MARIANNA	3	8	267
18	EASTERN	SHERIFF	3	4	266
19	EASTERN	HAUCK	7	8	265
20	EASTERN	CTY TERRCE	24	38	251
21	EASTERN	RAMONA	28	27	255
22	STATE UNIV	EASTERN	10	9	256
23	CAL STATE	BUSWAY STA	70	38	288
			474	223	

1. Total passengers for the line:	1427
2. Total number of stops for the line:	124
3. Total number of stops for the study area:	23
4. Survey Date:	92697

MTA BUS SERVICE

EAST LOS ANGELES - LINE 259 NORTHBOUND

	STOPS	ON	OFF	ON BOARDS
1	ARIZONA/OLYMPIC	87	38	301
2	VERONA	13	1	313
3	WHITTIER	191	61	443
4	HUBBARD	6	3	446
5	6TH	10	6	450
6	EAGLE	6	7	449
7	MEDNIK/4TH	10	41	418
8	3RD	60	78	400
9	1ST	8	27	381
10	CESAR CHVZ	35	101	315
11	HAMEL-FISH	2	39	278
		428	402	

1. Total passengers for the line:	1131
2. Total number of stops for the line:	84
3. Total number of stops for the study area:	11
4. Survey Date:	11598

MTA BUS SERVICE

EAST LOS ANGELES - LINE 620 NORTHBOUND

	STOPS	ON	OFF	ON BOARDS
1	ALL READY ON BOAR	704	0	704
2	EVERGREEN/4TH	63	19	748
3	1ST/EVERGREEN	33	55	726
4	MOTT	80	59	747
5	MOTT/MICHIGAN	11	32	726
6	CESAR CHAZ/SOTO	179	410	495
7	ST. LOUIS	70	82	483
8	STATE/CESAR CHAZ	41	139	385
9	SHERIDAN	3	46	342
		1184	842	

1. Total passengers for the line:	1247
2. Total number of stops for the line:	16
3. Total number of stops for the study area:	9
4. Survey Date:	50597

MTA BUS SERVICE

EAST LOS ANGELES - LINE 260 SOUTHBOUND

	STOPS	ON	OFF	ON BOARDS
1	ATLANTIC/OLYMPIC	126	218	1586
2	WHITTIER	353	447	1492
3	HUBBARD	26	20	1498
4	6TH	100	66	1532
5	EAGLE	38	19	1551
6	4TH	12	25	1538
7	BEVERLY	117	194	1461
8	POMONA	33	28	1466
9	RIGGIN	204	319	1351
		1009	1336	

1. Total passengers for the line:	7359
2. Total number of stops for the line:	121
3. Total number of stops for the study area:	9
4. Survey Date:	31397

MTA BUS SERVICE

EAST LOS ANGELES - LINE 66/67 SOUTHBOUND

	STOPS	ON	OFF	ON BOARDS
1	OLYMPIC/BOYLE	32	481	2830
2	SOTO/OLYMPIC	164	426	2568
3	8TH	370	193	2745
4	8TH/ORME	38	52	2731
5	ROSALIND	46	114	2663
6	DACOTAH	28	54	2637
7	GRANDE VST	34	87	2584
8	CONCORD	30	112	2502
9	LORENA	60	150	2412
10	SPENCE	26	79	2359
11	MIRASOL	17	54	2322
12	OLYMPIC/SOTO	60	119	2263
13	ORME	10	32	2241
14	CAMULOS	11	46	2206
15	DACOTAH	9	31	2184
16	GRANDE VST	17	79	2122
17	LORENA	16	70	2068
18	SPENCE	8	19	2057
19	MIRASOL	1	37	2021
20	OLYMPIC/CALADA	56	70	2007
21	LOS PALOS	51	116	1942
22	INDIANA	120	172	1890
23	DITMAN	39	54	1875
24	ROWAN	75	98	1852
25	HERBERT	113	158	1807
26	DOWNEY	59	174	1692
27	MARIANNA	15	46	1661
28	EASTERN	14	56	1619
29	FORD	26	41	1604
30	MCBRIDE	33	61	1576
31	ARIZONA	32	142	1466
32	FETTERLY	39	91	1414
33	FRASER	9	86	1337
34	VANCOUVER	9	127	1219
35	VERONA/ATLANTIC	0	228	991
36	OLYMPIC/ATLANTIC	47	323	715
		1714	4278	

1. Total passengers for the line:	12645
2. Total number of stops for the line:	85
3. Total number of stops for the study area:	36
4. Survey Date:	61897

MTA BUS SERVICE

EAST LOS ANGELES - LINE 38/71 SOUTHBOUND

	STOPS	ON	OFF	ON BOARDS
1	WABASH/SOTO	104	15	393
2	MOTT	1	9	385
3	EVERGREEN	14	62	337
4	STONE	7	39	305
5	CITY TERRACE/ALMA	13	80	238
6	DITTMAN	2	42	198
7	POMEROY	5	58	145
8	ROWAN	0	5	140
9	HERBERT	0	10	130
10	BONIE BCH	0	3	127
11	HAZARD	0	33	94
12	VAN PELT	0	13	81
13	LAFLER	0	2	79
14	EASTERN	5	15	69
15	EASTERN/LOTTA	0	10	59
16	SHERIFF/E. S8	0	8	51
17	SYBIL BRAN INSTITU	0	51	0
		151	455	

1. Total passengers for the line:	4562
2. Total number of stops for the line:	92
3. Total number of stops for the study area:	17
4. Survey Date:	101097

MTA BUS SERVICE

EAST LOS ANGELES - LINE 251, 252 SOUTHBOUND

	STOPS	ON	OFF	ON BOARDS
1	SOTO/OLYMPIC	686	460	3004
2	8TH	506	191	3319
3	SOTO/8TH	0	0	3319
4	SOTO/7TH	45	35	3329
5	WHITTIER	633	503	3459
6	SOTO ARR/WHITTIER	0	2	3457
7	SOTO LVE/WHITTIER	3	0	3460
8	SOTO/6TH	131	153	3438
9	4TH	313	397	3354
10	1ST	312	574	3092
11	CESAR CHAZ	503	822	2773
12	SHERIDAN	56	197	2632
13	WABASH	91	470	2253
		3279	3804	

1. Total passengers for the line:	9095
2. Total number of stops for the line:	118
3. Total number of stops for the study area:	13
4. Survey Date:	80696

MTA BUS SERVICE

EAST LOS ANGELES - LINE 254 SOUTHBOUND

	STOPS	ON	OFF	ON BOARDS
1	LORENA/OLYMPIC	9	18	183
2	8TH	53	15	221
3	BESWICK	9	1	229
4	7TH	6	9	226
5	WHITTIER	62	50	238
6	6TH	3	12	229
7	3RD	4	9	224
8	1ST	20	35	209
9	CESAR CHAZ	13	24	198
10	CESAR CHAZ/INDIAN	8	6	200
11	DITMAN	5	5	200
12	ROWAN/CESAR CHAZ	83	11	272
13	HAMMEL/GAGE	2	5	269
14	RECORD	4	3	270
15	BONNIE BCH/HAMME	8	4	274
16	FLORAL	3	2	275
17	FAIRMOUNT	16	44	247
18	HAZARD/FAIRMOUNT	14	58	203
19	DOBINSON	10	21	192
20	SNOW DR	0	17	175
21	ALMANZA	0	13	162
22	WOOLWINE	0	2	160
23	CITY TERRACE	2	31	131
24	CITY TERCE/ROGERS	5	4	132
25	HERBERT/CTY TERA	1	2	131
		340	401	

1. Total passengers for the line:	1043
2. Total number of stops for the line:	98
3. Total number of stops for the study area:	25
4. Survey Date:	11598

Appendix B

Detail Description of Alternative Alignment and Technology

TECHNOLOGY AND RIGHT-OF-WAY CONSIDERATIONS

Technologies Compared

Transit technologies can be described in terms of basic technology (type of vehicle and power plant), type of right-of-way or R/W (in mixed traffic on streets, surface R/W with preemption of cross traffic, or fully grade separated), and type of operations (local, limited stop, express, etc.).

Rapid Transit

The Metro Red Line system hitherto considered for the East Los Angeles Corridor utilizes rapid transit technology, meaning a fully grade separated line urban rail mode, with longer trains capable of providing high capacities and high average operating speeds. Rapid transit is also commonly referred to as "heavy rail transit" although the trains themselves are usually relatively light-weight (the term really refers to heavy capacity rapid transit). Rapid transit would operate in tunnel or on aerial structure, or on fully grade-separated segments on the surface. Rapid transit commonly has "local" service operated with widely-spaced stations, but skip-stop and express service are also used. Power is electric, usually 750 volts DC delivered by third rail (but overhead catenary is also used).

Light Rail

Light rail transit (LRT) as typified by the Blue Line, utilizes medium-capacity rapid transit technology, generally operating on former railroad right-of-way and/or new median alignments along broader arterial streets. By definition, as a system, light rail is not fully grade separated, i.e. there are always some highway grade crossings. LRT commonly operates with six-axle articulated vehicles in two or three car train configuration (though single cars and longer 4-car trains can also be operated). The term light rail refers to lower volumes of traffic carried as compared to rapid transit (the vehicles themselves are no lighter in weight than rapid transit cars).

Light rail operating speeds vary considerably. The Blue Line operates at a maximum speed of 55 MPH in normal operation over a railroad right-of-way with gated crossings with bells and flashing lights. The cars themselves will run considerably faster than this and LRT could be operated over 70 MPH provided adequate train control systems are provided for system safety. Conversely, operating in medians of arterial streets with frequent cross traffic and with low curbing to separate the rail R/W from highway traffic, the maximum speed would be the same as for parallel vehicles, often 35 MPH in our area.

Fencing R/W between cross streets allows operation 10 MPH above the limit for parallel streets; gating crossings allows higher speeds, although many arterial medians do not provide adequate space for gates. Traffic protection for street alignments can include signal preemption (red light for cross streets under all conditions), signal priority (sometimes preempting traffic lights but often only advancing or delaying the green phase for transit), and some combination of priority with signal synchronization to trip lights sequentially along the street parallel to the line.

LRT can also be operated on side-of-road rights-of-way, in tunnels or aerial structure (at higher speeds), or in pedestrian transit malls (at lower speeds, not usually over 25 MPH). Street running (in mixed traffic) is also possible along short segments on lightly-traveled streets; a double track line can be operated in a one-way couplet with one track on closely parallel streets. It is even possible to put one track underground where there is room for only one surface track, or to use short tunnel sections to connect parallel arterial alignments or other R/W (e.g. Calgary's northwest line). In Europe, there are applications of contraflow track on side private R/W mated to a with-flow track in the street; or on gradients, providing a single track median LRT R/W running uphill matched with an offset, paved track in a mixed flow lane running downhill.

Typical light rail lines employ a mixture of right-of-way types, and the average speed of service is often 35-40 MPH or so, considerably faster than local buses in street traffic. Local operation only tends to be used, but skip-stop and express operation are possible. Power is electric (usually 750 volts DC), supplied by overhead catenary. Self-service fare collection systems are generally used in modern light rail applications.

In arterial applications, with a relatively low speed (35 MPH or so) rail line paved and striped off, LRT has often been combined with busway operation in Europe, with separate loading areas. This works well when the frequency of buses is such that it will not interfere with rail operations. (Emergency vehicles can also operate over this kind of rail R/W). Although it has not been done anywhere thus far, Smart Shuttles could also operate over paved LRT R/W in sections, where convenient. If there are sections where bus or shuttle operation would not be contemplated, grass or other vegetation can be planted around and between the rails, and flowers, ornamental shrubs, and small trees can be used to provide ornamental landscaping.

Transitways

Transitways entail operation of transit buses on reserved lanes on freeways, former railroad rights-of-way, or reserved lanes along arterial streets, and can provide a medium-capacity alternative to urban rail transit. Transitways can be either at-grade in arterial alignments or following former railroad lines with at-grade crossings; or fully grade-separated, i.e. on freeways or on former rail R/W or arterial streets with flyovers at major intersections and side street access restricted.

Transitways can allow a large number of bus routes to be funneled from various surface street alignments onto a common trunk line facility that can serve major centers, including the regional CBD. As such, the transitway routes can provide their own feeder service, without requiring a transfer from local to limited stop bus. Hence, this concept allows a tremendous amount of flexibility, and the ability to extend transitway operation incrementally, e.g. providing service in conventional on-street bus mode, with operation in mixed flow lanes until new segments of transitway can be brought on line.

Transitway stations can be similar to low platform light rail stations, except that side platforms only would normally be used in arterial applications. Where right-of-way is especially wide, as with freeway transitway alignments, off-line stations can be provided with stopping lanes and bypass lanes that allow through traffic to go around vehicles pulling in to load/unload--also letting buses pull around other buses to access different loading positions along the same platform. (Center-island platforms are used on the El Monte Busway along a side-of-freeway alignment, but this is a specialized pre-metro application with the buses and other vehicles running on the left, barrier separated, instead of on the right as is normal for highway traffic in this country.)

Various kinds of transit buses could be operated on transitways, including 40', two-axle vehicles and 60', 3-axle articulated vehicles. However, longer, 4-axle articulated buses are also possible, at least on routes without steep hills (some are used in Curitiba, Brazil). Buses have traditionally been operated with all passengers paying their fare upon entering a front door across from the driver, a system which does not allow efficient boarding and alighting and results in poor distribution of passengers within the bus.

However, it has been proposed that higher-volume, arterial transitways be operated with self-service fare collection very much like light rail, i.e. pre-purchase of tickets at fare machines on the platform and extensive use of transit passes. Under this proposal, passengers would board and alight via any door, reducing delay at stations and greatly improving the efficiency of circulation within the buses. Enforcement of fare payment would be via roving inspectors or police acting in this capacity. This is the only system that would allow effective use of longer articulated buses with three or four double doors on a side. (In Curitiba, another form of pre-payment is used in which modular, enclosed bus stations are installed at station stops and passengers pay upon going through a turnstile.)

Operationally, transitway bus service can be "local" (really limited-stop as compared to local buses on the street), skip-stop, or express/local. Express service using a transitway is facilitated by off-line stations, provided there is the additional space for passing lanes; if there is not space for this, skip-stop service could be used, or perhaps some routes could pull entirely off the transitway in some locations to use local curb-side bus stops.

Power plant could be diesel or other ICE, or electric. The trend is currently to phase out diesel fuel in favor of cleaner fuels such as CNG, propane, or ethanol, using modified diesel engines. Electric trolley buses are also feasible to use in transitway applications, as are hybrid ICE/electric buses and battery-powered buses (short range or shuttle applications). In the future, pending successful development of the technology, fuel cell buses could also be used.

Transitways can allow Smart Shuttles to use the same right-of-way, and depending upon the lane capacity provided, they can allow at some other high-occupancy vehicles (vanpools, carpools) to use the same facility. This would of course be subject to minimal vehicle occupancy requirements. An arterial transitway with a very high frequency of buses and numerous on-line station stops might allow sharing of R/W only with vans and shuttles with an occupancy higher than three passengers.

Maximum transitway operating speeds would range from as high as 55 or 65 MPH on a freeway alignment to 35 MPH for transitway lanes on a typical arterial (with an unfenced R/W transitway speed limit will be the same as for parallel mixed flow lanes). The major advantage for an arterial transitway of course would be the ability to operate up to the speed limit without traffic interference, whereas buses in mixed flow are often impeded by other vehicles. The transitway would have a limited number of stations or bus stops as compared to typical local bus service, which will also increase operating speeds.

Cross traffic at intersecting streets would also be limited to the extent feasible, by restricting access for minor streets, providing signal preemption at other through streets, signal priority at major arterial crossings (modifying signal sequences to reduce delay due to the remaining red lights encountered en route), or even using some combination of priority with signal synchronization to trip a series of traffic lights sequentially. Of course, some of the major arterials would also have transitway stations, so that the buses would stop in these locations anyway. A combination of these delay reduction strategies with provision of a private R/W would provide greater enhancement of transitway bus service than would any individual strategy.

Bus transitways have seldom been operated on railroad rights-of-way with gated crossings, bells and flashing lights in typical light rail mode, but this may be possible in some locations. Often, however, a high frequency transitway operated with many individual buses instead of longer, coupled LRT trains, would result in considerable interference with cross-traffic, and for this reason many transitways are heavily grade-separated instead (e.g. Ottowa, which has a section of busway on a former surface railroad R/W, placed in a below-grade trench).

For arterial transitways, a strategy that can enhance speeds somewhat is to fence off a median or side R/W, much as can be done with LRT, and allow operation 10 MPH above the speed for parallel streets. This would be particularly applicable to potential, new arterial medians that would not provide adequate space for crossing gates.

Transitways can be operated not only in median alignments but also on side-of-the-road R/W (in which case the buses on the curb side can use sidewalk bus stops); and also in tunnels (if provided with adequate ventilation for ICE operation) or on aerial structures. They can also be routed into pedestrian transit malls (at lower speeds, not usually over 25 MPH). If necessary because of space limitations, a transitway can be split into two single lane transitways and operated in a one-way couplet arrangement on parallel streets.

Conversion of existing transit lanes to bus lanes can be accomplished easily by striping off one or two lanes, where full transitway development separated by curbing is not needed or where space is very limited. If necessary, contraflow transitway lanes can be provided with buses in one direction running "with flow" in mixed traffic or in a painted-off lane, and buses in the other direction (side-of-road) running in the other direction on a curbed R/W.

On steep gradients, if R/W is limited, a single lane transitway (with curbing to separate it from parallel lanes) can be dedicated to uphill buses, and the buses running downhill in the same location can be operated in mixed flow. The rationale here is that if private vehicles in mixed flow lanes stall out on a hill, it is most likely to be on the upgrade; if there are breakdowns in the downhill direction, it would be easier for the buses to run around them.

It follows that a transitway system can integrate a wide variety of types of R/W, including freeway HOV lanes, arterial medians, painted off lanes, transit mall, and street-running, as may be required.

AVAILABLE RIGHT-OF-WAY AND OTHER CONDITIONS FOR THE ROUTE ALTERNATIVES

The following describes right-of-way conditions for the five alternatives looked at in detail, with notes on land use and topography where appropriate to understanding the potential for developing a transit corridor on each. Comments will be made on the number of lanes along the alignments, and whether lanes are designated for parking all-day, or off-peak only. It will be noted that many of the alternatives use some common segments; and that all alternatives serve East Los Angeles at Whittier/Arizona.

Discussion of some potential variations on some of the alternatives, that emerged from field surveys of the area, will be included at the end, along with comments on potential alignments that do not look promising.

El Monte Busway/Soto Street Alternative

This alternative would apply to transitway development only, as it would use part of the El Monte Busway/HOV lane complex. The alignment would begin at the south side of Union Station, using the existing El Monte Busway station platforms. This would provide a route for transitway buses over the Los Angeles River and past the USC Medical Center on the existing HOV lanes. Buses using the Soto Street transitway would be able to use the extant USC Medical Center Busway station. New ramps would be used to connect the El Monte Busway facility to Marengo which would provide access to Soto Street just to the east.

The El Monte Busway in this location has a through lane and shoulder lane in each direction, separated by a median barrier (left hand rule of the road for this part of the HOV lanes). Along the south aide of the Busway there is a 20' wide vegetated strip separating the HOV lanes from the adjacent freeway; taking together the HOV lanes and this additional strip, the R/W is at least 60' wide, which should be adequate for construction of two ramp lanes connecting the Busway to the west, with the surface street to the east. Note that this would not encroach on the double track Metrolink R/W just north of the El Monte Busway in this location.

From Marengo/Soto, a new transitway facility would be provided south along Soto to the Boyle Heights commercial center at E. Cesar Chavez and Soto, with a transit station having a north-south orientation. The Soto Street bridge over the 10 Freeway and El Monte Busway has seven lanes (including median turn lanes). South of the Bridge, and below Wabash, Soto Street has 6 lanes including parking on both sides of the street (5 lanes at intersections). The adjacent land use is residential.

The remainder of the route would be the same as described for the E. Cesar Chavez alternative described below, except that transitway bus operation only is applicable. The description of this section of the line follows:

The alignment would continue south along Soto Street between Cesar Chavez and First Street, proceeding down a rather steep hill (maximum gradient 7% at Michigan, and 5-6% thence to First). Here the roadway has four lanes plus some parking on both sides (total width equivalent to five wide lanes of six narrower lanes). Land use here is light commercial, with some apartment buildings. Removal of parking along this section of Soto may not pose a serious problem. As this is a major north-south arterial within the study area, consideration might be given to providing a single lane transit R/W in an uphill direction, and operating in mixed traffic in the downhill direction. This would leave two through traffic lanes in each direction, assuming parking is removed.

The alignment would continue east on First Street from Soto to Evergreen. First street in this section has four traffic lanes and two parking lanes. Parking is prohibited from 7 to 9 AM westbound and 4 to 6 PM eastbound. The speed limit here is 35 MPH (25 MPH in school zones). Provision would need to be made for off-street parking to compensate for removal of parking lanes along this segment. As First Street is rather close to parallel Cesar Chavez and Fourth Street, which appear to be more major arterials, it might be more feasible to take 26' or so of lane space for a transit R/W than would be the case for these other streets.

Continuing east along First Street between Evergreen and Lorena, the same number of lanes applies (four traffic lanes and two parking lanes). Evergreen Cemetery lies along the north side of the street, and very few cars are parked on that side. The south side of the street is residential, and cross streets intersect 1st Street only on the south side. Hence, it may be easier to take R/W (including the sidewalk next to the cemetery) to provide for a transit facility in this segment. A constraint is that there are two cemetery entrances on the north side of the street (plus one on Evergreen north of 1st St.). Access would have to be provided to the cemetery from at least one direction along 1st.

Nevertheless, there might be an opportunity to provide a fenced transit R/W with no cross traffic between Evergreen and Lorena, permitting the speed to be increased to 10 MPH higher than for parallel traffic lanes (assuming the California PUC regulations for LRT in this kind of application would apply to a transitway for buses as well).

The alignment would provide a station at 1st/Lorena, providing peripheral access to the commercial section of 1st Street which extends from Lorena to Gage. While not accessing stores on both sides of the street east of Indiana, it would provide access to the Mercado at Lorena and there would be potential for a park-and-ride lot on cleared land on the northeast corner of 1st and Lorena. With a transitway alternative, there would be opportunities to have some runs pull off the transitway and run in to access the commercial center, and either continue beyond it, or terminate there.

The alignment would continue south along Lorena, a less heavily-used arterial which has four traffic lanes and two lanes for parking with largely residential land use. There is some excess land along the east side of the street as the alignment approaches the Fourth Street bridge (Lorena is grade separated from 4th in this location), but the R/W is constricted under the bridge to a little over three lanes wide. It should be possible to operate in mixed traffic in this section; otherwise the bridge might be reconstructed to provide an additional bay underneath it. However immediately south of the bridge is a roadway connecting Lorena to 4th, which is the reason for the R/W constriction here. Farther south, Lorena widens to 7 lanes where it passes over the 60 Freeway.

The remainder of the route would follow Whittier Boulevard from Lorena east to Atlantic. East from Lorena, the R/W has four traffic lanes and two parking lanes and land use on both sides is generally light commercial. The R/W widens to seven lanes from Indiana to the 710 Freeway. The speed limit is 35 MPH east of Lorena, dropping to 30 MPH along the New Calvary Cemetery and 25 MPH at Eastern. Peak period parking restrictions apply in both directions.

The alignment continues under the 710 Freeway into East Los Angeles. Whittier Blvd. between Ford Blvd. and a few blocks west of Atlantic, is a major commercial center with numerous shops along both sides of the street, heavy pedestrian activity, and relatively heavy vehicular traffic. Transit stations would be provided at Arizona and at Atlantic. The latter is a major north-south arterial, with heavily commercial land use, and the commercial nature of Whittier Blvd. extends a considerable distance east of Atlantic. A former theatre building on the southwest corner of Whittier/Atlantic, set some distance back from the road, might provide a focal point for joint development in this location, and surrounding open land could provide for station parking.

Whittier Boulevard in East Los Angeles east of the 710 Freeway has four traffic lanes and two parking lanes. Removal of 26' of lane space for a transit facility (with additional lane space or other property needed for station platforms) would leave room for only 3-4 traffic lanes, and on-street parking would have to be replaced by off-street parking (which is already in evidence in a number of locations north and south of Whittier Blvd.). An option which might be applied in the case of this bus transitway alternative would be to end the facility west of the 710 Freeway and allow the transit vehicles to run through the center in mixed traffic, albeit subject to heavy congestion at certain periods.

E. Cesar Chavez Alternative

The E. Cesar Chavez alternative would begin with an alignment north along Alameda Street just west of LA Union Passenger Terminal (Union Station). Alameda Street is wide here, with a total of seven lanes (including median turn lanes). In addition, there are wide parking lots (pay parking for Union Station) along the east side of the street and it is assumed that there would be ample R/W in this location.

The alignment would turn east along Cesar Chavez, initially 7 lanes wide but narrowing to 5 lanes where it passes through a tunnel under the Union Station passenger rail loading platforms used by Metrolink and Amtrak. The street has a total of five lanes (plus sidewalks on both sides) here, remaining 5 lanes wide where it continues over the LA river and railroad yards on both sides, on a bridge structure.

It will be noted that Mission Road and Boyle Avenue diverge from Cesar Chavez east of the LA River, and as the northern-most arterial accessing the Boyle Heights area and adjacent communities, diversion of traffic lanes to other purposes might pose a problem. A transit facility would probably require 26' of R/W, leaving enough room for three traffic lanes along this segment. Addition of a transit station should one be desired near Mission Road, would take 8-14 feet of additional width, depending on configuration (two side platforms of a single center platform); however, right-of-way might be widened here to provide for this.

Cesar Chavez continues east over the 10 Freeway and passes by the White Memorial Medical Center, where the highway is 6-7 lanes wide depending upon location. This section is somewhat wider than other parts of Cesar Chavez and might more easily accommodate a median transit facility and station, than farther east. The speed limit here is 35 mph (25 mph school speed limit). The bridge over the 5 Freeway, at State Street, is seven lanes wide.

The next segment from the 5 Freeway to Soto passes through an important commercial section, with shops along both sides of the road. Traffic conditions appear to moderate here, the speed limit is 30 MPH, and there is a fair level of pedestrian activity. The street has four traffic lanes plus parking on both sides; there is no parking westbound from 7 to 9 AM, and no parking eastbound between 4 and 6 PM. Hence, the equivalent six lanes is provided. (This arrangement is changed to five wider lanes with a turn lane at a few intersections; however, no left turn lanes are provided at the important Soto Street intersection.)

If a 26' wide transit R/W were installed here, the street would be reduced to two or three lanes; and additional space would need to be taken at the presumed transit station at E. Cesar Chavez and Soto St. In addition to requiring some traffic on this rather major arterial (which continues onward to East Los Angeles) to be rerouted elsewhere, parking along both sides of the street would have to be replaced with off-street parking nearby.

The alignment would continue south along Soto Street between Cesar Chavez and First Street, proceeding down a rather steep hill (7% maximum grade at Michigan, Ave., and 5-6% from Michigan to First. Along this section of Soto, the roadway has four lanes plus some parking on both sides (total width equivalent to five wide lanes of six narrower lanes). Removal of parking along this section of Soto may not pose a serious problem. Land use is light commercial with some apartment buildings in this location. As this is a major north-south arterial within the study area, consideration might be given to providing a single lane/single track transit R/W in an uphill direction, and operating in mixed traffic (streetcar track in the case of LRT) in the downhill direction. This would leave two through traffic lanes in each direction, assuming parking is removed.

The alignment would continue east on First Street from Soto to Evergreen. First street in this section has four traffic lanes and two parking lanes. Parking is prohibited from 7 to 9

AM westbound and 4 to 6 PM eastbound. The speed limit here is 35 MPH (25 MPH in school zones). Provision would need to be made for off-street parking to compensate for removal of parking lanes along this segment. As First Street is rather close to parallel Cesar Chavez and Fourth Street, which appear to be more major arterials, it might be more feasible to take the required 26' or so for a transit R/W than would be the case for these other streets.

Continuing east along First Street between Evergreen and Lorena, the same number of lanes applies (four traffic lanes and two parking lanes). Evergreen Cemetery lies along the north side of the street, and very few cars are parked on that side. The south side of the street is residential, and cross streets intersect 1st Street only on the south side. Hence, it may be easier to take R/W (including the sidewalk next to the cemetery) to provide for a transit facility in this segment. A constraint is that there are two cemetery entrances on the north side of the street (plus one on Evergreen north of 1st St.). Access would have to be provided to the cemetery from at least one direction along 1st.

Nevertheless, there might be an opportunity to provide a fenced transit R/W with no cross traffic between Evergreen and Lorena, permitting the speed to be increased to 10 MPH higher than for parallel traffic lanes (per California PUC regulations for LRT; assume the same would apply to a transitway for buses).

The alignment would provide a station at 1st/Lorena, providing peripheral access to the commercial section of 1st Street which extends from Lorena to Gage. While not accessing stores on both sides of the street east of Indiana, it would provide access to the Mercado at Lorena and there would be potential for a park-and-ride lot on cleared land on the northeast corner of 1st and Lorena.

The alignment would continue south along Lorena, a less heavily-used arterial which has four traffic lanes and two lanes for parking with largely residential land use. There is some excess land along the east side of the street as the alignment approaches the Fourth Street bridge (Lorena is grade separated from 4th in this location), but the R/W is constricted under the bridge to a little over three lanes wide. It might be possible to operate in mixed traffic in this section; otherwise the bridge might be reconstructed to provide an additional bay underneath it. However immediately south of the bridge is a roadway connecting Lorena to 4th, which is the reason for the R/W constriction here. Farther south, Lorena widens to 7 lanes where it passes over the 60 Freeway.

The remainder of the route would follow Whittier Boulevard from Lorena east to Atlantic. East from Lorena, the R/W has four traffic lanes and two parking lanes and land use on both sides is generally light commercial. The R/W widens to seven lanes from Indiana to the 710 Freeway. The speed limit is 35 MPH east of Lorena, dropping to 30 MPH along the New Calvary Cemetery and 25 MPH at Eastern. Peak period parking restrictions apply in both directions.

The alignment continues under the 710 Freeway into East Los Angeles. Whittier Blvd. between Ford Blvd. and a few blocks west of Atlantic, is a major commercial center with numerous shops along both sides of the street, heavy pedestrian activity, and relatively heavy vehicular traffic. Transit stations would be provided at Arizona and at Atlantic. The latter is a major north-south arterial, with heavily commercial land use, and the commercial nature of Whittier Blvd. extends a considerable distance east of Atlantic. A former theatre building on the southwest corner of Whittier/Atlantic, set some distance back from the road, might provide a focal point for joint development in this location, and surrounding open land could provide for station parking.

Whittier Boulevard in East Los Angeles east of the 710 Freeway has four traffic lanes and two parking lanes. Removal of 26' of lane space for a transit facility (with additional lane space or other property needed for station platforms) would leave room for only 3-4 traffic lanes, and on-street parking would have to be replaced by off-street parking (which is already in evidence in a number of locations north and south of Whittier Blvd.). An option in the case of a bus transitway would be to end the facility west of the 710 Freeway and allow the transit vehicles to run through the center in mixed traffic, albeit subject to heavy congestion at certain periods.

First Street Alternative

The First Street alternative would begin at Union Station and proceed south along Alameda Street. Alameda Street is wide here, with a total of seven lanes. In addition, there are wide parking lots (pay parking for Union Station) along the east side of the street and it is assumed that there would be ample R/W in this location, providing room for a transit station. South of Union Station at Temple the street is about 6 lanes wide (the turn lane in the middle was formerly a railroad track). In addition, there appears to be an additional strip of land just east of the street which could help accommodate a transit facility in this alignment. Presumably there would be a Little Tokyo station at Temple St. or above 1st.

The line would run east along First Street from Alameda to the 1st Street Bridge. There is a strip of vacant land (fenced off from the street) along the north side of 1st for almost this entire section. This would allow either a side of road R/W for transit, or space to widen the street to accommodate a median R/W. Since the adjacent land use is industrial/ vacant, a higher operating speed would be permitted here than along typical arterial medians and gated crossings may be feasible (at Alameda and at Vignes). Care would have to be taken however to provide access to, and avoid noise impacts on, a Japanese temple at 1st/Vignes.

A First St. transit facility would operate over the 1st Street bridge. The bridge has four through lanes and a median lane which is vacant to the west, becoming a turn lane as the bridge approaches Mission Rd. The bridge might be converted to provide a 24'-26' transit R/W on one side, leaving space for two or three through lanes. As a fenced, separate R/W on one side of the bridge, the transit facility could be operated at a higher speed than the parallel roadway. (There are other options including one reserved transit lane and return flow in mixed traffic, but they would not permit as high a speed.) A gated crossing might be possible at the east end of the bridge, at Mission, to speed movement of transit vehicles.

First Street has four traffic lanes from Mission St. east, with two parking lanes (the lane arrangement changes to four through lanes and a turn lane at some intersections). Land use is low-income housing west of the 101 Freeway, and commercial from the 101 to Soto Street. The speed limit is 30 MPH along this section; there is a moderately steep hill near the 101 Freeway (gradient 4-5%). Removal of 26' of lane space for a transit facility would leave three lanes for highway traffic, with fewer lanes where transit stations are provided.

There would, however, be additional space for stations where triangular pieces of land occur adjacent to the north side of the street at Boyle, and (in the form of a small park) at Chicago Street, near Soto. A transit station in the former location would access White Medical Center (parts of which are very close to 1st Street) and a station in the latter place would access (presumably using Smart Shuttles) the commercial center of Boyle Heights at E. Cesar Chavez and Soto St. Parts of 1st Street might be converted to transit/ pedestrian mall adjacent to/between these stations.

The general concept for the use of 1st Street as a transit facility is that it lies between Cesar Chavez and Fourth Street which are more important, through arterials, such that First Street is partially redundant as an arterial highway, allowing it to be converted to transit use to access the Boyle Heights center.

The remainder of the route would be the same as for the E. Cesar Chavez Alternative, and is described as follows:

The alignment would continue east on First Street from Soto to Evergreen. First street in this section has four traffic lanes and two parking lanes. Parking is prohibited from 7 to 9 AM westbound and 4 to 6 PM eastbound. The speed limit here is 35 MPH (25 MPH in school zones). Provision would need to be made for off-street parking to compensate for removal of parking lanes along this segment. As First Street is rather close to parallel Cesar Chavez and Fourth Street, which appear to be more major arterials, it might be more feasible to take the required 26' or so for a transit R/W than would be the case for these other streets.

Continuing east along First Street between Evergreen and Lorena, the same number of lanes applies (four traffic lanes and two parking lanes). Evergreen Cemetery lies along the north side of the street, and very few cars are parked on that side. The south side of the street is residential, and cross streets intersect 1st Street only on the south side. Hence, it may be easier to take R/W (including the sidewalk next to the cemetery) to provide for a transit facility in this segment. A constraint is that there are two cemetery entrances on the north side of the street (plus one on Evergreen north of 1st St.). Access would have to be provided to the cemetery from at least one direction along 1st.

Nevertheless, there might be an opportunity to provide a fenced transit R/W with no cross traffic between Evergreen and Lorena, permitting the speed to be increased to 10 MPH higher than for parallel traffic lanes (per California PUC regulations for LRT; assume the same would apply to a transitway for buses).

The alignment would provide a station at 1st/Lorena, providing peripheral access to the commercial section of 1st Street which extends from Lorena to Gage. While not accessing stores on both sides of the street east of Indiana, it would provide access to the Mercado at Lorena and there would be potential for a park-and-ride lot on cleared land on the northeast corner of 1st and Lorena.

The alignment would continue south along Lorena, a less heavily-used arterial which has four traffic lanes and two lanes for parking with largely residential land use. There is some excess land along the east side of the street as the alignment approaches the Fourth Street bridge (Lorena is grade separated from 4th in this location), but the R/W is constricted under the bridge to a little over three lanes wide. It might be possible to operate in mixed traffic in this section; otherwise the bridge might be reconstructed to provide an additional bay underneath it. However immediately south of the bridge is a roadway connecting Lorena to 4th, which is the reason for the R/W constriction here. Farther south, Lorena widens to 7 lanes where it passes over the 60 Freeway.

The remainder of the route would follow Whittier Boulevard from Lorena east to Atlantic. East from Lorena, the R/W has four traffic lanes and two parking lanes and land use on both sides is generally light commercial. The R/W widens to seven lanes from Indiana to the 710 Freeway. The speed limit is 35 MPH east of Lorena, dropping to 30 MPH along the New Calvary Cemetery and 25 MPH at Eastern. Peak period parking restrictions apply in both directions.

The alignment continues under the 710 Freeway into East Los Angeles. Whittier Blvd. between Ford Blvd. and a few blocks west of Atlantic, is a major commercial center with numerous shops along both sides of the street, heavy pedestrian activity, and relatively heavy vehicular traffic. Transit stations would be provided at Arizona and at Atlantic. The latter is a major north-south arterial, with heavily commercial land use, and the commercial nature of Whittier Blvd. extends a considerable distance east of Atlantic. A former theatre building on the southwest corner of Whittier/Atlantic, set some distance back from the road, might provide a focal point for joint development in this location, and surrounding open land could provide for station parking.

Whittier Boulevard in East Los Angeles east of the 710 Freeway has four traffic lanes and two parking lanes. Removal of 26' of lane space for a transit facility (with additional lane space or other property needed for station platforms) would leave room for only 3-4 traffic lanes, and on-street parking would have to be replaced by off-street parking (which is already in evidence in a number of locations north and south of Whittier Blvd.). An option in the case of a bus transitway would be to end the facility west of the 710 Freeway and allow the transit vehicles to run through the center in mixed traffic, albeit subject to heavy congestion at certain periods.

Fourth Street Alternative

The Fourth Street alternative would begin at Union Station and proceed south along Alameda Street. Alameda Street is wide here, with a total of 7 lanes. In addition, there are wide parking lots (pay parking for Union Station) along the east side of the street and it is assumed that there would be ample R/W in this location, providing room for a transit station. South of Union Station the street is about 6 lanes wide (the turn lane in the middle was formerly a railroad track). In addition, there appears to be an additional strip of land just east of the street which could help accommodate a transit facility in this alignment.

At Second St., there are parking lots on both sides of Alameda which would provide some additional R/W in this location. At Third St., Alameda is six or seven lanes wide; a small bank building on the east side of the street in this location might provide a R/W constraint. At Fourth, Alameda is 6-7 lanes wide, with some unused land available along the east side of the street. Presumably there would be a Little Tokyo station, or two stations, along Alameda from Temple to 2nd Street.

Access to the historic Fourth Street Bridge would be via Third Street, which is fairly wide, or a combination (one-way couplet) of 3rd and 4th Streets—which would use one lane each from the two streets accessing the bridge. In this regard, 3rd Street east of Alameda has four lanes plus parking on both sides (equal to 6 narrower lanes), while 4th Street has two eastbound and one westbound lane (total R/W probably equal to 3 ½ lanes). The bridge itself has five through lanes: two per direction, and a fifth, reversible lane in the center of the bridge. As a transit facility, 24' of lane width would be removed from mixed flow use, and the remainder of the bridge would be available for general traffic.

From the point where 4th Street goes under the 5 Freeway, to Soto, the street has four traffic lanes and two parking lanes (five full lanes at the I-5), and parking restrictions apply during peak periods. The speed limit here is 25-30 MPH. Fourth Street retains the same six lanes from Soto to just beyond Lorena, where it becomes Third Street. There is a grade separation where 4th passes over Lorena. The street is wider along the Third Street segment east to Arizona (seven lanes wide including median turn lanes). Practically the entire length of this alignment is in light commercial use, the exception being where it borders the New Calvary Cemetery (the East Los Angeles Civic Center, court facilities, and an athletic center on 3rd near Mednick/Arizona). As a transit facility, the eastern section of this alignment (along Third) might be relatively easy to develop, as removal of a 26' strip from the middle of the highway would still leave space for 4 or 5 lanes.

On the other hand, the alignment is distant from the Boyle Heights center, and does not closely access the 1st Street commercial center between Lorena and Gage. For this reason it may be less attractive for a major transit facility than some of the other alternatives discussed here.

Access to East Los Angeles would be via Arizona from Third to Whittier Blvd. This section of Arizona, while low density residential, is quite wide, with four through lanes and two parking lanes (no parking restrictions), and a landscaped median at least as wide as a full traffic lane. Hence, this roadway is the equivalent of seven lanes wide, and would provide ample room for a new transit facility. Speed limit is 35 mph (25 mph school speed limit at the north end near 3rd). Upon approaching Whittier Blvd., the Arizona/Whittier station facility would probably be placed on Arizona, where there is somewhat more space, rather than on Whittier.

The remainder of the alignment for this alternative along Whittier Blvd. would be the same as described above for the E. Cesar Chavez and First Street alternatives, and this description is largely repeated below:

Whittier Boulevard from Arizona to Atlantic has four traffic lanes and two parking lanes. The speed limit is 25 MPH and peak period parking restrictions apply in both directions. Whittier Blvd. between Ford Blvd. and a few blocks west of Atlantic, is a major commercial center with numerous shops along both sides of the street, heavy pedestrian activity, and relatively heavy vehicular traffic. Transit stations would be provided at Arizona and at Atlantic. The latter is a major north-south arterial, with heavily commercial land use, and the commercial nature of Whittier Blvd. extends a considerable distance east of Atlantic. A former theatre building on the southwest corner of Whittier/Atlantic, set some distance back from the road, might provide a focal point for joint development in this location, and surrounding open land could provide for station parking.

Whittier Boulevard in East Los Angeles has four traffic lanes and two parking lanes. Removal of 26' of lane space for a transit facility (with additional lane space or other property needed for station platforms) would leave room for only 3-4 traffic lanes, and on-street parking would have to be replaced by off-street parking (which is already in evidence in a number of locations north and south of Whittier Blvd.). An option in the case of a bus transitway would be to end the facility west of the 710 Freeway and allow the transit vehicles to run through the center in mixed traffic, albeit subject to heavy congestion at certain periods.

Whittier Boulevard Alternative

The Whittier Boulevard alternative would begin at Union Station and proceed south along Alameda Street. Alameda Street is wide here, with a total of 7 lanes. In addition, there are wide parking lots (pay parking for Union Station) along the east side of the street and it is assumed that there would be ample R/W in this location, providing room for a transit station. South of Union Station the street is about 6 lanes wide (the turn lane in the middle was formerly a railroad track). In addition, there appears to be an additional strip of land just east of the street which could help accommodate a transit facility in this alignment.

At Second St., there are parking lots on both sides of Alameda which would provide some additional R/W in this location. At Third St., Alameda is six or seven lanes wide; a small bank building on the east side of the street in this location might provide a R/W constraint. At Fourth, Alameda is 6-7 lanes wide, with some unused land available along the east side of the street. Presumably there would be a Little Tokyo station, or two stations, along Alameda from Temple to 2nd Street.

From 4th street to 6th Street Alameda Street is particularly wide, with 6 or 7 lanes comprising the street itself (including the median turn lane with a railroad track in pavement), plus a former railroad siding along the west side of the highway. It should be easy to provide a transit facility in a median or side of road location along this part of Alameda. Whittier Blvd. from Alameda to the LA River bridge varies from 4 to 7 lanes wide. The Whittier Blvd. bridge itself is four lanes wide, so removing 24' of lane space for a transit facility would leave less space for highway lanes than with some of the other alternatives.

From the east end of the bridge to Lorena, the street is four lanes wide with two parking lanes (parking restrictions apply; at some intersections it is restriped for five lanes including median turn lanes). The land use is largely light commercial, with remote access to the Boyle Heights center and to commercial area along 1st from Lorena to Gage. As compared to these activity centers, while Whittier Boulevard has considerable commercial frontage it is in the form of strip development.

From Lorena to East Los Angeles, the description of the route will be the same as for the E. Cesar Chavez and First Street alternatives. This is repeated below:

The remainder of the route would follow Whittier Boulevard from Lorena east to Atlantic. East from Lorena, the R/W has four traffic lanes and two parking lanes and land use on both sides is generally light commercial. The R/W widens to seven lanes from Indiana to the 710 Freeway. The speed limit is 35 MPH east of Lorena, dropping to 30 MPH along the New Calvary Cemetery and 25 MPH at Eastern. Peak period parking restrictions apply in both directions.

The alignment continues under the 710 Freeway into East Los Angeles. Whittier Blvd. between Ford Blvd. and a few blocks west of Atlantic, is a major commercial center with numerous shops along both sides of the street, heavy pedestrian activity, and relatively heavy vehicular traffic. Transit stations would be provided at Arizona and at Atlantic. The latter is a major north-south arterial, with heavily commercial land use, and the commercial nature of Whittier Blvd. extends a considerable distance east of Atlantic. A former theatre building on the southwest corner of Whittier/Atlantic, set some distance back from the road, might provide a focal point for joint development in this location, and surrounding open land could provide for station parking.

Whittier Boulevard in East Los Angeles east of the 710 Freeway has four traffic lanes and two parking lanes. Removal of 26' of lane space for a transit facility (with additional lane space or other property needed for station platforms) would leave room for only 3-4 traffic lanes, and on-street parking would have to be replaced by off-street parking (which is already in evidence in a number of locations north and south of Whittier Blvd.). An option in the case of a bus transitway would be to end the facility west of the 710 Freeway and allow the transit vehicles to run through the center in mixed traffic, albeit subject to heavy congestion at certain periods.

Other Alternatives

Various other alternatives might be possible, and some have been suggested in the course of field trips to the study area. A variation of the First Street alternative was considered, using a one-way couplet combining First and Michigan to bring the line somewhat closer to Cesar Chavez and reduce the walk up the Soto Street hill between First and Cesar Chavez for at least some patrons. However, Michigan is highly residential and barring major redevelopment plans for this area this concept does not look very promising.

Another concept is to combine the First Street alternative with the segment of Cesar Chavez between Soto and Lorena. This would entail operation east along First to Soto, north along the hilly part of Soto Street to Cesar Chavez, and thence east along Cesar Chavez. The intent would be, again, to provide better access to Cesar Chavez from a 1st street line.

This would have the advantage of running along the north side of Evergreen Cemetery, which does not have any entry gates on Cesar Chavez. In this case, part of the transit R/W would be provided by the dirt strip and sidewalk on the south side of Cesar Chavez, next to the nearly unused parking lane. A side-of-road R/W section here could be fenced off and allow a higher speed to be attained. The line would return to First Street, or remain on Lorena past first street. A problem with this in the case of LRT--at least for the six-axle cars currently operated--would be a sharp curve required to connect Cesar Chavez and Lorena, to avoid encroaching on the LA County Cemetery in this location.

Another concept is to continue the transit line east from Lorena along First Street to more directly serve the commercial center that extends east to Gage. This might entail converting this part of First into a pedestrian/transit mall. In the event it was desired to make this the trunk line to East Los Angeles, and not just a spur or short turn to serve this commercial area, the transit facility would be extended east along First Street to Eastern or Ford (1st being 6 lanes wide in this section), thence to connect with east Third Street and an Arizona Ave. approach to East Los Angeles as per the Fourth Street alternative described above.

While Eastern is fairly wide (5-6 lanes) and has a 40 MPH speed limit, higher than for most of the arterials in the study area, Ford provides two separate and relatively unused bays (each with room for three lanes, though striped for two) under the 60/710 Freeway four-level interchange. This concept in this case would be to convert half of the separated roadway to transit private R/W and operate at whatever speed is feasible along this short segment without regard to road speed limits.

Still another idea is to use the Arizona alignment to cross Whittier Blvd. in East Los Angeles rather than turning onto Whittier, and extend the line down to Olympic Blvd. Olympic was considered for LRT in an earlier LACTC study, because it is seven lanes wide and less congested than Whittier Blvd., making it easier to remove lanes for a transit R/W. This would move the Whittier/Atlantic transit station to Olympic/Atlantic, which would presumably then become a heavy bus to transitway or rail transfer station.

Just east of Atlantic on the south side of Whittier Blvd. is the Commerce Center, a major and heavily patronized shopping plaza with three anchor stores (K-Mart, Lucky, Target) and numerous other shops In the event of an Olympic Blvd. alignment being considered, it could be extended up Goodrich Blvd. which is five lanes wide plus parking and a wide lawn on the east side of the street--probably running along the east side of this road for that reason--and into the shopping center, possibly on a short aerial structure over the wide parking lots.

There are other options for connecting parallel or intersecting alignments together, such as using short tunnel segments (e.g. between First and Cesar Chavez west of Soto, 1st St. and 3rd Street, or 3rd Street near Gage, or 3rd with Arizona to avoid a very sharp turn) but such construction could prove to be very expensive or difficult to engineer, as could aerial structures following the 60 and 710 Freeways to connect 3rd Street with East Los Angeles.

Note that some of these route variations, such as 1st Street combined with Eastern or Ford, Third, and Arizona, or Olympic Blvd., would maximize the availability of right-of-way and reduce the amount of lane space taken from most heavily traveled arterials or from the most congested centers (e.g. Whittier Blvd. and East Los Angeles). The same philosophy is used in the Soto Street alternative which crosses Cesar Chavez but does not remove lane capacity from this heavily used arterial in the Boyle Heights center.

APPLICATION OF TECHNOLOGIES TO THE STUDY AREA

Rapid transit

In our study area, the Red Line as previously planned would be largely or completely underground, using cut-and-cover subway or bored tunnels, depending upon location, with the option of surface operation along the Metro Rail yards and aerial structure above the LA River. Trains would be 4 to 6 cars in length during peak periods, operating at a speed up to 55 MPH normally on longer stretches of tangent track (with the capability of running faster at up to 70 MPH or so to make up time as required to recover from any service disruption). However, the Red Line as planned through East LA would have a number of curved segments, between E. Cesar Chavez and Whittier/Rowan and operation would probably be slower than 55 MPH in many places—but still considerably faster than surface buses on streets overhead.

Light Rail Transit

R/W considerations and allowed speed

In the East Los Angeles study area, practically all of the right-of-way that would be usable for light rail would come from arterial streets, either by taking lanes to provide a median or side-of-road R/W, or in some cases by converting entire sections of minor arterials into transit malls which could be shared with local buses and Smart Shuttles. Considering the residential nature of many of the street segments, and the commercial nature of others (with a high level of pedestrian activity in some cases), either ordinary traffic signals or flashing lights would be used. The maximum speed in most locations would be 35 MPH: speed limits in the area range from 30 to 40 MPH; with a few commercial sections having lower speeds).

Several double tracked sections of the existing Blue Line operate in median arterial rights-of-way, principally along Washington Blvd. in Los Angeles and Long Beach Blvd. in Long Beach. These are at-grade installations with signal preemption and signal priority. The Washington Blvd. R/W is 26', all of which is paved; this which includes over six feet between the two sets of track, about 5' for each track (standard gauge is 4' 81/2" but the width of the rails themselves has to be added to this), about 3' or R/W outside on each side of this including a low curb on the outside, and on the adjacent roadway, a narrow 2' buffer zone painted off between traffic lanes and the curbing. This kind of application may be most suitable for creating a new transit R/W in arterials that are presently equivalent to seven or more lanes wide. (A 70' arterial with 26' removed would have space left over for four 11' traffic lanes.)

Long Beach Blvd. in Long Beach has a wider median including a broad landscaped area between the tracks. However, in a number of places the painted-off buffer between the curbing and the parallel traffic lanes is not present, and at Long Beach just south of Willow St., where there is no landscaped median, the double track LRT R/W is only about 21'10" wide (or about 22' wide). This includes 7' between the tracks, 5' each for the tracks, and 3' 1" outside of the tracks including the low curbing used. Some of the single track arterial R/W in Long Beach also have a 9" painted stripe just outside of the LRT curbing, which if done on a narrower double track median would make it 23-24' wide.

This kind of application may be necessary for developing new R/W along narrower 6 lane arterials. A 60' arterial with a 24' R/W removed would have space remaining for three 12' lanes (or, for instance, two 11' lanes and one 14' lane). Hence, the remaining roadway might become one-way with the transit R/W on the other side of the street, or an offset median transit R/W could be installed, leaving two through traffic lanes in one direction and one local access lane in the other direction (wide enough to provide for turns into alleys or driveways, provide for a narrow loading zone, etc.).

Removal of on-street parking would be necessary in most cases, presumably replaced by off-street parking. Transit malls, with only LRT, bus, shuttles, and pedestrian access would be possible in some commercial sections, especially where there is off-street parking from side streets.

In the case of a side-of-road transit line, the R/W would be narrower than the 26' median example given above, as the buffer zone would not be needed on the curb side--instead, railings would be used to discourage pedestrian intrusion on the line. This would be most feasible in places where there are no driveways on one side of the street, e.g. next to cemeteries which do not have entry gates on that particular street (e.g. E. Cesar Chavez between Evergreen and Lorena). On the other hand, if there is some extra space available, it may be desired to provide a landscaped strip on the curb side.

Combinations of single track private R/W with a return track in the street, and other such unusual combination treatments may be feasible, but careful attention would have to be given to likely traffic conditions, turning movements, and such that would interfere with any track placed in mixed traffic lanes before this could be recommended. (However, it is noted that a connector along Soto Street between Cesar Chavez and 1st Street, for a route that would utilize either 1st Street west of Soto and Cesar Chavez east of there, or vice-versa, might utilize a single, 12' LRT R/W in the uphill direction, and provide the return movement with track in mixed flow in the downhill direction.)

A device that can speed up LRT service above that of surface traffic, per California Public Utilities Commission (PUC) regulations, is to fence the R/W between cross streets, permitting a speed 10 MPH higher than that of parallel traffic on that segment. In the study area, this might be practical for a median R/W of side R/W next to a cemetery. In the case of a cemetery with entry gates on the same street, so that a wide access lane would be provided on that side, an offset LRT median with fencing would probably be about 31' wide, leaving (per PUC regulations) 18" of clearance on one side of the R/W inside of the fence, a walkway 30" wide on the other side, and 6" on each side to accommodate fencing. (Two feet of clearance on the outside of the fence would allow

Curve radius should not be a problem with the 6-axle cars if it is accepted that where it is necessary to curve the line to connect two 60' arterial alignments that intersect at a right angle, in a few locations it may be necessary to take a corner property, depending upon the exact location of the transit R/W (side or median, etc.). Such property takes might be necessary anyway to provide additional room for transit stations, off street parking, or space for park-and-ride. (If sharper-turning 4-axle or 8-axle cars were used, this would be less of a consideration.)

Gradients can pose a problem for light rail, depending upon body configuration. Six-axle LRVs with only four of the six axles powered (under the ends of the car) generally have a maximum allowable gradient of 7-8% (depending on how much of the car weight is loaded onto the powered trucks). Cars with all axles powered are believed to easily be able to go up 10% gradients (4-axle PCC cars on Pittsburgh's Fineview line went up a 13% grade in snow, albeit dropping considerable sand to accomplish that feat). Some years ago Freiberg in Germany purchased 8-axle articulated cars with all axles motored, because of steep gradients on its light rail trunk line. Six-axle cars with all axles powered would probably do almost as well. If necessary, equipment of this sort could be utilized on hilly lines in Los Angeles.

In the study area, the steepest gradients encountered in most places are on the order of 5%, which would be possible for Blue Line type equipment. However, the ruling gradient on Soto Street, just below Cesar Chavez at Michigan, is 7%. While this would be no problem for articulated cars with all axles motored, it could be on the borderline of acceptability for current equipment. If extant Blue Line type equipment were used on a route going up this hill, an option might be to slightly reduce the gradient along this short section of street, perhaps only for any uphill, reserved transit R/W.

(The downhill direction is less of a problem, as LRVs have three sets of brake—dynamic brakes using the motors, friction brakes applied to each axle, and magnetic track brakes on each truck—making it very unlikely that a train would be unable to stop on a streetcar track with a 7% gradient.)

<u>Transitways</u>

R/W considerations and allowed speed

In the East Los Angeles study area, practically all of the right-of-way that would be usable for a bus transitway would come from arterial streets, either by taking lanes to provide a median or side-of-road R/W, or in some cases by converting entire sections of minor arterials into transit malls which could be shared by limited stop transitway buses, local buses and Smart Shuttles. As with the LRT alternative, either ordinary traffic signals or flashing lights would be used. The maximum speed in most locations would be 35 MPH: speed limits in the area range from 30 to 40 MPH; with a few commercial sections having lower speeds).

Right-of-way width, at least for standard 35 MPH sections, would probably be very similar to that described above for LRT. As noted, the double tracked sections of the existing Blue Line operate in median arterial rights-of-way, principally along Washington Blvd. in Los Angeles and Long Beach Blvd. in Long Beach range in width from about 22' to 26' wide (the wider R/W having additional adjacent mixed flow lane space painted off as a buffer zone). These are at-grade installations with signal preemption and signal priority.

For a bus transitway, it would be preferable to use two 12' lanes, with low curbing on either side of the R/W. This would probably require a minimum of 24'. Where space allows, an additional 2' of buffer could be provided on either side, so that the total R/W width in this case would become 26'. In especially constricted places, narrower 10' or 11' lanes might be used, land the buffer narrowed. In such cases the transitway R/W could be about 22' wide.

As with LRT, a 70' roadway with 26' of R/W removed would have space left over for four 11' traffic lanes. A narrower, 60' arterial with a 24' R/W removed would have space remaining for three 12' lanes (or, for instance, two 11' lanes and one 14' lane). Hence, the remaining roadway might become one-way with the transitway on the other side of the street, or an offset median transitway could be installed, leaving two through traffic lanes in one direction and one local access lane in the other direction (wide enough to provide for turns into alleys or driveways, provide for a narrow loading zone, etc.).

Removal of on-street parking would be necessary in most cases, presumably replaced by off-street parking. Transit malls, with only buses, shuttles, and pedestrian access would be possible in some commercial sections, especially where there is off-street parking from side streets.

In the case of a side-of-road transitway, the R/W could be narrower than the 26' median example given, as the buffer zone would not be needed on the curb side--instead, railings would be used to discourage pedestrian intrusion on the line. This would be most feasible in places where there are no driveways on one side of the street, e.g. next to cemeteries which do not have entry gates on that particular street (e.g. E. Cesar Chavez between Evergreen and Lorena). On the other hand, if there is some extra space available, it may be desired to provide a landscaped strip on the curb side.

Combinations of single lane reserved transitway with a return track in the street, and other such unusual combination treatments may be feasible, but careful attention would have to be given to likely traffic conditions, turning movements, and such that would interfere with any track placed in mixed traffic lanes before this could be recommended. (However, it is noted that a connector along Soto Street between Cesar Chavez and 1st Street, for a route that would utilize either 1st Street west of Soto and Cesar Chavez east of there, or vice-versa, might utilize a single 13' transitway in the uphill direction, and provide the return movement with track in mixed flow in the downhill direction.)

A device cited above that can allow LRT speeds to be increased relative to those for adjacent mixed flow traffic, per PUC regulations, could also be adopted in transitway development. This is to fence the R/W between cross streets, permitting a speed 10 MPH higher than that of parallel traffic on that segment. In the study area, this might be practical for a median R/W of side R/W next to a cemetery. In the case of a cemetery with entry gates on the same street, so that a wide access lane would be provided on that side, an offset transitway median with fencing would probably be about 31' wide, including (per the PUC LRT regulations) 18" of clearance on one side of the R/W inside of the fence, a walkway 30" wide on the other side, and 6" on each side to accommodate fencing. (Two feet of clearance on the outside of the fence would allow autos in the adjacent lane to open their doors in the event of a breakdown; this is included in the basic 26' R/W upon which this example is based.)

An application of this kind would probably require some sidewalk narrowing/removal of a narrow vegetated space next to the sidewalk. Assuming 2' of additional space is added to the total street R/W, for a 60' wide street (now widened to 62'), this would leave space for two 10' lanes and a 12' lane on the cemetery side (the 2' buffer included in the transit corridor allocation would facilitate turns of wide vehicles on that side).

Stations of course would require additional lanes to be taken, or other property purchased adjacent to the R/W. Normally for buses, low level, side platforms are used as this technology is normally employed with curbside loading on streets. For a median bus transitway, it is assumed that the platforms would be 6" above the street level, with additional curbing and railings to protect bus waiting bus riders from being hit by cars in mixed flow lanes. These bus station platforms might be either on opposite sides of a major intersection, or along the same block but staggered; with the option of having the transitway gently curve from one side of the R/W to the other to accommodate the side platforms.

Platforms might range from as wide as the 12 ½' wide platforms used on the Long Beach light rail line in downtown Long Beach, to as narrow as 8' wide or so might be considered. With a 22' wide transitway, this would still leave room for three 10' lanes along a 60' roadway. In the event an entire roadway is converted into a transit mall, of course, it would be considerably easier to accommodate station platforms in virtually any location, or to utilize street-level loading.

Multiple loading locations, allowing buses that have completed loading to pull around those that are just pulling into their stop, could be accommodated in transit mall situations. Otherwise, providing additional bypass lanes along arterial transitway alignments would be difficult. Probably this would work only with the stops staggered, e.g. on opposite sides of an intersection. Assuming a 12' bypass lane to leave allow the buses to maneuver, a 60' arterial with a 22' wide transitway plus bypass lane and 8' station platform would leave with a bypass lane at one of these station platforms would have only 18' of lane space left for surface traffic. This suggests narrowing sidewalks to provide several more feet, so that two lanes of traffic, one in each direction, could be accommodated.

In the event of breakdowns on the transitway, it will be noted that there would not normally be enough space for a "dead" bus to be parked along the side of the facility. Probably in the event of a breakdown on a transitway lane, service would be maintained with buses using the transitway in the peak direction, and the return flow of buses using adjacent mixed flow lanes. Of course, a tow truck would eventually be able to move the broken-down vehicle off the transitway lanes and onto the side of the road so that service could be restored soon.

Curves, gradients, and maintenance facilities

No special provision is likely to be needed to accommodate turning movements for 40' transit buses, except as noted above where bypass lanes may be provided at station stops. 60' articulated buses in tractor configuration (engine under the floor driving the second axle) might require extra space if rear axle steering is not used (i.e. the bus is driven like a short tractor-trailer truck). Likewise, if pusher articulated buses are used (rear axle powered) similar provisions might be needed. 60' articulated buses in tractor configuration with rear end steering can turn much sharper corners than these other types. In the event 3-section, 4-axle articulated buses were desired, the geometrics of turning movements might require considerably more space.

It is assumed that the normal 5% gradients, and even the 7% maximum grade cited on the Soto Street hill below Cesar Chavez would pose no problem for 40' buses or 60' articulated units. While electric trolley buses can ascend such gradients more rapidly, conventional ICE propelled buses currently operate service on these hills successfully. Longer, 3-section articulated buses if desired to increase vehicle capacity might have difficulty with gradients however. These types of buses are not operated in this country. It is possible that a 3-section articulated unit with two engines, second and third axles powered, and rear end steering might need to be developed for service on some of the transitway alignments considered here.

There are a number of MTA shops assigned to several operating divisions that might be used to maintain the vehicles. There would, of course, be no special problem in accessing maintenance facilities over the street system; however, any facility used for articulated or other specialized vehicles would have to be equipped to handle them.

RUN TIME AND OPERATIONAL CONSIDERATIONS FOR THE TRANSIT CORRIDOR ALTERNATIVES

Run Time for Alternatives

Estimates were made of the time it takes to run from Whittier and Arizona to Union Station on the five corridor alternatives. Run times for light rail were developed for the four alternatives which have light rail as a technology option: E. Cesar Chavez, 1st Street, 4th Street, and Whittier Blvd.; and for transitway bus service for three of the alternatives: El Monte Busway/Soto, for which bus is the only technology option, and 1st Street and Whittier Blvd., to provide several other examples.

The methodology was to use a critical time and distance method, i.e. to compute the time to accelerate to the maximum allowable speed for a given segment plus the time to brake from that speed to zero (the sum of these times is critical time), and calculate the time to run at the maximum allowable speed for the distance that excludes the critical distance (i.e. critical distance is acceleration + braking distance, so the time run at the maximum speed for the segment is based on segment distance, minus critical distance). A 20 second station dwell was applied to all but the last station.

The Blue Line equipment was assumed to be typical for light rail; this has a maximum acceleration rate which is set at 3 MPH/S for comfort, applicable up to 30 MPH (straight line acceleration) and a declining acceleration rate above that (cut off at 55 MPH, the maximum speed operated on the present lines). Braking rate was assumed to be 2.5 MPH/S; the service braking rate is 3 MPH/S, but there is a tendency to ease off on braking to position the train correctly at the station platform. This braking rate assumption may be conservative, as practiced train operators can probably spot the train correctly, and overshooting can be avoided by applying the emergency (track) brakes.

For buses, a Flexible Metro bus was used as the standard; this is a type extensively used in El Monte Busway operation and is also widely used in street runs. For the bus, the rate of acceleration is of course greatest on starting and declines steadily as the vehicle goes through all four gears. Bus acceleration rate is lower than for light rail in middle speed ranges; unlike LRT, there is no governor on the rate of acceleration. Braking rate was assumed to be higher than for LRT at 3.5 MPH/S, not because it is the braking is intrinsically better, but because again braking rate is not electronically governed. In practice, on the street, bus drivers often have to brake at a very sharp rate to avoid other vehicles; the 3.5 MPH/S figure assumes an average of braking at rates that are at least 2.5 MPH/S and as high as 4.5 MPH/S.

As with LRT, the critical time and distance method was used to calculate time between stations, and a 20 second dwell time was used.

Additional adjustments were also made. Based on observations of Blue Line operations along Washington Blvd., a 35 MPH arterial median with speed and operational characteristics that would probably be similar for LRT or transitway operation in East Los Angeles, it was determined that time between stops computed strictly using the critical time and distance method would slightly underestimate actual time, so a figure of 1.15 times computed time was applied.

The Washington Blvd. and Flower St. alignments of the Blue Line have an extensive application of traffic signal preemption and priority control, favoring the light rail line. There are some cross-streets along Washington which are apparently always preempted by transit, and others at which transit has priority to a greater or lesser degree. At some streets between stations, the Blue Line trains come to a complete stop, which may be momentary or last a few seconds; there are other streets adjacent to stations where the stops are longer or where the trains run through at a rate of 20 MPH or so, lower than the speed limit for the section. This operation, and the run along Long Beach Blvd. in Long Beach, would provide a useful study for future planning work on transit signal priority and signal preemption in East Los Angeles. However, in the course of this brief study, it was not however possible to investigate the Blue Line operation in any detail.

For purposes of estimating run time for the East LA study corridors, it was assumed that the light rail or transitway vehicles would absolutely preempt lights at certain cross streets, especially those with greater connectivity to other neighborhoods; and that other streets would be closed off at the transitway, probably with fencing between tracks or lanes. At these controlled streets, only a right turn off the main thoroughfare parallel to the transitway, or onto the same from the side street, would be allowed.

At major arterials and other roadways with major connectivity to the regional transportation system, it was assumed that there would be signal priority for transit. This includes arterials close to transitway/light rail stations, certain other major arterials, streets leading to freeway ramps, and freeway ramps themselves where they connect with the arterial used by the transitway. For very simple estimating purposes, it was assumed that in a "worst case" on the average there would be a 20 second delay to trains/buses near transit stations, involving either slow running or a second stop before or after the intersection (depending on which side the station is on, near side or far side).

At other intersections between stations, it was assumed that the vehicles would come to a complete stop and start up again (35 MPH to zero to 35 MPH), with a 10 second wait in the middle; and that this would occur 50% of the time. Based on Blue Line car performance, this would mean again an approximately 20 second delay. These delays were summed for segments and for line alternatives, and provide an estimate of the slowest operating speed likely for the corridor. Zero delay of this kind would provide an estimate of the best operating speed likely to occur.

The following indicates the characteristics of the different alternatives. This information will be presented first for bus transitway alternatives; next for light rail alternatives; and next for both light rail and bus for the two alternatives for which both have been provided. Average speeds are provided with additional delay at crossings, and without such delay:

Mode	Alternative	Stops (no.)	Length (mi.)	Run time (min.)	Delay (min.)	Av. Speed (MPH)
Bus	El Monte Busway/Soto	11	7.63	21.7	-	21.06
				"	5	17.16
Bus	1st Street	11	6.73	19.7	-	20.52
				"	5.9	15.76
Bus	Whittier Blvd.	11	6.44	19.3	-	20
				"	5.6	15.5
LRT	E. Cesar Chavez	11	6.77	20.8	-	19.53
				"	5.9	15.2
LRT	1st Street	11	6.73	20.8	-	19.39
				"	5.9	15.1
LRT	4th Street	13	6.84	20.3	-	20.25
				"	6.3	15.5
LRT	Whittier Blvd.	11	6.44	18.5	-	20.9
				"	5.6	16.03
Bus	1st Street	11	6.73	19.7	-	20.52
				"	5.9	15.76
LRT	1st Street	11	6.73	20.8	-	19.39
				"	5.9	15.1
Bus	Whittier Blvd.	11	6.44	19.3	-	20
				"	5.6	15.5
LRT	Whittier Blvd.	11	6.44	18.5	-	20.9
				"	5.6	16.03

The above indicates that average speeds for these transit corridors range from 19 to 21 MPH without any traffic delay, and with delay, from 15 to 16 MPH. This suggests that efforts should be made to provide as much priority to transit as is reasonable given the requirements of other traffic and the need to maintain traffic flows on the arterial grid.

Run times range from 18 to 22 minutes without delay, indicating there is not a great deal of difference between the alternatives. (The delays used in these computations ranging from 5 to 6 minutes.) Of the bus transitway alternatives for which run time was computed, the El Monte Busway/Soto St. alternative has the highest average speed. There is relatively little difference between rail and bus alternatives in terms of average speed (not surprising since the typical segment maximum speed is 35 MPH). The bus speed was slightly higher for the 1st Street alternative, while the LRT speed was slightly higher for the Whittier Blvd. alternative. However, differences in performance this small should probably be considered insignificant.

Operational considerations

Stopping schedules

The above, however, considers only run time for a transitway local operation, with every train or bus stopping at every station. (Note that compared to local buses, this transitway service would really amount to a limited stop operation, equivalent to limited stop bus services that complement locals on major arterials such as Wilshire Blvd. and 3rd Street west of downtown LA). The evaluation does not looking at more complicated stopping schedules. Express bus runs on the transit corridor could reduce run time somewhat, and express light rail trains could also be run. However, there is scant space to provide bypass lanes or tracks parallel to transit stations along any of the transitway/rail alignments.

In the case of a transitway operation, this would leave the option of running around stopped buses in mixed flow lanes, or even, where there is considerable directionality on surface streets, operating the local and express buses on the transitway and diverting the return movement to parallel mixed flow lanes. This suggests that in most locations, whether bus transitway or light rail is considered, the most feasible way to increase speeds would be to go to skip-stop service. It is beyond the scope of this study to evaluate possible operating patterns of this kind, however.

Impacts on cross traffic

Another factor that has to be taken into account in evaluating actual run times for rail and transitway vehicles on the East Los Angeles transit corridor, is the impact on cross streets, i.e. how many streets could actually be preempted by the corridor transit line; and how much signal priority could be given, how often on streets where the transit line does not have absolute preemption? The only real difference between modes in this case relates to length of the operating unit (bus or train) and the resulting frequency of passage (less frequent for vehicles coupled in train configuration than for individual vehicles).

The RTP indicates a target of 76,000 riders per day for the East Los Angeles corridor, and this provides a useful starting point for developing an analytical framework to determine these impacts. This would correspond to about 41,000 home-to-work trips, or (assuming for purposes of the calculation a 3-hour peak period), 6833 per hour. Applying a directional split of 65:35 (based on 2020 Plan home-work figures for the Red line East LA extension at the maximum load point), this would mean a directional ridership of 4441 per hour in the peak direction; and (considering ons and offs at various stations along the line) assuming that the on-board ridership at the maximum load point for the corridor is 70%, this would mean 3109 riders per hour in the peak direction at this point.

With two car light rail trains this would require 10.8 trains per hour (headway about 5.5 minutes); with three car trains it would require 7.2 per hour (an 8 minute headway). For transitway buses, this would mean 62.2 buses per hour for standard buses (about a 1 minute headway), or 40.9 articulated buses per hour (1.4 minute headway). With half standard and half articulated buses, it would mean 49.4 per hour (a 1.2 minute headway).

A very preliminary look was made at typical intersections of arterials, such as would be encountered at transit stations, and at cross-streets with through traffic intersecting the arterial along with the transit line is running (i.e. for a segment between stations). The former would be assumed to be candidates for signal priority for the transit line, with a 10-20 MPH speed for transit at this point; the latter, would be assumed to be candidates for signal preemption, with a 35 MPH speed on the transit line. A 1.5 minute light cycle time was assumed, with 41 seconds of green time (+ four seconds of yellow) for a major crossing arterial and 26 seconds of green time (+ four seconds of yellow) for the other cross streets.

The results, in terms of number of cycles affected and percent of total hourly green phase time impacted by transit, suggest that for light rail signal preemption will be feasible for the minor cross streets, but that the frequency of buses during peaks would be such that it would be difficult for the bus system to preempt these streets (instead a signal priority strategy would probably be required). For major crossing arterials where a priority strategy would apply, it is suggested that light rail, with much longer headways, would have relatively minor impacts as compared to buses. Nevertheless, depending on the speed of travel through the intersections by the transit vehicles, some level of signal priority would still be possible with the bus transitway system.

These observations apply only to the more heavily loaded section of the line, which would be assumed to be between the LA CBD and Soto Street or Lorena. Based on the Red Line forecasts, the load would decrease considerably towards the eastern end of the line, and with a number of bus routes using the line—some of which be "short turns" or would branch out in an easterly direction to run down other streets, the bus service frequency could be less frequent (but would probably still allow for with no worse than a 5 minute headway or so) during peaks. At the same time, it is probable that the western end of the line would permit higher average speeds for light rail than for transitway buses, because the longer LRT headways should permit extensive signal preemption and more effective signal priority (less delay per crossing event) than would be possible for bus system with a very short headway.

There are many factors that would need to be investigated to develop definitive answer on this question. This would require transitway and light rail model output for various alternatives, including data on directionality and maximum load point; information on traffic signalization and forecast traffic conditions along each corridor alternative; and a transit operating plan and simulations. For instance, trains or buses passing each other at crossings will reduce the delay impact at crossings, while vehicles or consists passing each other near the crossings may actually make the impacts worse.

There are also questions of synchronization of lights along the transit corridor, timed from the first signal preempt event, as a train or bus passes through at constant speed; requiring also a directional priority for transit to give the "green wave" to the trains/vehicles moving in the most critical direction during peaks. The intent of this section in the current study is to primarily to raise these engineering issues which should be addressed in further work, and not to give definitive answers or make specific system recommendations based on very preliminary calculations.

ROUTE COMBINATIONS AND ROUTING OPPORTUNITIES

Description of light rail route combinations

In the event a light rail option is chosen for the East Los Angeles Corridor, there are possibilities for through-routing combinations with other light rail routes such as the Blue Line to Long Beach and the Pasadena Light Rail Line, and for a downtown connector or connectors linking these services and providing for joint use of maintenance facilities and flexibility to move equipment around to optimize use and maintenance scheduling.

As with a bus transitway alternative, it would be important to link an East Los Angeles light rail line to other major routes serving parts of the CBD and to provide through-routing along other urban rail corridors. While all of the routes envisioned would connect with the Red Line and numerous bus routes serving LA Union Station, it would be helpful to such transit riders on an East Los Angeles LRT rail corridor as would be traveling to other points on the light rail system, to have through-routed trips without a transfer, reducing travel time and inconvenience of transferring.

With respect to maintenance, if a surface LRT connection is provided between the Pasadena and Long Beach lines, largely along Alameda Street, it would be possible to eliminate construction of a new Pasadena Line maintenance facility in the former SP Bullring Yard area near Chinatown by (a) gaining access to the Long Beach Blue Line shops in north Long Beach, and (b) to the Red Line shops along the LA River near Union Station. The latter would entail a short connection between the Alameda Street Line and the shops, either north of south of 1st Street.

Sharing the shops between Red Line and Blue Line equipment would provide better use of the facility for heavy repair of vehicles. Additionally, the Long Beach Line equipment is the same that is currently used on the Green Line, and theoretically, some use of the Green Line shops in the Hawthorne area is also possible. Sharing of maintenance facilities, combined with replacement of the Chinatown grade separation on the Pasadena Line and replacing it with an Alameda Street alignment at Union Station, could save up to $ 140 million from Pasadena LRT development costs. This could pay not only for the east-side downtown connector but help fund the East Los Angeles extension as well.

With just the Pasadena and Long Beach Lines in operation and no downtown connector (Text Figure 1), the Blue Line system operation would comprise two isolated segments, with the existing operations from the Long Beach Transit Mall and from Willow St. in North Long Beach to 7th Metro Center; and operations from Sierra Madre Villa in East Pasadena and likely also a shorter line from the future Pasadena Transportation Center near Old Town, both to LAUPT. Through trips between points on the Long Beach Line and the Pasadena Line would require an intermediate Red Line ride and two transfers downtown, at 7th Metro Center and Union Station.

With a downtown connector on the east side along Alameda St., a through, revenue service from Long Beach to Pasadena would be possible, at least during certain times of day (Text Figure 2. For example, there might be three lines operated: (1) from the Long Beach Transit Mall to Metro Center, (2) from Sierra Madre Villa to LAUPT, and (3) from North Long Beach to Old Town in Pasadena.

With an East Los Angeles transit corridor as well, one service scenario (Text Figure 3) could have the following routes in operation: (1) from Long Beach Transit Mall to Metro Center, (2) from Sierra Madre Villa to LAUPT, (3) from East LA to Old Town in Pasadena, and (4) from East LA to North Long Beach. Another service scenario (Text Figure 4)could include the following routes: (1) from Long Beach Transit Mall to Metro Center, (2) from North Long Beach to Old Town in Pasadena (3) from East LA to Sierra Madre Villa, and (4) from East LA to 7th metro Center—via Washington Blvd. and serving LA Trade Tech. These scenarios would provide service from East Los Angeles to the LA Produce Market, also.

If a short branch were also provided west of Alameda Street to serve Little Tokyo and continue on through to Broadway/Hill on the 2nd/3rd Street corridor (Text Figure 5), the following would be one possible route combination: (1) Long Beach Transit Mall to Metro Center, (2) North Long Beach to Old Town, (3) Sierra Madre Villa to East LA, and (4) East LA to Broadway via Little Tokyo. Another possible combination (Text Figure 6) would be: (1) Long Beach Mall to Metro Center, (2) North Long Beach to East LA, (3) Washington Blvd. via Alameda to Old Town, (4) Sierra Madre Villa to Broadway via Little Tokyo, and (5) East LA to Broadway via Little Tokyo.

If the branch through Little Tokyo along the 2nd/3rd Street corridor were extended to the west side of downtown and run down Flower to 7th Metro Center, another downtown connector will have been completed and through routing via Metro Center would be possible. One possible route combination (Text Figure 7) would be (1) Long Beach Mall to East LA via Metro Center, (2) North Long Beach to East LA via Alameda, (3) Old town to Washington Station via Metro Center, and (4) Sierra Madre Villa to LAUPT. Another possible combination (Text Figure 8) would be (1) Long Beach Mall to East LA via Metro Center, (2) North Long Beach to LAUPT via Alameda, (3) Washington to Sierra Madre Villa via Metro Center, and (4) Old Town to East LA.

Although new transit corridors other than East Los Angeles are really beyond the scope of this study, in the event a light rail technology were also chosen for the Exposition/ Martin Luther King and Crenshaw Corridors, one possible routing scheme (Text Figure 9) might be as follows: (1) North Long Beach to East LA via Washington Blvd. and Metro Center, (2) North Long Beach to Sierra Madre Villa via Alameda St., (3) Santa Monica to Old Town via Metro Center, and (4) Inglewood to East LA via Exposition, the Santa Monica Branch east of USC, the north end of the Long Beach Line thence to Washington, and Alameda Street.

There are obviously many possibilities, and certain routes might be operated only at some times of day (possibly combined with movements of equipment out of the North Long Beach yard), e.g. to serve the Produce Market, whose peak hours are different from those of commutes to offices in downtown Los Angeles and other centers.

Light Rail - connection to Long Beach Line and Metro Rail Maintenance Facilities

As noted elsewhere, there is potential to connect the Pasadena Light Rail Line with the Long Beach line and to tie in a potential East Los Angeles light rail line with both, allowing both the Pasadena line and the East LA line to use the Blue Line and Red Line maintenance facilities. Some observations were made as part of this study as to how this connection might be made using an Alameda Street LRT connector on the east side of downtown Los Angeles, passing by Little Tokyo and the Produce Market en route.

Beginning at the Long Beach line Washington Station, and proceeding northbound, one option is to turn the corner onto Washington Blvd. at the Washington Station (there is a parking lot in this location making this turn easier), continue east along Washington to Alameda, and curve onto an Alameda St. alignment here. The angle between Washington and Alameda is less than 90 degrees (an acute angle), but not as bad as 2nd and 3rd Street farther north. There is a modern building at the northwest corner of Washington and Alameda which would have to be avoided. Nevertheless this curve can probably be accomplished without taking the building. Traffic congestion at this major intersection might be the most serious concern as there is very heavy vehicular movement, including turning movements, in this location.

The other option is to go north along a strip of land facing Long Beach Avenue, bordering the piece already owned by MTA for a Blue Line siding north of the Washington station. Unfortunately as one proceeds north along Long Beach Avenue in this location, the former railroad R/W has been built on and the total R/W remaining (street plus lateral space) becomes pinched at about 14th by new warehouses.

This suggests that if this option were pursued, it would be better to curve the line east in a new median along 15 St. (this street is 4 lanes wide or so), to where the street goes under the 10 Freeway, and then follow the south side of the freeway curving northeast (possibly relocating a towing company in this location) to join Alameda St. at a better angle. This would avoid the Washington intersection and also clear the 16th St. on/off ramps connecting Alameda to the freeway. Lane width along this part of Alameda appears to be 6-7 lanes (lane markings largely indeterminate here), which should allow room for the LRT connection.

There may be several other ways to make this connection from the north end of the Long Beach Line to Alameda Street, including some which use one-way couplets following several streets in this location. It may be possible to route one or more tracks directly under some part of the 10 Freeway, but this did not look promising during the short field survey because of closely-spaced support columns along 15th. While a connection at or near 15th Street would probably result in less traffic interference than a Washington Blvd. connection, it might still be a challenge to avoid/reduce conflicting traffic movements in this location.

The continuation north from 6th Street/Whittier Blvd. towards Union Station has been discussed elsewhere under R/W conditions applicable to the various East LA options. There may be other options for extending this eastside downtown connector between 15th Street and Union Station, such as a one-way couplet combining Alameda and Central, or an alignment east of Alameda Street. However, a double track line along Alameda appears workable and will suffice for these preliminary planning purposes.

R/W along Alameda and Main north of LAUPT appears quite adequate for location of an at-grade connection to the Pasadena line, but this was not investigated in detail. A specific alignment or route for a connector to the Red Line yards along the west bank of the LA River was not investigated during this study. However, there are probably a number of locations where this link could be made, north and south of 1st Street.

Light Rail - connection to 7th Metro Center

As noted elsewhere, there is a possibility of linking an East Los Angeles LRT route to the 7th/Metro Center transit station via Little Tokyo and the north end of the financial district and so providing a westside downtown connector. This might entail use of either 2nd Street or 3rd Street, and the existing 2nd or 3rd Street highway tunnel. The segments will be discussed separately, as a connection from a 2nd Street transit line to the 3rd Street tunnel, or from a 3rd Street line to the 2nd Street tunnel, could be made via Hill Street. In addition, one-way couplet operations, using both 2nd and 3rd are also possible.

Relative to developing a rail line along 2nd St., it will be noted that the street is generally 4 lanes wide from the 2nd St. tunnel to Alameda. This appears to be particularly feasible towards the western part of the alignment. However in Little Tokyo there are a number of driveways to hotels, parking structures, etc. and parking accessing shops along 2nd. A decision would have to be made to eliminate on-street parking to convert this to a transit-oriented street with a double track line in the center and access lanes provided to parking structures, or a full transit mall.

Another alternative would be to use 3rd Street. From Alameda to Hill, 3rd Street has the following lane conditions: from Alameda to Central to LA St., it is 6 lanes wide (1 way and including parking)--probably 60-70 ft. wide; from LA to Main, it has approximately 3 ½ lanes; from Main to Spring, 5 lanes; from Spring to Broadway, 4 lanes; and from Broadway to Hill, about 3 ½ lanes. The distance from Broadway to Hill on the map suggests a 4 car LRV train (250') could be accommodated at a station stop. Note that 3rd Street is a little closer to the major Broadway shopping section than 2nd Street.

The third alternative would be to utilize both 2nd and 3rd Street through Little Tokyo and accessing the Broadway area, using a one-way track pair.

At the east end, the street layout is slightly unfavorable for making a transition from Alameda St. to the north (for a 1st Street LRT alternative) to an east-west street such as 2nd or 3rd because of the angle being more acute than 90 degrees (2nd Street is worse than 3rd Street in this regard). The suggestion is that for a 1st Street alternative, the line would cut through the parking lot on the NW corner of Alameda and 2nd to access a 2nd Street transit mall; or, to access a 3rd Street alignment, it would run down Central, which is about 7 lanes wide (six through lanes and a turn lane; including parking). In the latter case the line would turn west onto 3rd at Central. However, a turn from the middle or east side of Alameda directly onto 3rd can probably also be done.

Access to these alignments from 4th Street or Whittier Blvd. transit lines coming north along Alameda Street would be easier in terms of curve geometrics, as in this case the angle between Alameda and 2nd or 3rd is greater than 90 degrees.

If it is necessary to transition from a 2nd Street alignment to the 3rd Street tunnel, or from a 3rd Street alignment to the 2nd Street tunnel, it should be noted that Hill Street is very wide and in addition has extremely wide sidewalks and a lawn on the west side of the street. This suggests that either a double track line or a single track line (in this case linking a one-way couplet with a single line to the east or west of Hill) could easily be accommodated using a new R/W along this arterial.

The 2nd Street tunnel is approximately 49' wide, including four traffic lanes handling two-directional traffic, and a pedestrian sidewalk on the south side (including two 10' and two 10 ½' lanes, and a 6.75' sidewalk). The ceiling is high and arched, and there would be no overhead clearance problems. The tunnel appears to be underutilized considering the number of lanes (it is sometimes used in movie shoots during very late evening hours). Per PUC regulations, in tunnels the clearances required are based to the dynamic envelope of the vehicles operated, although a 30" emergency walkway would be needed on one side; also, a median barrier would be needed to isolate a light rail line from mixed flow traffic.

For a double track line this would probably mean 26 ½' of R/W inside the tunnel, leaving 22 ½ feet for mixed flow lanes, i.e. two 10' lanes with 2 ½ feet of buffer left over, including 1 ½ feet as now on the north side and 1' on the south side next to the barrier. The mixed flow lanes would probably be operated one-way in this scenario. The LRT line could either emerge at the west end on Figueroa, or a new tunnel opening could be cut in on the south side, to connect the line more directly with the existing Flower St. LRT alignment. There appears to be room to provide the new tunnel connection north and east of Flower/3rd Street where this tunnel would portal.

The 3rd Street tunnel is two lanes wide and has two sidewalks. This should be adequate for LRT or a bus transitway. It is paired with the 4th Street eastbound traffic lanes as part of the 1-way street grid system. This tunnel is about 31' wide. Per PUC regulations there would be adequate space for a 24 ½ foot LRT line, a narrow barrier, and a pedestrian lane in this tunnel. The tunnel mouth at the west end widens to about 6 lanes, allowing LRVs with a long curve radius to swing onto Flower Street. There may be an overhead clearance problem near the middle of the tunnel where the center, box section meets the arched end sections. Here there is a lower concrete arch about 8' up from the sidewalk at the sides; if this is a structural member, it would require an LRT line to be lowered some feet towards the middle of the tunnel (there are adequate drains in the center area).

Lowering the floors of tunnels is a widely accepted practice in the railroad industry, but more information would be needed on the structure under the floor of this particular structure to pass judgment on this. Perhaps more of a problem is the fact that 3rd Street carries heavy traffic and is paired with 4th Street (a 4-lane arterial where it parallels these two tunnels) as part of a one-way couplet system. Removal of westbound traffic from the 3rd St. tunnel would require it to use the 2nd Street westbound lanes. Nevertheless, 2nd Street traffic could rejoin the 3rd Street arterial corridor west of the Harbor Freeway, via three southbound lanes on Beaudry Street.

For both the 2nd Street and 3rd Street tunnel options, it would be assumed that the emergency walkway, along one tunnel wall, would be on the ground, it would require people to walk across at least one set of tracks to get to it.

Yet another option would be to use a one-way couplet with a single LRT track in each tunnel. This would entail placing a track along the south side of the 2nd Street tunnel, preferably with a new portal coming out on Flower St., and a track on one side of the 3rd Street tunnel, probably lowering the floor of the tunnel, as discussed above. This would leave a single traffic lane westbound in the 2nd Street tunnel, which would effectively become a long left turn access onto Flower which runs southbound west of the tunnel; and three traffic lanes moving westbound in the 2nd Street tunnel, which would be paired with some improvements along Beaudry to connect 2nd St. traffic with 3rd St.. (It is also possible to turn south onto Figueroa from the 2nd Street tunnel, onto two lanes that provide a link to 3rd Street in a westbound direction.)

This option would entail a high-platform or car floor-level emergency walkway along the tunnel wall side of the track in each tunnel; the walkway could be wider than the required 30" and suitable for moving wheelchairs the length of the tunnel, probably with a lip on the "platform" edge of the walkway. These walkways would exit at gated ramps on either end, in each tunnel (closed circuit TV, intruder detection pads in the pavement, etc. might be used to restrict trespassing). This alternative would require about 16' of LRT R/W including a 3' walkway and a 2' median barrier, in each tunnel. It would leave in the 2nd Street tunnel, 15' of R/W, enough for an 11' traffic lane and 4' of buffer; and in the 3rd Street tunnel, 33' or R/W, enough for three 10' traffic lanes and 3' of buffer. This alternative should reduce the cost and structural problems involved in cutting into the side of the 2nd Street tunnel.

A connection to the Blue Line level of the 7th/Metro Center station would entail placing a light rail station between 3rd and 5th Streets, and providing a portal to the existing station between 5th and 6th. There appears to be space to do this with regard to gradients suitable for Blue Line equipment. An alternative Figueroa St. tunnel portal would probably be possible, but would require an s-curve underground at 6th Street, so that the savings from not modifying the 2nd Street tunnel could be eaten up by lengthening the entry to the 7th/Metro Center station.

The roof of the Metro Center station appears to be about 15' or so below street level; hence the line would have to begin climbing north of Wilshire to come up under 6th Street in order to portal north of here. The distance between 5th and 6th Streets is over 500'; with a 7% gradient on the light rail portal beginning 21' below the surface, it should be possible to portal in 400-450' (including sag and crest where the gradients change). However, station plans and profiles for the station and for Flower St. would have to be examined in detail as part of a preliminary engineering study of this connection.

Appendix C

Potential Funding Sources

LOCAL SOURCES (Los Angeles County)

Funding Source	Approximate Amount Available	Eligible Uses	Who Allocates	Other Comments
1. Proposition A				
1.a. Local Return (25%)	$100 million/year	Bus and rail public transit projects (capital and operating costs)	MTA allocates funds to local jurisdictions on a per capita basis.	Local jurisdictions use funds as needed; MTA performs fiscal and compliance audit upon project completion.
1.b. Rail Development (35%)	$140 million/year	Rail development consistent with Prop A Rail Corridor map	Funds programmed by MTA at its discretion.	MTA programs up-front on projects like Red Line, Blue Line, and Green Line.
1.c. Discretionary (40%)	$160 million/ year	Bus transit (capital and operating costs)	MTA programs funds via Formula Allocation Plan (FAP).	Approximately 95% of funds are allocated to municipal operators; Approx. 5% go to subregional paratransit and are typically only used for operating costs.
2. Proposition C				
2.a. Local Return (20%)	$85 million/year	A variety of public transit and transit-related purposes	MTA allocates funds to local jurisdictions on a per capita basis.	Local jurisdictions use funds as needed; MTA performs fiscal and compliance audit upon project completion.
2.b. Security (5%)	$20 million/year	Improvements to bus and rail security.	Funds programmed by MTA at its discretion.	Approx. 95% of funds went to the MTA police in FY 96, and 5% went into the Call for Projects.
2.c. Commuter Rail & Transit Centers (10%)	$40 million/year	Commuter rail (capital and operating costs).	MTA allocates funds to Southern California Regional Rail Authority (SCRRA)	Any funds remaining after SCRRA's baseline needs are met are programmed via the Call for Projects.
2.d. Transit Related Highway Improvements (25%)	$105 million/year	HOV/transitways, TDM, Incident Management Program, Park-n-Ride facilities, etc.	MTA (via Call for Projects)	
2.e. Discretionary (40%)	$170 million/year	Improve/expand bus & rail transit service: capacity expansion, technology, safety,	MTA programs the majority via Call for Projects; some via budget process.	This is typically seen as the principal source of flexible discretionary funds which are open to competition.

Funding Source	Approximate Amount Available	Eligible Uses	Who Allocates	Other Comments
		security.		
3. Service Authority for Freeway Emergencies (SAFE)	$8 million/year	Emergency call boxes; Freeway Service Patrol and Incident Management	Funds managed by the MTA SAFE program.	
4. Benefit Assessments	$12 million/year	Assessments on private property to help pay Metro Red Line costs. Established pursuant to state law.	The MTA administers the program.	Covers interest and principal payments on $162 million in assessment district bonds.
5. Fare Box Revenues	Typically 20% to 50% of operating budget.	Transit capital and operating costs. Must be reflected in transit operators' Short Range Transportation Plans (SRTPs).	Transit operators	
6. Other (Advertising/ Auxiliary Funds)	$28 million/year	Transit capital and operating costs	MTA annually determines allocations in Operating Budget.	
7. HOV Violation Fund	$500,000/year (in LA County)	Funds for Freeway Service Patrol (FSP) program.	MTA	Funds collected from fines for HOV lane violations.

5.0 CONLUSION/LOOKING AHEAD

The present study has gathered a considerable body of information concerning the nature of the study area and its resident population, the transit bus system serving this area and local transit needs. A number of alternative solutions have been presented, including a series of corridor alignments for transitway or light rail development. Technical and technology issues have been discussed concerning the way these systems would function, how they could be adapted to fit the arterial streets in the study area, and how they would fit into the overall transit system.

Forthcoming studies of the East Los Angeles area transit restructuring and transit corridor development will require substantial further technical work on the alternatives discussed, including patronage forecasts for various alternatives using a model suitable for corridor evaluation in a Subregional area, traffic engineering work to determine how various alternatives will enhance or impact the local transportation system, further refinement of alternatives and their interconnection with the regional transit system—including possible combinations of the several major alternatives suggested, and additional work on costs, funding and financing of transit improvements for this area.

REGIONAL SOURCES

Funding Source	Approximate Amount Available	Eligible Uses	Who Allocates	Other Comments
1. SCAG Planning Funds	$15.1 million annually to SCAG[1]	Planning activities pursuant to §134, Title 23, U.S.C.	FHWA/FTA to SCAG via the state; SCAG allocates a portion to subregions.	
2. Air Quality Registration Fee in South Coast Air Quality Management District				
2.a. AB2766 Local Return (40%)	$14-$16 million/year	Projects which produce quantifiable emission reductions	SCAQMD allocates to cities and counties within SCAQMD area on a per capita basis.	
2.b. AB2766 AQMD Retention (30%)	$11-$12 million/year	Programs which reduce pollution, and studies associated with implementing the Clean Air Act.	SCAQMD programs these funds at its discretion.	
2.c. AB2766 Discretionary (MSRC) Program (30%)	$11-$12 million/year	Proposals to reduce air pollution, including demonstration projects.	SCAQMD's Mobile Source Pollution Reduction Review Committee (MSRC).	Jurisdictions submit proposals to SCAQMD. MSRC submits recommendations to SCAQMD Board, which must accept or reject *in toto*.
3. Air Quality Registration Fee for Ventura County Air Quality Management District				
3.a. AB 2766 Air Quality Registration Fee Funds	$300,000/ year (in Ventura County)	Service Authority for Freeway Emergencies (SAFE)	VCTC	

[1] With the passage of the new 1998 ISTEA these funds and the rules governing these funds may change.

Funding Source	Approximate Amount Available	Eligible Uses	Who Allocates	Other Comments
1. SB 45 STIP Reform (County Transportation Improvement Program, CTIP) : $4.623 billion in 1998 STIP (FY98 - FY04) This legislation consolidated a number of state and federal funding streams into two new programs -- 75% of the funds go to the Regional Improvement Program and 25% of the funds go to the Interregional Improvement State Discretionary program. *State* programs that were consolidated and eliminated include the Flexible Congestion Relief Program, Traffic Systems Management (TSM) and TSM Match, Transit Capital Improvement (TCI), Urban and Commuter Rail, Interregional Roads, Intercity Rail, Retrofit Soundwalls, and State and Local Transportation Partnership Program (SLTPP). *These programs are being phased out at different times. See end of "State Sources" Chart for information on programs that have been consolidated or phased out.* *State and Federal* programs not consolidated into the SB 45 programs are: expenditures for administration of Caltrans; maintenance and operation of the state highway system; rehabilitation of the state highway system; or local assistance programs required by state or federal law or regulations, including, but not limited to, railroad grade crossing maintenance, bicycle lane account, congestion mitigation and air quality, regional surface transportation programs, local highway bridge replacement and rehabilitation, local seismic retrofit, local hazard elimination and safety, local federal demonstration projects, and local emergency relief. [See §163 and 164 of the Streets and Highways Code.] Because all the new SB 45 funds mix federal Transportation Enhancements Activities (TEA) funding as part of their revenue stream, each program has a portion of funds that are restricted to TEA activities. This is discussed under the TEA program in the section on federal funds.				
1.a. Regional Improvement Program (or "Regional Choice Program") (75%)	$3.467 billion in 1998 STIP Statewide $738 million in 1998 STIP in LA County $86 million in 1998 STIP in Ventura County	75% of the funds under SB 45 go to the Regional Improvement Program for a variety of uses including roads, buses, rail, and pedestrian and bicycle facilities.	MTA, VCTC ranks projects for the Regional Program and submits list for approval to the CTC.	Priority in the Regional Improvement Program is given to projects that 1) Make safety improvements, 2) Capital Improvements to expand capacity or reduce congestion, and 3) Environmental enhancements and mitigation.
1.b. Interregional Improvement State Discretionary	(40%) $565 million in 1998 STIP	Any projects which facilitate the movement of goods and people.	Caltrans nominates projects in the Interregional Transportation Improvement	Funds are subject to 40%/60% North/South split.

Funding Source	Approximate Amount Available	Eligible Uses	Who Allocates	Other Comments
Program **(25%)**			Program (ITIP) which is approved by the CTC.	
	(60%) $693 million in 1998 STIP	Interregional road and rail, *outside* urbanized areas. with a minimum of 15% of this fund (the 60%) for rail and grade separation projects.	(See above)	These funds are not subject to the North/South split.
2. Article XIX	Permits up to 25% of state gas tax revenues to be spent on fixed guideway projects.	Previously funded under Transit Capital Improvement and Flexible Congestion Relief, now under SB 45 funds.	CTC	CTC previously committed projects; $420 million of Article XIX funds to Metro Red Line project; minor amount to Pasadena Blue Line.
3. State Transportation Development Act (TDA)				
3.a. Article 3	$4 million/ year (in LA County) TBD (in Ventura County)	Bicycle and pedestrian facilities.	MTA allocates funds to local jurisdictions on a per capita basis. VCTC criteria TBD	
3.b. Article 4	$170 million/year (in LA County) TBD (in Ventura County)	Bus capital and operating costs for municipal operators, transit authorities, joint powers authorities.	MTA allocates via Formula Allocation Plan (FAP) VCTC criteria TBD	
3.c. Article 8	$10 million/year (in LA County) TBD (in Ventura County)	Transit and paratransit programs which fill unmet needs outside service area of MTA operations.	MTA allocates funds to local jurisdictions meeting this criteria (see next column) on a per capita basis. VCTC criteria TBD	Eligible areas include: Avalon, Lancaster, Santa Clarita, Palmdale, and unincorporated areas of Los Angeles County
4. Public Transit Account (PTA): SB 45 changed name from Transportation Planning and Development to PTA.				

Funding Source	Approximate Amount Available	Eligible Uses	Who Allocates	Other Comments
4.a. State PTA Funds (50%)	Funds are currently overcommitted and CTC anticipates a $47 million shortfall by FY04.	State transit programs, intercity bus/rail service and rideshare programs	CTC	
4.b. State Transit Assistance (STA) (50%)	$11 million/year (in LA County) TBD (in Ventura County)	For public transit capital and operations.	MTA allocates via Formula Allocation Plan (FAP) to transit operators that are eligible to receive TDA Article 4 funds. VCTC criteria TBD	Transit projects or operations must be consistent with the the Short Range Transportation Transit Plan and the Short Range Transportation Improvement Program.
5. State PUC Grade Separation Project Fund	$15 million/year (Statewide)	Funds to modify existing or build new railroad/ roadway crossings.	State PUC prioritizes list of projects to be funded.	Railroads required to provide 10% match for grade separations built at existing railroad/roadway crossings. Localities also must provide a 10% match.
6. State Highway Operation & Protection Program (SHOPP)	$35-$40 million/year (in LA County) TBD (in Ventura County)	Capital funds for state highway rehabilitation, operation, safety, other improvements to maintain system integrity.	Caltrans	Caltrans programs these projects in the STIP and administers the program.
7. Environmental Enhancement and Mitigation (EEM)	$10 million (Statewide)	To mitigate the effects of transportation projects on the environment.	State Resources Agency ranks projects and CTC selects them.	Projects must entail environmental mitigation over and above that required in environmental documents (e.g. EA, EIR).
8. Budget Change Proposal Funds	$3-$4 million/year (in LA County) TBD (in Ventura County)	Funds for the Freeway Tow Service Patrol (FTSP)	Caltrans, CHP	Caltrans Headquarters allocates to Caltrans District 7, which passes them through to the MTA and VCTC for the FSP.

Funding Source	Approximate Amount Available	Eligible Uses	Who Allocates	Other Comments
9. State Infrastructure Bank (SIB)/ Transportation Finance Bank (TFB)	Up to $100 million total credit (Statewide)	Toll roads, intermodal corridor improvements, rail transit construction, enhancements to existing facilities.	Caltrans,CTC,California Economic Development Finance Authority (CEDFA)	Application and selection processes are under development.
10. State Gas Tax and Motor Vehicle Fee Subventions **(Section 2105, 2106, 2107, 2107.5)**	$267 million/year (Statewide) $86 million subject to Congestion Management Program (CMP) requirements	Subvention funds to cities for local streets and roads purposes. Cities must be in conformance with the CMP to receive some of these funds.	Allocated by formula to cities and counties. MTA and VCTC certify CMP compliance.	
11. Petroleum Violation Escrow Account (PVEA)	Funds are allocated to states by the Federal government. Projects require specific state legislation.	Energy conservation projects and programs that result in energy savings and/or displaced or non-renewable fuels.	State legislature	
Programs Consolidated/Eliminated by SB 45				
State and Local Transportation Partnership Program (SLTPP) ***Ends FY 99***	$4 million/year (LA County) TBD (in Ventura County)	Enhance capacity, extend service to new area, or extend useful life of a roadway by 10 years.	Local agencies	Funds can only cover construction contract items, not right-of-way and administrative costs.
Flexible Congestion Relief (FCR) ***Replaced by CTIP on Jan. 1, 1998***	$200 million/year (LA County) TBD (In Ventura County)	Highway and fixed guideway capacity improvements to reduce or avoid congestion	MTA, Call for Projects	MTA submits rankings to the CTC for STIP programming.
Interregional Road (IRR) System Program	$25 million/ year (LA County)	Improvements for interregional traffic on state highways outside urban limit lines	Caltrans	Caltrans programs these projects in the STIP and administers the program.

Funding Source	Approximate Amount Available	Eligible Uses	Who Allocates	Other Comments
Replaced by Interregional Improvement State Discretionary Program, Jan. 1, 1998	TBD (in Ventura County)			
Transit System Management (TSM) ***Expires end of FY 98***	$30-$35 million/year (in LA County) TBD (in Ventura County)	(1) $8-$9 million programmed to match federal STP and CMAQ funds on projects which make better use of existing transportation facilities (e.g. ramp meters, message signs, HOV lanes, bus turn-outs, etc.) (2) Remaining funds, $20-$25 million programmed for TSM projects consistent with LA County CMP.	MTA (indirectly via the Call for Projects) Local Caltrans Office (District 7)	Federal STP and CMAQ funds programmed by the MTA via the Call for Projects are automatically matched by the State with TSM funds (as long as the project is TSM eligible). MTA must ensure local consistency with CMP requirements.
Transit Capital Improvements (TCI) ***Ended under SB 45.***	Program over except for funding already committed to existing projects.	Abandoned railroad rights-of-way; bus rehabilitation; rail guideway & rolling stock ; grade separations; intermodal stations; ferry vessels & terminals; short line railroad rehabilitation.		

Funding Source	Approximate Amount Available	Eligible Uses	Who Allocates	Other Comments
FEDERAL HIGHWAY PROGRAM				
1. National Highway System (NHS) or (Highways of National Significance)	Approx. $441.7 million per year FY98-03 (Statewide)	NHS projects; up to 50% may be shifted to STP.	Programmed by the CTC through the STIP process.	TEA-21 clarifies that funds may be spent on infrastructure based ITS, publically owned bus terminals, and natural habitat mitigation.
1.a. Interstate Maintenance Program	Approx. $344.2 million per year FY98-03 (Statewide)	Maintenance and reconstruction on Interstate routes.	CTC, Caltrans through the STIP process.	Under TEA-21, the IM program is technically a sub-program of NHS. The legislation allows states with unused Interstate Construction authorization to transfer the funds to their IM account.
2. Surface Transportation Program (STP): $535.4 million per year FY98-03 (Statewide); Program is divided into 4 subcategories, 10% Safety programs, 10% Transportation Enhancements (TEA), 50% Regional STP (STP 110% guarantee program and rural areas guarantee program), and 30% State Discretionary funds.				
2.a. Safety Projects (10%)	10% of Statewide STP funds	Highway safety projects.	Caltrans	Funds are included in the STIP but not called out as separate program.
2.b. Transportation Enhancement Activities (TEA) (10%)	$48 million under 1998 STIP in LA County $4.6 million under 1998 STIP for Ventura County	Funds improvements which beautify or enhance transportation projects and make them more environmentally or community "friendly."	MTA nominates projects and CTC awards after screening by Caltrans. TEA projects will be awarded through a process separate from the regular STIP process.	Since federal TEA funds are blended into both SB 45 funding programs, a percentage of Regional Improvement Program funds as well as a portion of Interregional Program funds are restricted to TEA projects.
2.c. Regional suballocations (50%)		Highway, transit, multi-modal, and intermodal projects.	MTA via Call for Projects	Eligibility under the regional and statewide discretionary STP has been broadened to include additional environmental provisions, ITS capital improvment projects, intercity

Funding Source	Approximate Amount Available	Eligible Uses	Who Allocates	Other Comments
				bus terminals and facilities, etc.
2.d. State Discretionary STP funds (30%)	Approx. $160.6 million per year FY 98-03 (Statewide)	Highway, transit, multi-modal, and intermodal projects.	Included as part of SB 45 CTIP funding.	See above.
3. Congestion Mitigation & Air Quality (CMAQ)	Approx. $277.4 million per year FY 98-03 (Statewide) $48.5 million in FY 96 (in LA County) TBD (in Ventura County)	Projects to improve air quality.	MTA via Call for Projects	TEA-21 broadens CMAQ eligibility from only non-attainment areas to both non-attainment areas and maintenance areas. Also, a State may transfer up to 50% of its increase in CMAQ funds to other federal aid programs for projects in maintenance or non-attainment areas.
4. Highway Bridge Rehabilitation and Replacement (HBRR) Program	Approx. $260.8 million per year FY98-03 (Statewide)	Funds for 7 project categories: (1) Seismic Retrofit; (2) Replacement Projects; (3) Rehabilitation Projects; (4) Bridge Painting; (5) Low Water Crossings; (6) Barrier Rail Replacement; (7) Special Bridge Program	Local Caltrans Office (District 7)	District 7 creates list of projects and forwards to Caltrans Headquarters for approval; Seismic Retrofit requirements are the top priority for funds.
5. Minimum Guarantee Program	Approx. $348.7 million per year FY98-03 (Statewide)	Funds are distributed among the program listed above. 50% of the funds are administered as though they were STP. The rest are divided among IM, NHS, Bridge, CMAQ and STP based on share for each program under the regular formula allocations.	See relevant program.	TEA-21 added the minimum allocation program to ensure that each State received at least a 90.5% return on each dollar put into the Highway Trust Fund. The funding for the Minimum Allocation program is listed separately from the other programs even though it is incorporated into their funding

Funding Source	Approximate Amount Available	Eligible Uses	Who Allocates	Other Comments
				streams.
6. **Federal Lands Highways Program**	$4.1 billion FY98-03 (Nationally); No formula amount -- allocations made on a need basis.	Indian reservation roads; parkways and park roads; public and federal lands highways.	FHWA; Caltrans	
7. **High Priority Projects**	$153.7 million per year FY98-03 (Statewide)	Highway, transit, intermodal, and other projects.	Congress	TEA-21 designated 1,850 projects as high priority projects to receive earmarked demonstration grant funds.
FEDERAL TRANSIT PROGRAM				
8. **Section 5307 (9) Formula Grant Program**	$155.2 million in FY98 (L.A. Urbanized area)	Bus capital and operations; Southern California Regional Rail Authority (SCRRA)	MTA	L.A. Urbanized area includes Orange Co., portion of San Bernardino Co.
9. **Section 5311 (18) Rural Program**	NA	Rural transit purposes.	Caltrans	
10. **Section 5310 [16(b)(2)] Paratransit Vehicles**	NA	Transportation for elderly and disabled persons.	Local operators apply to MTA which makes recommendations to the state; CTC allocates with advice of Caltrans.	In California, funds are restricted to capital purchases only.
11. Section 5309 Discretionary				
11.a. New Starts	$6.1 billion in TEA-21 FY98-03 (Nationwide)	New rail starts (e.g. Metro Red Line).	Congress (via earmarks); FTA	
11.b. Fixed Guideway Modernization	$6.1 billion in TEA-21 FY98-03 (Nationwide) $11.5 million in LA in	Modernization of older rail systems.	Congress (via statutory formula).	

Funding Source	Approximate Amount Available	Eligible Uses	Who Allocates	Other Comments
	FY98			
11.c. Bus & Other	$3 billion in TEA-21 FY98-03 (Nationwide)		FTA, or Congress (via earmarks)	TEA-21 created several new subcategories for this grant program, including projects using fuel cell technology, and other clean fuels.
12. Transit Planning & Research Program	Over $600 million in TEA-21 FY98-03 (Nationwide)	Specified transit-related research activities and programs.	FTA; TCRP Board.	45% subvened to MPOs for regional planning (see Regional Sources).
Selected Other TEA-21 Programs				
13. MAGLEV Deployment Program	$60 million in TEA-21 FY 99-02 $950 million in TEA-21 is authorized from FY 98-03, but must be appropriated.	To fund nationally significant projects testing the feasibility and safety of MAGLEV technologies.	US Department of Transportation (USDOT)	STP and CMAQ funds may also be used for developing MAGLEV technology.
14. Welfare to Work Program	$400 million in TEA-21 for FY 99-03 out of the Highway Trust Fund $350 million can be appropriated.	To develop transportation services to move welfare recipients to jobs; and to develop transportation services for residents of urban areas to suburban areas where there are employment opportunities.	USDOT	
15. National Corridor Planning and Border Infrastructure Programs	$700 million in TEA-21 for FY 99-03 $30 million available for law enforcement needs in border States	For coordinated planning, design and construction of corridors for international and interregional trade; specific corridors are identified in ISTEA. And for improving the infrastructure along the US/Mexico, US/Canada border.	USDOT/Congress	

Funding Source	Approximate Amount Available	Eligible Uses	Who Allocates	Other Comments
16. Ferry Boats	$220 million in TEA-21 for FY 99-03	For the construction of ferry boats and ferry boat terminals.	USDOT	A portion of these funds is taken off the top for New Jersey, Alaska, Washington, and Hawaii.
17. Recreational Trails Program	Approx. $3.1 million in TEA-21 for FY 98-03 (Statewide)	To provide and maintain recreational trails. 30% for motorized use; 30% for non-motorized and 40% for diverse trail uses.	Caltrans	
18. National Scenic Byways	$148 million in TEA-21 for FY 99-03	Developing National Scenic Byways Programs	USDOT	
19. Transportation and Community and System Preservation Pilot	$120 million in TEA 21 for FY 99-03	Demonstration grants to plan and implement strategies which improve the efficiency of the transportation system, reduce the environmental impacts of transportation, etc.	USDOT	

FEDERAL SOURCES
ISTEA REAUTHORIZATION PROPOSALS FOR ITS PROGRAM

Funding Source	Approximate Amount Available	Eligible Uses	Who Allocates	Other Comments
Intelligent Transportation System Research Program Under ISTEA: ITS Program established to research, develop and operationally test and promote ITS. Program establishes goals for deployment, requires standards development, supports interoperability; established ITS Corridors program; requires the study of Commercial Vehicle Operations (CVO) safety technology and development of an Automated Highway System (AHS) prototype. Establishes and information clearinghouse and an annual report to Congress. Requires a report on nontechnical issues and constraints.	**Funding proposals-** **Administration:** ✓$96M annually through FY 2000 and $130M annually thereafter. **House:** ✓$100M annually **Senate:** ✓$120M for FY 98 and $800M total for six years FY98-2003. **Federal share:** ✓80%: w/waiver provision per existing law. ✓Intelligent vehicle research: 50% Federal/50% non-Federal	**Administration Proposal:** Research Program includes development of a fully integrated intelligent vehicle (including crash avoidance and AHS); development of standards; professional capacity building; rural applications; research and field testing; technology transfer.	FHWA	**House Proposal:** ✓Earmarks $4.2 M annually for hazardous materials monitoring systems, motor carrier advanced sensor systems, and the Gary-Chicago-Milwaukee Priority Corridor. **Senate Proposal:** ✓Requires R& D on crash avoidance, AHS and air bag technology. • ✓Allows up to 5% of funding provided for operational tests and deployment projects to be set aside for evaluation. • ✓Limits funding of outreach, public relations, and training. **Funding Source**
Intelligent Transportation System (ITS) Deployment Incentives Program	**Funding Proposals-** **Administration:** ✓$600 M for FY98-2003. ✓Non-ITS match 50%, remaining 30% can be from other Federal aid; ✓Federal share not to exceed	✓Current ITS Corridors Program would be replaced by Deployment Incentives Program. ✓ITS Deployment incentives program would support integration of the metropolitan travel management intelligent	FHWA	✓Senate program would be a comprehensive program to accelerate integration and compatibility of ITS echnologies

Funding Source	Approximate Amount Available	Eligible Uses	Who Allocates	Other Comments
	80%. **House Proposal:** ✓$450M for FY98-2003 **Senate Proposal:** ✓$735M for FY98-2003 (w/additional) ✓$90M for accelerated integration and deployment of ITS in rural areas; ✓$185M for deployment of commercial vehicle ITS infrastructure.	infrastructure, and deployment of Commercial Vehicle Information System and Network (CVISN) and rural intelligent transportation infrastructure.		

Funding Source	Approximate Amount Available	Eligible Uses	Who Allocates	Other Comments
Other ITS Provisions	N/A	✓Expands eligibility for ITS capital improvements in Interstate Maintenance, National Highway System, Surface Transportation System funding categories. ✓Expands eligibility for ITS operations and maintenance activities in NHS and STP by defining as operational improvements. ✓Requires life-cycle cost analysis for ITS projects where the initial Federal investment exceeds $3 million.	FHWA	✓Requires use of National ITS Architecture and adopted interoperability standards when Federal funds are used. ✓Requires U.S. DOT Secretary to take action with FCC to secure permanent communications spectrum allocation of dedicated short range communications. ✓Senate bill requires action on communications spectrum within two years of enactment of bill. ✓Senate bill authorizes $10 M annually for Corridor Development and Coordination. ✓Requires development of guidance and technical assistance on procurement for ITS projects.

PRELIMINARY DRAFT
PROJECTS IN U.S. HOUSE OF REPRESENTATIVES REAUTHORIZATION BILL
Los Angeles and Ventura County Earmarked Demonstration Projects
BASED UPON HOUSE BILL 2400 REPORT- DATED 3/24/98
(Shaded rows indicate ITS projects and/or projects assumed to have major ITS components)

House Report #	Project Description	Amount
11	Construct San Fernando Valley Regional Transportation Hub, Los Angeles	$.500
29	Construct sound walls along SR 23 in Thousand Oaks	$2.532
38	Construct Chatsworth Depot Bicycle & Pedestrian Access Project	$.492
39	Reconstruct Palos Verdes Drive, Palos Verdes Estates	$.450
53	Reconstruct the I-710/Firestone Interchange	$16.000
63	Construct I-10/Pepper Ave. Interchange	$8.800
100	Improve streets and related bicycle lane in Oak Park, Ventura Co.	$.907
110	Improve streets in Canoga Park and Reseda Areas, Los Angeles	$1.100
139	Implement City of Compton Traffic signal systems improvements	$5.800
140	Undertake San Pedro Bridge project at SR1, Pacifica	$1.500
164	Construct Alameda Corridor East Project	$12.750
169	Roadway improvements-provide access to Hansen Dam Rec. Area in LA	$1.000
174	Rehabilitate Artesia Blvd.	$4.000
227	Reconstruct and widen Mission Rd. Alhambra	$3.250
234	Upgrade delAmo Blvd. At I-405	$5.000
254	Construct bike path between Sepulveda Basin Recreation Area & Warner Center/Canoga Park, Los Angeles	$3.000
264	Construct Palisades Bluff Stabilization project-Santa Monica	$8.000
279	Construct bike paths-Thousand Oaks	$.625
295	Reconstruct Grand Avenue between Elm St. & Halycon Road, Arroyo Grande	$.500
338	Construct bicycle path- Westlake Village	$.136
345	Construct Los Angeles Co. Gateway Cities NHS Access	$8.750
366	Construct Backbone Trail through Santa Monica National Recreation Area	$.200
374	Construct improvements to Moorpark/Highway 101 Interchange, Bouchard/ Highway 101 Interchange & associated street improvements, Thousand Oaks	$.368
429	Extend I-10 HOV lanes, Los Angeles	$2.940
471	Construct improvements to Route 101/Los Hills Road Interchange, Calabasas	$5.790
528	Implement safety and congestion management improvements along Pacific Coast Highway, Malibu	$.650
553	Construct connector between I-5 & SR 113 and reconstruct I-5 Interchange	$11.500

	w/Road 102, Woodland Hills	
579	Construct Phase 3 of Alameda St. project, Los Angeles	$6.000
593	Construct bicycle path, Calabasas	$.500
615	Construct HOV lane and bicycle lane within the Glendale Blvd. Corridor in LA	$16.000
630	Construct improvements to Harry Bridges Blvd., Los Angeles	$9.100
695	Construct-So.Central LA Exposition Park Intermodal Urban Access Project-LA	$26.000
697	Construct bicycle paths as part of regional system, Agoura Hills	$.100
699	Construct I-5 rail grade crossings between I-605 & SR 91, LA and Orange Co.	$20.120
705	Implement ITS technologies in Employment Center in El Segundo	$3.550
706	Construct grade-separated bicycle path along L.A. River between Fulton Ave. To the vicinity of Sepulveda Blvd. & Sepulveda Basin Recreational Area, LA	$1.600
718	Construct Alameda Corridor East- San Gabriel Valley	$2.940
777	Construct Centennial Transportation Corridor	$21.000
879	Improve SR91/Green River Road Interchange	$6.500
880	Widen and improve I-5/SR 126 Interchange in Valencia	$13.900
981	Construct Nogales St. at Railroad St. Grade separation in Los Angeles Co.	$4.500
1048	Widen SR-23 between Moorpark and Thousand Oaks	$14.000
1063	Construct highway-rail grade separation for Fairway Dr. & Union Pacific track	$4.215
1095	Upgrade and synchronize traffic lights in Alameda Corridor East- LA County	$23.000
1400	Improve & modify-Port of Hueneme Intermodal Corridor-Phase II, Ventura Co.	$22.400
1439	Construct Ocean Blvd. & Terminal Island Freeway Interchange- Long Beach	$20.000
SUBTOTAL HIGHWAY PROJECTS		**321.965**
TRANSIT FACILITIES AND PROJECTS		
29	Culver City Buses	$2.500
65	Foothill Transit buses	$3.250
66	LA Co. MTOC buses	$2.000
67	San Fernando Valley Smart Shuttle buses	$.300
68	LA Union Station Gateway Intermodal Transit Center	$2.500
86	Norwalk Transit Facility	$1.000
106	Santa Clarita buses and facilities	$2.500
145	Woodland Hills/Warner Center Transit Hub	$.950
	SUBTOTAL TRANSIT PROJECTS	**$15.000**
	GRAND TOTAL ALL PROJECTS	**$336.965**