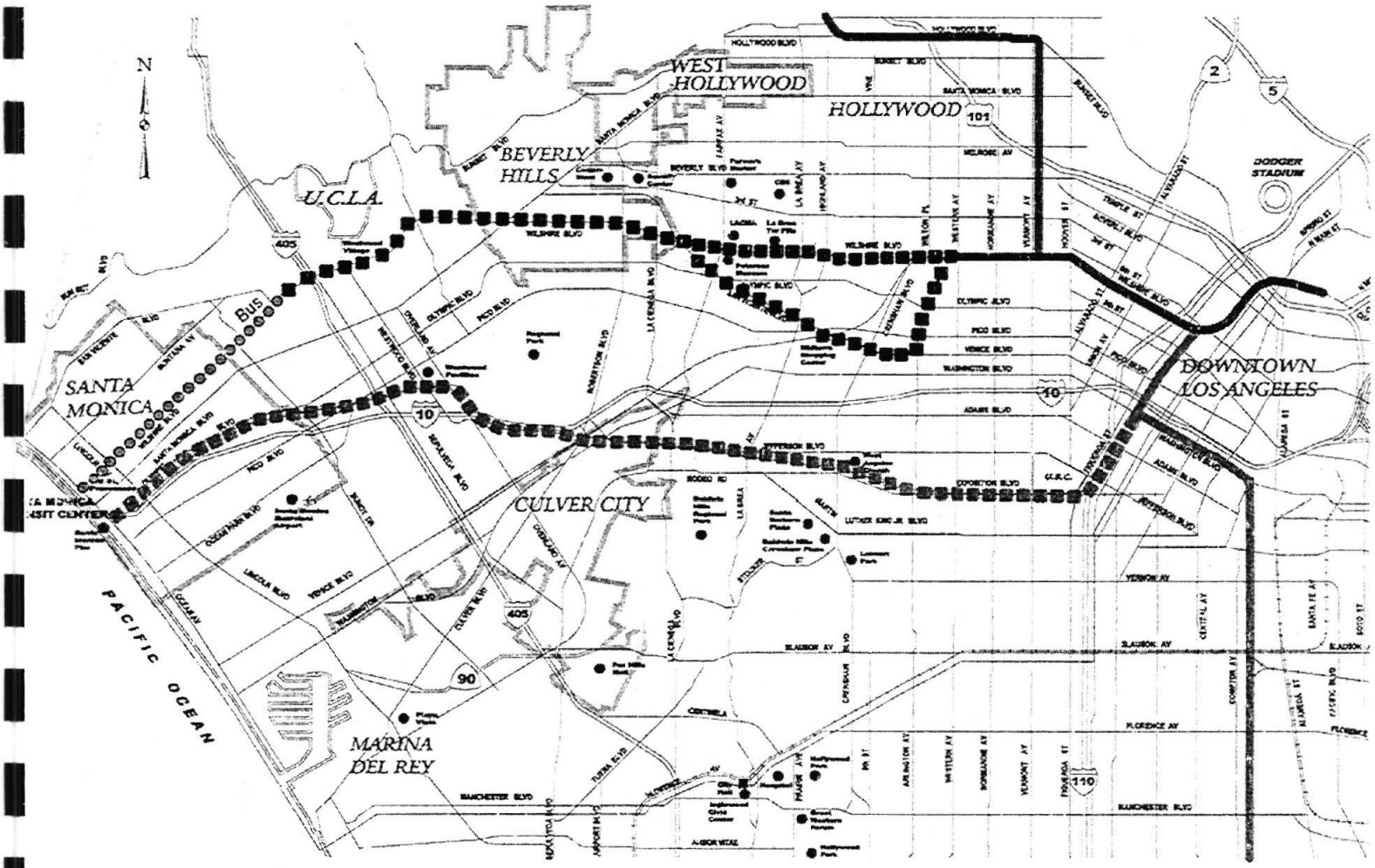
MID-CITY/WESTSIDE TRANSIT CORRIDOR STUDY



RE-EVALUATION/ MAJOR INVESTMENT STUDY REPORT

Los Angeles County
Metropolitan
Transportation
Authority

February 24, 2000

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MID-CITY/WESTSIDE TRANSIT CORRIDOR RE-EVALUATION/MAJOR INVESTMENT STUDY

February 24, 2000

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SUMMARY

SUMMARY

S.1 Status of Current Transit Investments in the Mid-City / Westside Transit Corridor

The Mid-City Segment of the Metro Red Line was adopted as the Locally Preferred Alternative in 1992. This 2.3-mile extension would have extended Metro Red Line service from Wilshire Boulevard and Western Avenue to Pico and San Vicente Boulevards in the "Mid-City" area via a Crenshaw Boulevard alignment. Engineering design work for the tunneling and stations on this project was suspended in 1994 due to concern about hazardous underground gases along Crenshaw and Pico Boulevards and an optional alignment using Wilton Place, Arlington Avenue, and Venice Boulevard was pursued instead. The MTA was in the process of environmentally clearing this revised alignment when work on the Mid-City Segment, the Metro Red Line East Side Extension, and the Pasadena Blue Line were suspended for financial reasons.

Shortly thereafter, Proposition A (which prohibited the use of local sales tax monies for subway construction) was placed on a county wide ballot and was passed by the voters in November 1998. Meanwhile, the Gas Prohibition zone along Wilshire is still in place as is the Consent Decree that mandates specific financial commitments to the existing MTA bus operation. While there have been some major long term transportation investments in the study area such as the Red Line Subway to Wilshire and Western in 1996 and the purchase of the Exposition ROW in 1990, the more immediate focus has been to complete the Westside Transit Restructuring Plan and to proceed with the Metro Rapid Bus Demonstration Project on Wilshire to be implemented in June 2000.

S.2 Purpose of this Study

In light of the current situation, the KORVE team has been tasked with re-evaluating the suspended subway Locally Preferred Alternative (LPA) and comparing it to a set of fixed-guideway transit improvements that have been identified in a number of other studies conducted to date. KORVE has been tasked with recommending to the Los Angeles County Metropolitan Transportation Authority (MTA) a short-term (0-5 years) and long-term (6-20 years) strategy for improving public transit. Based upon the recommended strategy, KORVE will coordinate with MTA to develop a funding program including federal participation as appropriate. The outcome of this re-examination of conditions in the Mid-City / Westside Transit Corridor will be the selection of one or more alternatives that will enter into more detailed environmental analysis during Phase 2. Upon completion of Phase 2, when the draft environmental documents are completed, MTA will be able to adopt a new Locally Preferred Alternative complete final environmental clearance and seek to renegotiate an amended funding agreement with the Federal Transit Administration.

S.3 Purpose and Need for Transit Investment

The central question is whether a significant investment is warranted for transit improvements in the Mid-City/Westside study area. The answer is yes for the following reasons.

1. **The Need for Transit Improvements has been Established in Previous Studies.** Providing high-capacity transit service improvement has been long recognized in the Mid-City/Westside Area. Since the 1970's, the LACMTA and its predecessors (SCRTD, LACTC) have conducted numerous transportation planning and environmental impact

studies that established the need and feasible locations for either bus, light rail and/or heavy rail east-west service in various parts of the study area.

2. **Study Area Contains A Major Concentration of Activity Centers and Destinations.** The area contains the largest concentration of major activity centers and destinations within the Los Angeles metropolitan region. Many of these centers are located within the most congested portion of the study area north of the Santa Monica Freeway (I-10) and east of the San Diego Freeway (I-405).

3. **The "Centers Concept" Land Use Policy is Transit Based.** Land use policies in the Los Angeles metropolitan region have traditionally been founded upon the framework that access to major activity centers would be facilitated through a network of transit connections. The recently completed Los Angeles General Plan Framework reinforced this concept as a continuing policy framework for the City of Los Angeles. New growth is planned and encouraged to occur only in areas that are served by transit.

4. **There is an Existing Concentration of Transit Supporting Land Uses.** The existing activity centers in the study area are a central part of a large concentration of land uses that are considered to be transit supporting (high-density housing, commercial and retail). In fact, roughly 30 percent of the land area within the study area falls into this category. Patterns of transit supporting land uses are concentrated along the Santa Monica Boulevard/Wilshire Boulevard corridors. A lesser concentration is evident along a southern oriented Venice Boulevard corridor.

5. **High Study Area Population and Employment Densities Support Transit.** Population and employment densities in the study area are the highest within the metropolitan region, averaging approximately 13,883 persons per square mile and 9,167 employees per square mile.

6. **There is a History of Transit Usage in the Study Area.** Existing transit usage within the study area is proportionally higher than any other area in Los Angeles County (13.64 percent for the study area versus 6.8 percent for the County). Because there is a large base of existing transit service and transit patrons, increasing the transit mode share through increased service would represent a natural extension of existing patterns and trends.

7. **There is a Significant Transit Dependent Population in the Study Area.** Part of the underlying reason for high transit usage in the study area is that a significant number of households do not own an automobile and have low incomes. According to the 1990 Census, approximately 18.33 percent of households did not have a vehicle compared to 10.90 percent for the County. The majority of these households are concentrated in the eastern and northeastern portion of the study area. In addition, in 1990, 20.91 percent of the population of the study area was below poverty status compared to 14.76 percent in the County.

8. **Apparent Lack of East-West Transit Service Impairs Mobility for a Significant Proportion of the Study Area Population.** Travel to work time comparisons of various communities within the study area strongly suggests that communities in the Mid-City

portion of the study area (eastern half) are not served by an efficient transit system. Travel to work times are longer than travel to work times in the Westside portion of the study area. This differential strongly suggests that socioeconomic mobility is greatly impaired for residents in the eastern portion of the study area because they cannot conveniently access (via transit) jobs, educational facilities, cultural facilities, and services that are largely concentrated in the western portion of study area.

9. **The Study Area Is Expected to Continue to Capture a Large Share of Regional Population and Employment Growth.** Population and employment forecasts to the year 2020 adopted by the Southern California Association of Governments clearly suggest that the study area will capture a large share of growth over the next 20 years. This growth will place further demands on transit service and well as result in increasing congestion on local roadways and regional highways serving the study area.

10. **Continued Growth in the Business Services Sector (Entertainment and Media Related) Underlies the Future Development Potential in the Study Area.** Growth in the study area will continue to be fueled by the fact that entertainment and media-related businesses are concentrating in the western part of the corridor. Currently, the study area is the center of approximately 1/3 of all new office construction underway in LA County, which makes it the largest office market in Los Angeles. Real estate analysts expect that the demand for production and creative spaces will continue to be robust. The industries and businesses that are attracted to the study area are those that are expected to be the foundation of the local and regional economy for many years into the future.

11. **There are Substantial East-West Travel Patterns that are Not Currently Served by a High Capacity Transit System.** Travel patterns currently indicate that the study area is a primary attraction for work trips with origins in the West and East San Fernando Valleys. A simplified "spider network" of travel patterns derived from origin-destination data in the LACMTA Travel Model suggests north-south travel patterns from the San Fernando Valley convert to east-west demand within the study area. The spider network for 1997 and 2020 conditions both indicate there is strong east-west travel demand along major east-west corridors: Santa Monica Boulevard, Wilshire Boulevard, Santa Monica Freeway and Exposition/Venice Boulevards. None of these corridors are currently served by a high capacity transit system.

12. **Peak Hour Congestion on Study Area Roadways Underlies Need for Transit Improvements.** There is substantial peak hour congestion in the northern portion of the study area. Vehicular travel to the East and West San Fernando Valleys must ultimately pass through the Sepulveda or Cahuenga passes. Access patterns to these routes are congested during the peak travel hours as motorists attempt to pass northward at either the western or eastern ends of the study area.

13. **Local Policies are Oriented Toward Demand Management and Transit Solutions rather than on Physical Roadway Improvements.** Because of the level of buildout and density within the study area, local jurisdictions have generally determined through their local policies that congestion relief improvements should focus on travel demand management rather than on physical improvements such as widening and new roadways.

In a number of cases, local communities desire to eliminate cut through and neighborhood traffic or to support more livable downtown or commercial areas, are supporting initiatives to limit roadway capacity or further slow traffic flow; thus leaving transit improvements as one of the only viable remaining alternatives to reduce traffic volumes and congestion-related delays.

S.4 Corridor Recommendations

Based on the "spider network" analysis (1997 & 2020), there are at least three major east-west corridors:

1. The *Wilshire Corridor* extends 14 miles generally along Wilshire Boulevard from the current Metro Red Line station at Wilshire / Western to downtown Santa Monica.

    a. In the long-term, the recommended strategy is to incrementally extend the Metro Red Line subway westerly from Wilshire / Western. This proposal will require lifting the gas prohibition zone and rescinding Prop A or devising an alternative funding strategy. Based on technical investigations by the KORVE team and those of the Tunnel Advisory Panel, it is technically feasible to safely construct a tunnel for heavy rail transit service through the gas zone.

    b. In the short-term, Bus Rapid Transit (BRT) should be vigorously pursued during Phase 2 of this Study to San Vicente Boulevard when environmental consequences of the selected alternatives will be thoroughly analyzed. In Phase 3, the Final Environmental Documentation will be completed, as well as the Preliminary Engineering. If the Wilshire BRT still looks promising at that point, the final implementation decision should await the final results from the Metro Rapid Bus Phase 1 & 2 Demonstration Project. At the current time, the KORVE team does not have sufficient information to accurately discern the benefits of BRT vis-à-vis Metro Rapid Bus. In other words, are the speed and ridership increases great enough to warrant a permanent transformation of the use, appearance, and function of Wilshire Boulevard, which will occur if BRT is implemented?

2 The *Exposition Corridor* represents a distinct corridor from either the Santa Monica Boulevard Corridor or the Wilshire Corridor, based on investigations to date: it traverses extensive areas targeted by local jurisdictions for economic revitalization; is projected to experience higher than average population and employment growth; and suffers from comparatively poor transit service. It is recommended that both LRT and BRT full-length options be carried forward into Phase 2 with considerations of Minimal Operable Segments to Crenshaw, La Cienega and Venice/Robertson. Initial ridership estimates indicate either option has similar potential, based upon the following key underlying assumptions:

    - Full signal pre-emption at north-south cross streets (for railroad ROW portion of route).

- Top speed of 55 mph in certain segments of the route that are wide and protected.

Key issues to be resolved in Phases 2 & 3 are:

1. How to protect at-grade crossings for buses traveling at up to 55 mph?

2. How to mitigate traffic congestion caused by full signal pre-emption strategy for the LRT and BRT?

3. How to deliver a cost-effective project while avoiding or minimizing localized impacts, such as night-time noise and pedestrian/vehicular safety concerns?

3 *Santa Monica Boulevard Corridor* has long-term merit as a potential transit corridor. The corridor exhibits high travel demand and is lined with transit-supportive land uses. It is recommended that the Santa Monica Boulevard Corridor be further investigated as part of the LRP update.

S.5 Overall Study Area Implementation Strategy

Assuming that the Metro Rapid Bus Project is successful and that Wilshire BRT represents significant benefits above and beyond Metro Rapid Bus, it is anticipated that BRT would be implemented in phases:

1. Wilshire/Vermont to Wilshire/San Vicente (to easterly boundary of Beverly Hills);

2. Beverly Hills westerly boundary (LA Country Club) to Wilshire/Centinela (Santa Monica easterly boundary);

3. Beverly Hills segment; and

4. Santa Monica segment, Centinela to Wilshire/Ocean.

In the long-term (if and when the subway is extended) a decision would have to be made regarding continuation and/or modification of the BRT service.

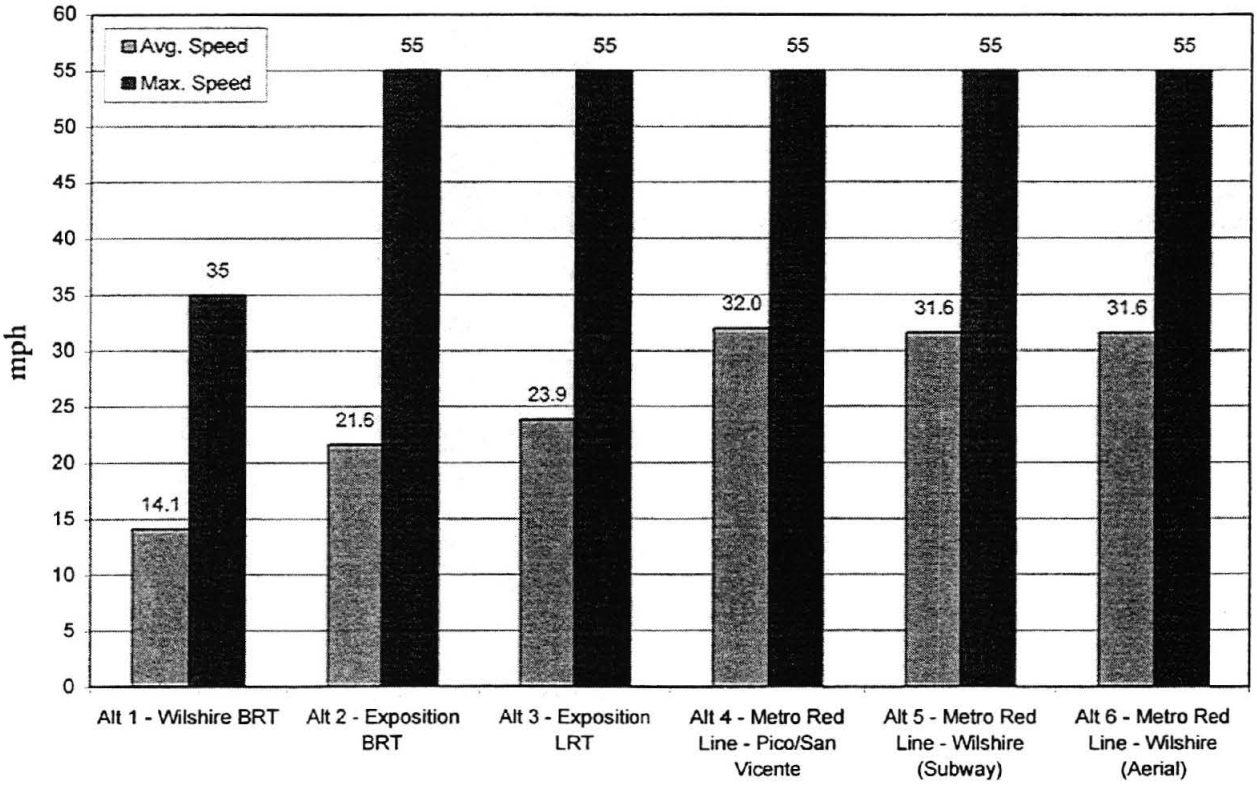
With regard to the Exposition Corridor, the results of Phase 2 – in conjunction with overall MTA funding capability – will provide sufficient information to decide between BRT and LRT. The choice of either alternative will potentially represent both the short and long-term solution, since both represent major investment commitments.

For the mid-term (6-10 years), the combination of the Wilshire BRT with either the Exposition BRT or LRT (choice to be determined in Phase 2), may provide the most cost-effective improvement strategy for the study area.

S.6 Technical Overview

Alternatives Considered. In addition to the required No Action and Transportation System Management Alternatives, this MIS examines six fundamental transit proposals to serve the Mid-City/Westside Study Area. As noted previously, these alternatives have evolved from previous studies, primarily the 1992 Re-evaluation Report/Final SEIS/SEIR for the Mid-City Segment; 1994 Metro Red Line Segment 3/Mid-City Extension Reassessment Study; 1996 Mid-City Alternative Alignment Gas Explorations Study; and the 1998 Regional Transit Alternatives Analysis. This MIS is re-evaluating and refining these earlier identified alternatives. The alternatives vary in route, technology, and vertical alignment. A comparison of peak travel speeds is shown graphically in Figure S.1. The route layouts for each alternative are provided below in Figures S.2 through S.7.

Figure S.1
Average and Maximum Speeds



* Note: Average speed calculated for Exposition BRT and LRT were calculated for speeds along the Exposition ROW Corridor plus values for on-street, mixed flow travel in Santa Monica and Downtown Los Angeles.

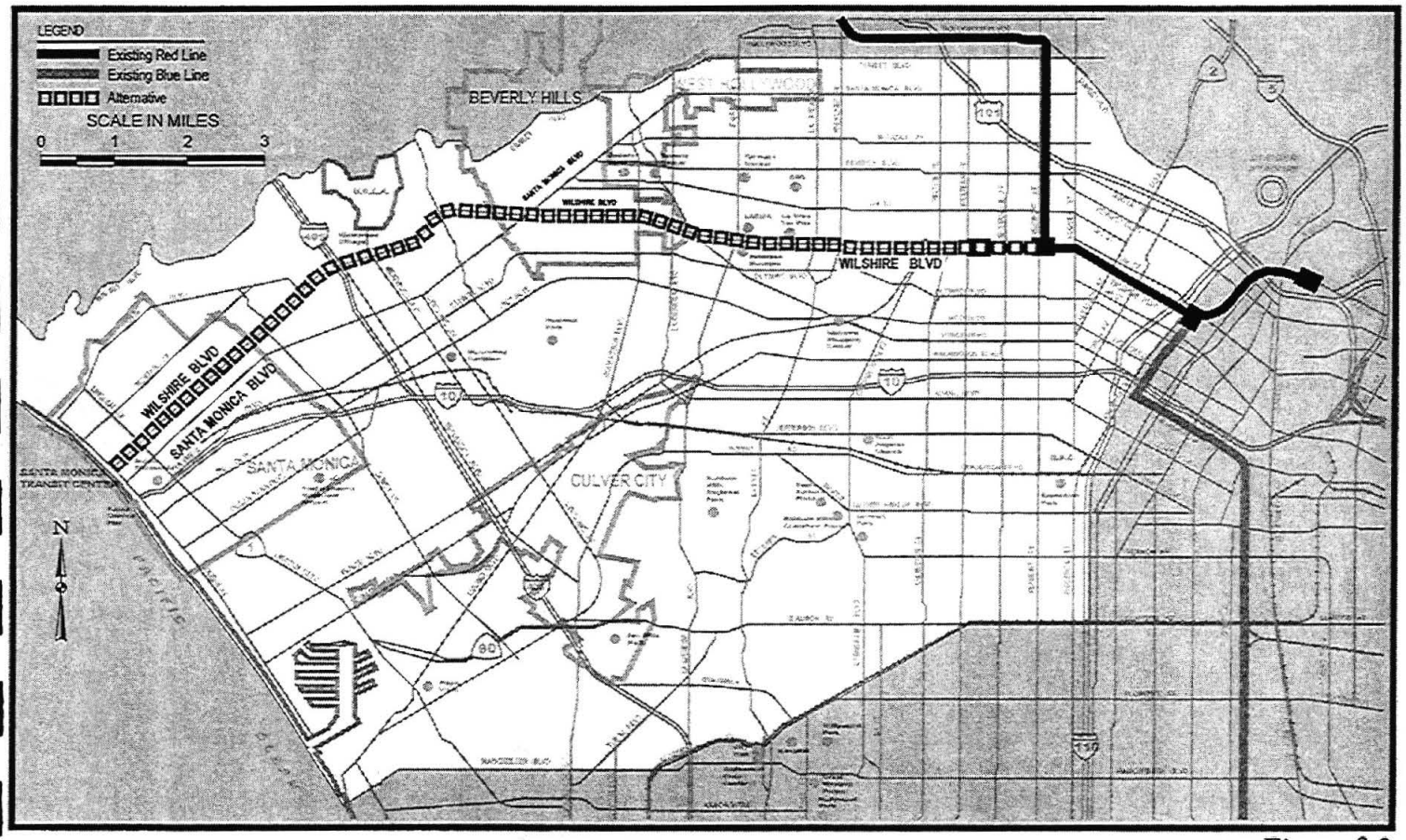


Figure S.2
Alternative 1-Wilshire BRT

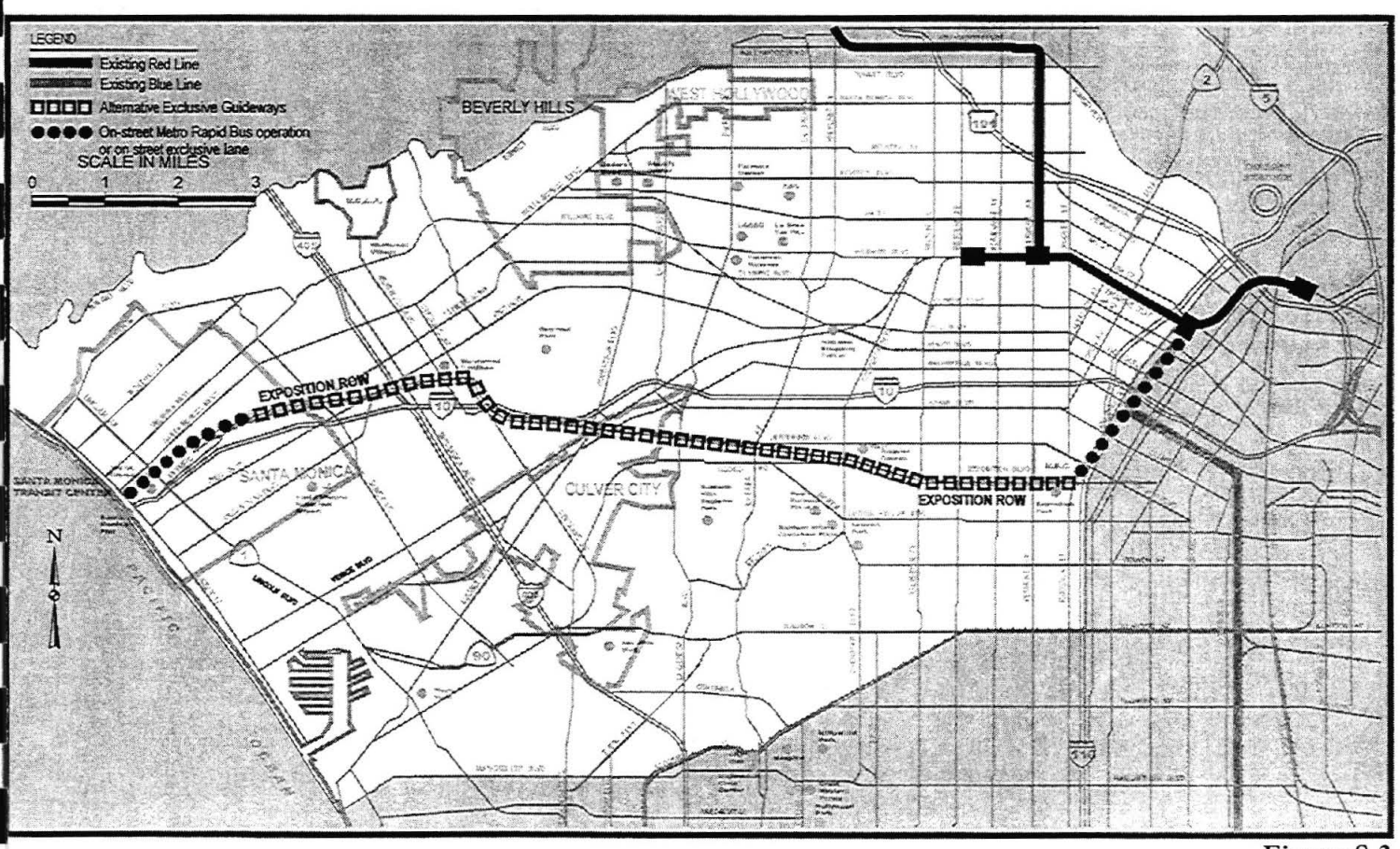


Figure S.3
Alternative 2-Exposition BRT

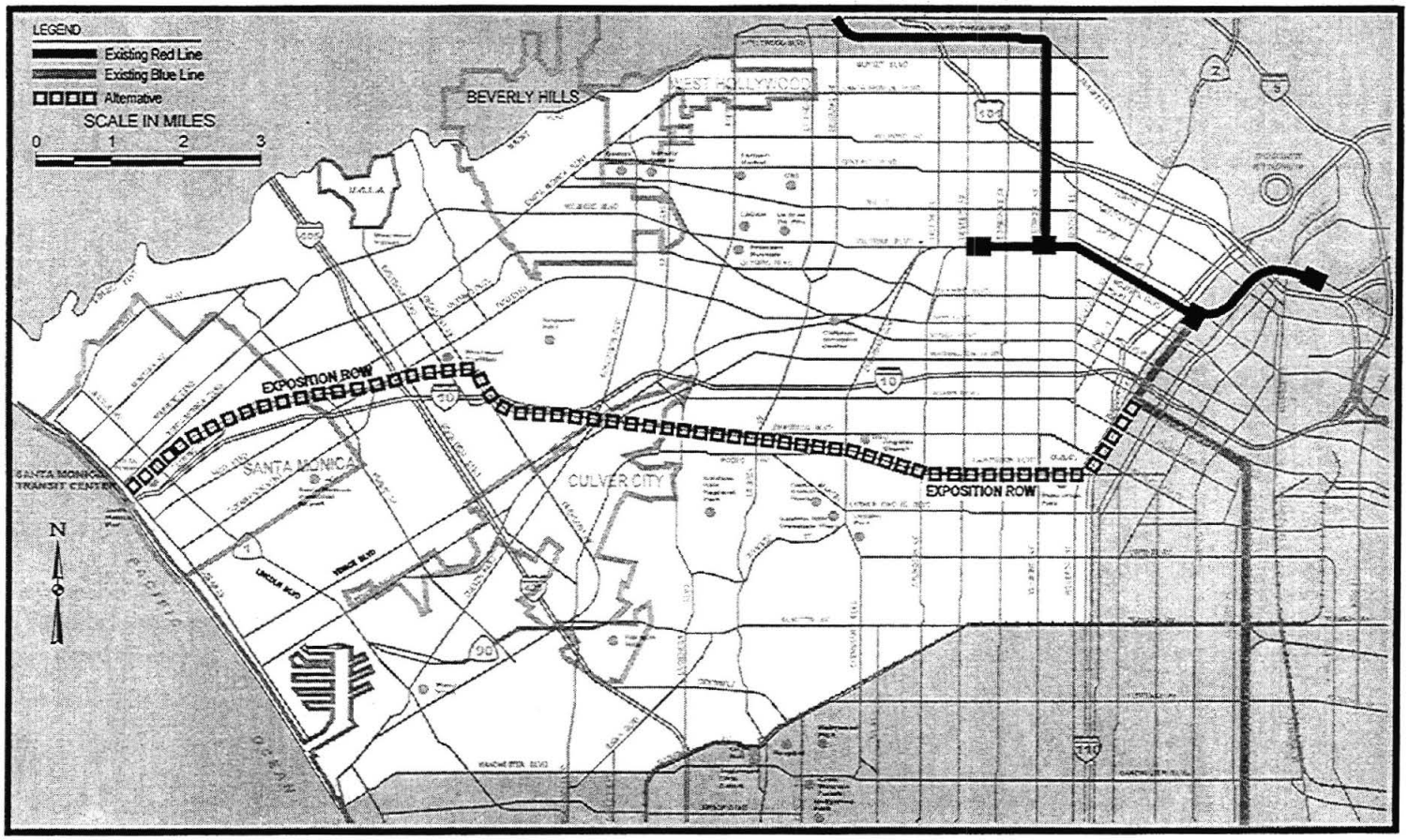


Figure S.4
Alternative 3-Exposition LRT

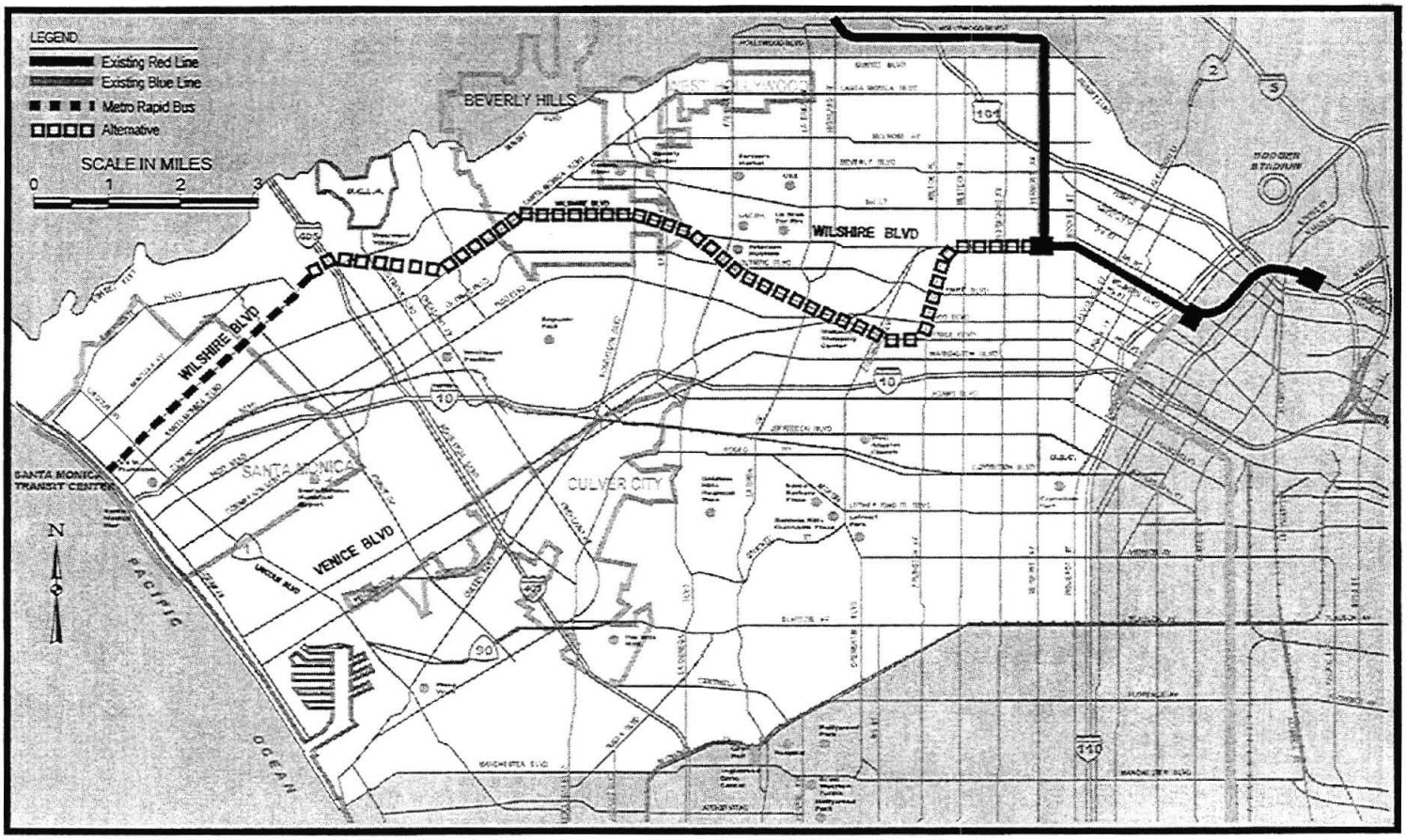


Figure S.5
Alternative 4-Mid-City HRT via Pico/San Vicente

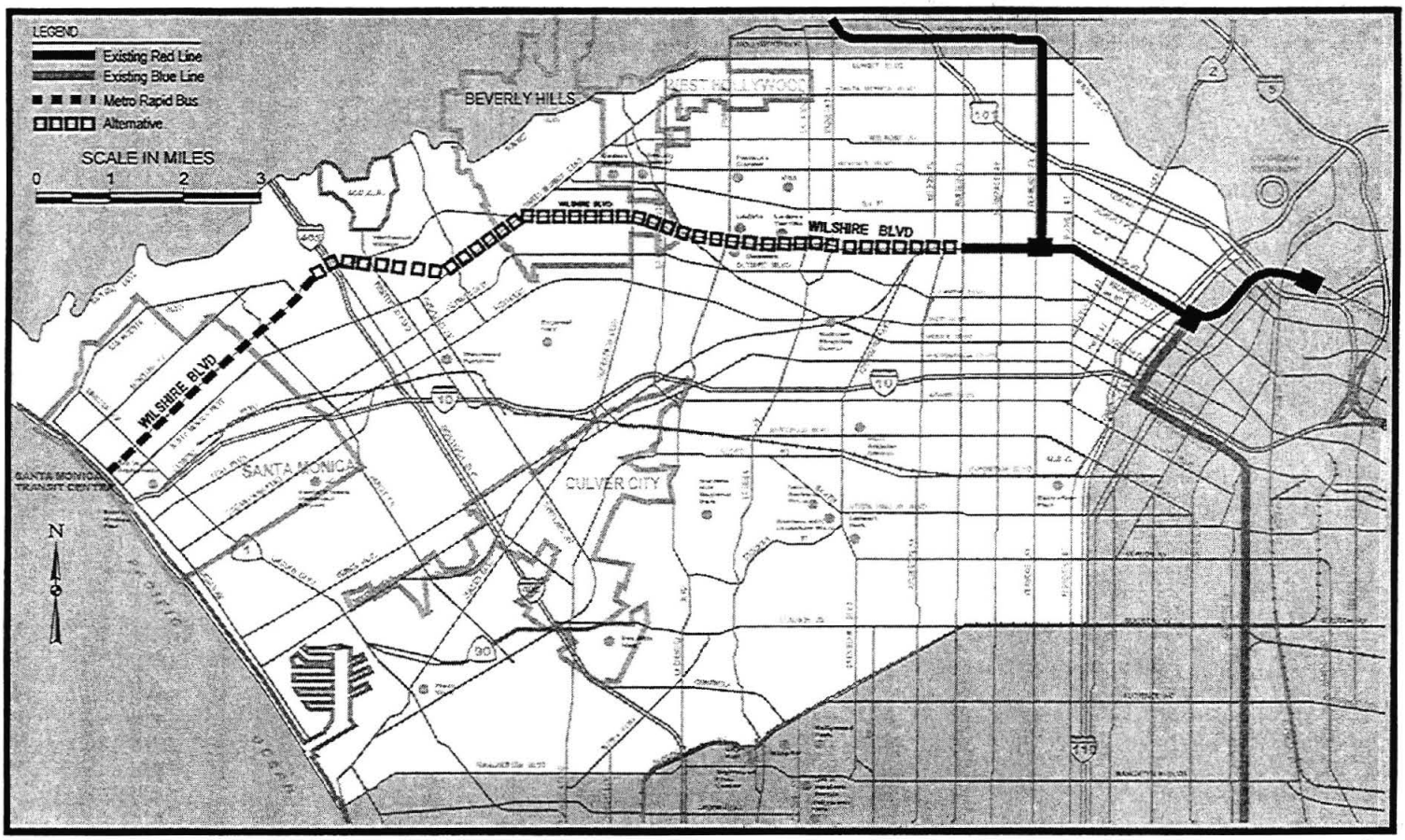


Figure S.6
Alternative 5-Metro Red Line along Wilshire (Subway)

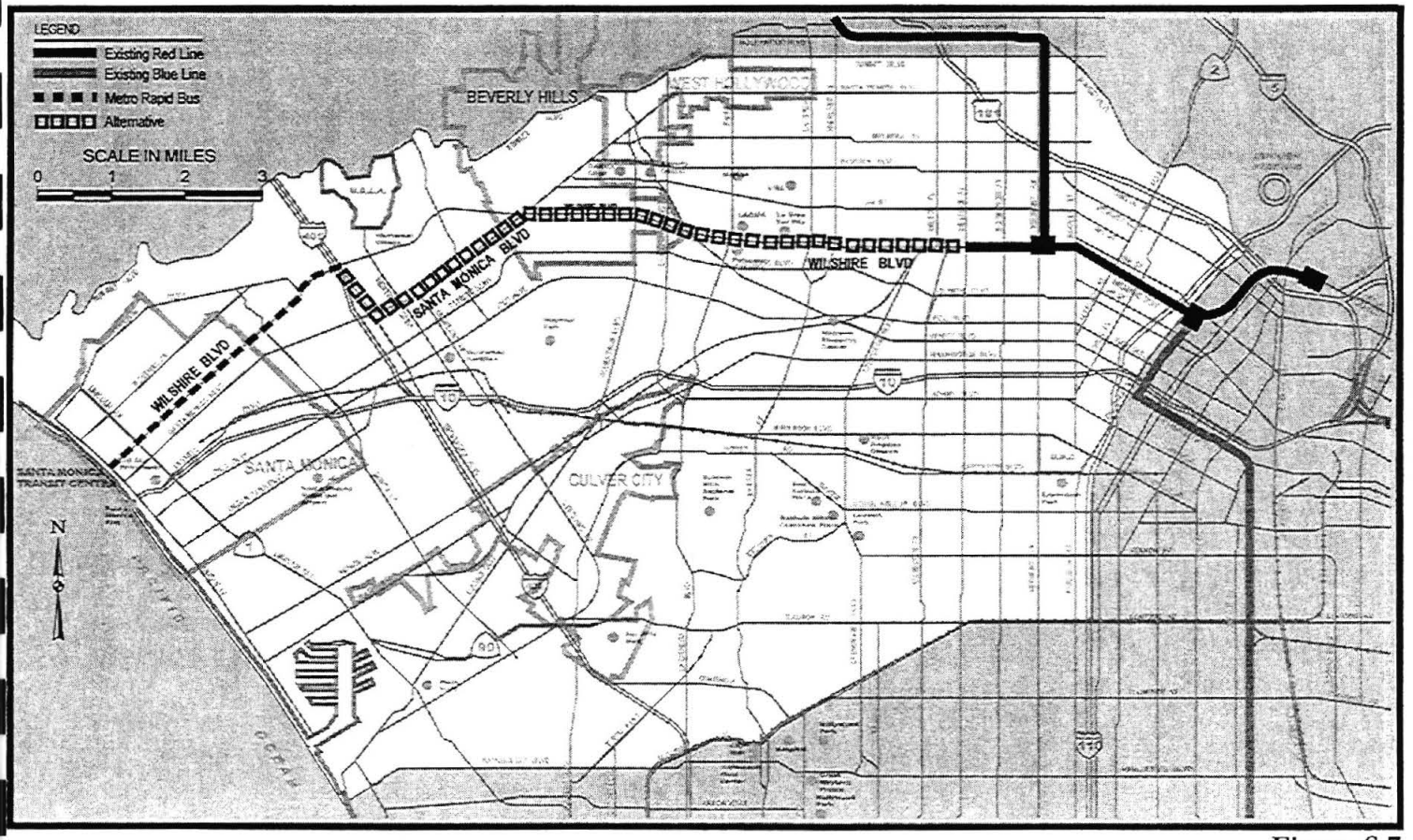


Figure S.7
Alternative 6 - Wilshire (Aerial) HRT

S.7 Evaluation

The alternatives have been evaluated from three distinct perspectives: engineering, environmental, and community response/perception. Findings from each of these perspectives are presented in Table S.1. In addition, Table S.2 presents a summary matrix that compares and contrasts the alternatives (including TSM) for the following key operating costs:

- Capital Cost (full-length and alternative length options);
- Annual Operating Cost;
- New Daily Transit Trips;
- Daily Fixed Guideway Boardings;
- Annualized Cost per New Daily Transit Trip;
- Average and Maximum Speed;
- Travel Time (downtown Los Angeles to downtown Santa Monica);
- Environmental Issues (Qualitative Summary Indicator); and
- Community Concerns (Qualitative Summary).

Table S.1
Evaluation of Considered Alternatives

Alternatives	Engineering	Environmental	Community Response/Perception
#1 Wilshire BRT	• Requires removal of traffic lane in each direction and/or parking • Minimal investment in new traffic signals • Possible reconstruction of median required • Each station requires two separate platforms	• Loss of traffic lanes in Wilshire • Interference/delays to north-south traffic • Some loss of street trees in median possibly required • Highly responsive to transit-supportive land uses	• Poor image as less clean and safe, compared to rail technologies • Traffic diversion into residential neighborhoods from reduced mixed flow lanes • Reconfiguration and reconstruction of landscaped median • Potential to merely shift ridership from current buses
#2 Exposition BRT	• Relatively simple grading and paving required • Fits within existing right-of-way • Several grade separations would need to be built • Maintenance of buses could be spread to several existing facilities	• Interference/delays to north-south traffic • Loss of some street trees in median • Potential impacts to adjacent land uses • Supportive of targeted redevelopment/economic revitalization areas	• Poor image as less clean and safe, compared to rail technologies • Safety concerns near schools and homes and at major intersections • Potential to merely shift ridership from current buses • Bus does not provide adequate capacity compared to LRT

			• Bus more flexible because it can detour around sensitive areas • General environmental concerns including noise, crime, traffic at stations
#3 Exposition LRT	• Fits within existing ROW for majority of route. On-street sections (i.e. at western terminus) would require removal of traffic lane • Several aerial structures would need to be built • A light maintenance yard could be built on MTA property serving both Exposition and Long Beach Blue lines	• Interference/delays north-south traffic • Loss of some street trees in median • Change to visual setting due to overhead lines and support poles • Potential impacts to adjacent land uses • Changes to local circulation due to safety fencing along ROW • Supportive of targeted redevelopment/economic revitalization areas	• Safety concerns for pedestrians and opposing traffic • Noise impacts on nearby residents especially from horns • Vibration effects on nearby residents • Perception that LRT is more appealing than BRT in attracting new riders • LRT needed to provide capacity for ridership • General environmental concerns including noise, crime, traffic at stations
#4 Wilshire HRT - Pico/San Vicente	• Longer alignment than the Wilshire HRT alternative • More wear and tear due to tight turning radii • Additional ventilation required at stations for H_2S and Methane gases • Use of Advanced Tunnel Boring Machine with a full faced cutting wheel would facilitate placement of tunnel sealer	• Potential vibration, ground-borne noise and settlement effects • Exposure to hazardous gases, but can be mitigated • Potential interference with underground utilities • Highly responsive to transit-supportive land uses	• Not worth studying because of: - gas hazards - federal referendum - Proposition A • If pursued, would cause Wilshire traffic and parking impacts
#5 Wilshire HRT - Subway	• Construction potentially close to major buildings along route • Additional ventilation required at stations for H_2S and Methane gases • Use of Advanced Tunnel Boring Machine with a full faced cutting wheel would facilitate placement of tunnel sealer	• Potential vibration, ground-borne noise and vibration effects • Exposure to hazardous gases, but can be mitigated • Potential effect on la Brea Tar Pits and paleontological resources • Potential interference with underground utilities	• Not worth studying because of: - gas hazards - federal referendum - Proposition A • If pursued, would cause Wilshire traffic and parking impacts

		• Highly responsive to transit-responsive land uses	
# 6 Wilshire HRT - Aerial	• Significantly cheaper to build than subway • Would require some reconfiguration of streets at stations • Would require property displacements on both sides of Wilshire Blvd. in station areas.	• Loss of street trees in median • Significant alteration of visual setting, streetscape, and pedestrian experience due to scale, mass, and shadows in impacts • Alteration of views and visual encroachments for building occupants facing Wilshire	• No support • Limited support for an aerial monorail. Some opposition to this concept as well, monorail has same impacts as HRT in areas of property displacement, median reconstruction, loss of left turns. Visual impacts are somewhat less due to smaller guideway structure.

S.8 Conclusion

Basis for Recommendations

Alternative 1 - Wilshire Bus Rapid Transit (BRT)

- Has potential as interim solution to feed Metro Red Line and serve high veolume Wilshire Corridor at low cost.
- Allows faster speeds than Metro Rapid Bus in future as congestion grows
- Further detailed analysis warranted to see how inpacts can be mitigated

Alternative 2 - Exposition Bus Rapid Transit (BRT)

- Offers significant long-term transportation benefits of community impacts can be resolved
- Connection to Downtown Los Angeles, USC, Exposition Park and Harbor Freeway Transitway from key centers in Santa Monica, West Los Angeles and Culver City
- Achieves similar ridership to LRT at less cost

Alternative 3 - Exposition Light Rail Transit (LRT)

- Offers significant long-term transportation benefits of community impacts can be resolved
- Direct connection via Blue Line to Downtown Los Angeles, USC, Exposition Park and Harbor Freeway Transitway from key centers in Santa Monica, West Los Angeles and Culver City

- Less frequent disruption of intersections and adjacent properties than BRT
- Has capacity to serve post-2020 demand

Alternative 4 – Wilshire Heavy Rail Transit (HRT) via Pico/San Vicente

- Not currently feasible due to funding restrictions
- Longer route to Westside than Wilshire Corridor
- Lower density and fewer activity centers served than Wilshire Corridor

Alternative 5 – Wilshire Heavy Rail Transit (HRT) Subway

- Not currently feasible due to funding restrictions and Methane Gas Prohibition Zone
- Underground gas issue may have technical solutions that would permit construction of a subway
- Further analysis of this alternative should be undertaken in Long Range Plan due to high densities and transit use

Alternative 6 – Wilshire Heavy Rail Transit (HRT) Aerial

- Achieves same ridership at lower cost than subway alternative, but would alter the character of Wilshire Boulevard in a permanent and unaccpetable manner
- Considered in 1987 and deleted from further consideration due to visual impacts and intense community opposition
- Monorail option would have similar negative environmental consequences and would attract fewer riders than HRT. No acceptable site has been identified for the necessary storage and maintenance yard

Recommendations

1. **Wilshire Corridor**
   - Carry forward BRT into environmental clearance to San Vicente
   - Further consideration of Wilshire subway in Long Range Plan

2. **Exposition Corridor**
   - Carry forward both BRT and LRT into environmental clearance to Santa Monica, with consideration of phased lengths to Crenshaw, La Cienega and Venice/Robertson

ALTERNATIVE	CAPITAL COST (MILLIONS IN 1999 DOLLARS)				ANNUAL OPERATING COST (MILLIONS IN 1999 DOLLARS)		NEW DAILY TRANSIT TRIPS		DAILY FIXED GUIDEWAY BOARDINGS	ANNUALIZED COST PER NEW DAILY TRANSIT TRIP	
	FULL LENGTH	ALTERNATIVE LENGTH OPTION			COMPARED TO NO BUILD	COMPARED TO TSM	COMPARED TO NO BUILD	COMPARED TO TSM		COMPARED TO NO BUILD	COMPARED TO TSM
TSM	$92	N/A	N/A	N/A	$24	N/A	6,600	0	N/A	$16	0
1 Wilshire BRT	$169 To Santa Monica	$62 To San Vicente	N/A	N/A	$41	$17	8,300	1,700 [10,600]	11,000 [34,000]	$24	$60
2 Exposition BRT	$188 To Santa Monica	$76 To La Cienega	$87 To Venice Blvd	N/A	$32	$7	12,400	5,800	23,000	$14	$13
3a Exposition LRT (Baseline)	$589 To Santa Monica	$178 To Crenshaw	$312 To La Cienega	$398 To Venice Blvd	$45	$21	15,300	8,700	38,600	$21	$25
3b Exposition LRT (Minimum Grade Separations)	$431 To Santa Monica	$135 To Crenshaw	$209 To La Cienega	$227 To Venice Blvd	$45	$20	15,300	8,700	38,600	$18	$20
4 Wilshire Blvd HRT Subway (Via Pico/ San Vicente)	$2,643 To Federal	$673 To Pico / San Vicente	N/A	N/A	$29 (Pico/ San Vicente)	$5 (Pico/ San Vicente)	10,400 (Pico/ San Vicente)	3,700 (Pico/ San Vicente)	11,400 (Pico/ San Vicente)	$28 (Pico/ San Vicente)	$50 (Pico/ San Vicente)
5 Wilshire Blvd HRT Subway (Via Wilshire Blvd)	$2,469 To Federal	$891 To Fairfax	N/A	N/A	$41	$17	15,300	9,200	33,500	$50	$75
					$31 (Fairfax)	$7 (Fairfax)	8,800 (Fairfax)	2,200 (Fairfax)	15,800 (Fairfax)	$40 (Fairfax)	$114 (Fairfax)
6 Wilshire Blvd HRT Aerial (Via Wilshire Blvd)	$1,269 To Sepulveda	$543 To Fairfax	N/A	N/A	$41	$17	15,300 (Est)	9,200 (Est)	33,500 (Est)	$30	$41
					$31 (Fairfax)	$7 (Fairfax)	8,800 (Fairfax)	2,200 (Fairfax)	15,800 (Fairfax)	$29 (Fairfax)	$72 (Fairfax)

NOTE: Brackets [ ] indicate Sensitivity
Model Run results assuming full signal preemption.

TABLE S.2

ALTERNATIVES SUMMARY EVALUATION MATRIX

1. PURPOSE AND NEED

1. *PURPOSE & NEED*

1.1 Introduction

This chapter establishes the purpose and need for transportation investments in the Mid-City/Westside Study Area. This discussion builds upon and uses as a point of departure the *West Los Angeles Transit Corridor Technical Report* prepared by the Southern California Association of Governments (SCAG) in 1998. The Transit Corridor Technical Report evaluated transportation alternatives for two corridors: 1) the Exposition/Martin Luther King Transit Corridor; and the Wilshire Corridor. In evaluating whether a major transit investment or investments is warranted in the Mid-City/Westside Study Area a number of themes emerge from the SCAG evaluation that are amplified in the discussions below.

1.1.1 Study Area Location and Profile

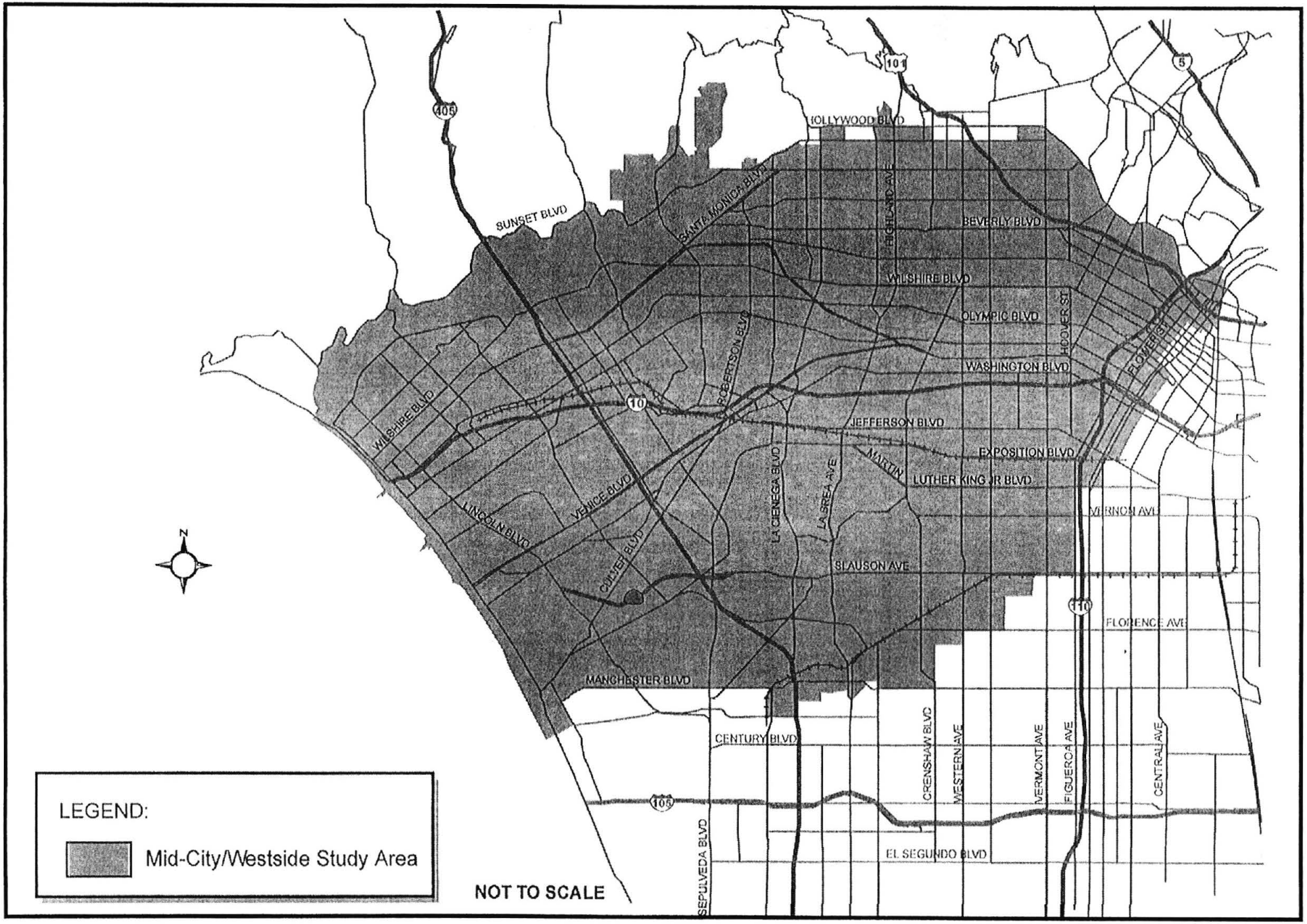
The Study Area is located in western Los Angeles County and encompasses approximately 112 square miles (Figure 1.1). Approximately 16 percent of the population and 24 percent of the jobs in Los Angeles County are concentrated in the Study Area. According to a market trend analysis conducted by Grubb & Ellis, 27 percent of Los Angeles County's 161 million square feet of new office space is on the Westside, which makes it the largest office market in Los Angeles.[1]

The Study Area is roughly bounded by the Pacific Ocean on the West; Sunset Boulevard and the Hollywood Freeway (US 101) on the north; Hope Street and Figueroa Street on the east; and Slauson/Manchester Boulevards on the south. The Study Area includes portions of the City of Los Angeles, unincorporated areas of Los Angeles County (Baldwin Hills, Sawtelle) and the cities of West Hollywood, Beverly Hills, Santa Monica and Culver City. As shown in Figure 1.2 this Study Area is slightly different than the area evaluated by SCAG in 1998, particularly along the northern boundary which SCAG extended to Santa Monica Mountains ridge line along Mulholland Drive and where this current study has limited the northern boundary to Sunset Boulevard to focus on areas that may directly benefit from transit improvements.

The Mid-City/Westside Study Area represents one of three regional Study Areas in which potential expansion of the Los Angeles Rapid Transit Project (Metro Red Line) is being evaluated (Figure 1.3). The existing Metro Red Line system has four basic segments:

- Segment 1 (Union Station to Westlake/MacArthur Park) was competed and opened for service in 1993;
- Segment 2A (Westlake/MacArthur Park to Wilshire/Western) was completed and opened for service in 1996;
- Segment 2B (Wilshire/Vermont to Hollywood/Vine) was completed and opened for service in June 1999;
- Segment 3-North Hollywood (Hollywood/Vine to North Hollywood) is on schedule to open for service in June 2000.

[1] Grubb & Ellis, Office Market Trends, Third Quarter, 1999.



Mid-City/Westside Transit Corridor
Re-Evaluation/Major Investment Study

FIGURE 1.1

REGIONAL LOCATION

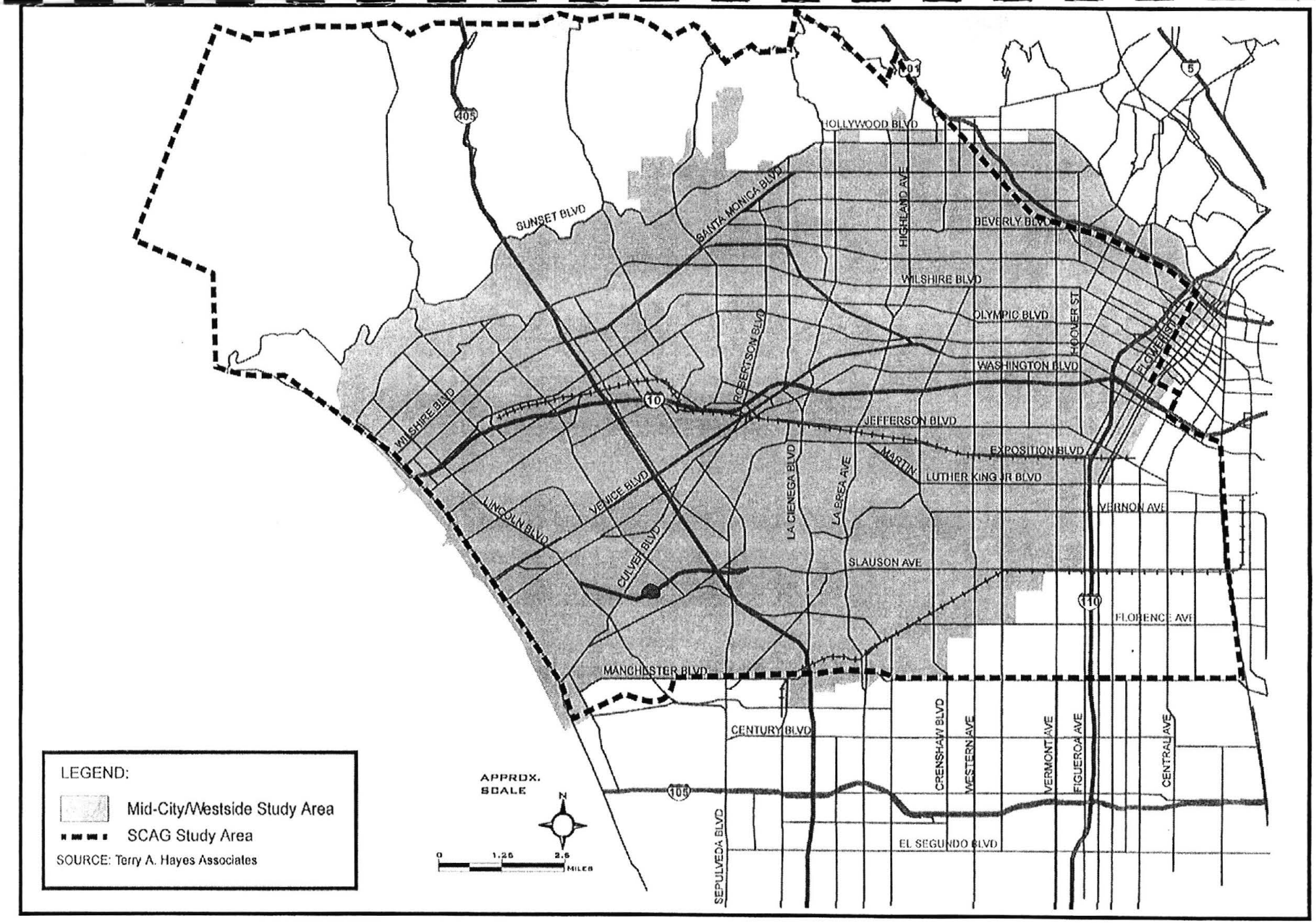


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FIGURE 1.2

MID-CITY/WESTSIDE STUDY AREA AND SCAG STUDY AREA

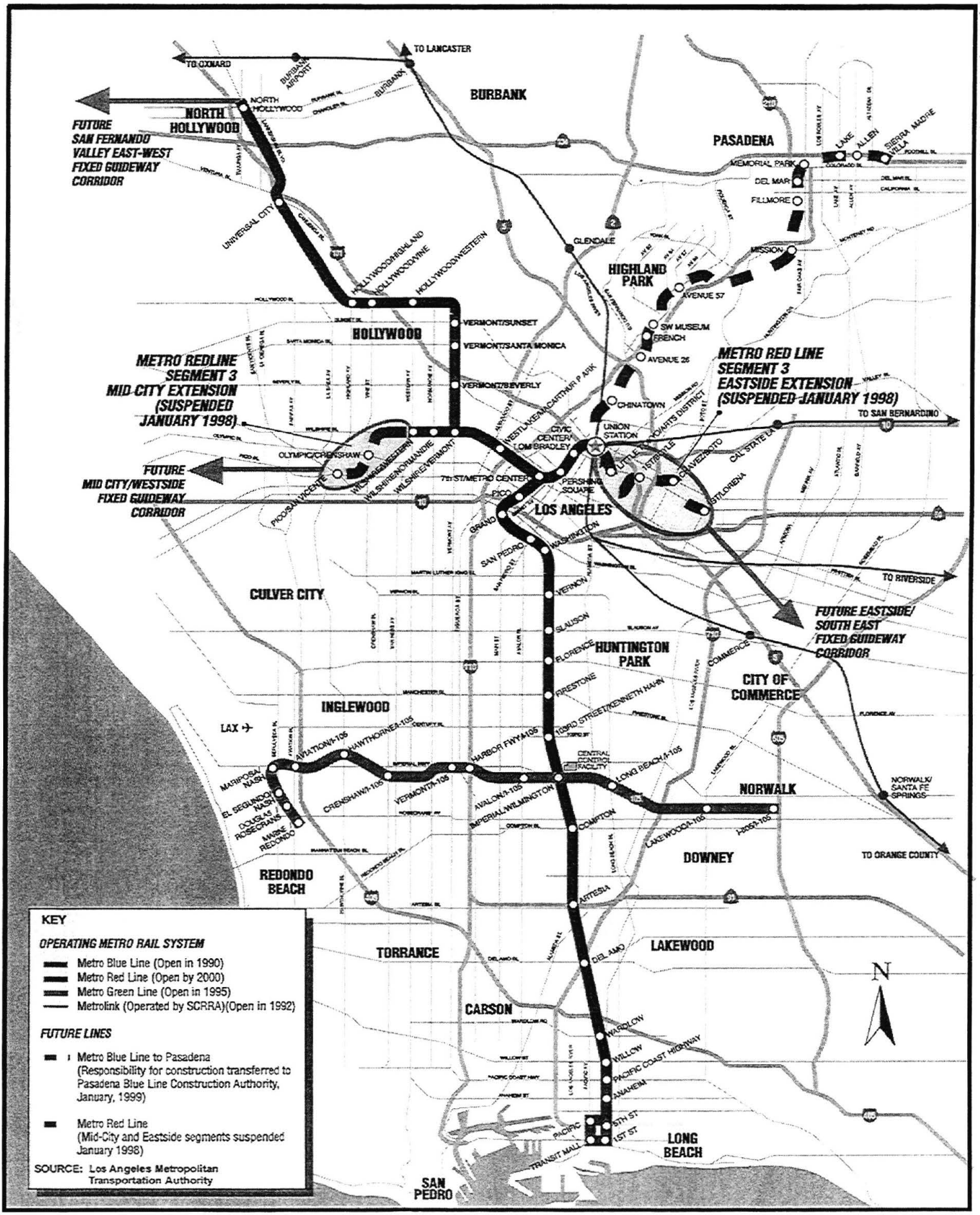

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FIGURE 1.3

MTA SYSTEM MAP WITH EXPANSION STUDY AREA

The other two regional Study Areas in which potential expansion of the Metro system are being evaluated include the Eastside and the San Fernando Valley. These two Study Areas are being evaluated under separate studies and are not included in this report.

1.1.2 Regional Transportation Planning Policy Context.

Regional transportation planning for five counties in southern California is the responsibility of the Southern California Association of Governments (SCAG) the metropolitan planning organization (MPO) for the area. The 1998 Regional Transportation Plan (RTP) entitled "Community Link 21" was adopted by the SCAG Regional Council in April 1998. It is the regional planning document which establishes the goals, objectives and policies for the transportation system and establishes the implementation plan for transportation investments over the next 20 years.

The five goals of the RTP are as follows:

- Meet the need for mobility and access to transportation of an increased employment and population base in the Subregions and Region, reduce congestion to 1990 or better levels of performance and enhance the movement of goods.
- Ensure that transportation investments are cost-effective, protect the environment, promote energy efficiency and enhance the quality of life.
- Serve everyone's transportation needs in a safe, reliable and economical way, including those who depend on public transit, such as the elderly, handicapped and disadvantaged.
- Develop regional transportation solutions that complement subregional transportation systems and the needs of cities, communities and Subregions.
- Promote transportation strategies that are innovative and market-based, encourage new technologies and support the Southern California economy.

The Mid City/Westside Transit Study Area extends through two of the 13 Subregions in SCAG's planning area: (1) the City of Los Angeles and (2) the Westside Cities Subregion. The Westside Cities Subregion includes the cities of Beverly Hills, Culver City, Santa Monica, and West Hollywood and the unincorporated portions of Los Angeles County near Marina Del Rey and the Baldwin Hills.

The RTP includes regional performance indicators with objectives against which they can be measured. In preparing the RTP, SCAG developed subregional data for the performance indicators, so that policy makers could understand the performance of the transportation system in each subregion, as well as the region as a whole. Because the Westside Cities Subregion does not represent a contiguous land area, but rather four islands surrounded by the City of Los Angeles, for RTP performance indicators, SCAG developed aggregated data to reflect transportation conditions in the Westside Cities and the adjacent portion of the City of Los Angeles (west of Vermont Avenue, south of Mulholland Drive, north of I-105 Freeway). The performance indicators, objectives and results for 1990 and 2020 Baseline are shown in Table 1.1.

Table 1.1
Mid-City/Westside RTP Performance Indicators

Performance Indicator	Measurement	Objective	1990 Results	2020 Baseline Forecast
Mobility	Average Work trip travel time	22 minutes	23 minutes	29 minutes
	PM peak hour highway speed	33 mph	25.2 mph	22.6 mph
	Percent of Peak travel in Delay	33%	32%	40%
Accessibility	Work Opportunities Within 25 Minutes	88%	56%	61%
Environment	Meet Federal & State Standards	Meet Air Plan Emission Budgets	82 tons per day ROG	16 tons per day ROG
Reliability	Percent Probability of On-Time Arrival	63% Transit 76% Highway	100% 100%	74% 52%
Safety	Fatalities per Million Passenger Miles	0.008	n.a.	0.010

Source: SCAG, Regional Transportation Plan, 1998.

The 2020 Baseline forecasts indicate the conditions that could be expected in the Mid-City/Westside area in 2020 if only the projects currently under construction or included in the seven-year Regional Transportation Improvement Program (RTIP) are in place. This equates to a No Build Alternative in the Mid-City/Westside Transit Study Area. The performance indicators illustrate that travel conditions on the Westside will worsen by 2020 and the area will not meet regional objectives for mobility, accessibility, reliability or safety, without the implementation of additional transportation improvements.

Average travel time to work (mobility indicator) will increase by 26 percent over 1990 conditions to 29 minutes and will exceed the regional objective of 22 minutes by 32 percent. Average travel speeds on all parts of the highway network (arterials and freeways) will decline to 22.6 mph, 32 percent below the regional objective. Fully 40 percent of travel in peak hours will be wasted due to delay.

The percentage of job opportunities within 25 minutes of employees' homes (accessibility indicator) will improve in the subregion due to the high employment growth, but 39 percent of the workers on the Westside will have to travel more than 25 minutes to work, compared to the regional objective of 22 minutes. The continued implementation of reduced emission vehicles (environment indicator) will reduce the amount of reactive organic gases produced on the Westside, but the reliability of the transportation system will decline. A commuter probability of arriving at a destination on time (reliability indicator) will decrease to 74 percent if riding transit and to 52 percent if traveling by car, illustrating how unpredictable travel will become as increased congestion will cause the subregion to exceed the regional safety objective.

1.2 Major Themes Supporting Transit Investment In The Study Area

Given the RTP forecasts and the data provided in the discussions that follow, several themes emerge regarding the need for transportation improvements in the Study Area.

- Need for Transit Improvements Established in Previous Studies
- Major Concentration of Activity Centers and Destinations
- "Centers Concept" Land Use Policy is Transit Based
- High Concentration of Transit Supporting Land Uses
- High Population and Employment Densities Support Transit
- Local Redevelopment Plans Depend Heavily on Transit Improvements
- High Existing Transit Usage
- Substantial Transit-Dependent Population within Study Area
- Impaired Mobility for Transit-Dependent Residents
- Study Area Share of Regional Population and Employment Growth Remains High
- Business Service Sector is Backbone to Local, Regional, and Statewide Economic Growth
- Existing and Projected Travel Demand Patterns are Not Met by Transit Services
- Peak Hour Roadway Congestion over Large Area Underlies Need for Transit Improvements
- Local Policies Oriented Toward Demand Management and Transit Solutions Rather Than Physical Roadway Improvements

These themes amplify the rationale for transit investment in the Mid-City/Westside Study Area. They are discussed in more detail below.

1.3 Need For Transit Improvements Established In Previous Studies

Providing high capacity transit service improvements has been long recognized in the Mid-City/West Area. Since 1970's, the Los Angeles County Metropolitan Transportation Authority (LACMTA) and its predecessors (SCRTD, LACTC) have conducted numerous transportation planning and environmental impact studies that established the need and feasible locations for improved east-west oriented transit service in various parts of the Study Area. As shown in Figure 1.4, the northeastern portion of the Study Area is currently served by the Metro Red Line Subway Redline. The westward extensions of transit service have been the focus of a number of studies.

In November 1989, the Final Supplemental Environmental Impact Statement/ Supplemental Environmental Impact Report (SEIS/SEIR) was certified for an 18-mile subway project between Union Station and North Hollywood. Several additional planning and environmental studies prepared in the late 1980's and early 1990's identified the potential for expansion of the Metro Red Line system in the Eastside and Mid-City/Westside Transit Study Areas. These efforts led to the adoption in 1994, of Locally Preferred Alternatives (LPA) for the Metro Red Line Segment 3 Eastside and Mid-City Study Areas. Full Funding Grant Agreements were executed with the Federal Transit Administration (FTA) and the projects were transitioned into the construction phase.

In January 1998, however, the MTA suspended work on extensions of the Metro Red Line heavy rail subway project. Specifically, the suspended segments included the Eastside Extension from Union Station to 1st/Lorena (4 stations – 3.7 miles) and the Mid-City Extension from Wilshire/Western to Pico/San Vicente (2 stations – 2.3 miles).

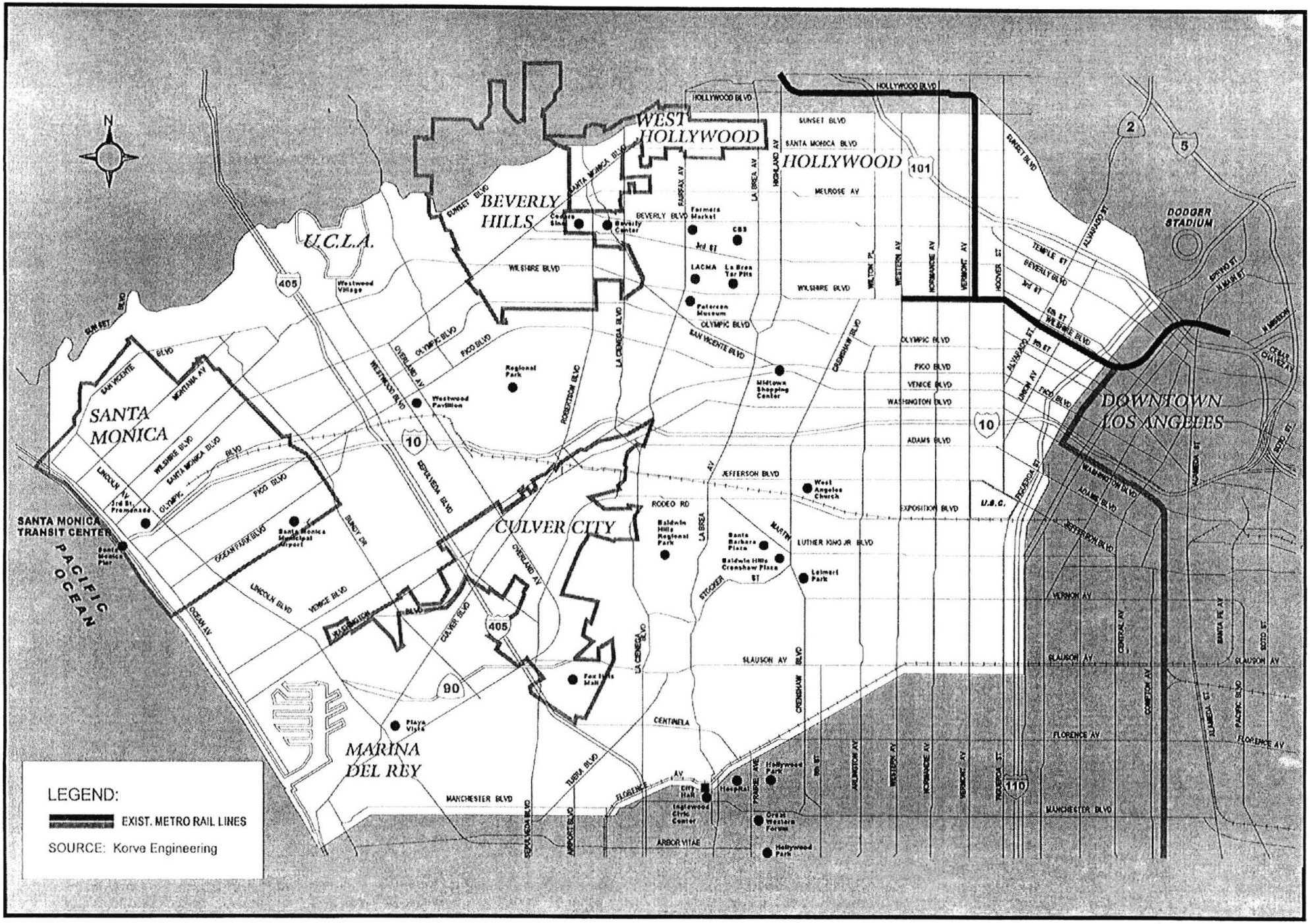

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FIGURE 1.4

EXISTING METRO RAIL LINES IN STUDY AREA

The following summarizes the most significant recent actions that have driven the need for project suspension and redefinition:

MTA Restructuring Plan. Reasons for suspension of work on the Mid-City and Eastside extensions are documented in the MTA Restructuring Plan: Analysis and Documentation of the MTA's Financial and Managerial Ability to Complete North Hollywood Rail Construction and Meet the Terms of the Bus Consent Decree, adopted by the MTA Board of Directors on May 13, 1998 and subsequently approved by the FTA on July 2, 1998. The Restructuring Plan documented that the MTA did not have sufficient local matching funds to finance heavy rail subway projects in the Eastside and Mid-City Study Areas as anticipated in the original Full Funding Grant Agreements for those projects. At the same time, the Restructuring Plan called for the MTA to study "viable and effective options" for all parts of Los Angeles County, with an emphasis on the Study Areas in which the rail lines had been suspended.

Within the Eastside and Mid-City Study Areas, this necessitated the examination of alternative fixed guideway options to heavy rail subway. It also committed the MTA to a re-evaluation of the financial capacities of the agency to undertake new start, fixed guideway projects. To that end, the Board authorized the Regional Transit Alternatives (RTAA Study) that commenced in July 1998 and was completed in November 1998.

Regional Transit Alternatives Analysis (RTAA Study). The RTAA Study accomplished several important objectives for the MTA. The study identified the amount of funding available for new projects between FY1999 and FY2004; it suggested possible funding allocations; it identified immediate bus transit improvements in Los Angeles County; and it established a framework for further fixed guideway project development in the Eastside, Mid-City, and San Fernando Valley Study Areas.

The study included a preliminary evaluation of fixed guideway alternatives in the Eastside, Mid-City, and San Fernando Valley Study Areas. The study did not make recommendations with regard to preferred fixed guideway transit modes or configurations, however, it recommended that a Major Investment Study level of analysis be conducted to provide more information regarding these choices.

Results of the RTAA Study were presented to the MTA Board on November 9, 1998. At that meeting, the Board approved the concept of a recommended rapid bus plan, under which the MTA will develop a demonstration project for three rapid bus lines serving the Eastside, Mid-City, and San Fernando Valley. The Board also reaffirmed its commitment to fund fixed guideway transit improvements beyond rapid bus in the suspended rail corridors. A priority funding commitment of $220 million through FY2004 was made to the Eastside and Mid-City areas from remaining uncommitted funds.

TEA-21 Redefinition of Metro Red Line. Segment 3 – As a necessary parallel step in obtaining greater flexibility in project definition for the Eastside and Mid-City Study Areas, the MTA sought to expand the definition of Segment 3 of the Metro Red Line, which was defined in both Intermodal Surface Transportation & Efficiency Act (ISTEA) and the Segment 3 Full Funding Grant Agreement as "heavy rail subway." With the cooperation and assistance of the Los Angeles congressional delegation, the MTA obtained revised definitional language in the Transportation Equity Act for the 21st Century, which was signed into law by the President on June 9, 1998. This

action was taken with the specific intent of being able to utilize the Segment 3 funding balance in the future for any type of fixed guideway project in the Eastside and Mid-City Study Areas. The TEA-21 legislation expanded the definition of the Segment 3 project to include "any fixed guideway project" (not just heavy rail subway) in the transportation corridors to be served by the three extensions of Segment 3. It also authorized the start of final design and construction for the Segment 3 project during the FY1998-2003 funding cycle under section 5309 (new starts funding).

Proposition A Ballot Initiative (Subway Funding Prohibition). A new County law, referred to as the Metropolitan Transportation Authority Reform and Accountability Act of 1998, was a ballot initiative, which was approved by the voters (and became effective) on November 3, 1998. The key substantive provisions of this initiative prohibit the use of Proposition A County sales tax revenues and Proposition 'C' County sales tax revenues to pay the cost of planning, design, construction or operation of any new subway. The term "new subway" is defined to mean any subway (a rail line which is in a tunnel below grade) other than the Metro Red Line Segments 1, 2 or 3 (North Hollywood). As a result, the initiative prohibits the use of these sales tax revenues to build a subway in the Eastside or Mid-City Study Areas.

The initiative does not prohibit the use of sales tax revenues to design and construct light rail, at-grade rail, elevated rail systems or busways in the Eastside, Mid-City or other areas of Los Angeles County. Nor does this initiative prevent the MTA from using State or Federal revenues or local revenues other than sales tax, to design and construct a new subway in the Eastside or Mid-City areas.

1.3.1 Corridor Studies

In addition to the significant recent actions described above, several studies have been conducted within the Mid-City/Westside Study Area. These are described below in chronological order.

Los Angeles Metro Orange Line Extension Transitional Analysis Study, July 1990. The purpose of this study was to demonstrate that an extension to the east (Pico/Whittier Boulevard) and west (Wilshire/First) of the Metro Rail system could meet the cost-effectiveness thresholds and further study (Alternatives Analysis/Draft Environmental Impact Statement) could then be undertaken. The analysis indicated that both Study Areas met the then required "Cost per New Rider" criteria of below $10.00 (based on the former UMTA, now FTA, criteria). It was indicated that the corridors could then proceed to the Alternatives Analysis (AA)/Draft EIS phase of study.

Exposition Right-of-Way Preliminary Planning Study, May 1992 - This study evaluated alternatives for the 12-mile corridor of the former Southern Pacific Railroad right-of-way extending from just south of downtown Los Angeles to 17th Street in Santa Monica. The study examined light rail transit, trolley bus, a transitway, and a bicycle path. The study recommended four routes and various types of modes for these routes for further study, and identified future steps on which subsequent study should focus.

Exposition Right-of-Way Final Draft Phase I Summary Report, December 1994 - This study continues the transportation planning process initiated in the May 1992 Preliminary Planning Study for this corridor and examines transit improvements to address mobility needs and demands in the Exposition Right-of-Way Corridor. The study recommended to defer or retain alternatives

developed in the course of the analysis, and recommended design enhancements and light rail transit (LRT) enhancement options.

Exposition Park Branch Line Rail Transit Corridor Route EIR, April 1992 - This environmental impact report examined light rail transit facilities which would operate as a branch of Metro Blue Line. The extensions would link and serve the employment, residential, educational, and cultural centers in downtown LA to Exposition, USC Campus area and Vermont business area.

Mid-City Extension Reassessment Study, July 1994 - This study provided information regarding the extent and nature of the hydrogen sulfide gas in the Mid-City corridor. The study identified alternatives that would generally raise the alignment of the Metro Rail Locally Preferred Alternative (LPA) above the San Pedro Formation and assessed the extent that the alternatives would minimize potential human exposure to hydrogen sulfide gas during project construction and operation.

Westside Bus Improvement Study, March 1998 - This study examined bus improvements in the area bounded by Hoover/Hyperion, the Pacific Ocean/Malibu, Mulholland Drive, and I-10 Freeway/Culver City southern boundary/Jefferson Boulevard. The study found that the current bus service resulted in: slow arterial bus operations, overcrowding on certain lines/times, bus bunching, and continuity and coordination problems. Recommendations included introducing new and faster "Metro Rapid bus" service and high capacity buses; adjusting network and services for Metro Red Line openings; improving network connections and service continuity; restructuring duplicated or poorly performing bus route segments; enhancing bus passenger facilities; and developing a "seamless" fare structure.

Los Angeles Metro Rapid Bus Demonstration Program, March 1999 - The purpose of the Metro Rapid Bus demonstration program is to address the need for faster travel choices for bus riders, especially the transit-dependent, on an interim basis prior to the completion of the Eastside and Mid-City rail segments of the Metro Red Line. Potential expansion of the system countywide would be predicated on the performance and public acceptance of the demonstration project.

Mid-Cities Bus Transit Restructuring Study, March 1999 - This study was a follow-up to the 1993 Inner City Transit Needs Assessment Study, with the goals of improving ridership, operations, cost-efficiency and cost-effectiveness, and integration of the transit system. The Study Area was bounded by the I-105 Freeway, the Pacific Ocean/La Cienega Boulevard, Slauson Avenue/Marina Freeway, and Alameda Street. Recommendations from the study included a three-tiered restructuring strategy, addressing the needs of the core service of basic routes; the community connectors which serve inter-community travel; and the local services, including shuttles, circulators, feeder services, and demand responsive services.

Crenshaw-Prairie Corridor Route Refinement Study, July 1999 - This study evaluated future transportation system improvements for the corridor bounded by Arlington Avenue, Pico Boulevard, La Cienega/Sepulveda Boulevards, and Imperial Highway/El Segundo. The RRS identifies a final set of alternatives but does not provide data for decision makers to select among the alternatives. The study recommended as a next step the reinitiation and completion of the Major Investment Study process in order to qualify the project for federal funding.

1.4 The "Centers Concept" Land Use Policy Is Transit Based

Land use planning in the Los Angeles area has traditionally viewed the urban area not as a central downtown served by adjacent areas, but rather a collection of urban centers. These centers are "little downtowns" in and of themselves. The Centers Concept Plan, originally formulated for the Los Angeles area in the 1960's and 1970's by Calvin Hamilton (Director for the Department of Los Angeles City Planning Department) and Norman Murdock (Director for the Los Angeles County Regional Planning Department), acknowledged there were urban centers of various types throughout the region that represented concentrations of economic activity or a mix of economic activities and higher density housing (Figure 1.5). The Centers Concept envisioned that the centers would be interconnected via an infrastructure of transit. The City of Los Angeles General Plan Framework, revisited and reconfirmed the Centers Concept. The Framework more clearly defined targeted growth areas, mixed use centers, and mixed used corridors that would serve centers that were envisioned to be interconnected via the emerging Metrorail transit system. The City of Los Angeles, in working directly with the Los Angeles County Metropolitan Transportation Authority, developed a series of Transportation and Land Use Guidelines which specifically tied the size and intensity of centers to the supporting transit infrastructure and transit station locations.

1.5 Study Area Contains a Major Concentration of Activity Centers and Destinations

The area contains the largest concentration of major activity centers and destinations within the Los Angeles metropolitan region. Many of these centers are located within the most congested portion of the Study Area north of the Santa Monica Freeway (I-10) and east of the San Diego Freeway (I-405). Of all the areas within the Los Angeles metropolitan area, the Mid-City/Westside Study Area best exemplifies the centers concept. These centers represent more specific destinations in the Study Area. These destinations correspond with, as well as add to, the location and number of activity centers identified in the Centers Concept. As shown in Figure 1.6, a large concentration of activity centers is located in the Study Area. Over 60 locations have been identified.

Not only does the Study Area encompass the western portion of the traditional/historical downtown area, but it also encompasses the most well known employment, entertainment, educational/cultural activity centers in the region, including USC, UCLA, Santa Monica College, Trade Tech, Rodeo Drive/Beverly Hills, Westwood Village, Hollywood Boulevard, Sunset Strip, Century City, Westside Pavilion, Paramount and Sony Studios, Los Angeles County Museum of Art, Page Museum, Petersen Automotive Museum, Wilshire Miracle Mile, Santa Monica Pier, Third Street Promenade, Los Angeles Memorial Coliseum, Los Angeles Convention Center, and the newly-opened Staples Center. Currently, the portion of the Metrorail system built or under construction to date only interconnects a small portion of the centers in the eastern portion of the Study Area, such as downtown to Hollywood to Universal City and to Mid-Wilshire. The remaining centers are served by two major freeways (Interstate 10 - Santa Monica Freeway, and Interstate 405 - San Diego Freeway), as well as by less than a dozen major east-west and north-south arterials. As discussed later in this chapter, as growth continues to be concentrated in the existing centers and a few emerging Westside centers (such as Playa Vista and Culver City) in the future, there is a finite

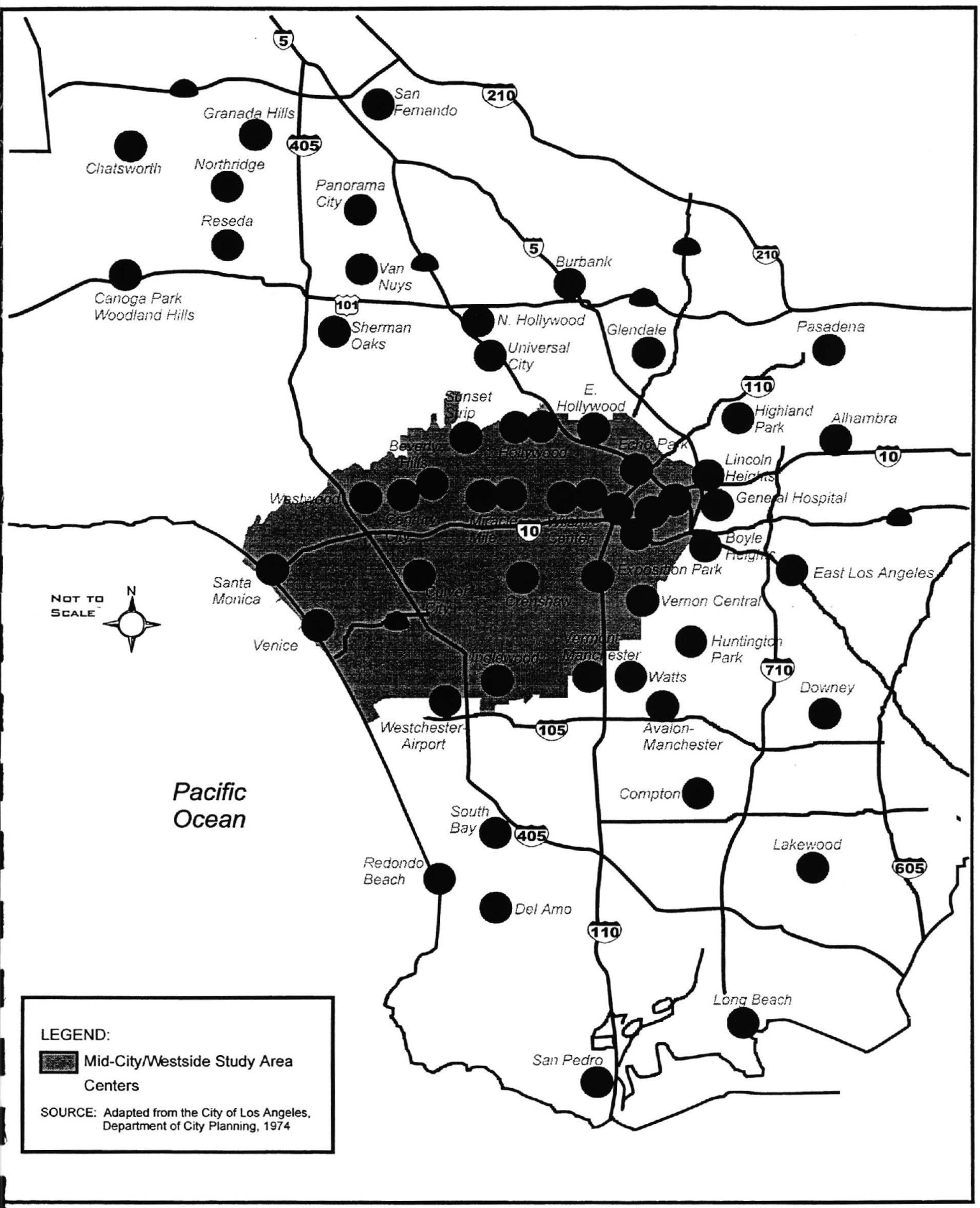

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FIGURE 1.5

LOS ANGELES CENTERS CONCEPT

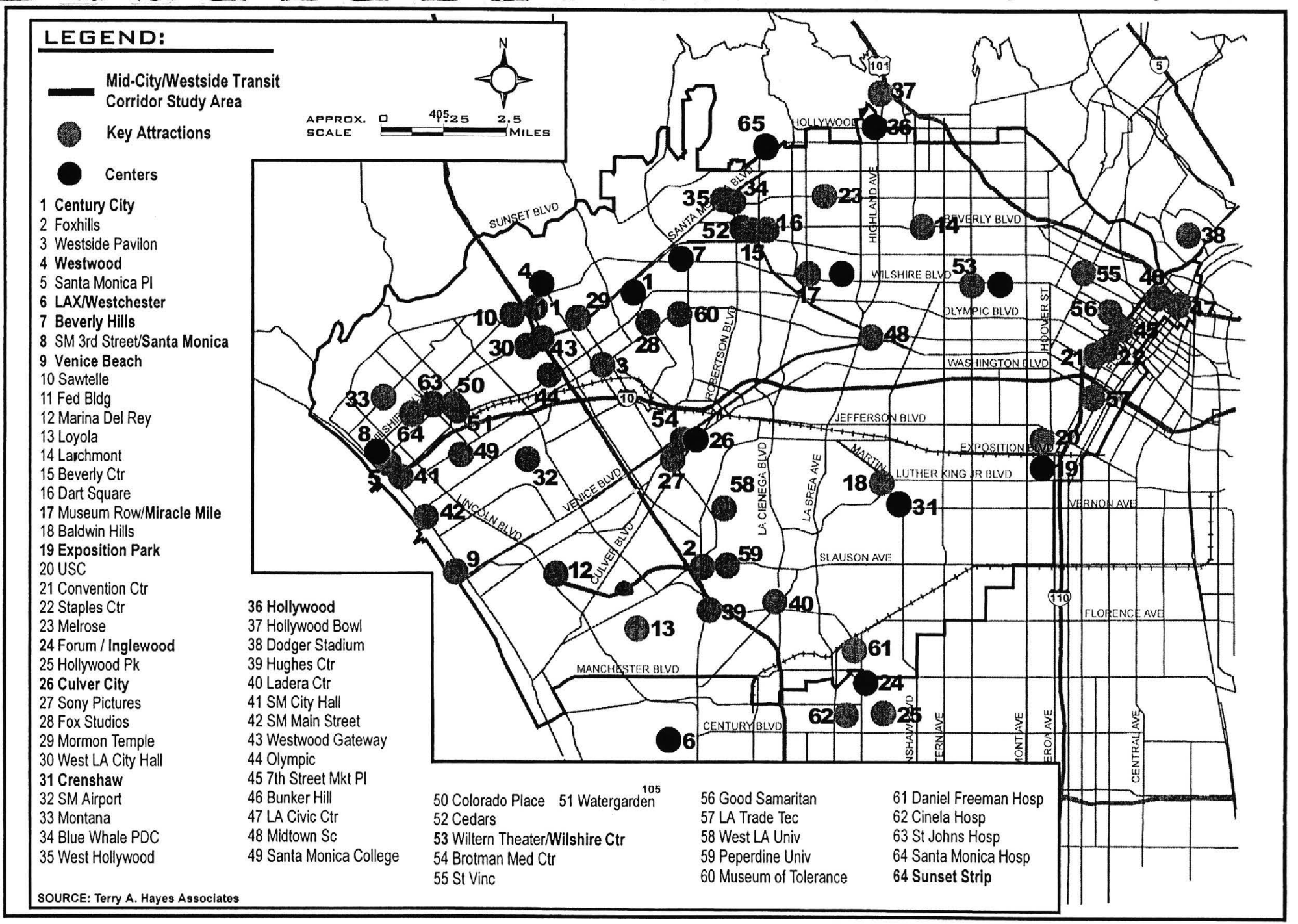

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FIGURE 1.6

ACTIVITY CENTERS

limit to the physical and operational capacity of these highways and arterials to meet travel demands generated by the centers.

1.6 High Concentration of Transit Supporting Land Uses

The existing activity centers in the Study Area are central part of a large concentration of land uses that are considered to be transit supporting. Transit-supporting land uses can generally be defined as high density housing and concentration of commercial retail/office development. Figure 1.7 illustrates the spatial location of these land uses within the Study Area. Transit supporting land uses encompass approximately 30 percent of the 112 square-mile Study Area. As can be seen, these transit related uses tend to be concentrated in three major corridors in the Study Area: e.g., a northern corridor approximating Santa Monica Boulevard; a central corridor represented by Wilshire Boulevard; and a less well-defined southern corridor centering along Venice Boulevard. Currently only the eastern portions of these land use corridors are served by the Metrorail System. The remaining high density areas are served by conventional bus service from LACMTA, Culver City, LADOT and Santa Monica.

1.7 High Population and Employment Densities Support Transit.

Population and employment densities in the Study Area are the highest within the metropolitan region, averaging approximately 13,883 persons per square mile and 9,167 employees per square mile. Population and employment densities are shown in Figures 1.8 and 1.9, respectively. As can be seen the more densely populated areas are concentrated in the east and northeastern portion of the Study Area, while the greatest employment densities are in the western and northwestern portion of the Study Area.

According to the West Los Angeles Transit Corridor Technical Report prepared by SCAG in 1998, "the population density in the SCAG Study Area in 1990 was about 9,600 persons per square mile, which was more than four times the County." Population density for the MTA Study Area in 1997 was approximately 13,883 persons per square mile, over 6 times that of the LA County 2,300 persons per square mile. According to SCAG's forecasts, the population density will increase to over 17,000 persons per square mile by the year 2020, compared with 3,017 persons per square in the County.

Employment densities are also higher than the County. In 1997, the Study Area employees per square mile were 9,167, compared with a County employment density of 1,070 employees per square mile. These densities will increase by the year 2020 to 10,829 employees per square mile in the Study Area and 1,433 employees per square mile in the County.

Corridor Transit Services

The West Los Angeles Transit Corridor Technical Report, prepared by Southern California Association of Governments (SCAG), as part of the 1998 RTP Transit Restructuring Study provides information on the current overall usage of transit services in the Study Area.

To understand the current transit usage and the needs of transit users in the Corridor area, transit services along two general Regional Transportation Plan (RTP) corridors were examined. These two corridors are Martin Luther King Jr./Exposition (MLK/Expo.) and Wilshire or West Los Angeles.

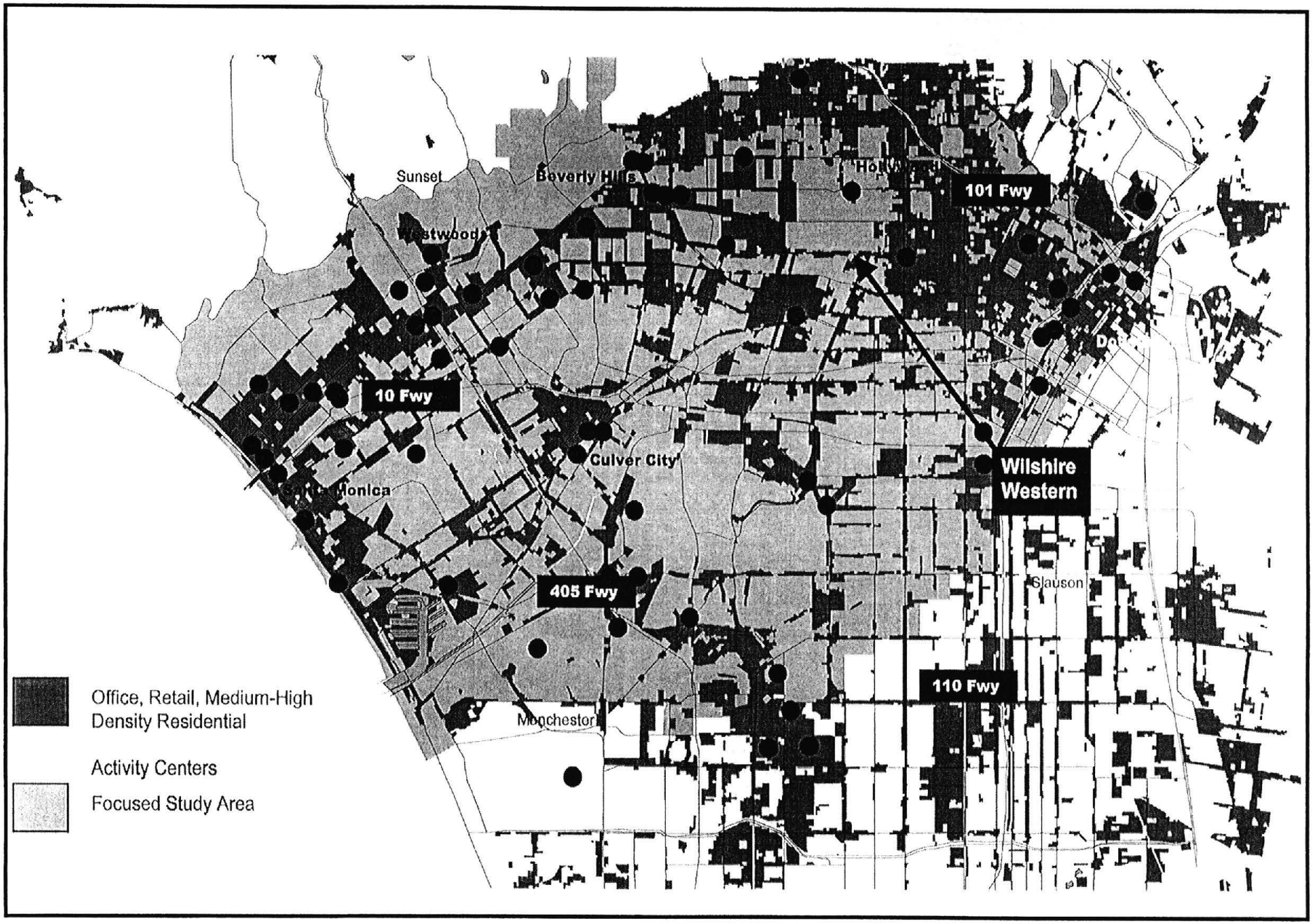

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FIGURE 1.7

TRANSIT SUPPORTING LAND USES

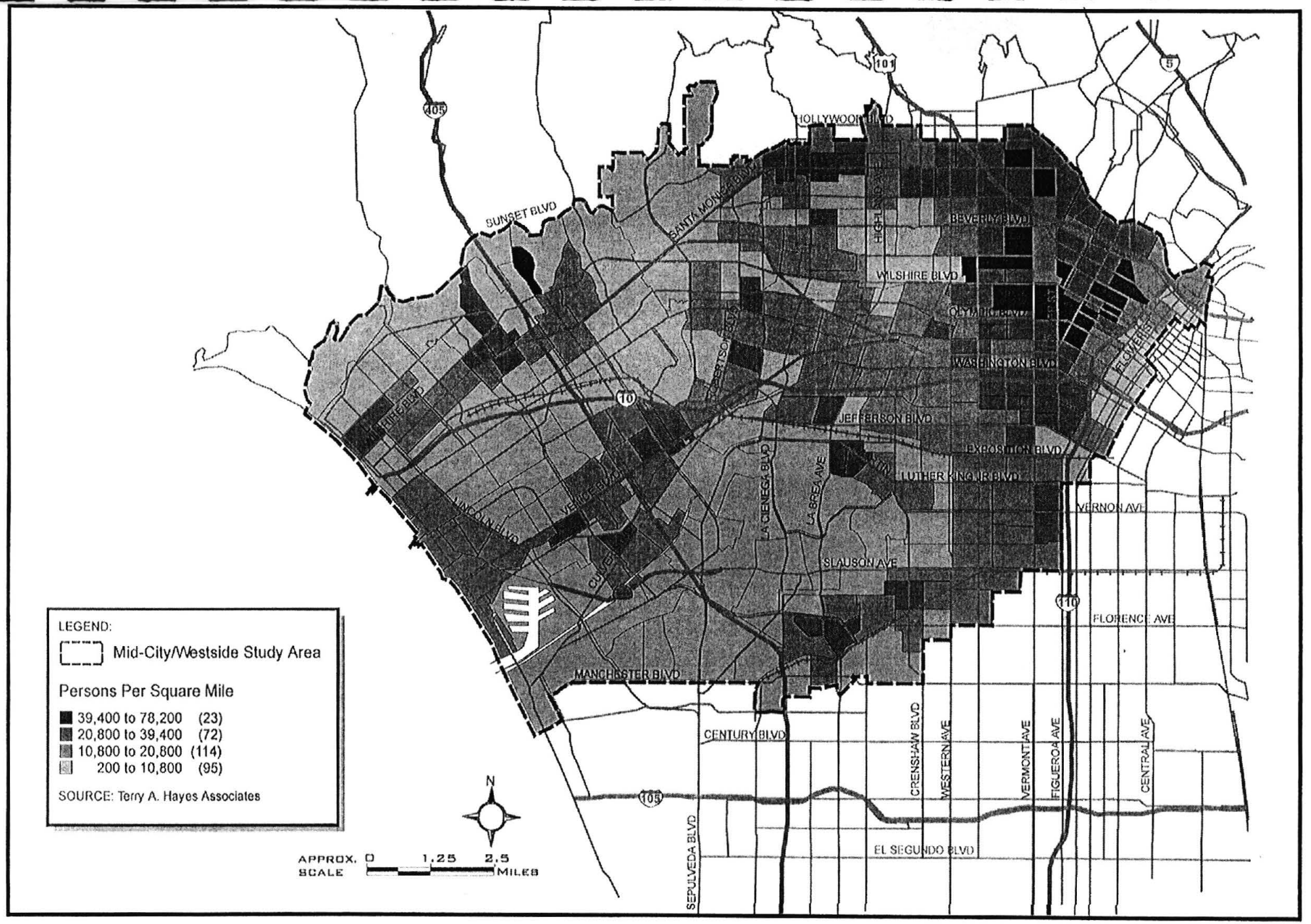

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FIGURE 1.8

EXISTING POPULATION DENSITY

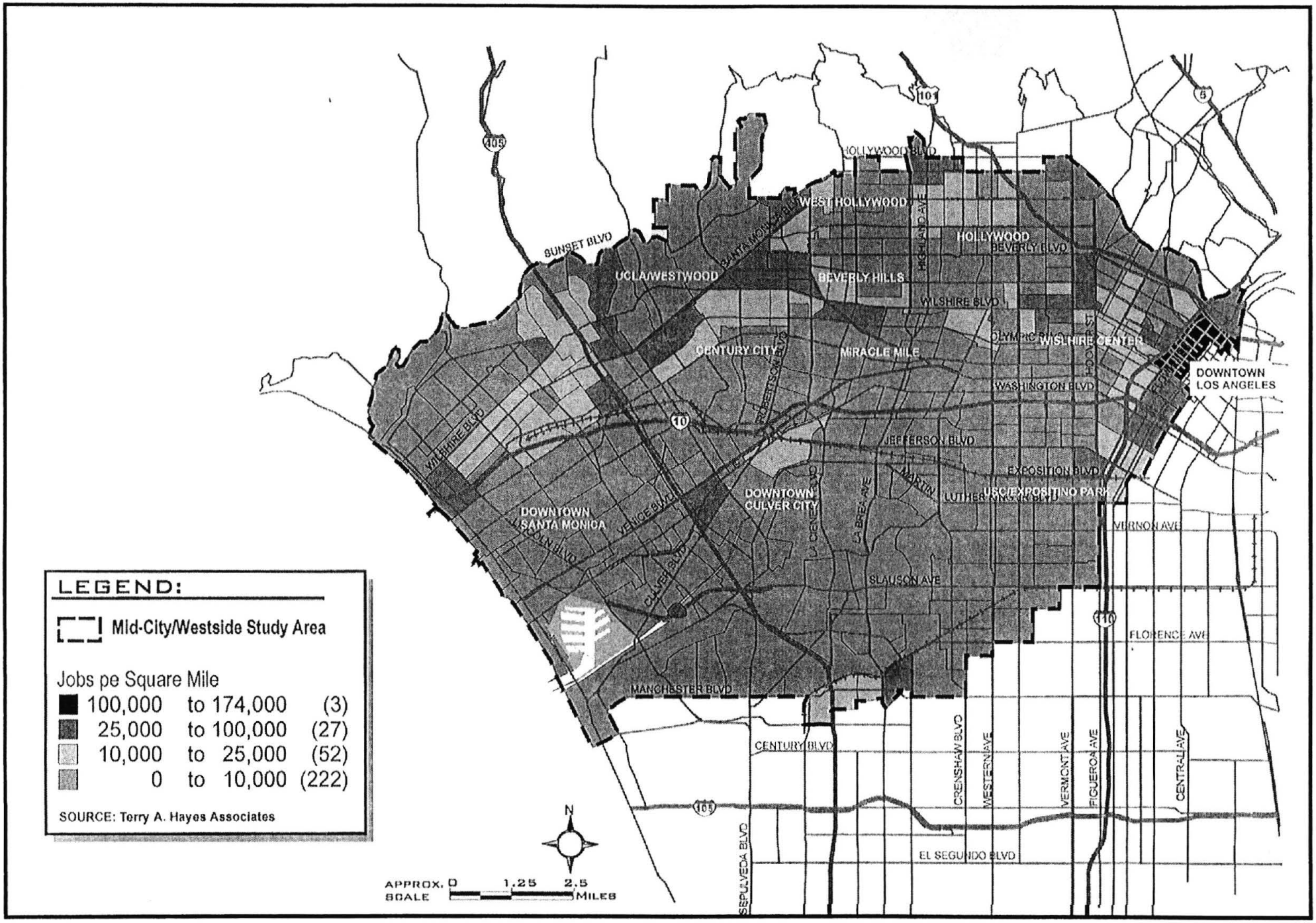

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FIGURE 1.9

EXISTING EMPLOYMENT DENSITY

Local transit is primarily provided by the MTA. There are over fifteen municipal operators. The Los Angeles Department of Transportation (LADOT) and Santa Monica Bus Lines provide express service in the Study Area, and LADOT Dash, Culver City Bus Lines, and Santa Monica Bus Lines provide local service. The express service runs along the Santa Monica Freeway (I-10) from west to Downtown Los Angeles.

The two corridors in the RTP have been identified as having significant transit usage, and the preliminary analysis in the RTP identified a deficiency of service. In fact, the total transit usage as a percentage of all trips is greater within the Study Area as a whole than it is along these corridors. The reason may be an accessibility problem. The following table illustrates the existing transit mode choice at the Study Area level and at various distances from the corridors:

Table 1.2
Summary of Mode Choice

Level	All Modes	Drive Alone	Carpool	Transit	Others
1/4 Mile of Corridors	100.00%	63.82%	12.76%	11.89%	11.53%
1/2 Mile of Corridors	100.00%	62.88%	12.96%	12.35%	11.81%
1 Mile of Corridors	100.00%	61.63%	12.87%	13.70%	11.80%
Study Area	100.00%	62.37%	13.58%	13.64%	10.41%

Source: 1990 Census Transportation Planning Package (CTPP)

The major bus lines running along the Wilshire Transit Corridor, partially the Red Line MOS-3 & 4 alignment, are MTA Routes 20,21,22,320 and322. Due to the alignment of the proposed MLK/Expo Transit Corridor, i.e., the Exposition rail right-of-way that does not entirely follow streets, no bus line follows this transit corridor in its entirety. Between downtown Santa Monica and the San Diego Freeway, MTA Route 434 and Santa Monica Bus Lines Route 7 are the primary routes. MTA Routes 14,37, 38, and 102 are the primary routes between La Cienega and the University of Southern California.

Mid-City/Westside transit ridership is best summarized using the Census Transportation Planning Package (CTPP), transportation data collected as part of the 1990 Census. Based on the census data, 41 percent of all work transit trips in Los Angeles County originate in the Study Area. The remaining 59 percent originate at various points in the County and may potentially run through the Study Area. West L.A. (as defined by this report) contains 18 percent of Los Angeles County's population, implying that the transit needs of West L.A. are higher than the service presently provided.

In addition to the high transit mode split of 14%, the Study Area has a significantly higher use of transit than the rest of Los Angeles County. This demand warrants a much higher percentage of transit investment than it has received in the last fifteen years.

The following table captures the bus routes that reveal significant number of boardings in the two corridors, most of which are operated by the MTA. The exceptions are two Santa Monica Big Blue Bus lines, S5 and S7, and four LADOT lines, LX 438, 430, 431, and 437. The significance of each

line is estimated by the aggregate number of boardings for all the bus lines in the West LA area, and extracting those lines that run within one mile of each corridor.

There are over 119,000 daily boardings on the bus lines generally along the Wilshire Boulevard Corridor and nearly 76,000 daily boardings on the bus lines generally along the Exposition/Martin Luther King Boulevard Corridor.

Table 1.3
Transit Boardings along Mid-City
West Los Angeles Transit Corridors

Route Number	# Stops (in Study Area)	Total # Stops	Boardings (in Study Area)
Wilshire Corridor			
20/212/22/320/322	14	14	37,851
27/28/328	6	7	28,977
316	8	10	870
14/37	6	8	16,309
16	5	7	17,869
S5	27	27	2,581
S7	34	34	15,030
		TOTAL	119,487
Exposition/Martin Luther King Corridor			
102	4	6	627
38	4	6	6,008
434	6	11	1,269
LX438	6	9	215
S8	6	6	6,076
S7	6	6	15,030
S10	4	7	1,290
LX430	7	9	60
LX431	6	8	133
LX437	6	8	97
439	4	13	649
436	9	11	261
105	6	8	12,093
14/37	6	8	16,309
33	5	7	15,711
		TOTAL	75,828

Source: West Los Angeles Transit Corridor Technical Report, SCAG, August 1998 based on MTA and municipal operator statistics.

1.8 Local Redevelopment Plans Depend Heavily On Transit Improvements

Figure 1.10 illustrates a composite picture of the location of redevelopment areas, enterprise zones and other investment areas targeted by local jurisdictions within the Study Area. There are almost 20 such areas within the Study Area. The ultimate success of redevelopment and revitalization of these areas largely rest on transportation accessibility and links to transit. Some improvements and

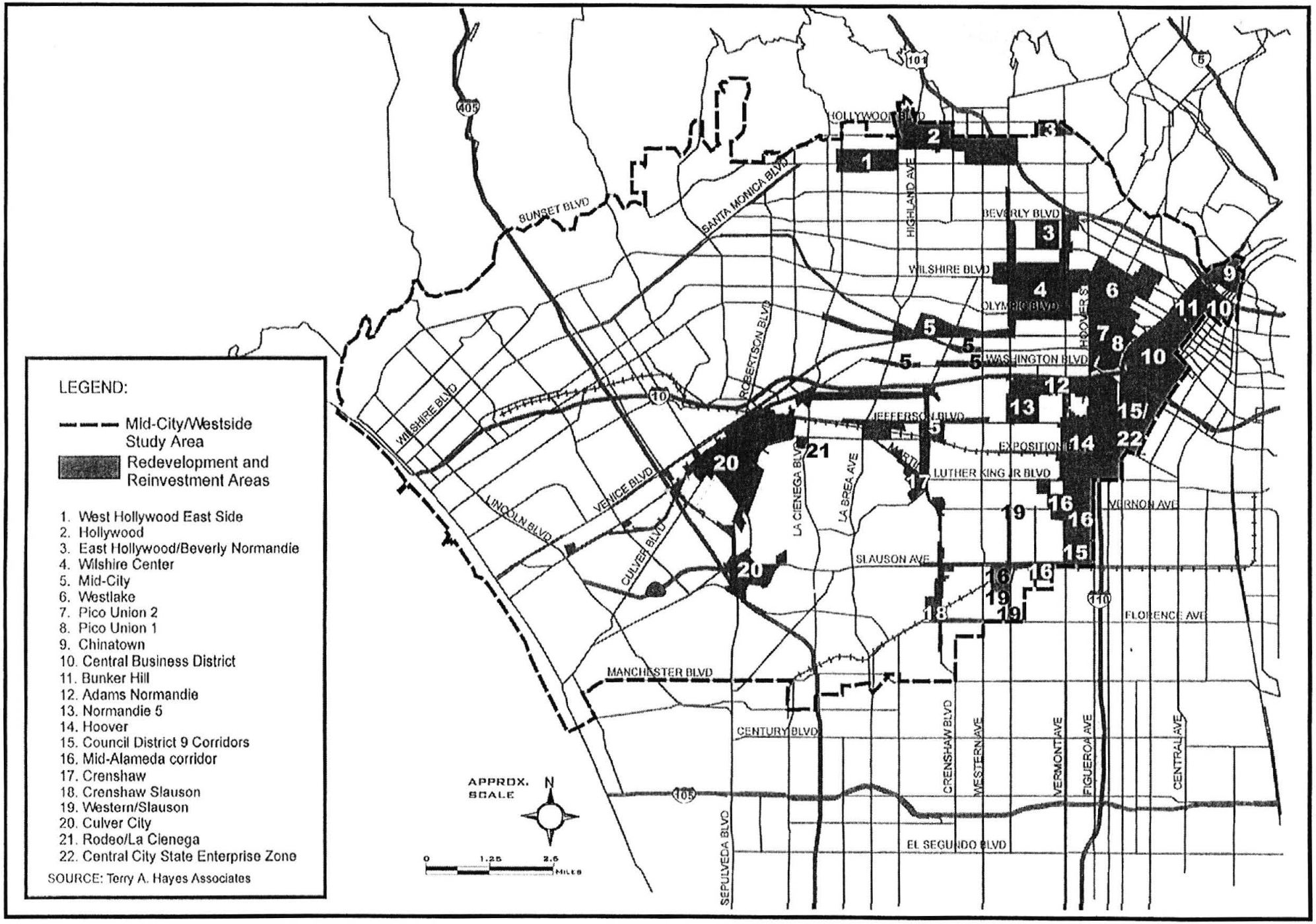

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FIGURE 1.10

REDEVELOPMENT AND REINVESTMENT AREAS

strategies being employed – such as Santa Monica Boulevard improvements in West Hollywood and in Santa Monica – focus on increasing pedestrian amenities, and reducing or eliminating vehicular traffic, which places increasing demand on increased transit access and level of transit service to help support existing and future land use development objectives.

1.9 High Existing Transit Usage

Existing transit usage within the Study Area is proportionally higher than any other area in Los Angeles County. Because there is a large base of existing transit service and transit patrons, increasing the transit mode share through increased service would represent a natural extension of existing patterns and trends.

Transit services in the Study Area are primarily provided by the MTA. A number of municipal operators: the Los Angeles Department of Transportation (LADOT) and the Santa Monica Bus Lines; also provide express service in the Study Area, and LADOT Dash, Culver City Bus Lines, and Santa Monica Bus Lines provide local service. The express service runs along the Santa Monica Freeway (I-10) from points west to Downtown Los Angeles.

Because the Study Area represents a significant concentration of educational, cultural entertainment, and office centers, and because the area is the most densely populated area within the region (over 13,883 persons per square mile), there has traditionally been a substantial amount of transit service and transit use. According to the SCAG Transit Corridor Technical Report, "the proportion of workers who took the bus [in the Study Area] was double that of the County [13.64 percent for the Study Area versus 6.8 percent for the County]. This is further substantiated by the Census Transportation Planning Package (CTPP), transporation data collected as part of the 1990 Census. This data indicates that "41 percent of all work transit trips in Los Angeles County originate in the Study Area."[2]

1.10 Substantial Transit-Dependent Population Within The Study Area

Part of the underlying reason for high transit usage in the Study Area is that a significant number of households are autoless and have low incomes. These two factors are considered to be indicative of transit dependency. According to the 1990 Census CTPP data, there are approximately 18.33 percent of the households in the Study Area did not have a vehicle compared to only 10.9 percent in Los Angeles County.[3] The majority of these households are concentrated in east and northeastern portion of the Study Area (see Figure 1.11).

Figure 1.12 illustrates those census tracts with households that have lower incomes. According to the 1990 Census, 20.9 percent of the population in the Study Area was below poverty status compared to 14.76 percent in Los Angeles County. In addition, households in the Study Area had a weighted income of $5,451 less than that of Los Angeles County.[4]

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2 SCAG West Los Angeles Transit Corridor Technical Report, 1998, pp. 15 and 18, respectively.

3 Op. Cit., p. 14.

4 Op. Cit., p. 10.

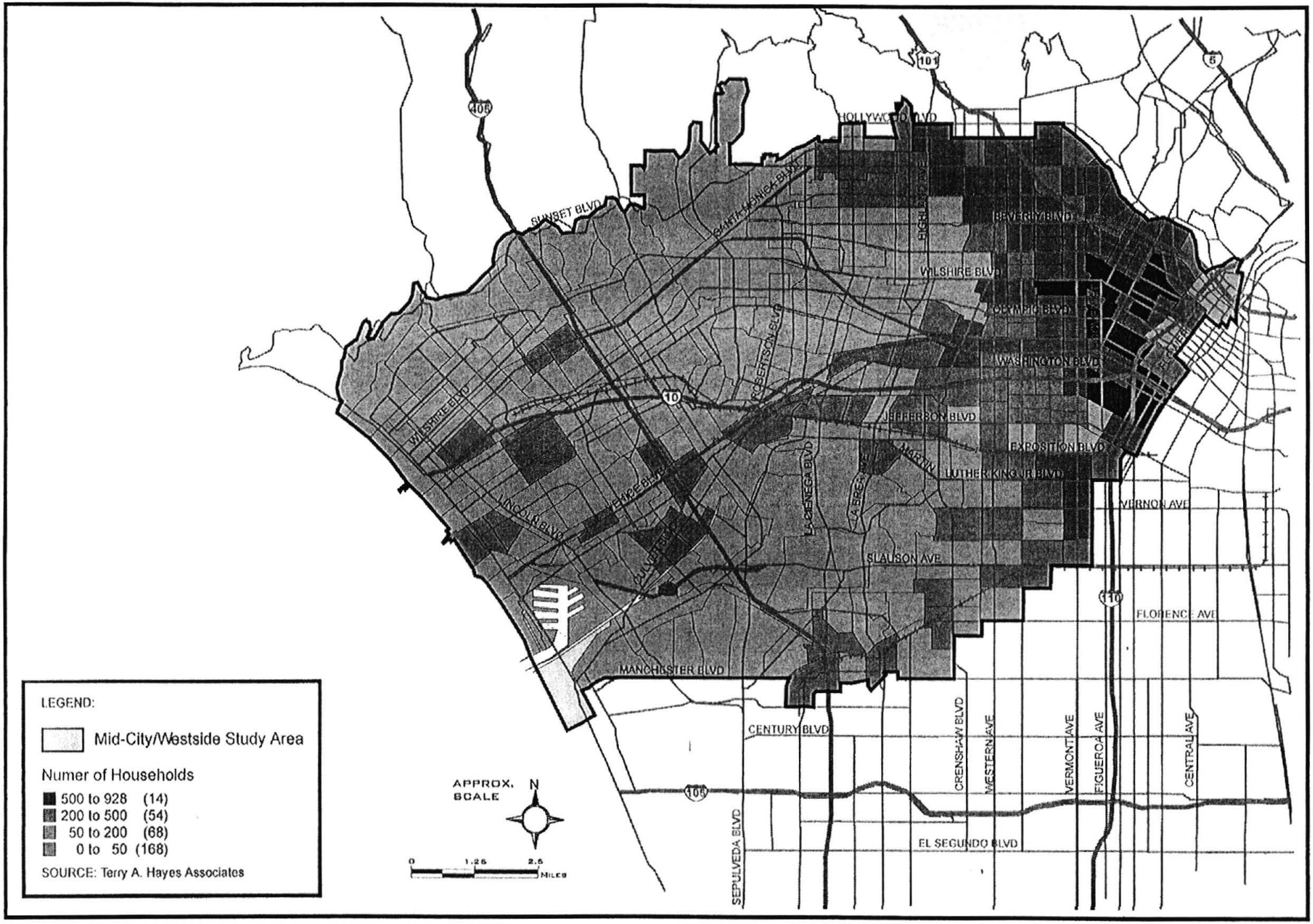

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FIGURE 1.11
HOUSEHOLDS WITH NO AUTOMOBILE AVAILABLE

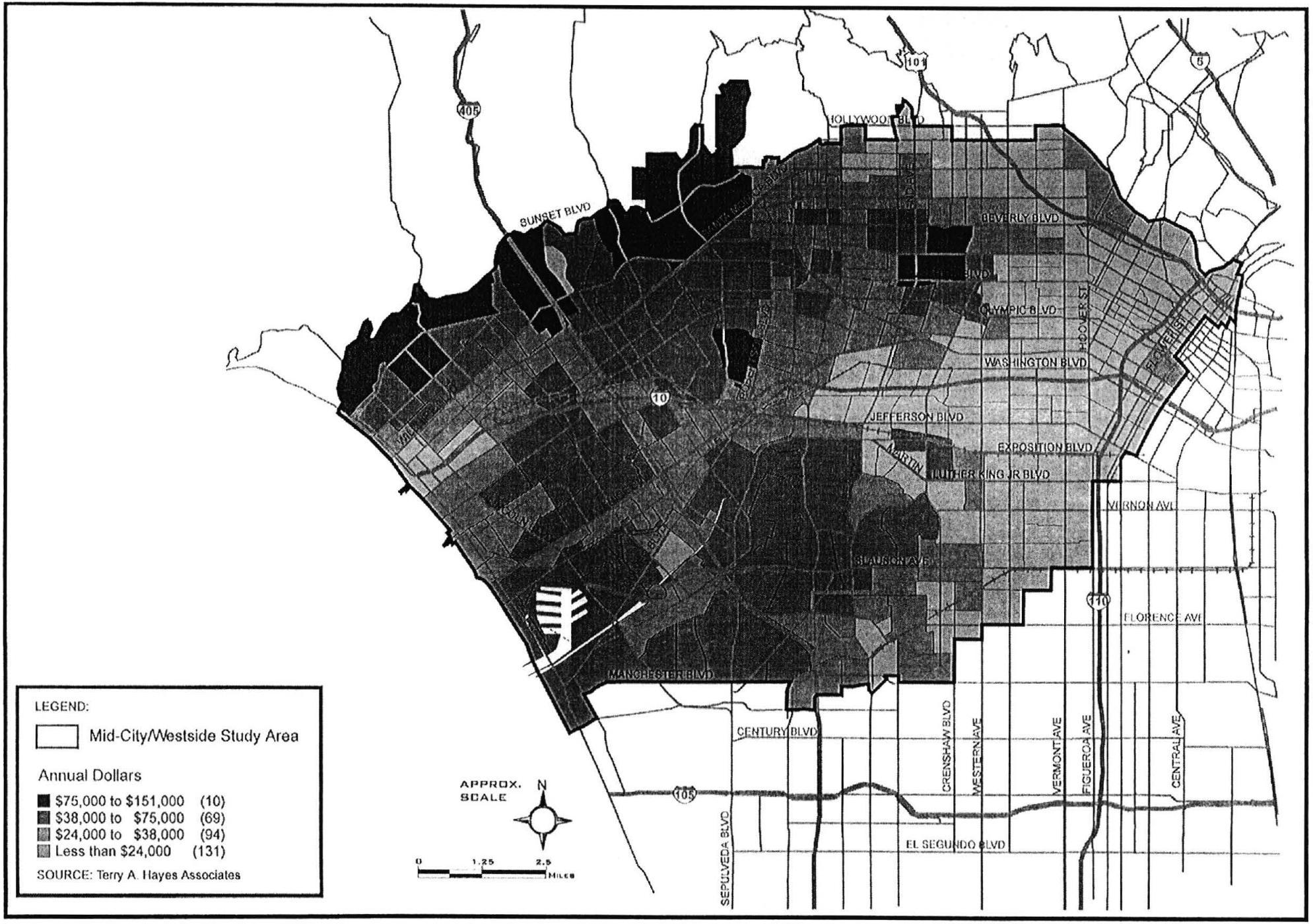

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FIGURE 1.12

MEDIAN HOUSEHOLD INCOME

1.11 Impaired Mobility For Transit-Dependent Residents

Although a portion of the eastern Study Area is served by the existing Metrorail Red Line with stations in Downtown, Mid Wilshire, and Hollywood, there is no significant transit infrastructure that allows the population in the eastern portion of the Study Area to travel westward where there is expected to be significant growth in higher paying jobs due to industries, services and cultural/educational facilities. Thus, the lack of westward serving transit infrastructure significantly affects job accessibility and socioeconomic mobility of lower income and transit dependent households.

The poor accessibility is illustrated in Figure 1.13 that shows the average travel time to work for the Study Area. This is further illustrated by taking a careful look at Figures 1.8, 1.9 and 1.11. Not surprisingly, the longer travel times are concentrated in the eastern portion of the Study Area, where low income and auto-less households are concentrated. Average travel to work times in the east part of the Study Area is about 20 percent longer when compared to the west part (using La Cienega Boulevard as a dividing line). In addition, the lack of higher capacity transit service to the west, also limits access to services such as educational centers (UCLA in Westwood, West LA College, Santa Monica City College) and major medical facilities (also located in Westwood and Santa Monica).

1.12 Study Area Share Of Regional Population And Employment Growth Remains High

Population and employment forecasts to the year 2020 adopted by the Southern California Association of Governments clearly suggest that the Study Area will capture a disproportionate share of growth over the next 20 years. Growth that will place further demands on transit service and well as result in increasing congestion on local roadways and regional highways serving the Study Area.

Adopted Regional Population and Employment Forecasts. According to SCAG's most recent adopted forecast (April 1998), the Study Area is expected to grow by 356,265 (18.85 percent increase) persons and 186,200 (15.35 percent increase) employees between 1997 and 2020. The forecast strongly suggest that both the Mid-City and West Los Angeles portions of the Study Area are expected to attract significant growth (Table 1.4).

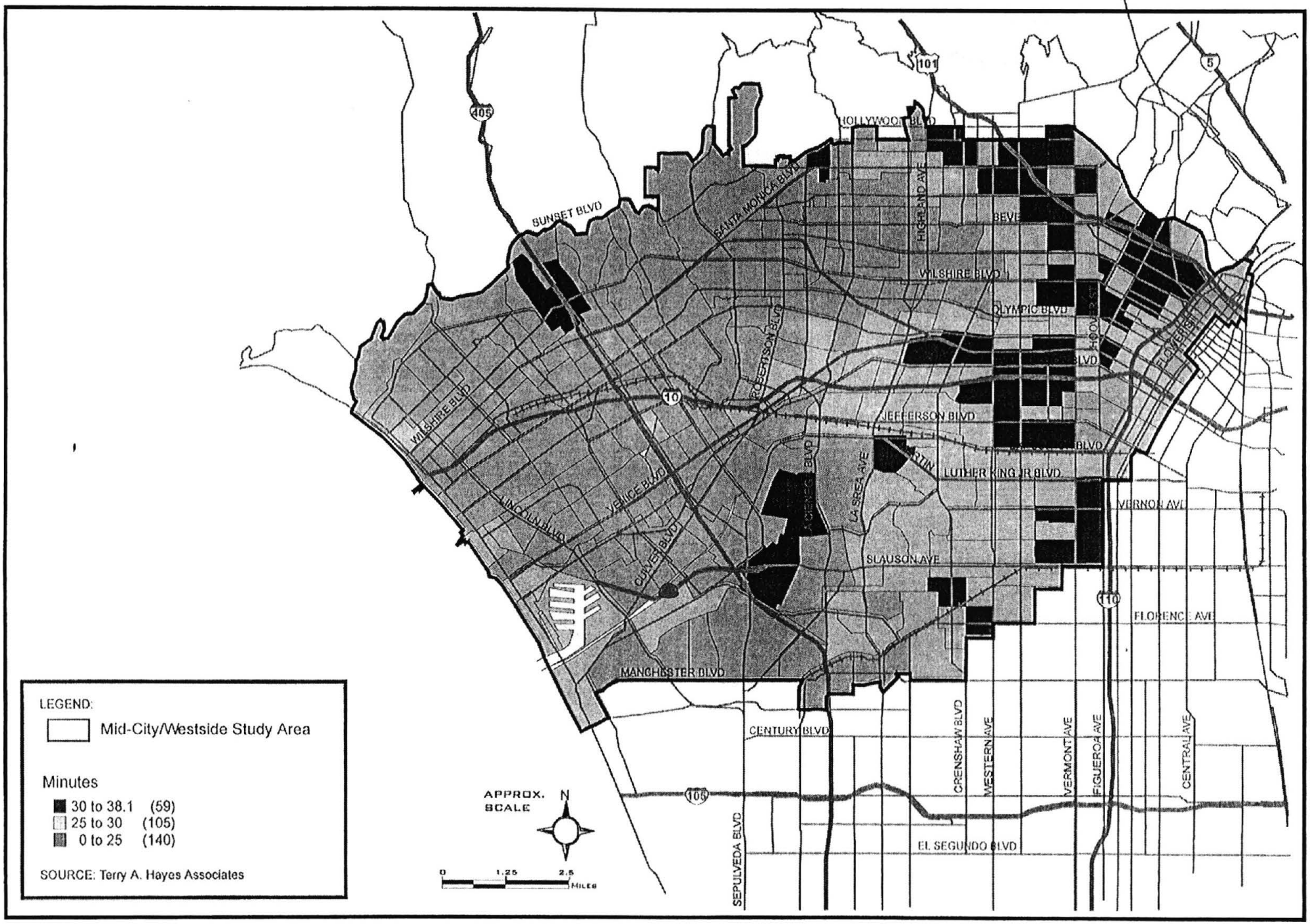

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FIGURE 1.13

MEAN TRAVEL TIME TO WORK

Table 1.4
Population & Employment Forecast

Year	1997	2010	2015	2020	1997-2020
Population					
MTA Study Area	1,555,005	1,725,512	1,813,919	1,911,270	18.85%
LA County	9,524,890	10,868,869	11,513,385	12,249,104	22.24%
% of LA County (MTA)	16.28%	15.88%	15.75%	15.60%	
Employment					
MTA Study Area	1,026,685	1,134,474	1,170,729	1,212,885	15.35%
LA County	4,345,926	5,223,383	5,511,845	5,817,654	25.30%
% of LA County (MTA)	23.62%	21.72%	21.24%	20.85%	

Source: SCAG Forecast, April, 1998.

1.13 Business Services Sector Is Backbone To Local, Regional, Statewide Economic Growth

The primary engine for growth will be business services and entertainment related businesses. As further indicated in the Grubb & Ellis report, other sectors in the Westside economy contribute to regional, as well as statewide economic growth: "in the 1980s and 1990s five sectors emerged to propel California economic base forward: foreign trade, high tech manufacturing, professional services, tourism, and entertainment. The West Los Angeles market is home to most of these industries which have been a principal catalyst to economic growth, and a driving force for the office market."[5] Over the past decade there has been an ever increasing number of these businesses located in West Los Angeles/Century, Santa Monica, and Culver City. Although the specific "Dreamworks Studio Campus" at Playa Vista has been put on hold, it is anticipated that there will be a significant increase in production and postproduction type businesses on the Westside. Many of the current office and warehouse space vacancies are featuring references to the availability of "creative space" rented in a 10,000+ square feet increments.[6]

Growth in the Study Area will continue to be fueled by the fact that entertainment and media related businesses concentrating in the western part of the corridor. US Census County Business Patterns data indicate that these new service businesses are locating in West Hollywood, Beverly Hills, West Los Angeles, Culver City and Santa Monica, as shown in Figure 1.14 Real estate analysts expect that the demand for production and creative spaces will continue to be robust. The industries and businesses that are attracted to the Study Area are those that are expected to be the foundation of the local and regional economy for many years into the future.

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5 Ibid.

6 Creative space indicates both the creative use of buildings built with a standard utilization in mind, and a tenant profile catering to expensive and skilled labor force companies want to nurture in the workplace." Grubb & Ellis, 2000 Real Estate Forecast, 1999, p. 7.

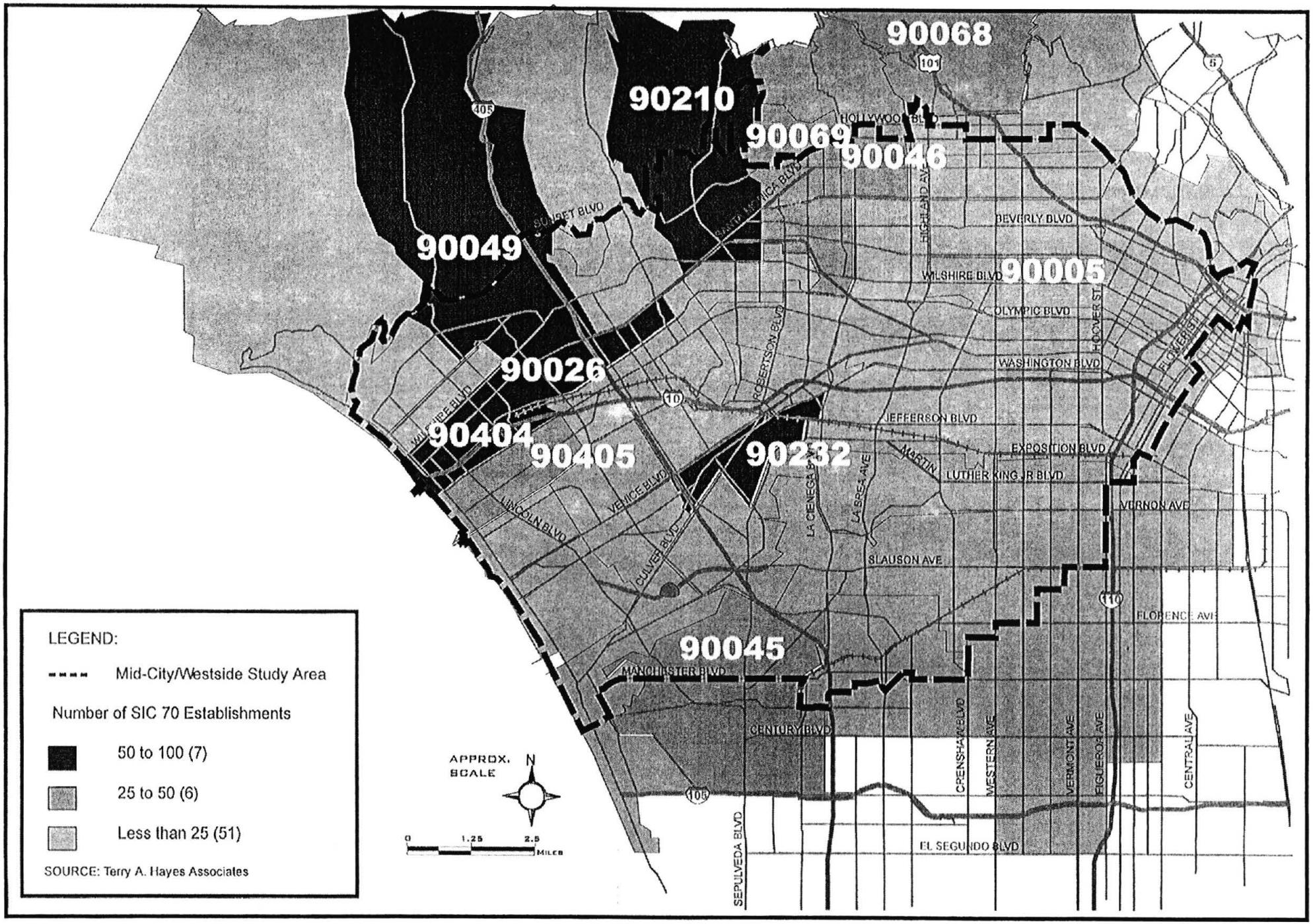

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FIGURE 1.14

CHANGE IN SERVICE BUSINESS 1994 TO 1996 STUDY AREA ZIPCODES

In addition the Mid-City/Westside area is the center of approximately one-third of all new office construction underway in LA County.[7]

1.14 Existing and Projected Travel Demand Patterns and Justification for Transit Services

The Study Area attracts thousands of trips each day from all areas of the Los Angeles region. Growth levels in both population and employment documented above will further exacerbate travel demand. Based on the output of the LACMTA Transportation Model, Figure 1.15 illustrates the overall desire line patterns between the Study Area and other portions of the region for work trips. The figure illustrates that there are currently strong interaction patterns between the Study Area and the West and East San Fernando Valleys, as well as from the South Bay.

Figures 1.16 through 1.19 provide additional data related to the interaction of the Study Area's work-related trips with other subregions in southern California. Figure 1.16 shows that over 45 percent of daily work trips generated by the Study Area as a whole are internal trips that have both the origin and the destination within the Study Area. This includes almost 5 percent to and from downtown and over 41 percent within the remaining parts of the Study Area. San Fernando Valley, as a whole is one of the most predominant origin/destinations for works trips to and from the Study Area, with 9.4 percent of the total. When north Los Angeles County and the Glendale area are added to this group; collectively, areas generally to the north of the Study Area represent over 17 percent of all work-trip interactions. Another predominant origin/destination outside the Study Area is the South Bay/Long Beach area with nearly 15 percent of the total work trips. San Gabriel/Pomona Valleys with 7.5 percent and the southeast County area, with 8.3 percent of the total work trips are also significant origin/destination points.

Figure 1.17 shows the interaction of work trip between the west-side of the Study Area (generally west of the I-405 Freeway) and other communities. This figure shows that nearly 19 percent of the work trips to/and from this area are internal. There is a strong interaction between the west and north parts of the Study Area (20.5 percent of all work trips). Over 16 percent of the work trips related to the west-side are to/from San Fernando Valley and points north.

Figure 1.18 shows the interaction of work trips between the northern portion of the Study Area (areas generally north of the Santa Monica Freeway and including Downtown) and other communities. This figure shows that nearly 30 percent of the work trips to/and from this area are internal. This part of the Study Area has the strongest interaction with San Fernando Valley and points north, with over 22 percent of the total work trips to/from this area. The work-trip interaction between this area and other parts of the Study Area are between 8 to 9 percent of total work trips.

Figure 1.19 shows the interaction of work trips between the southern portion of the Study Area (areas generally south of the Santa Monica Freeway) and other communities. This figure shows that only 13.4 percent of the work trips to/and from this area are internal and the subarea has a strong

[7] Grubb & Ellis Office Market Trends, West Los Angeles, Third Quarter 1999, p. 1.

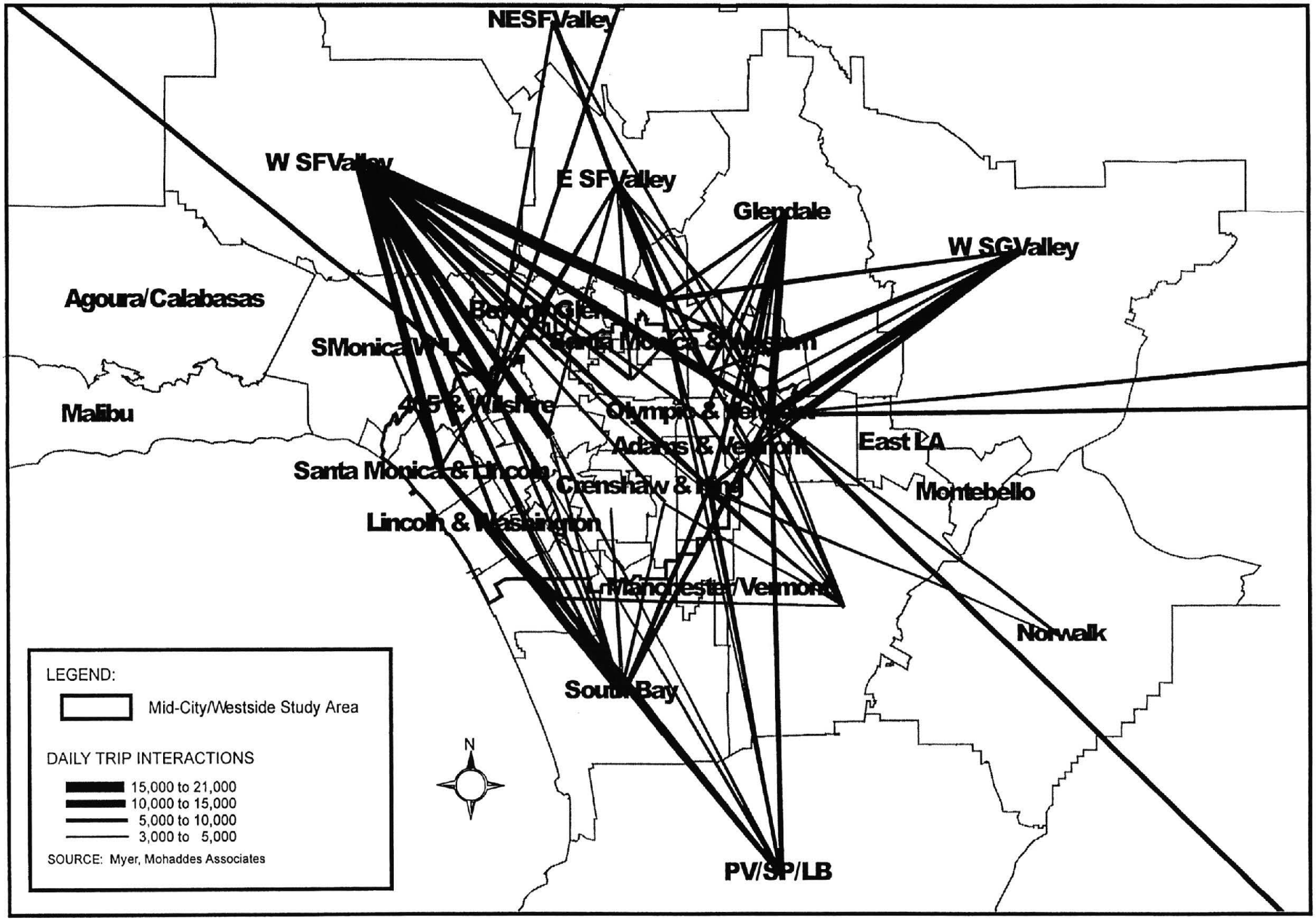

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FIGURE 1.15

1997 DESIRE LINES FOR DAILY HOME BASED WORK TRIP INTERACTIONS

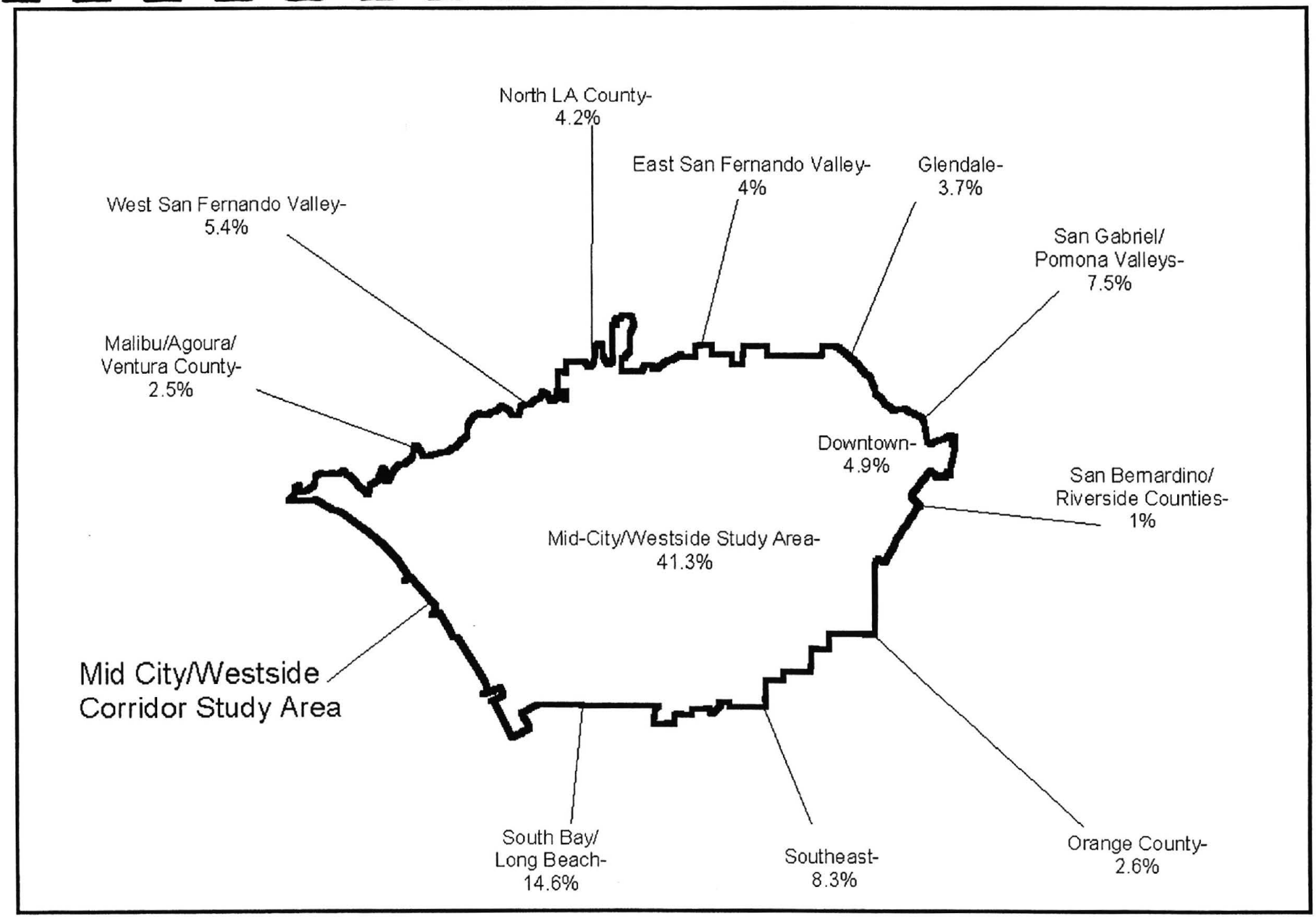

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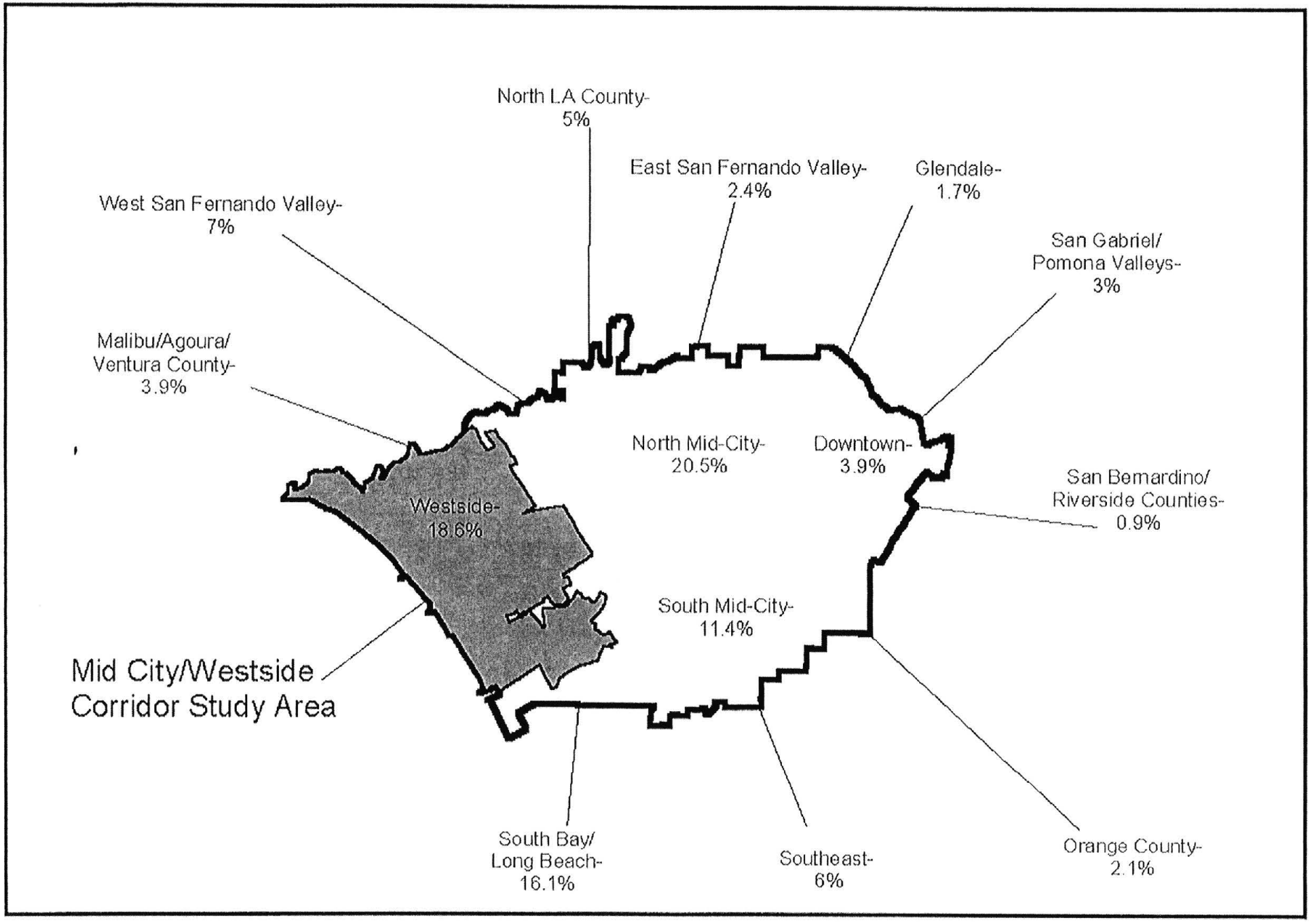
FIGURE 1.16
PERCENT DISTRIBUTION OF 1998
TOTAL TWO-WAY DAILY STUDY AREA WORK TRIP



Mid-City/Westside Transit Corridor
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FIGURE 1.17
PERCENT DISTRIBUTION OF 1998
TOTAL TWO-WAY DAILY STUDY AREA WORK TRIP

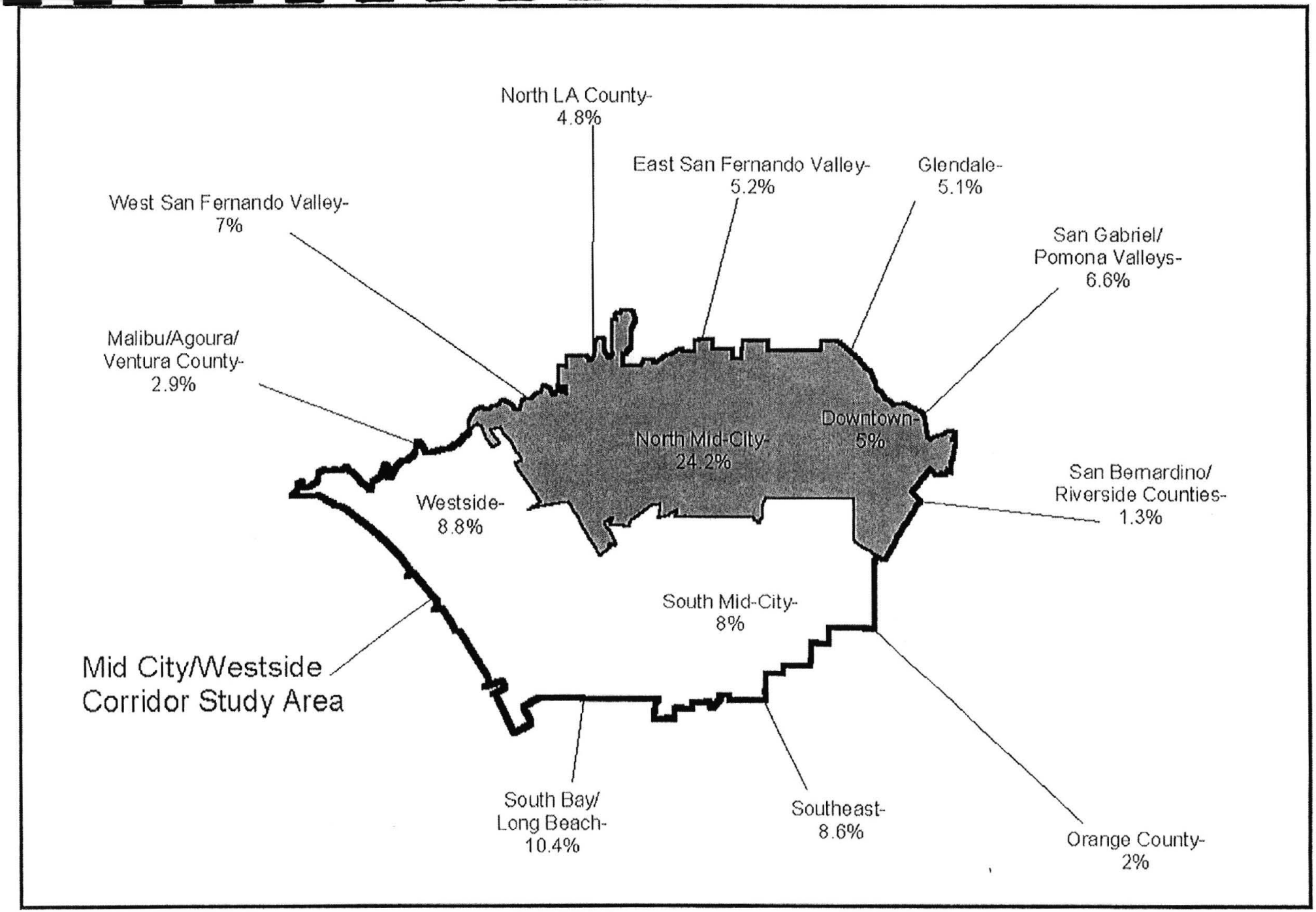

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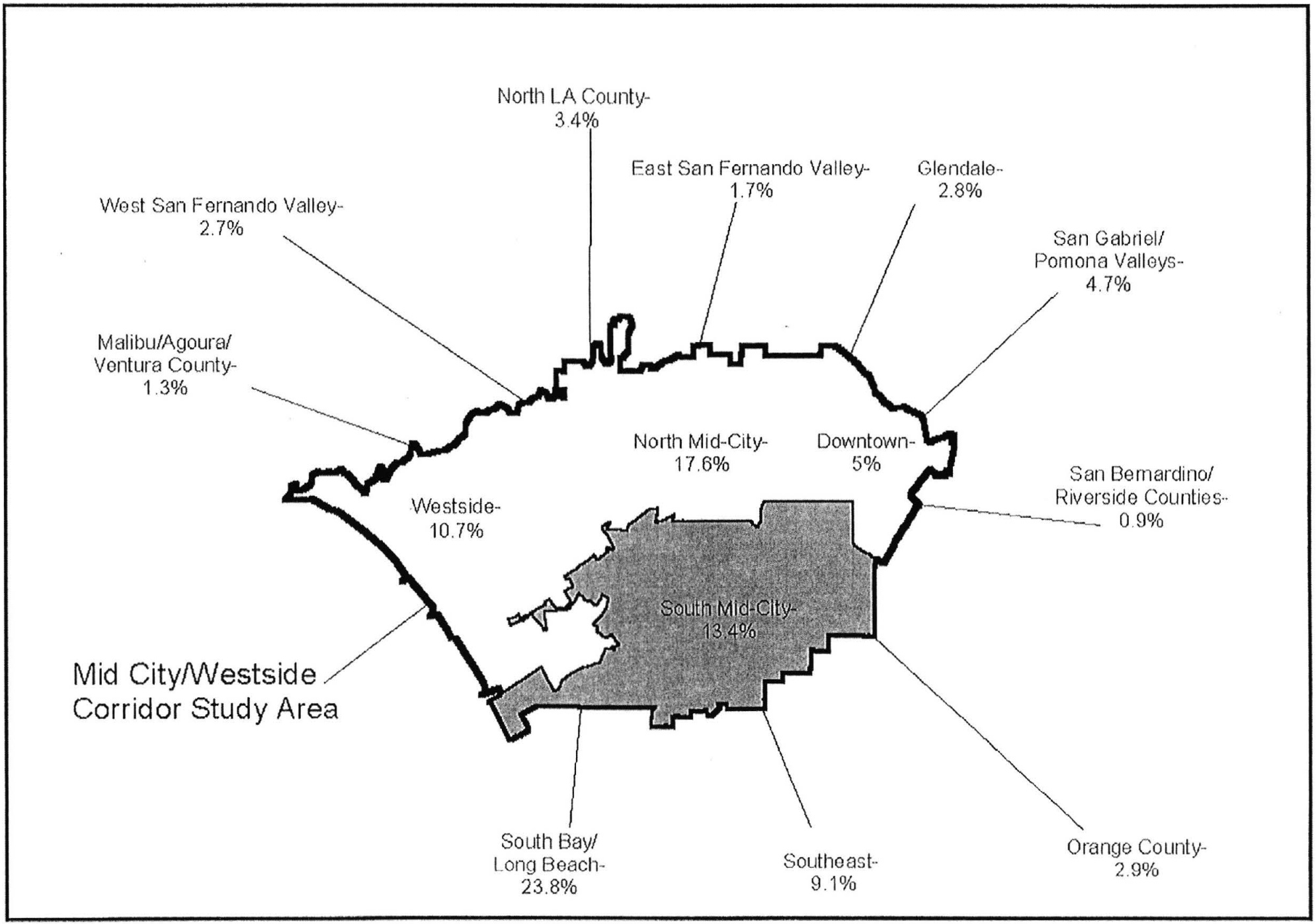
FIGURE 1.18
PERCENT DISTRIBUTION OF 1998
TOTAL TWO-WAY DAILY STUDY AREA WORK TRIP



Mid-City/Westside Transit Corridor
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FIGURE 1.19
PERCENT DISTRIBUTION OF 1998
TOTAL TWO-WAY DAILY STUDY AREA WORK TRIP

interaction with the westside, at 10.7 percent, and with the north side (including Downtown), at 22.6 percent of the total work trips. The southern part of the Study Area also has a strong interaction of work trips with South Bay and Southeast, with almost 33 percent of the total work trips to/from this area. On the other hand, the work-trip interaction between this area and San Fernando Valley and points north is relatively less, with only 10.6 of the total work trips.

Based on the overall interaction patterns between the Study Area and surrounding areas a simplified "spider network" was constructed to identify potential corridors of travel patterns and the magnitude of travel activity. The thickness of the lines on the network is proportional to the identified level of travel demand for home-to-work trips between the two adjacent communities. The level of travel also includes potential through travel from other communities that would use major routes connecting the two adjacent communities.

As seen on Figure 1.20, the 1997 data identifies heavy work-travel demand between the Mid-City/Westside Study Area and the San Fernando Valley along both the Sepulveda and Cahuenga passes. Work-travel demand is also heavy to the south-east and east along the San Bernardino and Golden State freeway corridors. Within the Mid-City/Westside Study Area, three distinct parallel east-west corridors can be observed, which connect Downtown Los Angeles to points west of the San Diego Freeway: a northern corridor approximating Santa Monica Boulevard; a central corridor represented by Wilshire Boulevard; and a less well-defined southern corridor on, or south of the Santa Monica Freeway.

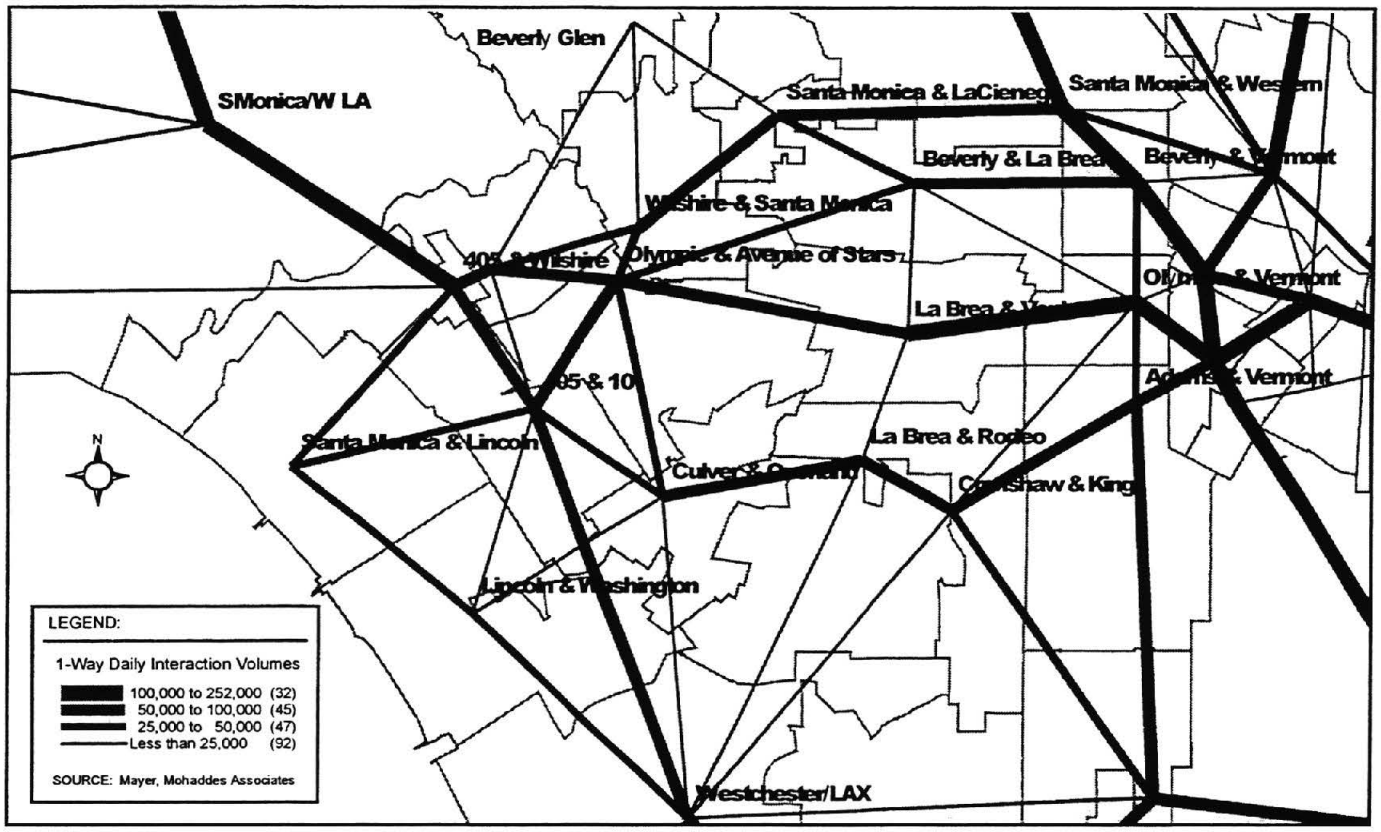
An analysis of Figure 1.21 for 2020 conditions reveals that work-travel demand along every corridor is expected to increase significantly in the future. This is the case for trips between communities in the Study Area, as well as travel to and from the San Fernando Valley and the east side. Several east-west corridors within the Study Area show travel demand well in excess of 200,000 daily two-way work-trips. The pattern of three distinctive east-west corridors within the Study Area is again apparent for 2020 conditions, with all community-to-community movements showing significant increases in demand.

The spider network for 1997 and 2020 conditions both indicate there is strong east-west travel demand along major east-west corridors: Santa Monica Boulevard, Wilshire Boulevard, Santa Monica Freeway and Exposition/Venice Boulevards. None of these corridors are currently served by a high capacity transit system.

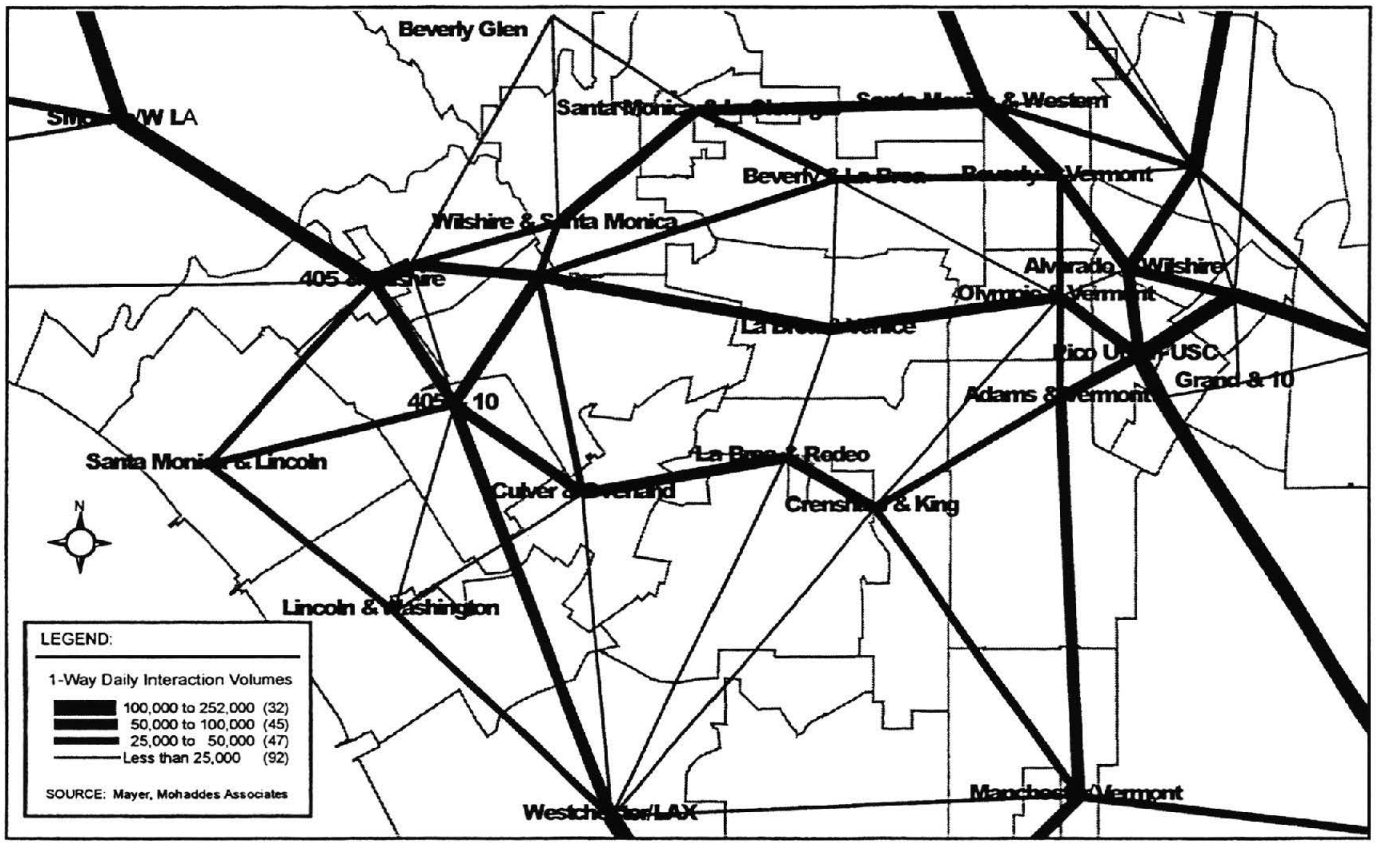
Travel Growth Projections. Travel growth projections characteristics for the Mid-City/Westside Study Area were obtained and summarized from the Los Angeles County MTA's travel demand model.[8] Three of the most meaningful categories of travel characteristics are:

- **Total Daily Person Trips** - the number of <u>one-way</u> trips made by all <u>persons</u> within a 24-hour period

[8] The travel demand model provides statistics which describe the magnitude and overall travel characteristics of the five County southern California area in general and Los Angeles County in particular. The model can be used to get information about existing travel patterns as well as to develop future travel forecasts. The model provides data on total daily and peak hour travel by various modes, including personal vehicle (single occupant or carpool) and transit (bus and rail). This model is used to develop travel forecasts on highways and patronage (ridership) forecasts for transit services.



2020 DAILY WORK TRIP VOLUMES ON "SPIDER" NETWORK **FIGURE 1.20**



1997 DAILY WORK TRIP VOLUMES ON "SPIDER" NETWORK **FIGURE 1.21**

- **Daily Home-Work Person Trips** - the number of one-way trips made by all persons between home and work location within a 24-hour period

- **Daily Transit Person Trips** - the number of one-way trips made by all persons on transit (bus and rail) within a 24-hour period

A summary of these statistics compiled for 1998 and 2020 are presented in Table 1.5. Statistics related to the entire region are shown on the left side of the table, whereas the information on the right side pertain to the Study Area.

All Trips

As seen in the first section of the table, in 1998 there were a total of approximately 50.7 million daily person trips made in the five-county region. As the second row of figures shows, 10.3 million, or 20.3 percent of these total daily trips are two-way home to work trips, and almost 1.6 million of the daily trips, or 3.2 percent are made on transit. As the table also illustrates, there are nearly 8.5 million daily person trips made in the Study Area, of which 2.3 million, or 27.5 percent are home to work trips, and over 675,000 trips, or 8 percent are made on transit.

When compared to the region as a whole, it can be seen that the Study Area has a higher percentage of work trips (by 7 percentage points) of all daily trips. This is a reflection of relatively higher population density as well as abundance of employment opportunities in the Study Area. The more notable observation, is the significantly higher transit percentage for Study Area trips compared to the overall regional transit percentage. The Study Area's 8 percent transit mode split is 2.5 times higher than the regional 3.2 percent mode split. This is a clear indication of two characteristics related to the Study Area: high transit dependency in certain Study Area communities and relatively high levels of transit services, which are provided in the Study Area.

The significance of the Study Area's travel characteristics compared to the region is shown on the third row of the table. This part of the table has some revealing facts. Whereas, the Study Area's total daily person trips account for 16.7 percent of the total trips in the region, more than one out of every five home-work trips in the region (22.7 percent), are related to the Study Area. This again, points to the higher population and employment opportunities in the Study Area. The Study Area's share of regional transit trips is extremely significant. The statistics show that 42.2 percent (more than 2 out of every 5) daily transit trips made in the region have either an origin or a destination in the Study Area.

Internal Trips

Travel statistics, which were presented above were related to all trips that either originate or are destined to the Study Area. The last three rows of tables provide information about Study Area's internal trips. Internal trips are those which have both ends of the trip (origin and destination) entirely within the Study Area. As can be seen, in 1998 there were a total of 4.4 million daily trips, which stayed entirely within the Study Area. Over 652,000 of these, or 14.7 percent, were work trips, and 411,000, or 9.3 percent of the total internal trips, were transit trips.

Table 1.5
Summary of Person Travel Characteristics - Mid-City/Westside Study Area

Person Trips and Growth, 1998-2020	Region			Corridor		
	1998*	2020	% Growth	1998	2020	% Growth
Total Daily Person Trips	50,705,715	65,952,425	30.1%	8,479,289	9,596,260	13.2%
Daily Home-Work Person Trips	10,271,754	13,092,874	27.5%	2,328,448	2,666,914	14.5%
Daily Transit Person Trips	1,597,598	2,018,584	26.4%	674,979	815,057	20.8%
Home-work and Transit Trips as a Percentage of Total Trips	Region			Corridor		
	1998	2020		1998	2020	
Total Daily Person Trips	100.0%	100.0%		100.0%	100.0%	
Daily Home-Work Person Trips	20.3%	19.9%		27.5%	27.8%	
Daily Transit Person Trips	3.2%	3.1%		8.0%	8.5%	
Corridor Trips as a Percentage of Regional Trips				Corridor		
				1998	2020	
Total Daily Person Trips				16.7%	14.6%	
Daily Home-Work Person Trips				22.7%	20.4%	
Daily Transit Person Trips				42.2%	40.4%	
Corridor Internal-Internal Trips and Growth				Corridor		
				1998	2020	% Growth
Total Daily Person Trips				4,438,461	4,878,137	9.9%
Daily Home-Work Person Trips				652,708	681,254	4.4%
Daily Transit Person Trips				411,736	449,720	9.2%
Internal-Internal Home-work and Transit Trips as a Percentage of Total Trips				Corridor		
				1998	2020	
Total Daily Person Trips				100.0%	100.0%	
Daily Home-Work Person Trips				14.7%	14.0%	
Daily Transit Person Trips				9.3%	9.2%	
Internal Trip Retention Percentage in the Corridor				Corridor		
				1998	2020	
Total Daily Person Trips				52.3%	50.8%	
Daily Home-Work Person Trips				28.0%	25.5%	
Daily Transit Person Trips				61.0%	55.2%	

Key: Region=Five-County Southern California MTA Modeling Area
Corridor=Mid-City/Westside Study Area

Source: Compiled by Meyer, Mohaddes Associates from LACMTA Travel Demand Model Trip Tables

* Note:According to SCAG's 1997 regional model, the total daily person trips is estimated at 52 million, daily HBW person trips is 8.8 million. The MTA model is being revised and the data is higher in both categories.

When comparing the internal trips to total trips generated by the Study Area, it can be seen that a relatively large portion of the total trips, more than half (52.3 percent) stay within the Study Area. This is an indication of availability of travel opportunities (both home and work) for all trips in the Study Area, which results in high trip retention. However, the percentage of retention for work trips is significantly lower at less than one out of four (28.0 percent). This shows that many residents commute to work destinations outside the region. When analyzing the internal capture of transit trips, the trends are even higher than all trips, showing 61 percent of all transit trips generated by the Study Area staying entirely within the Study Area's boundaries.

Future Trends

Forecasts of travel statistics were also made available form the MTA model for 2020. These data are also presented in Table 1.5, in conjunction with the corresponding 1998 information. Comparison of 1998 and 2020 data for each category, both for the region and the Study Area, provides information about expected growth in magnitude of travel and the relative significance of this growth when compared to the expected regional growth.

The region's 50.7 million total daily trips are expected to grow by 30.1 percent to nearly 66 million by 2020. Home to work trips will grow similarly by 27.5 percent, from 10.3 million to 13.1 million. The expected growth in regional transit trips is also relatively consistent, at 26.4 percent, from 1.59 million to just over 2 million. There is, however, a notable difference between the Study Area and the region as it relates to growth in travel. Overall, the three travel indicators show lower growth for the Study Area, compared to the region as a whole. This is a reflection of relative maturity and built-out nature of the Study Area. While the 1998 to 2020 growth of the regional statistics were between 26 and 30 percent, the Study Area' are in the 13 to 21 percent range. In the 23-year span, total daily trips in the Corridor are expected to grow by 13.2 percent, from 8.5 million to 9.6 million. The growth in home-work trips is slightly higher, at only 14.5 percent, from 2.3 million to 2.7 million. However, the Study Area's transit trips are expected to increase at a much higher rate than total trips, by 21 percent, from the 1998 level of 675,000 to 815,000 by 2020.

As seen in the second row of tables, the share of daily home-work and transit trips as a percentage of the total trips are expected to remain very similar to 1998 trends, both for the region and the Study Area. However, as the overall regional transit mode split shows a slight decrease (from 3.2 to 3.1 percent), while the Study Area's transit mode split is expected to increase slightly (from 8 to 8.5 percent).

With the expected high regional growth levels, share of Study Area trips as a percentage of total regional trips show declines in all categories in 2020 compared to 1998. All daily trips will be 14.6 percent, home to work trips will drop to 20.4 percent, and transit trips will fall slightly to 40.2 percent. It should be pointed out that regardless of these declines, the Study Area's share of regional travel will still be fairly significant in all categories.

It was discussed earlier that the Study Area's total trips in all categories lagged behind the region in projected growth, when the growth in internal trips is analyzed, the Study Area shows similar trends. Total internal trips are expected to grow at only 9.9 percent. Internal home-work trips are projected to grow by 4.4 percent. Internal transit trips are expected to grow by 9.2 percent.

The last two rows of tables also point to the fact that in 2020, home to work and transit trips will make up slightly lower percentage of total daily trips compared to 1998, and the percentage to retention for each trip category will decrease slightly.

Several key highlight points can be concluded from the above statistics:

- The Mid-City/Westside Study Area is a highly significant origin and/or destination point for trips in Southern California, especially for transit trips, over 42 percent of which have one end in the Study Area

- The Study Area has a significantly higher transit mode split than the region as a whole, and the trend is expected to increase (from nearly 2.5 to 2.7 times the regional mode split)

- The Study Area currently has a very high internal trip retention (over half of all trips), and despite growth in regional trips, is expected to maintain these high internal trip retention percentages

Another primary indicator of changing travel patterns in the Study Area is traffic volume along the Santa Monica Freeway. This facility bisects the Study Area and is the primary transportation facility serving east-west travel between downtown Los Angeles and Santa Monica..

The travel patterns on the freeway illustrate how longer-distance trips in the Study Area may be oriented. Over the last 20 years those patterns have significantly changed as well. In the 1970's commute patterns were heavily oriented from the Westside toward downtown Los Angeles. The freeway was heavily congested in the eastbound direction in the morning peak hours and in the westbound direction in the afternoon peak hours. With the significant increase in jobs on the Westside, the commute patterns have reversed. The Santa Monica Freeway is now more congested in the westbound direction in the morning and the eastbound direction in the evening, and traffic volumes are very heavy in both directions all day long (Figures 1.22 and 1.23). Existing conditions are illustrated in photographs taken of the Santa Monica Freeway (Figures 1.24 and 1.25) Many of the commute trips to the Westside originate east of downtown.

While the total daily traffic volume on the Santa Monica Freeway has remained relatively constant over the last ten years, the peak hour volumes have increased significantly at the two ends of the freeway in the Study Area near the San Diego Freeway and near Downtown. In the Mid-City section, the traffic volume has generally decreased during the last ten years. Table 1.4 provides a comparison of volumes between 1989 and 1998 on Santa Monica Freeway within the Study Area.

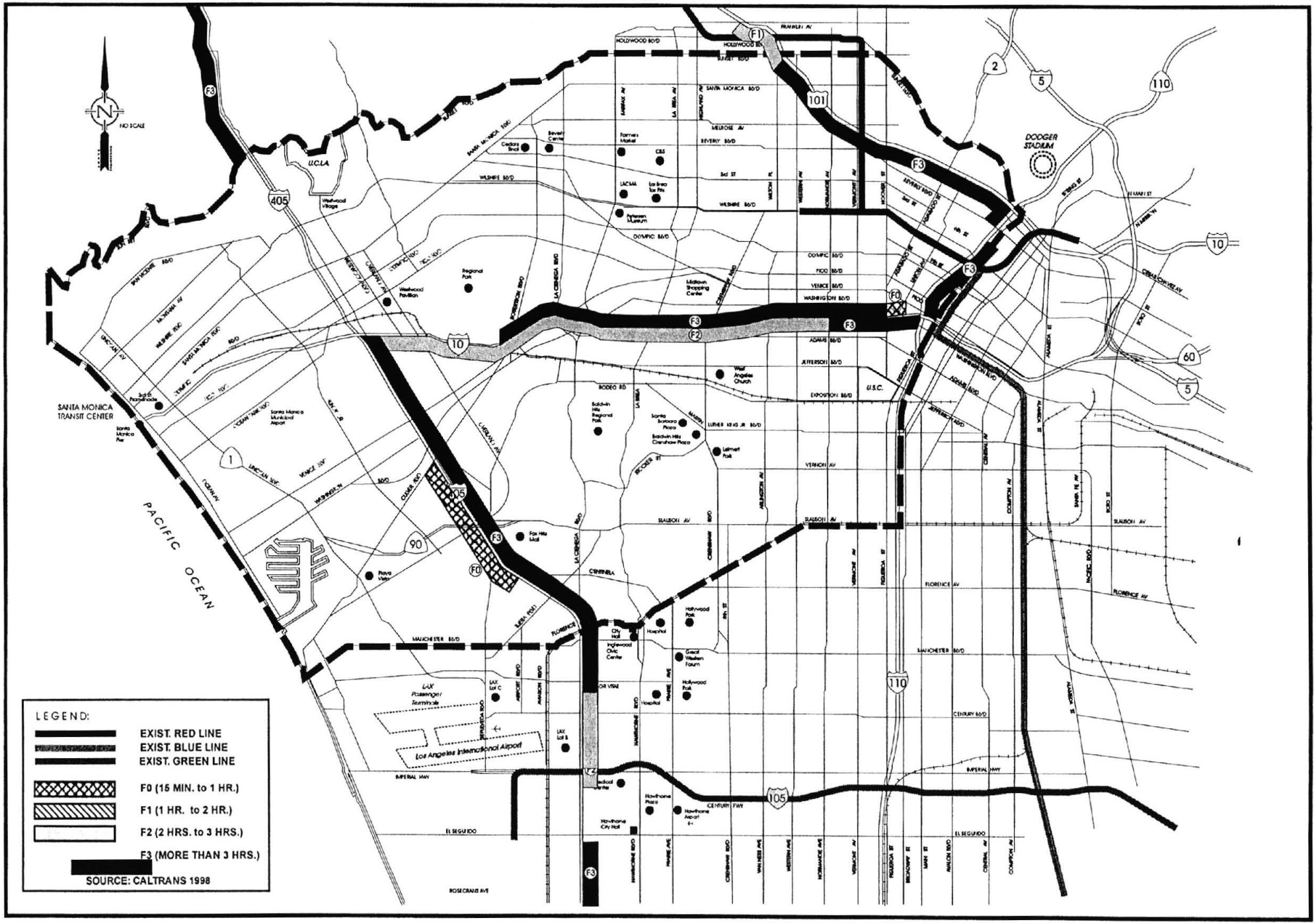


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FIGURE 1.22

FREEWAY LEVEL OF SERVICE (A.M. PEAK PERIOD 1998)

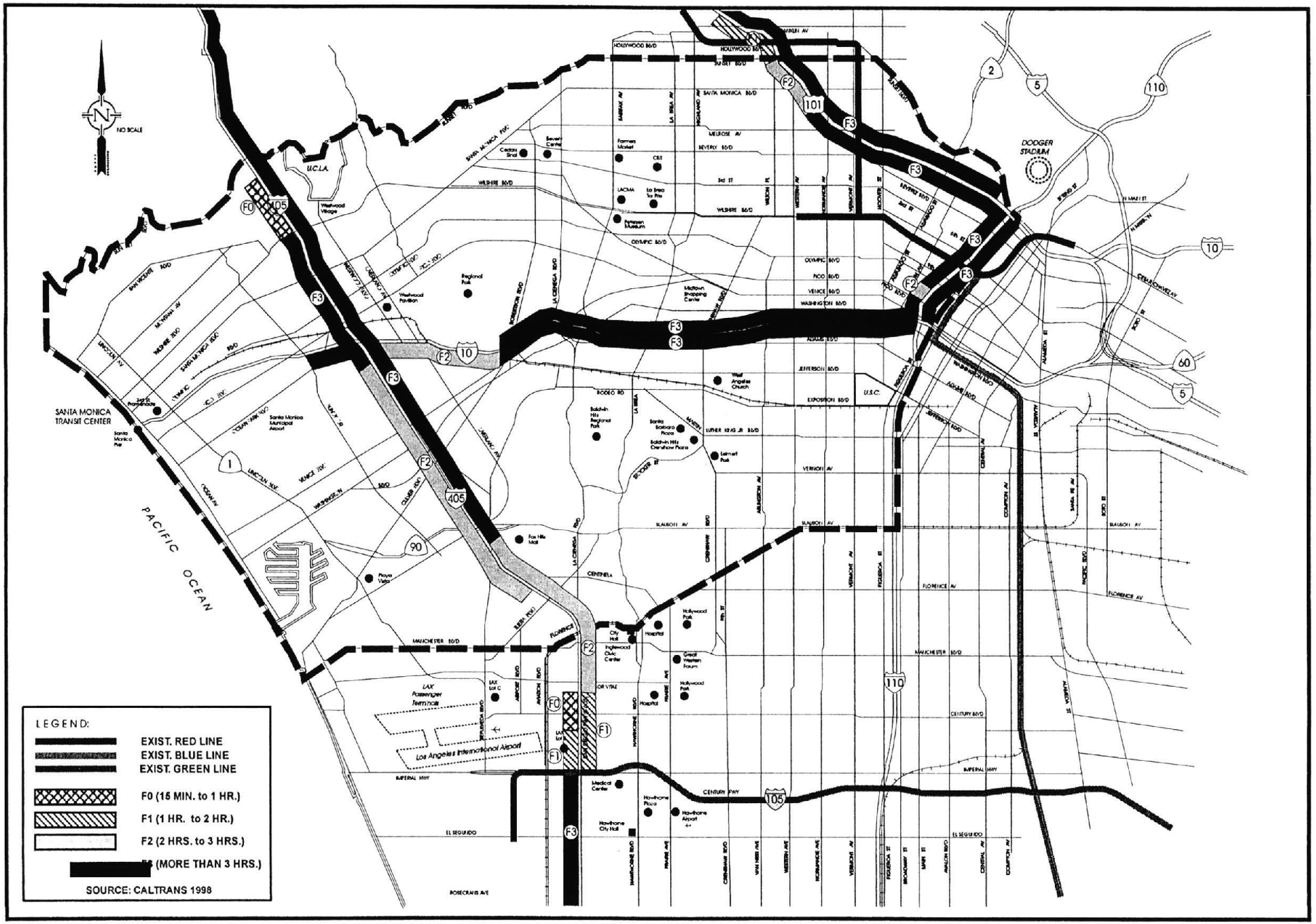

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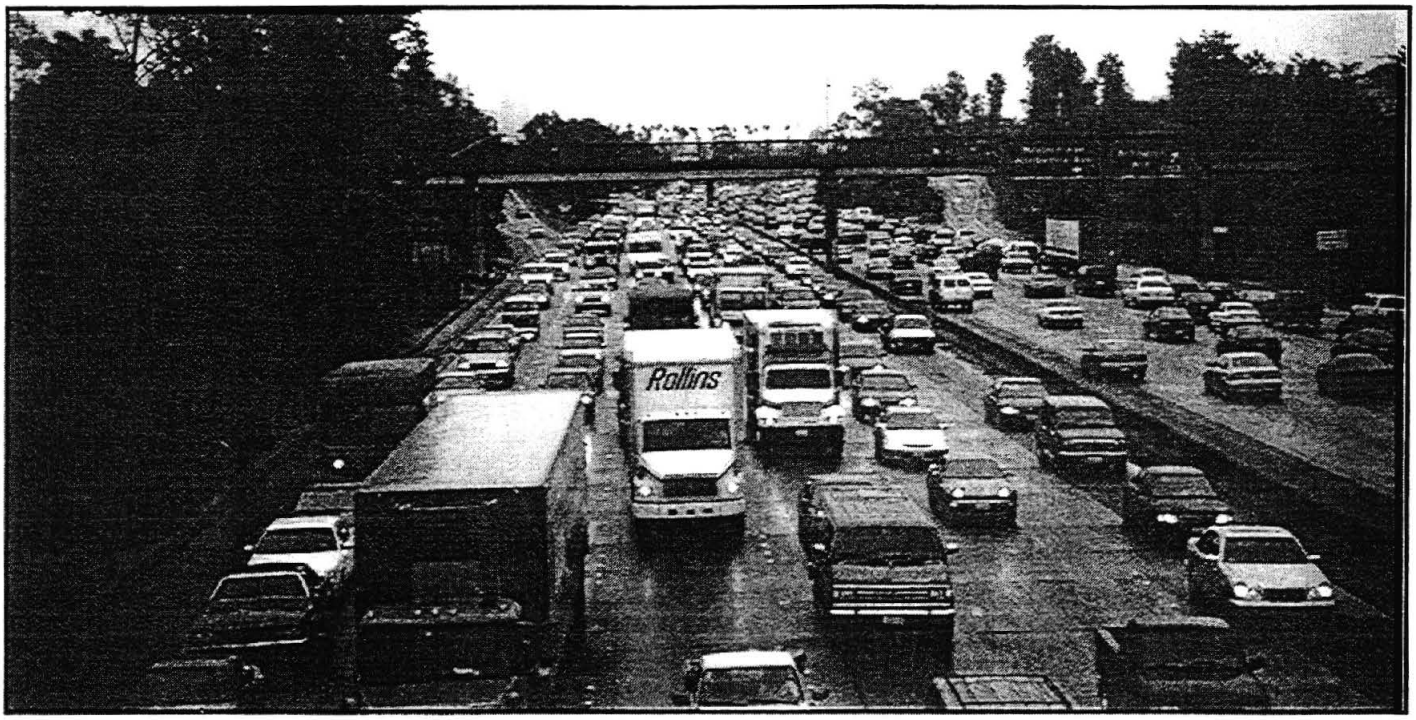
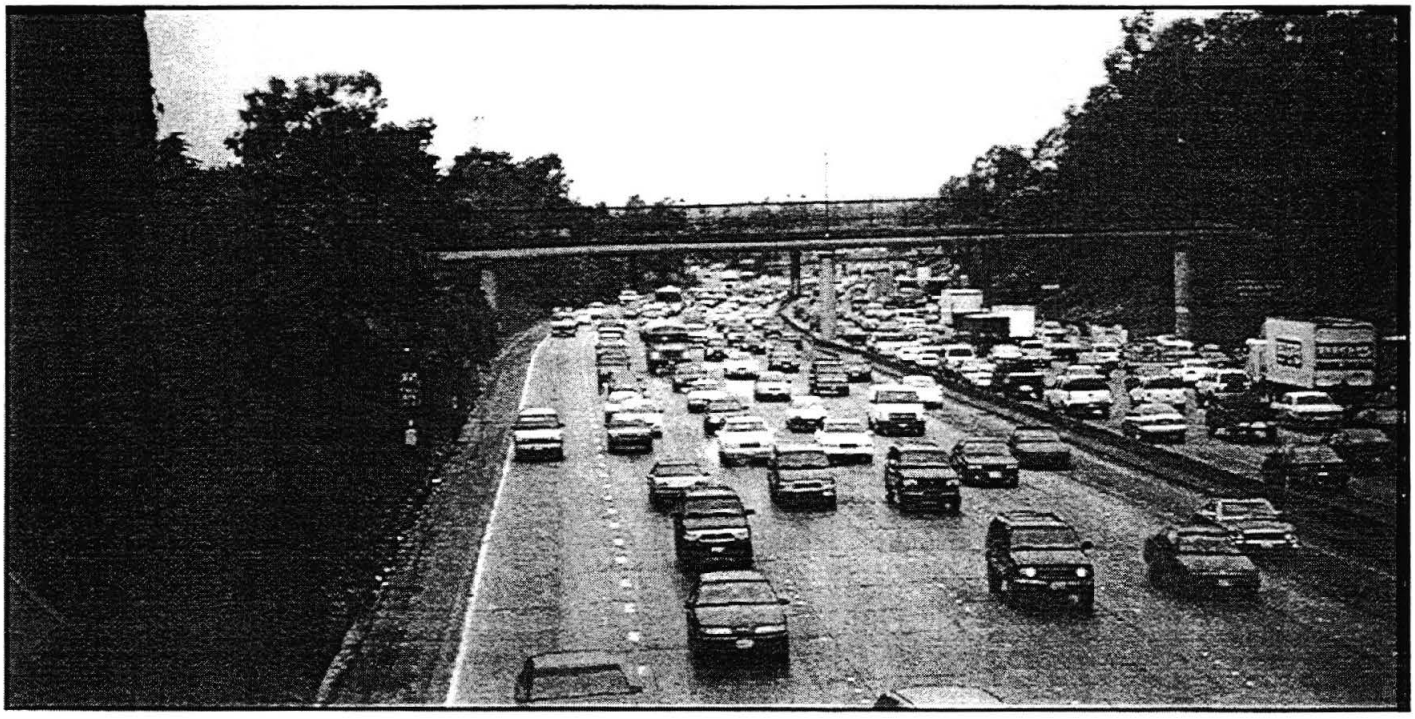
FIGURE 1.23

FREEWAY LEVELS OF SERVICE (P.M. PEAK PERIOD 1998)



Santa Monica Freeway, AM Peak Hour. View looking east near Western Avenue. At this location, it appears that eastbound and westbound traffic volumes are about the same.

FIGURE 1.24 WESTBOUND TRAFFIC



Santa Monica Freeway, AM Peak Hour. View looking west near Crenshaw Boulevard. Note greater density of traffic in westbound direction

FIGURE 1.25 EASTBOUND TRAFFIC

Table 1.6
Traffic Volume Trends on Santa Monica Freeway

Segment	1989 Traffic Volumes		1998 Traffic Volumes	
	Peak Hour	Daily Volume	Peak Hour	Daily Volume
West of I-405	14,900	230,000	16,700 (+12%)	231,000 (+0.4%)
Overland to I-405	14,700	266,000	19,100 (+30%)	272,000 (+2%)
La Brea to Crenshaw	20,000	314,000	20,300 (+1.5%)	293,000 (-7%)
Hoover to I-110	18,500	337,000	22,000 (+19%)	325,000 (-4%)

Source: MMA, 1999

1.15 Peak Hour Roadway Congestion Over A Large Area Justifies the Need For Transit Improvements

There is substantial peak hour congestion in the northern portion of the Study Area. Vehicular travel to the East and West San Fernando Valleys must ultimately by-pass through the Sepulveda or Cahuenga passes. Access patterns in to these routes are congested during the peak travel hours as motorist attempt to pass northward at either the western or eastern ends of the Study Area.

Figure 1.26 illustrates the location of roadway segments that operate at LOS E and LOS F during the evening peak hour. As can be seen the majority of congested segments are concentrated north of the Santa Monica Freeway and east of the San Diego Freeway. The densest concentration of congested segments is located in the northeastern portion of the Study Area, and reflects Study Area traffic flowing toward access points to the eastern San Fernando Valley, Glendale and Burbank. The other major area of congestion occurs on the San Diego Freeway and Wilshire Boulevard area where travel to the western San Fernando Valley is concentrated.

Total morning and evening peak hour freeway and arterial traffic volumes in the peak direction were compared to the total available capacity. This was done for both existing 1997 and future 2020 conditions. The following paragraphs summarize some of the key observations.

Existing Conditions

- North-south travel demand on all facilities crossing Wilshire Boulevard is currently 15 percent over the available capacity.
- North-south travel demand on all facilities crossing Venice Boulevard is 10 percent over the available capacity.
- East-west travel demand on all facilities crossing La Cienega Boulevard is 10 percent over the available capacity.

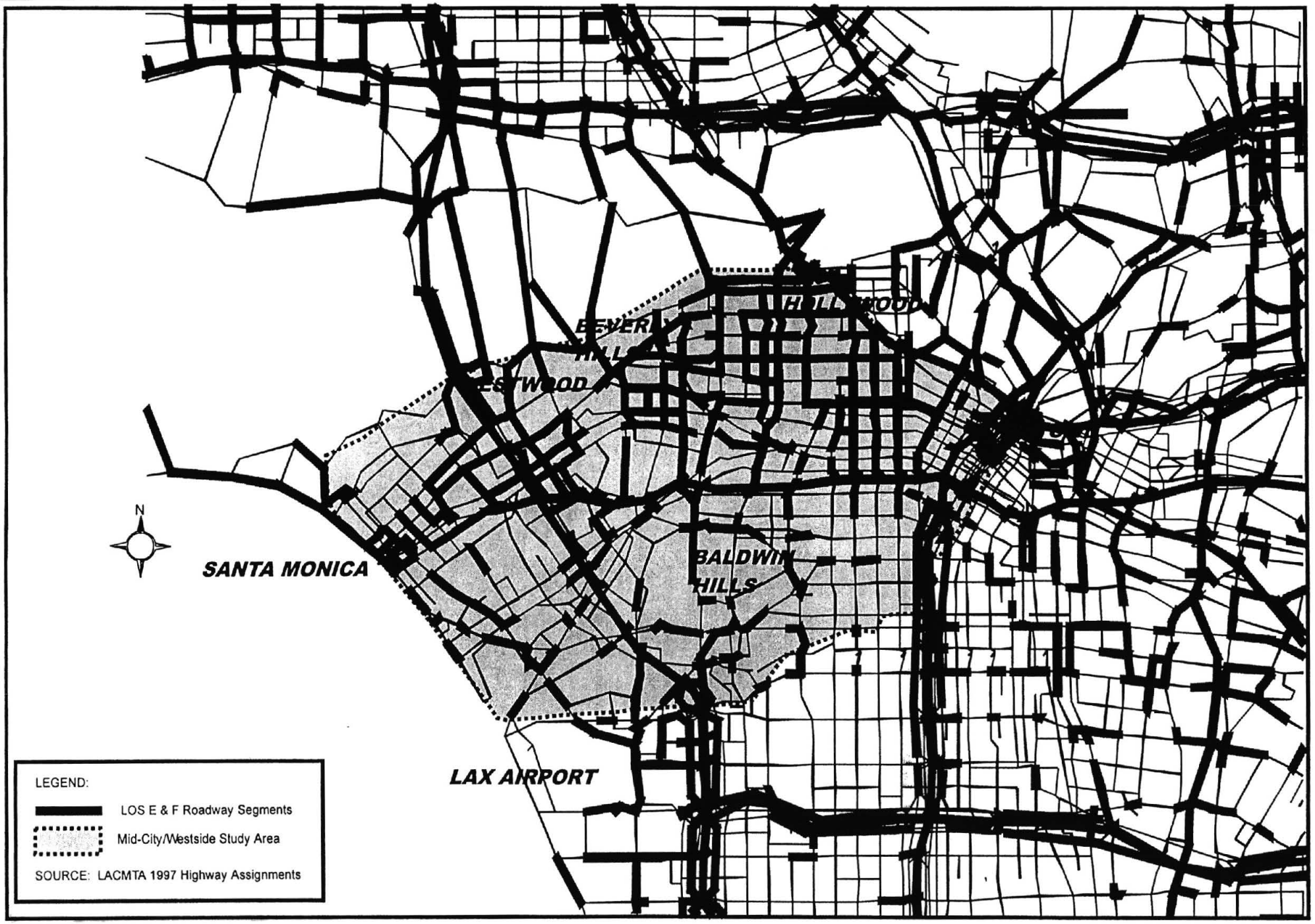


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FIGURE 1.26
EXISTING LEVEL OF SERVICE AND RAODWAY SEGMENTS EVENING PEAK PERIOD

Future (2020) Conditions

- All corridors within the Study Area (north-south and east-west) show increase in travel demand compared to existing conditions.
- All corridors show either no change or significant increases in overall highway capacity deficiency compared to existing conditions.
- Most significant increases in travel demand are expected to be for north-south travel across Jefferson Boulevard and for east-west travel across Vermont Avenue.
- North-south travel demand across Wilshire Boulevard will be 14 percent over the available future capacity.
- North-south travel demand across Venice Boulevard will be 21 percent over the available future capacity.
- East-west travel demand across Vermont Avenue will be 21 percent over the available future capacity.

1.16 Planned Transportation Improvements

There are several transportation improvements included in the 1998 Regional Transportation Plan which are planned to be implemented in the Mid-City/Westside Study Area by the year 2020. These planned improvements are shown in Figure 1.27 and summarized in Table 1.7.

All of the programmed improvements, with the exception of two arterial widening projects west of the I-405 on Culver and Venice Boulevards, are located on north-south facilities. There are no planned improvements that will address the significant capacity deficiencies on east-west facilities.

It should be noted that in addition to these specific projects, there are several categories of countywide funding which will be allocated to projects in the following categories: Non-Motorized, Operations & Maintenance, Signal Synchronization, Smart Shuttles, Transit Centers/Park-and-Ride, and Traveler Information. Local jurisdictions, including those in the Mid-City/Westside Study Area, will propose projects in these categories during the next 20 years, but none are likely to be of such regional significance as to address the east-west traffic congestion problems throughout the Mid-City/Westside Study Area.

It should also be noted that the RTP proposes implementation of transit corridors, including two in the Mid-City/Westside; the Exposition/MLK Corridor and the West LA Corridor, but the RTP notes that there are eight such corridors competing for limited resources and does not prioritize the phasing of the transit corridor projects.

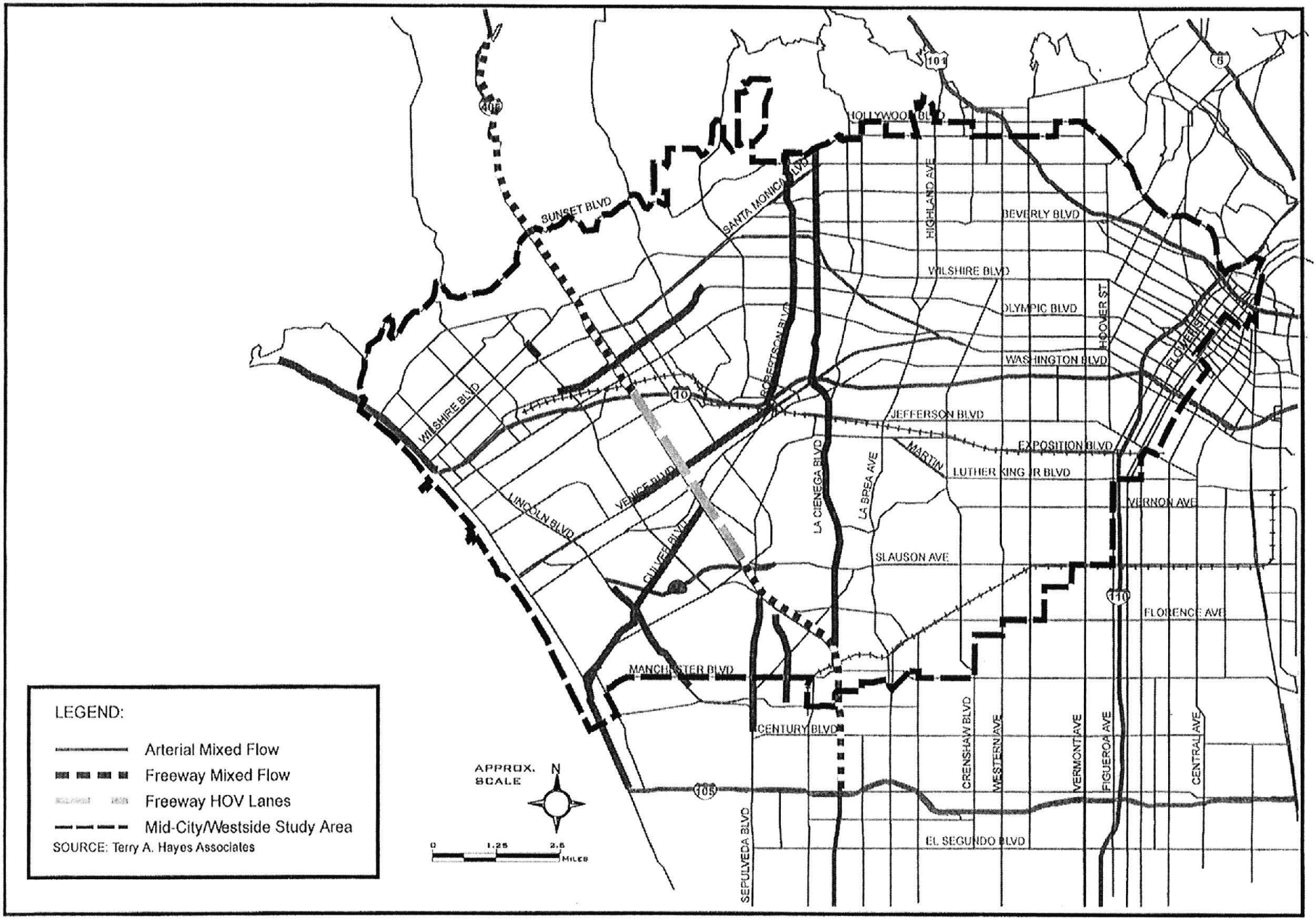

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FIGURE 1.27

PLANNED TRANSPORTATION IMPROVEMENTS

Table 1.7
Project List In/Near Mid-City/Westside Study Area

Improvement Type	Corridor	Route Description	From	To
Arterial mixed flow (TSM)	Local	La Cienega Blvd	Sunset Blvd	I-405
Arterial mixed flow (TSM)	Local	Robertson Blvd	Sunset Blvd	I-10
Arterial HOV (transit)	Local	Culver Blvd	SR-90	I-405
Arterial Mixed Flow	1	Lincoln Blvd	La Tijera	Hughes Terrace
Arterial Mixed Flow	1	Lincoln Blvd	Hughes Terrace	Fiji Way
Arterial Mixed Flow	1	Lincoln Blvd	Jefferson Blvd	Fiji Way
Arterial Mixed Flow	1	Lincoln Blvd	at Mindanao	
Arterial Mixed Flow	1	Sepulveda Blvd	Howard Hughes	Century Blvd
Arterial Mixed Flow	1	Pacific Coast Hwy	Santa Monica Blvd	Ventura Co Line
Arterial Mixed Flow	Local	Venice Blvd	Centinela Ave	Robertson Blvd
Arterial Mixed Flow	Local	Olympic Blvd	Centinela Ave	Century Park East
Arterial Mixed Flow	Local	Culver Blvd	SR-90	1-405
Arterial Mixed Flow	Local	Bundy Dr	Wilshire Blvd	Santa Monica Blvd
Arterial Mixed Flow	Local	I-405 Airport Connector Rd	Howard Hughes Pkwy	Arbor Vitae St
Freeway: HOV Lanes	I-405	San Diego Freeway	SR-90 Marina Freeway	I-10 Santa Monica Freeway
Freeway: Mixed-Flow Lanes	I-405	San Diego Freeway	US-101 Ventura Freeway	I-105 Century Freeway

Source: Meyer, Mohaddes Associates Inc., 1999

In addition to the projects included in the RTP, there are transportation improvements proposed by local jurisdictions in the Study Area. These include implementation of the Adaptive Traffic Control System (ATCS) by the City of Los Angeles, which will improve the efficiency of signalized intersections in responding to changing traffic conditions on a real-time basis. The City of Los Angeles, in partnership with the MTA and Caltrans, will also be implementing the Santa Monica Boulevard Transit Parkway Project in the Century City area, between the I-405 and Beverly Hills. This project will reconfigure the two roadways into one boulevard, provide bus priority treatments and bicycle lanes along its 2.5 mile length. Similarly, the City of West Hollywood is reconfiguring Santa Monica Boulevard to add bike lanes and urban design enhancements, but this project will not provide additional east-west traffic capacity. The City of Los Angeles has other local improvements planned on arterial streets that will be funded through the Westwood/West LA Transportation Improvement and Mitigation Program (TIMP).

None of these local projects will provide the necessary capacity enhancement in the Study Area corridor-long transportation needs.

1.17 Local Transportation Improvement Policies Are Oriented Toward Demand Management And Transit Solutions Rather Than On Physical Roadway Improvements

Because of the level of build out and density within the Study Area, local jurisdictions have generally determined through their local policies that congestion relief improvements should focus on travel demand management rather than on physical improvements such as widening and new roadways. In

a number of cases, local communities desire to eliminate cut through and neighborhood traffic or to support more livable downtown or commercial areas, are supporting initiatives to limit roadway capacity or slow even further traffic flow. Thus, transit improvements remain as one of the only viable remaining alternatives to reduce traffic volumes and congestion-related delays.

Specifically, to assist in the implementation of the Regional Comprehensive Plan and the associated Regional Transportation Plan, SCAG has decentralized local jurisdiction participation into specific subregions. The Study Area is encompassed by the Westside Cities Subregion (Santa Monica, West Hollywood, Beverly Hills and Culver City), as well as by the Los Angeles Subregion (consisting solely of the City of Los Angeles).

In each of the cities on the Westside, policy makers have taken strong positions against the wholesale widening of streets and narrowing of sidewalks to accommodate more travel lanes. Localized transportation system management (TSM) improvements, such as additional turn lanes or signal phasing changes, have been supported, but the Mid-City/Westside arterial network is essentially built out. In this highly urbanized area, the types of transportation improvements that have the support of the policy makers are transit improvements, intelligent transportation systems projects, and livable communities programs. Future increases in travel demands will have to be accommodated by making the existing highway network work better, to the limited extent that it can, but more likely through increased usage of transit and other (i.e., non-motorized) modes of transportation. Throughout the Westside, efforts are also underway in all of the jurisdictions to make it harder for automobile traffic to seek alternate routes through residential neighborhoods. These traffic calming programs will further concentrate commute traffic on the already congested arterial streets.

1.18 Summary Conclusions

The central question is whether a significant investment is warranted for transit improvements in the Mid-City/Westside Study Area. The answer is yes for the following reasons.

- **The Need for Transit Improvements has been Established in Previous Studies.** Providing high capacity transit service improvement has been long recognized in the Mid-City/West Area. Since 1970's, the LACMTA and its predecessors (SCRTD, LACTC) have conducted numerous transportation planning and environmental impact studies that established the need and feasible locations for either bus, light rail and/or heavy rail east-west service in various parts of the Study Area.

- **Study Area Contains A Major Concentration of Activity Centers and Destinations.** The area contains the largest concentration of major activity centers and destinations within the Los Angeles metropolitan region. Many of these centers are located within the most congested portion of the Study Area north of the Santa Monica Freeway (I-10) and east of the San Diego Freeway (I-405).

- **The "Centers Concept" Land Use Policy is Transit Based.** Land use policies in the Los Angeles metropolitan region have traditionally been founded upon the framework that access to major activity centers would be facilitated through a network of transit connections. The

recently completed Los Angeles General Plan Framework reinforced this concept as a continuing policy framework for the City of Los Angeles. New growth is planned and expected to occur only in areas that are served by transit.

- **There is an Existing Concentration of Transit Supporting Land Uses.** The existing activity centers in the Study Area are central part of a large concentration of land uses that are considered to be transit supporting (high density housing, commercial and retail). In fact, roughly 30 percent of the land area within the Study Area falls into this category. Patterns of transit supporting land uses are concentrated along the Santa Monica Boulevard/Wilshire Boulevard corridors. A lesser concentration is evident along a southern oriented Venice corridor.

- **High Study Area Population and Employment Densities Support Transit.** Population and employment densities in the Study Area are the highest within the metropolitan region, averaging approximately 13,883 persons per square mile and 9,167 employees per square mile.

- **There is a History of Transit Usage in the Study Area.** Existing transit usage within the Study Area is proportionally higher than any other area in Los Angeles County (13.64 percent for the Study Area versus 6.8 percent for the County). Because there is a large base of existing transit service and transit patrons, increasing the transit mode share through increased service would represent a natural extension of existing patterns and trends.

- **There is a Significant Transit Dependent Population in the Study Area.** Part of the underlying reason for high transit usage in the Study Area is that a significant number of households are autoless and have low incomes. According to the 1990 Census there are approximately 18.33 percent of households did not have a vehicle compared to 10.90 percent for the County. The majority of these households are concentrated in east and northeastern portion of the Study Area. In addition, in 1990, 20.91 percent of the population of the Study Area was below poverty status compared to 14.76 percent in the County.

- **Apparent Lack of East-West Transit Service Impairs Mobility for a Significant Proportion of the Study Area Population.** Travel to work time comparisons of various communities within the Study Area strongly suggests that communities in the Mid-City portion of the Study Area (eastern half) are not served by an efficient transit systems. Travel to work times are longer than travel to work times in the Westside portion of the Study Area. This differential strongly suggests that socioeconomic mobility is greatly impaired for residents in the eastern portion of the Study Area because they cannot conveniently access jobs, educational facilities, cultural facilities, and services via transit that are largely concentrated in the western portion of Study Area.

- **The Study Area Is Expected to Continue to Capture a Large Share of Regional Population and Employment Growth.** Population and employment forecasts to the year 2020 adopted by the Southern California Association of Governments clearly suggest that the Study Area will capture a disproportionate share of growth over the next 20 years, growth that will place further demands on transit service and is expected to result in increasing congestion on local roadways and regional highways serving the Study Area.

- **Continued Growth in the Business Services Sector (Entertainment and Media Related) Underlies the Future Development Potential in the Study Area.** Growth in the Study Area will continue to be fueled by the fact that entertainment and media related businesses concentrating in the western part of the corridor. Currently, the Study Area is the center of approximately 1/3 of all new office construction underway in LA County, which makes it the largest office market in Los Angeles. Real estate analysts expect that the demand for production and creative spaces will continue to be robust. The industries and businesses that are attracted to the Study Area are those that are expected to be the foundation of the local and regional economy for many years into the future.

- **There are Substantial East-West Travel Patterns that are Not Currently Served by a High Capacity Transit System.** Travel patterns currently indicate that the Study Area is a primary attraction for work trips with origins in the West and East San Fernando Valleys. A simplified "spider network" of travel patterns derived from origin-destination data in the LACMTA Travel Model suggests north-south travel patterns from the San Fernando Valley convert to east-west demand within the Study Area . The spider network for 1997 and 2020 conditions both indicate there is strong east-west travel demand along major east-west corridors: Santa Monica Boulevard, Wilshire Boulevard, Santa Monica Freeway and Exposition/Venice Boulevards. None of these corridors are currently served by a high capacity transit system.

- **Peak Hour Congestion on Study Area Roadways Underlies Need for Transit Improvements.** There is Substantial Peak Hour Congestion in the Northern Portion of the Study Area. Vehicular travel to the East and West San Fernando Valleys must ultimately by-pass through the Sepulveda or Cahuenga passes. Access patterns in to these routes are congested during the peak travel hours as motorist attempt to pass northward at either the western or eastern ends of the Study Area.

- **Local Policies are Oriented Toward Demand Management and Transit Solutions rather than on Physical Roadway Improvements.** Because of the level of build out and density within the Study Area, local jurisdictions have generally determined through their local policies that congestion relief improvements should focus on travel demand management rather than on physical improvements such as widening and new roadways. In a number of cases, local communities desire to eliminate cut through and neighborhood traffic or to support more livable downtown or commercial areas, are supporting initiatives to limit roadway capacity or slow even further traffic flow. Thus, leaving transit improvements as one and only viable remaining alternatives to reduce traffic volumes and congestion-related delays.

2. ALTERNATIVES CONSIDERED

2. *ALTERNATIVES CONSIDERED*

The following section provides a discussion of the planning history that has occurred in the Mid-City/Westside Study Area and the alternatives currently being considered in this re-evaluation report. A brief overview provides details of the screening and selection process employed to evaluate the current alternatives being considered for further study. This process was derived from previous studies of the selected Locally Preferred Alternatives (LPA) associated with the Wilshire Corridor, the emergence of the Exposition ROW Corridor, currently owned by MTA, as a viable future transit improvement opportunity, and transit improvements throughout the study area. Finally, a comprehensive definition of the physical, operating and financial characteristics for each alternative being considered for implementation within the Mid-City Westside Transit Corridor is provided.

2.1 Screening and Selection Process

The following studies of the Mid-City/Westside were conducted over a seventeen year time span and reflect a certain evolutionary process influenced by expanded knowledge of the existing geotechnical conditions, improved methods of construction developed from on-going metro rail experience, and greater community awareness and understanding of general transit needs. After a careful review of the findings of these studies, several alternatives were derived, that reflected the nature and concerns of community issues and needs, yet could fall within the scope of future funding availability. These alternatives are discussed at length later in this section.

2.1.1 Mid-City/Westside Study Area

A number of high-density centers are scattered throughout the Mid-City/Westside Study Area, making it difficult for a single transit corridor to provide efficient and comprehensive service. Both the Wilshire Corridor (which includes the alternative via Pico/San Vicente) and the Exposition ROW Corridor stand out as potential corridors for transit improvements that would be able to both perform efficiently on their own and together as complimentary services. The Wilshire Corridor would provide service to activity centers located in the northern portion of the study area, while the Exposition ROW Corridor would serve those activity centers located in the southern and eastern sections.

2.1.2 Wilshire Corridor

The original LPA, adopted in 1983, for the Mid-City/Westside Study Area was an 18.6-mile heavy rail subway line extending from Los Angeles Union Station to North Hollywood using the alignment represented in Figure 2.1. Due to budget constraints, the Urban Mass Transit Administration (UMTA), precursor to the present-day Federal Transit Administration (FTA), was unable to provide funding for the entire LPA alignment. In 1984, a 4.4-mile minimal operable segment (MOS), extending from Union Station to a station at Wilshire/Alvarado, was chosen and a full funding contract for this segment was signed into legislation on December 19, 1985. Construction of this segment began in 1986.

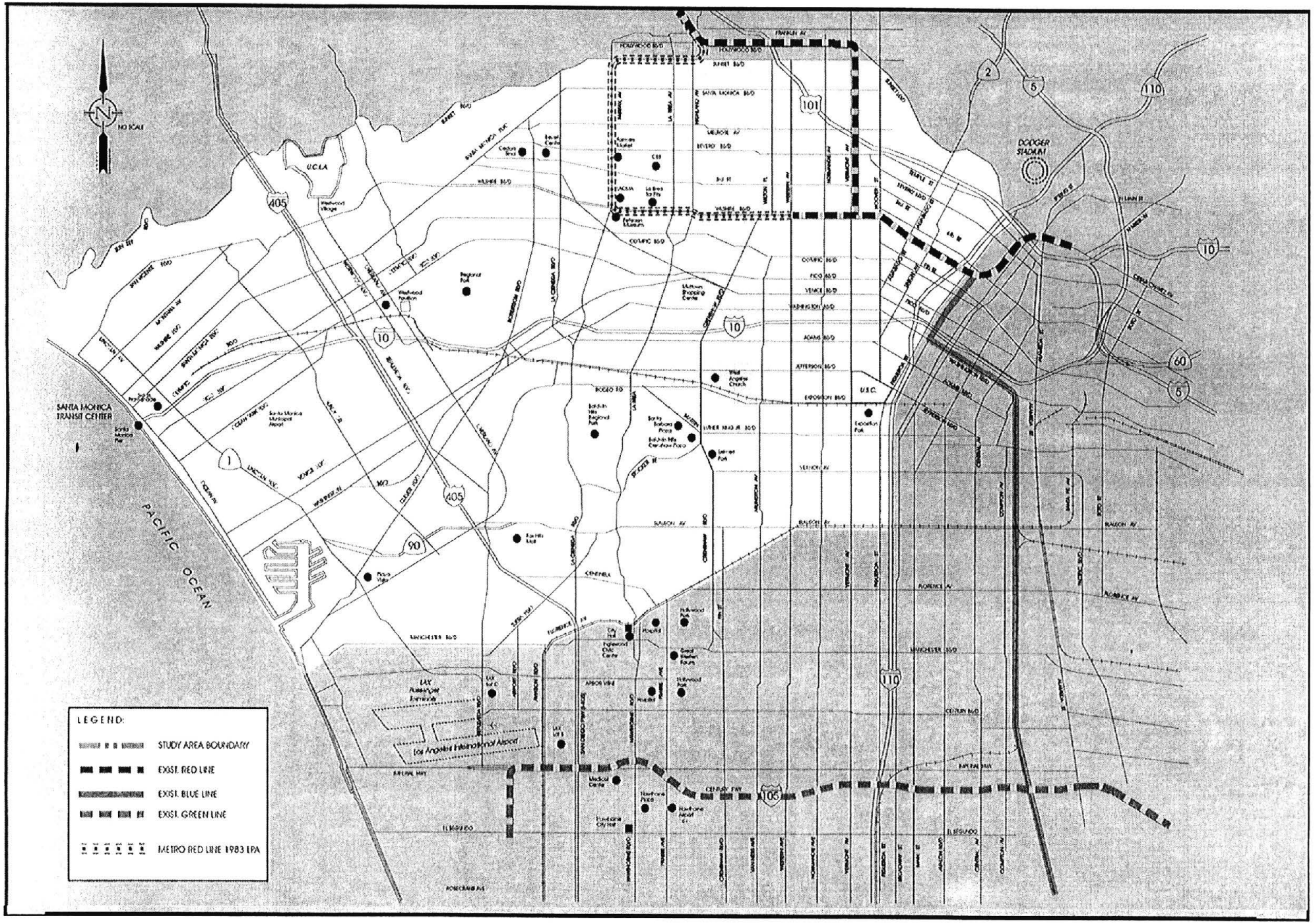

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FIGURE 2.1

ORIGINAL LOCALLY PREFERRED ALTERNATIVE (LPA) - 1983

In 1985, a "naturally-occurring" methane gas fire at a Ross "Dress-For Less" store, located along the selected LPA alignment, resulted in an investigation by a special City of Los Angeles Task Force. Conclusions from this investigation lead to a Congressional prohibition on federal funding for subway construction within the designated Methane Gas Risk Zone, as determined by the Task Force's 1985 report on subsurface conditions in the region. As mandated by the Congressional prohibition, a Congressionally Ordered Re-Engineering (CORE) study was conducted. The intent of this study was to determine an appropriate alignment through which to link the Los Angeles Central Business District, the San Fernando Valley and the Wilshire Corridor. Over 40 candidate alignments were reviewed and 6 alignments studied in detail environmental reports.

In July 1988, a new LPA was chosen (see Figure 2.2). This new LPA, building from the previously adopted MOS currently under construction, would travel from Los Angeles Union Station to Wilshire Boulevard/Vermont Avenue and split into two separate lines, one traveling west to Wilshire Boulevard/Western Avenue and the other proceeding north to Hollywood and North Hollywood. The extension to North Hollywood is currently under construction. Construction of this segment was continued and both the western branch to Wilshire/Western and the northern branch to Hollywood/Vine were open for operation in 1996 and 1999, respectively.

The 1991 approval of Proposition C created a new local funding source for Southern California Rapid Transit District (SCRTD) and further study of a Metro Red Line extension to the west was conducted in 1992.. The 1992 Final Supplemental Environmental Impact Statement/Final Supplemental Environmental Impact Report (FSEIS/FSEIR) adopted LPA for the Mid-Cities segment showed the construction of a subway from the existing Wilshire/Western station to Pico/San Vicente (Figure 2.3).

In 1993, geotechnical tests conducted to provide detailed information concerning the nature and extent of hydrogen sulfide gas along the Mid-City Segment LPA alignment found concentrations much greater than preliminary tests had identified. This discovery prompted the 1994 Metro Red Line Segment 3/Mid-City Extension Reassessment Study which identified possible vertical alternative alignments for the LPA to mitigate impacts from the hydrogen sulfide gas. The conclusions of this study initiated a new Supplemental Environmental Impact Statement/Supplemental Environmental Impact Report (SEIS/SEIR) in 1996 to assess the environmental impacts of shallow cut-and-cover and aerial configurations along the original Crenshaw Boulevard alignment.

The environmental process determined that the impacts of this alignment were highly negative to the community. In an effort to mitigate these impacts, the March 1996 Mid-City Alternative Alignment Gas Exploration Study was conducted to investigate a deep-bore tunneling option along the Wilton Place/Arlington Avenue alignment, approximately one-quarter mile east of the current LPA (Figure 2.4). Results of geotechnical tests done along this alignment produced significantly lower hydrogen sulfide levels. As a result, the Draft SEIS/SEIR underway for the Mid-City Segment added a Wilton/Arlington alignment.

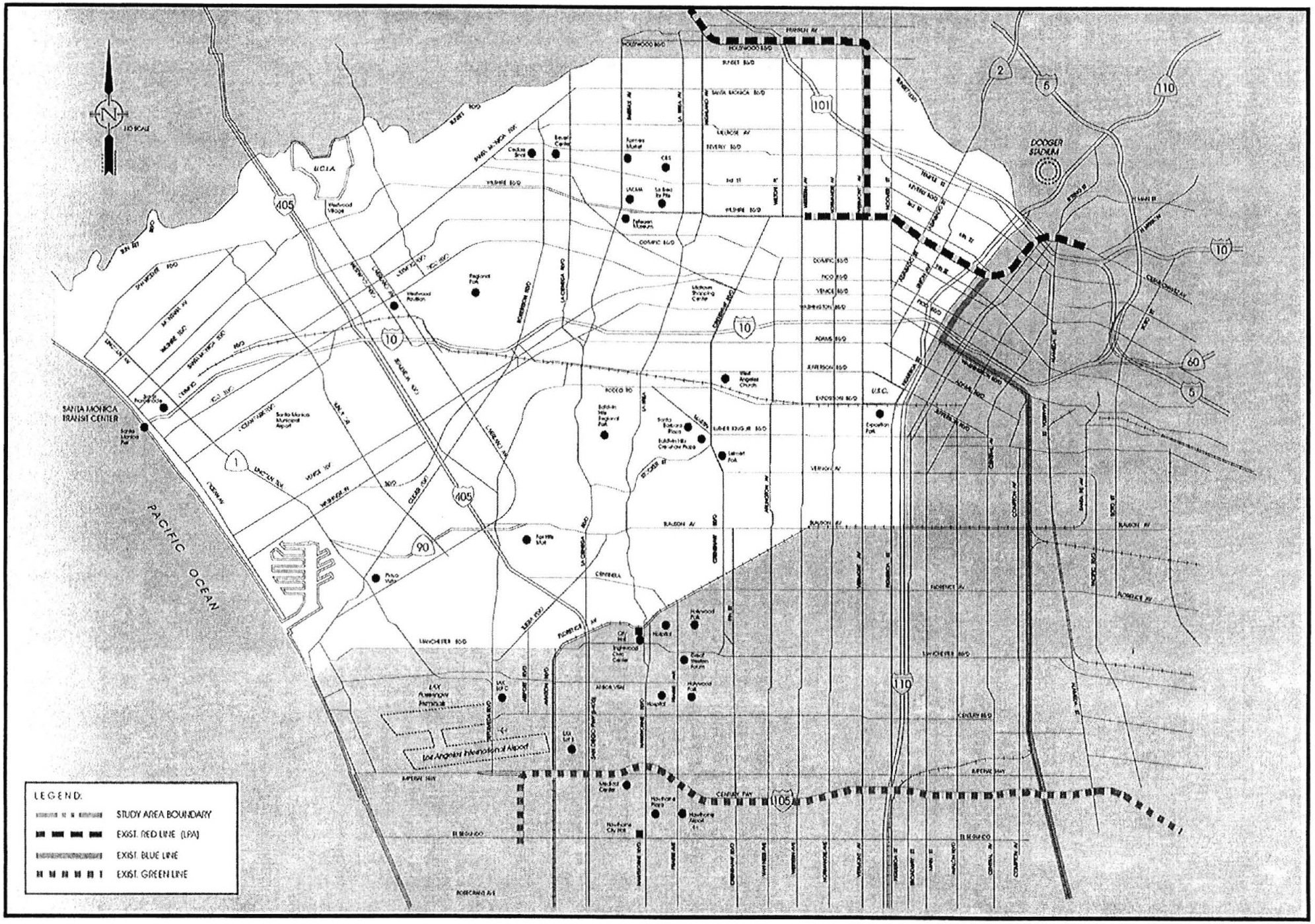

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FIGURE 2.2

LOCALLY PREFERRED ALTERNATIVE (LPA) - 1988

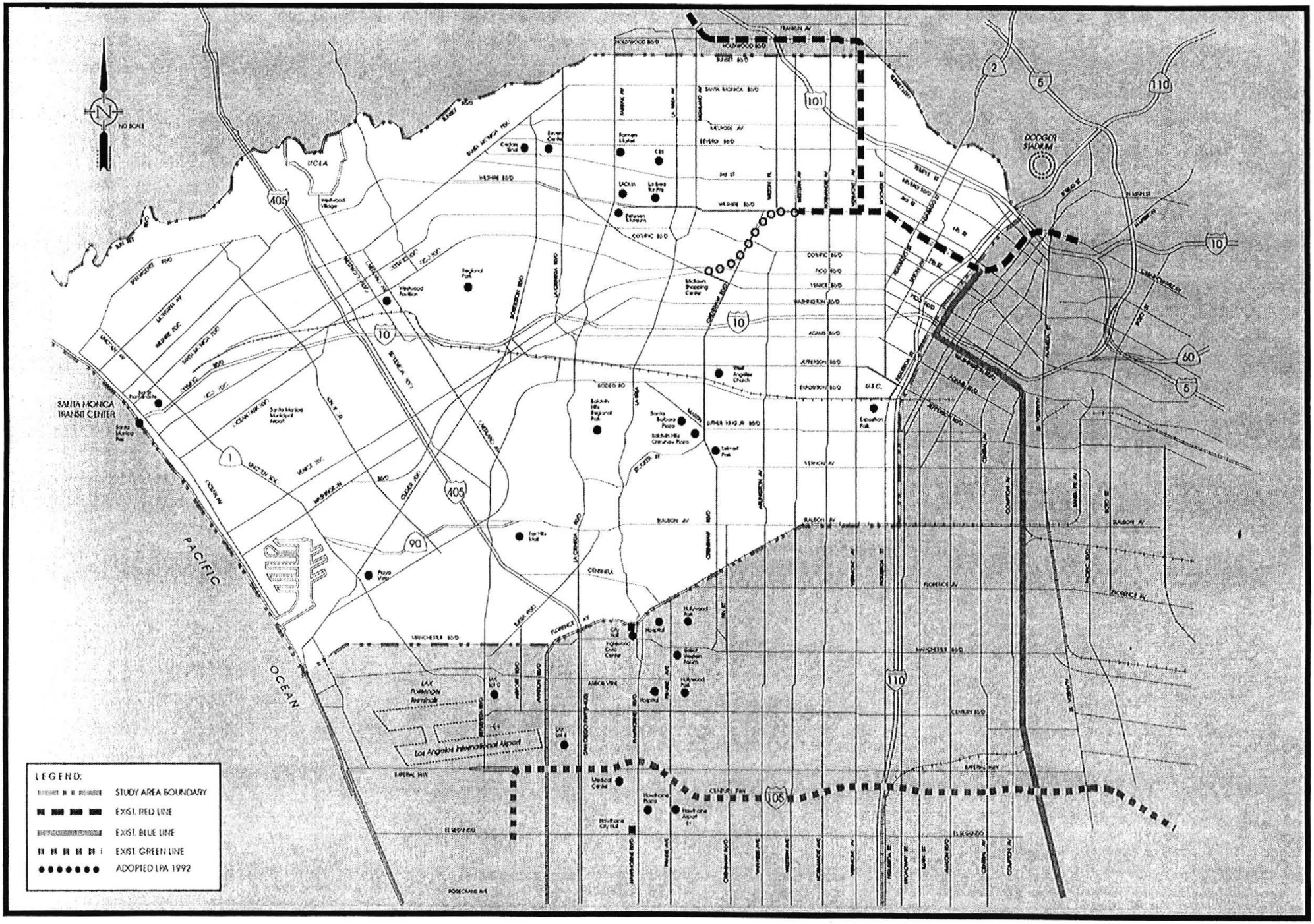

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FIGURE 2.3

ADOPTED LPA - 1992

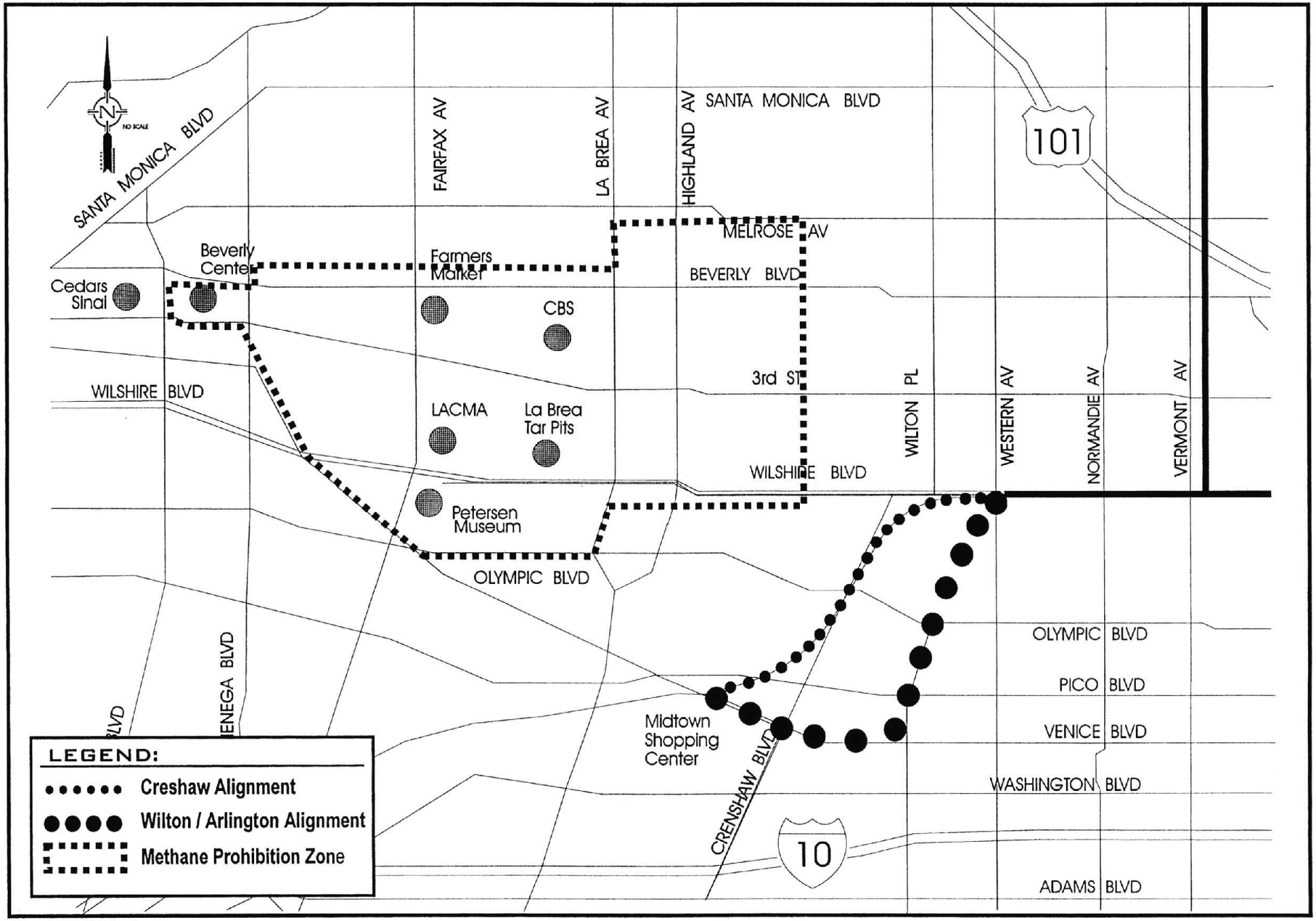

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FIGURE 2.4

SUSPENDED LPA - 1997

In 1998, MTA conducted a restructuring plan to document its ability to complete the North Hollywood rail construction and meet the terms of the Bus Consent Decree adopted by the MTA Board of Directors on May 13, 1998. The FTA approved this restructuring plan on July 2, 1998. This plan documented that MTA did not have sufficient funds to finance further heavy rail subway projects for the Eastside and Mid-City study areas that was necessary to meet the requirements of the original Full Funding Grant Agreements for these projects. As a provision of this plan, MTA was to study "viable and effective options" throughout Los Angeles County, emphasizing study areas containing suspended heavy rail projects.

2.1.3 Exposition Right-of-Way (ROW) Corridor

The Exposition ROW Corridor is located just south of downtown Los Angeles and on the Westside extends approximately 12 miles along the former Southern Pacific Railroad right-of-way, purchased by MTA in 1990, to 17th Street in downtown Santa Monica (Figure 2.5). This corridor has been recognized as a possible transit corridor and was included within MTA's 30-Year Integrated Transportation Plan.

The Exposition Right-of-Way Preliminary Planning Study was completed by BRW in May of 1992 to identify the transportation improvement alternatives available along this corridor. The transit alternatives evaluated for development in this corridor were light rail transit (LRT), trolley bus technology, a transitway facility, and a bicycle path. Four alignments utilized by various modes were recommended and future steps for further study were developed.

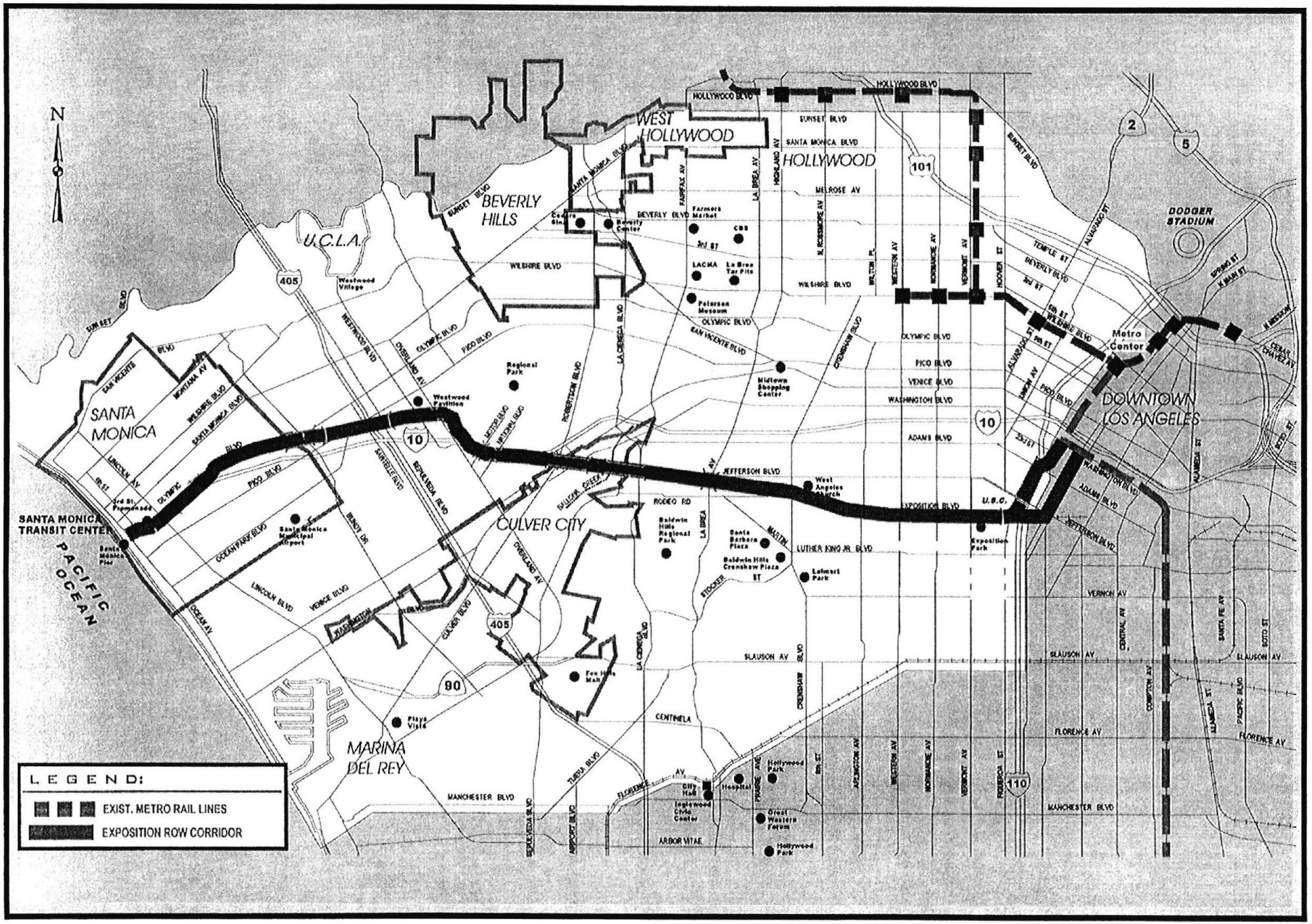
A follow-up study, Exposition Right-of-Way Final Draft Phase I Summary Report, was completed by BRW for the Exposition Right-of-Way Corridor in December 1994. This study took the recommendations of the 1992 Preliminary Planning Study and more clearly defined the alternatives under consideration. Specific items covered by this study were design enhancements for both the busway and light rail alternatives recommended for further analysis..

2.1.4 Additional Mid-City/Westside Studies

Several studies have been conducted that are contained within the Mid-City/Westside study area. These studies range in scope from a system-wide analysis to alternatives available for a particular corridor to options associated with a specific mode of transportation.

System-wide Studies

In an attempt to re-evaluate the financial capabilities of MTA to fund new fixed guideway projects, the agency commissioned the Regional Transit Alternatives (RTAA) Study. First, the RTAA study identified the amount of funding available for new projects between FY 1999 and FY 2004. Secondly, it developed several funding allocations and established a framework for further fixed guideway development within the Eastside, Mid-City and San Fernando Valley study areas. Finally, the study provided a preliminary evaluation of fixed guideway alternatives in the three study areas



Mid-City/Westside Transit Corridor
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FIGURE 2.5

EXPOSITION RIGHT-OF-WAY CORRIDOR

and recommended that a Major Investment Study be conducted to provide more detailed information of these alternatives.

On November 9, 1998, the results of the RTAA study were presented to the MTA Board. The Board approved the recommended rapid bus plan, which would be conducted in a demonstration project for three rapid bus lines serving the Eastside, Mid-City and San Fernando Valley study areas. The Board also reaffirmed its commitment to fund fixed guideway transit improvements in the suspended rail corridors. Also, a funding commitment of $220 million through FY 2004 was made a priority for the Eastside and Mid-City study areas.

During the development of MTA's restructuring plan, two significant legislative actions occurred. The first was the redefinition of Segment 3 of Metro Red Line from "heavy rail line" to "fixed guideway" under the Intermodal Surface Transportation and Efficiency Act (ISTEA) and the Segment Full Funding Grant Agreement. This definitional change was made to allow a fixed guideway project proposed for either the Eastside or Mid-City study areas to utilize the Segment 3 funding balance.

The second legislative action was the passage of Proposition A Ballot Initiative (Subway Funding Prohibition). Voters approved this new County law on November 3, 1998. This initiative contained the provision that Proposition A County sales tax revenues and Proposition C County sales tax revenues could not be utilized in funding the cost of planning, design, construction or operation of any New Subway. "New Subway" was defined as any subway other than the Metro Red Line Segments 1,2 or 3 (North Hollywood). Under this initiative, sales tax revenues cannot be used to fund subway development in the Eastside or Mid-City study areas. The initiative does not prohibit the use of sales tax revenue to develop light-rail, at-grade rail, elevated rail systems or busways in either of these study areas. Also, the initiative does not prevent the use of State or Federal revenues or local revenues other than sales tax to design, construct or operate a new subway in either area.

Corridor Studies

In 1989, SCAG conducted a system planning study for LACTC, pre-cursor to MTA, which identified the need for a Central East/West Corridor as the highest priority for an extension from the 1983 LPA. The 1990 Los Angeles Metro Orange Line Extension Transitional Analysis Study was conducted to demonstrate that an east-west extension of the existing Metro Rail system could meet required federal cost-effectiveness levels and merit further study. This analysis meet the FTA required $10.00 or lower "Cost per New Rider" criteria. Once this criteria was met, the corridors would then be cleared to proceed to the next phase of study (Alternative Analysis / Draft Environmental Impact Statement).

The Crenshaw-Prairie Corridor Route Refinement Study, conducted in July 1999 evaluated future transportation services along the corridor bounded by Arlington Avenue, Pico Boulevard, La Cienega/Sepulveda Boulevards, and Imperial Highway/El Segundo. This study develops several alternatives but does not provide detailed information for a final selection. The study recommends that a Major Investment Study be conducted to obtain federal funding for future alternatives.

Mode Specific Studies

The Westside Bus Improvement Study completed in March 1998 examined existing bus operations in area bounded by Hoover/Hyperion, the Pacific Ocean/Malibu, Mulholland Drive, and the I-10 Freeway/Culver City southern boundary/Jefferson Boulevard. Key conditions identified by the

study were: patron overcrowding on specific lines/times; slow arterial bus operations; and lack of continuity of service due to bus stockpiling. The study develops recommendations for greater service through use of "Metro Rapid bus" service and high capacity vehicles; creating greater coordination with Metro Red Line openings; providing greater continuity and connections; eliminating duplicate service lines to reduce congestion; and creation and implementation of a "seamless" fare structure.

The 1999 Mid-City Bus Transit Restructuring Study was a follow-up to the 1993 Inner City transit Needs Assessment Study and contained the goal of increasing ridership, operations and integration while improving cost-efficiency and cost-effectiveness of the transit system. Study area boundaries for this study were: the I-105 Freeway, the Pacific Ocean/La Cienega Boulevard, Slauson Avenue/Marina Freeway, and Alameda Street. This study recommended that a three-tier restructuring strategy be implemented that would address the needs of the following service sectors: core service on basic routes; inter-community connectors; and local shuttles, feeders and demand responsive services.

As a result of MTA's RTAA Study, the Los Angeles Metro Rapid Bus Demonstration Program was developed in March 1999. This program was created to address the need for faster travel service for existing bus riders. This program would operate on an interim basis until the completion of Eastside and Mid-City fixed guideway extensions. Expansion of the program to a countywide level is to be based upon performance results and public acceptance obtained from the three demonstration corridors: Whittier/West 6th/Wilshire Boulevard (Eastside/Mid-City); Ventura Boulevard (San Fernando Valley); and Pico/Broadway/East 1st/Cesar Chavez (Mid-City/Eastside). Further expansion of the program could include the Exposition Right-of-Way as a transitway corridor.

2.2 Alternatives Being Considered

2.2.1 No Action

Physical Characteristics
The No Build alternative is comprised of the existing transit and bus systems currently in use or expected to be in place in 2020. This includes the existing alignments and operating schedules of the Red, Blue and Green Lines, as well as the approved Pasadena Blue Line. It assumes that regular bus service will be expanded as required to meet projected 2020 ridership demands. These components are to be the foundation upon which all other alternatives must build.

Operating Characteristics
The following table provides a summary of the operating characteristics of the No Build alternative as it was modeled:

Table 2.1
No Build Operating Characteristics

Bus Service:	In general, 2000 existing bus routes are used. The peak fleet size is increased to meet projected 2020 ridership demands. Parallel bus routes are rerouted onto new freeway HOV's as applicable. The existing fare structure is retained, with inflationary growth.
Operations:	Trains would run every 7.5 minutes in the peak period for the two branches of the Red Line from Union Station to Wilshire/Western and to North Hollywood. Peak period train frequency on Blue & Green lines increased to 5 minutes. Peak period headway for Pasadena Line set at 5 minutes. Off-peak service is set at 10 minutes for each of the two Red Line branches; and 12 minutes for the Blue, Green and Pasadena Lines.
Length:	N/A
Stations:	N/A
Avg. Station Spacing	N/A
Max Speed:	N/A
Avg Speed:	N/A
Signal Priority/Preemption:	Signal Priority assumed for Rapid Bus.

Financial Characteristics
No additional financial resources are included other than those allotted for continued operation and maintenance of the projected Year 2020 transit system.

2.2.2 Transportation System Management (TSM)

Physical Characteristics
This alternative is based on the No Build characteristics with the addition of three Metro Rapid Bus lines: Wilshire/Whittier, Santa Monica Boulevard and Crenshaw Boulevard (See Figure 2.6). The Santa Monica Boulevard and Crenshaw Boulevard lines are based on improved service frequencies and speeds on existing MTA routes 304 and 310.

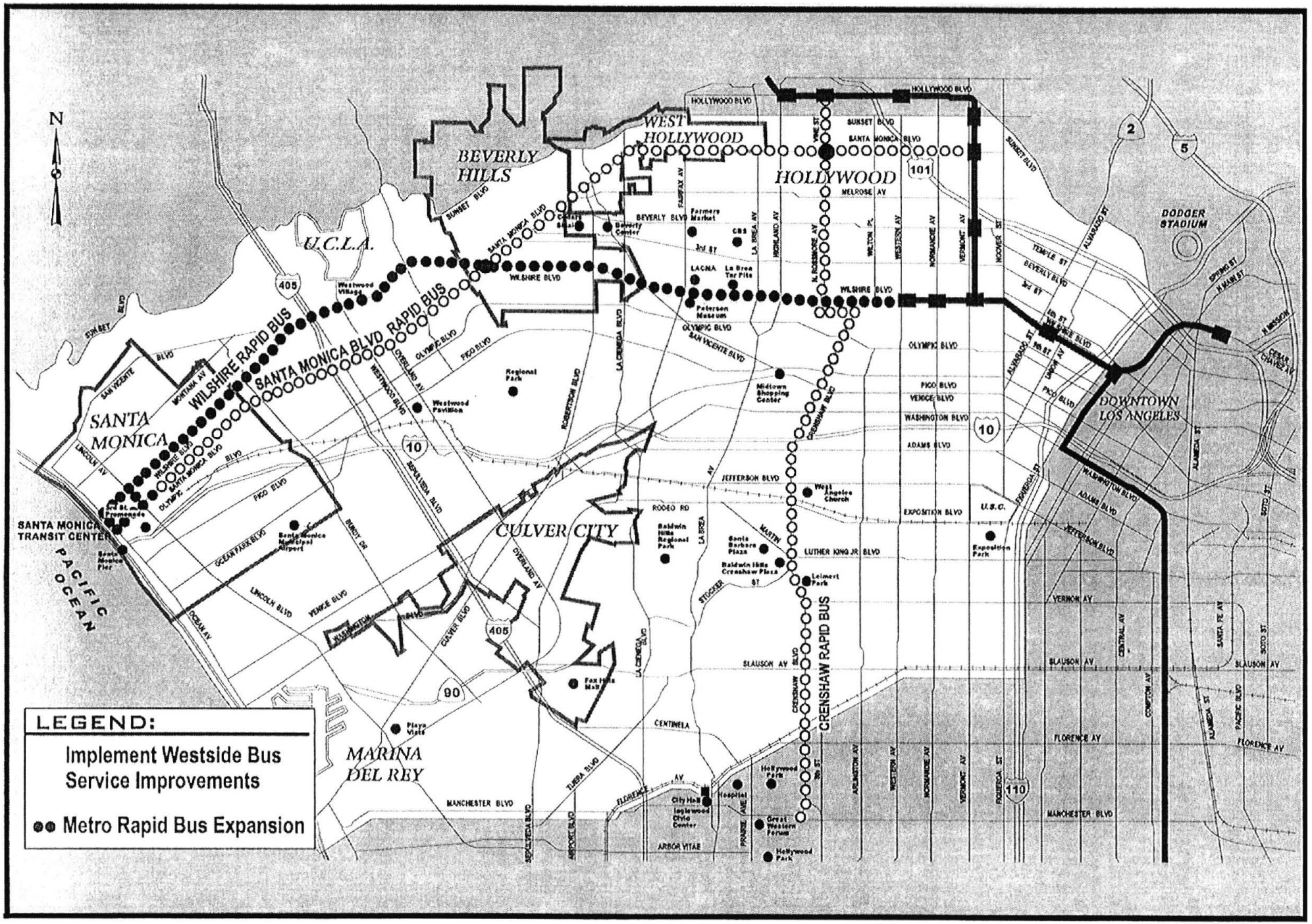

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FIGURE 2.6

TSM ALTERNATIVE

Operating Characteristics
The following table provides a summary of the operating characteristics of the Transportation System Management alternative as it was modeled:

Table 2.2
Transportation System Management (TSM) Operating Characteristics

Bus Service:	As stated above, Rapid Bus routes are assumed on Wilshire/Whittier, Crenshaw Boulevard and Santa Monica Boulevard. Other bus routes represent implementation of Westside Bus Service Improvement Study recommendations. Changes include modifying service frequencies to more closely match demand on various routes (mostly minor, since major service improvement recommendations appear to have since been implemented under the Consent Decree); Route extensions to connect to major destinations and/or transit hubs; route truncations to eliminate unproductive service segments or duplication; consolidation of service to simplify route structure and use; replacement of unproductive routes and creation of new routes.
Operations:	Red Line trains would run every 4 minutes in the peak period from Union Station to Wilshire/Western and to North Hollywood. Combined train frequency from Union Station to Vermont would be 2.0 minutes (maximum frequency). Blue, Green and Pasadena line train service as in the No Build system. Articulated busses (60 feet long) would be used on the Wilshire/Whittier line. Standard (40 feet long) buses would be used on Crenshaw Boulevard and Santa Monica Boulevard. Proof of payment fare collection would be required to reduce dwell time at stops. Passengers board and alight buses through both front and rear doors.
Length:	N/A
Stations:	N/A
Avg. Station pacing	N/A
Max Speed:	N/A
Avg Speed:	Rapid Bus speeds assumed to improve by 10% over 2000 projected bus speeds.
Signal Priority/Preemption:	Signal Priority assumed for Rapid Bus demonstration lines.

Financial Characteristics

The estimated cost for the full TSM including the three Rapid Buses routes (Wilshire, Crenshaw, and Santa Monica Boulevards) and the pro rata share for the required additional bus maintenance facilities is approximately $92 million dollars.

2.2.3 Alternative 1 - Wilshire Bus Rapid Transit (BRT)

Physical Characteristics
Alignment. This alternative involves the operation of an all-day BRT service along Wilshire Boulevard (Figure 2.7). The full-length (Baseline) alignment would go from Wilshire Boulevard and Vermont Avenue to Ocean Avenue and Broadway in Santa Monica, a distance of 14.0 miles. The BRT system can be implemented in stages or segments, with the overall speed of operation increasing as each new BRT segment becomes operational. The minimal operating segment (MOS)

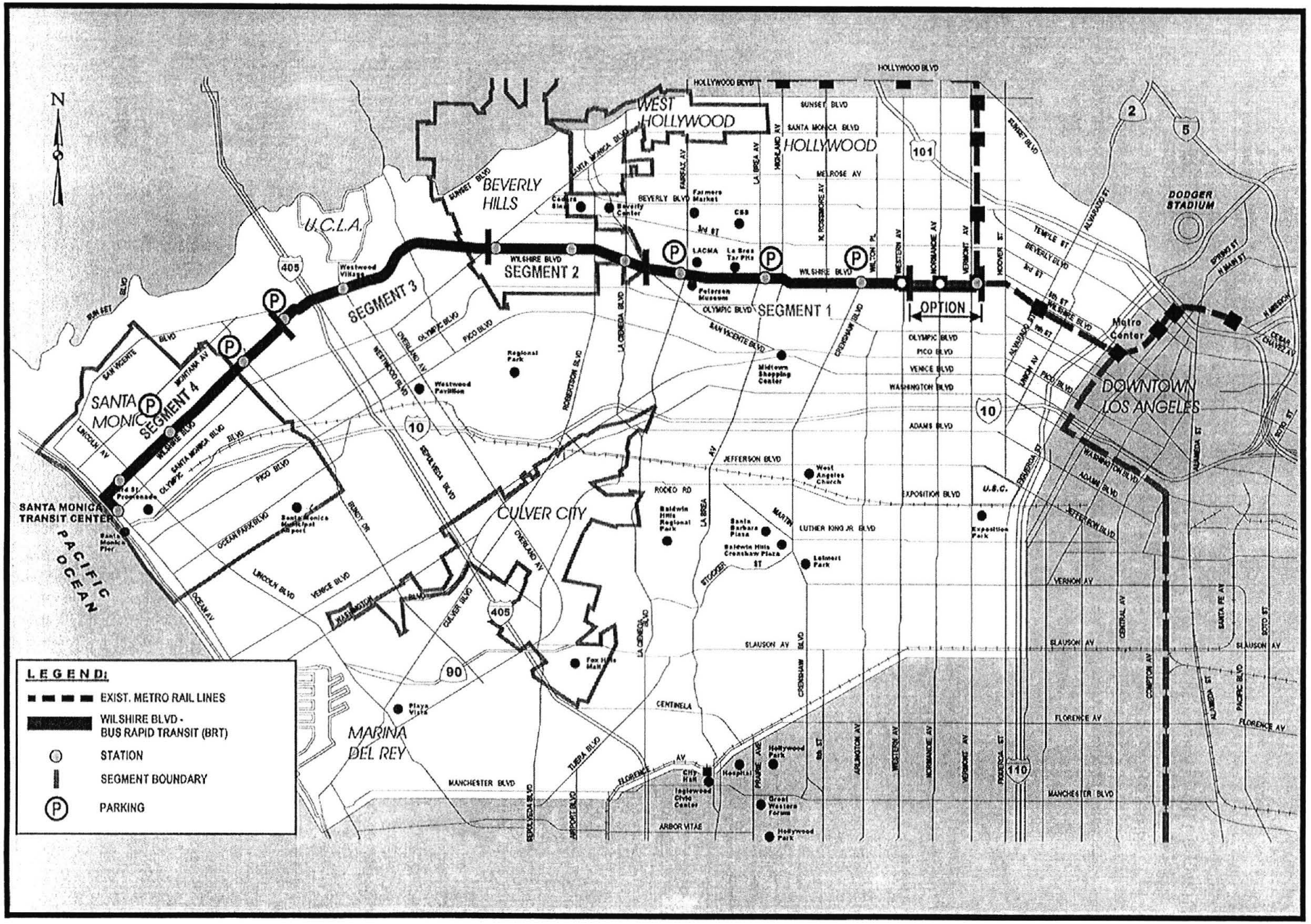

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FIGURE 2.7
ALTERNATIVE 1
WILSHIRE BOULEVARD (BRT)

would be 4.9 miles and would run from the existing Metro Red Line station at Wilshire/Vermont to Wilshire/San Vicente. The next segment could be between Wilshire/Santa Monica and Wilshire/Federal and cover the reach through Westwood; this could be followed by the connecting gap through Beverly Hills (between Wilshire/San Vicente and Wilshire/Santa Monica). The final segment would travel through Santa Monica beginning at Wilshire/Federal and continuing to Ocean Avenue. This service is intended to operate similar to a light rail transit (LRT) system with stops limited to approximately one every mile or at major cross-streets, and the use of exclusive bus lanes with signal priority (i.e. extended green times).

To achieve operating performance levels comparable to LRT, this alternative would require exclusive bus lanes located within the Wilshire Boulevard right-of-way (ROW). Due to the proximity of existing development to the roadway, this can only be achieved by converting an existing through-traffic lane into an exclusive lane. Four design options are currently being considered to accommodate BRT operation along Wilshire Boulevard. These options are discussed below and are summarized in Table 2.3.

Option1: Bus running in existing curb lane with bus station located on existing sidewalk (Figure 2.8).

This option requires very little change to the existing travel lanes on Wilshire Boulevard, only that all curb parking is prohibited. The existing landscaped median island would remain, as well as the existing left turn lanes. The bus stations on the sidewalks provide convenient access for patrons using the express buses. The disadvantage to this option is that: 1) parking in the curb lane is prohibited, which could affect customers and deliveries to businesses along Wilshire, and 2) the BRT would be intermixed with local buses, which could affect its running time. In addition, express buses may be delayed by vehicles making right turns at intersections or into parking lots. There may also be the need to provide additional sidewalk space in the vicinity of the bus station on the sidewalk.

Option 1 may be operated as "peak period only" and would have a minimum impact on existing curb parking.

Option 2a: Median running bus lane within existing right-of-way, with bus station located at the far side of the intersection (Figure 2.9) with a non-standard lane transition through the intersection.

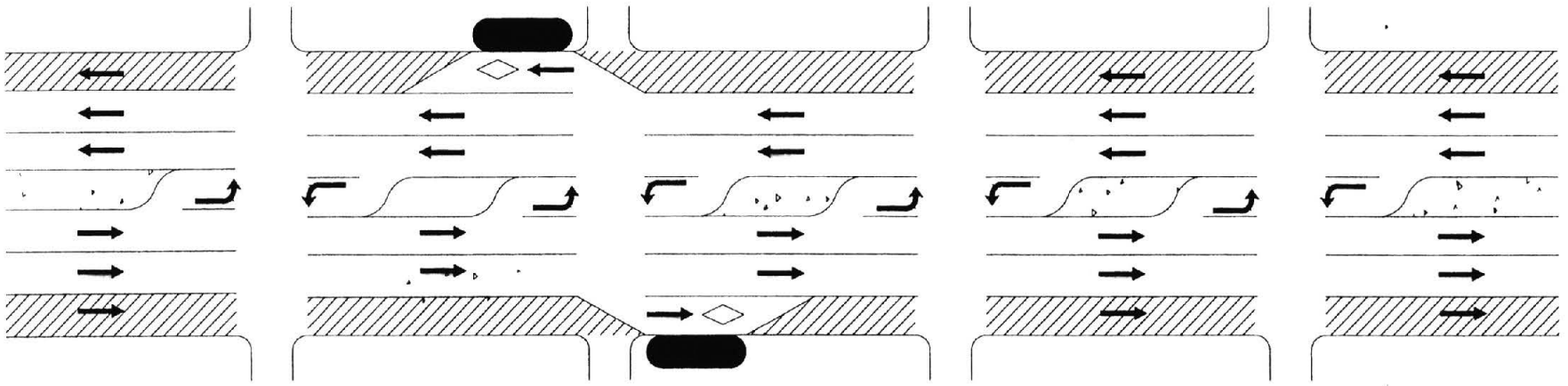
Under this option, the express bus operates in the median, with bus stations consisting of a platform and canopy provided at the far side of the major intersection. Patrons must use the crosswalks at the intersection to access the bus station in the center of the street. The advantage of this option is the exclusive lane for express buses. In addition, curb parking and loading/unloading is allowed in the curb lane during off-peak hours. The disadvantage is the majority of existing landscaped median would have to be removed, and a high percentage of existing left-turn movements would not be allowed, especially at intersections where there is a station. Finally, there is only one travel lane in each direction on Wilshire if curb parking is allowed during off-peak hours. With this arrangement of lanes, buses would have to negotiate a one-lane shift within the limits of the intersection.

Option 2b: Median running bus lane with bus station located at the far side of the intersection (Figure 2.9) with a standard lane transition in mid-block.

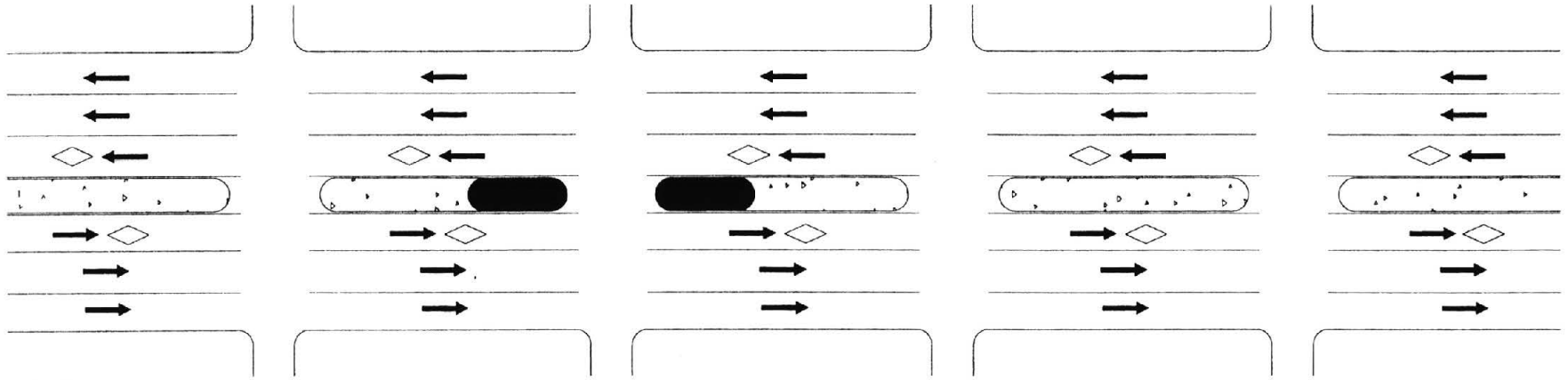
Table 2.3
Comparison of Wilshire (BRT) Alignments

Alignment	Description	Advantages	Disadvantages
Option 1: - Curb-lane	BRT running in existing curb-lane with bus station on sidewalk.	• Retention of landscaped median. • Continued use of left-turn pockets along Wilshire Blvd. • Convenient access to bus stations.	• Curb parking prohibited along entire length of service corridor, during peak periods. • BRT intermix with local buses, creating reduced timesavings. • BRT experiencing possible delays from vehicles making right turns. • Possible need to provide additional sidewalk space to accommodate station location.
Option 2a: Center-lane, far-side	BRT operating in the street median with bus stations located at far side of intersection.	• Exclusive lane for BRT service. • Loading/ unloading allowed in curb lane during off-peak hours. • 30% to 35% of existing left turns would be retained.	• Patrons must use crosswalks to access bus stations in median of roadway. • Existing landscaped medians must be removed and replaced where possible. • Left turn would not be permitted at intersections containing a station. • Curb parking would be eliminated and replacement off-street parking must be provided. • Buses must make one lane shift within limits of intersection to align with stations correctly.
Option 2b: Center-lane, far-side	BRT operating in the street median, with bus stations located at the far side of intersections (separated by a block).	• Exclusive lane for BRTservice. • Loading/ unloading allowed in curb lane during off-peak hours. • Standard lane transition provided. • 20% to 25% of existing left-turn lanes would be retained.	• Patrons must access two different crosswalks for service, depending upon direction of trip. • Curb parking would be eliminated and replacement off-street parking must be provided. • Lane transition space required between intersections with stations, and where left turns are to be maintained.
Option 3: Center-lane, left-side bus	BRT stations located in median of Wilshire with exclusive bus lanes operating on both sides.	• Existing landscaped median may remain. • Loading/unloading allowed in curb lane during off-peak hours. • Exclusive lane for BRT service.	• Patrons must use crosswalk to access stations. • Buses with left-side doors required for station access. • Curb parking would be eliminated and replacement off-street parking must be provided. • Left-turn movements prohibited at all intersections.*

* Some left turns could be preserved, but this would require the median to be removed in many places in order to allow space for the bus lanes to shift over one lane, making this Option very similar to Option 2a or 2b. An attractive feature of Option 3 is that the existing median will remain intact.



BRT IN CURB LANES
OPTION 1



BRT IN MEDIAN
OPTION 3

LEGEND :

- EXCLUSIVE BUS LANES
- STATION
- PEAK HOUR TRANSIT ONLY (PARKING ALLOWED IN OFF-PEAK HOURS)
- LANDSCAPED MEDIAN

NO SCALE

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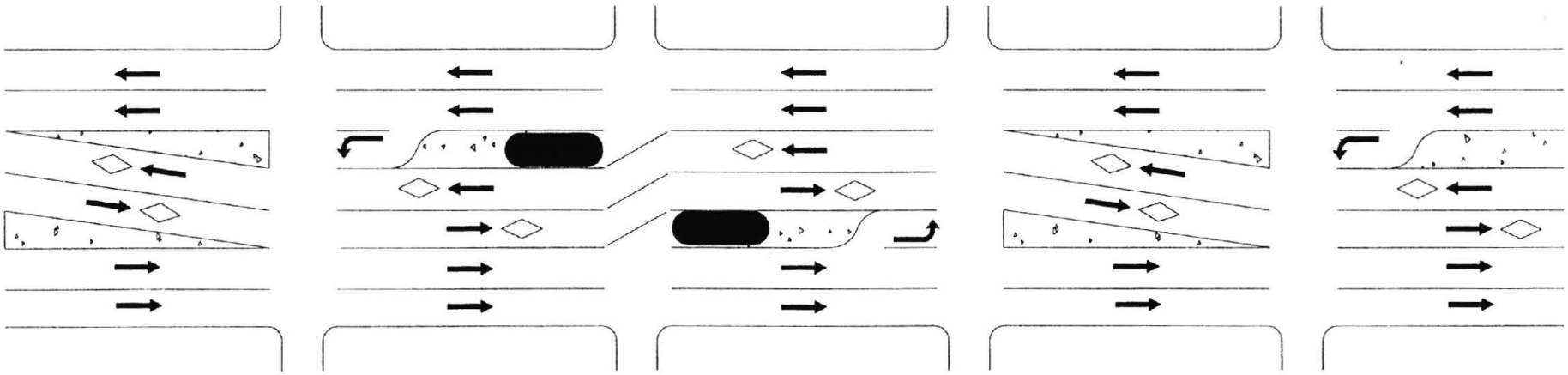
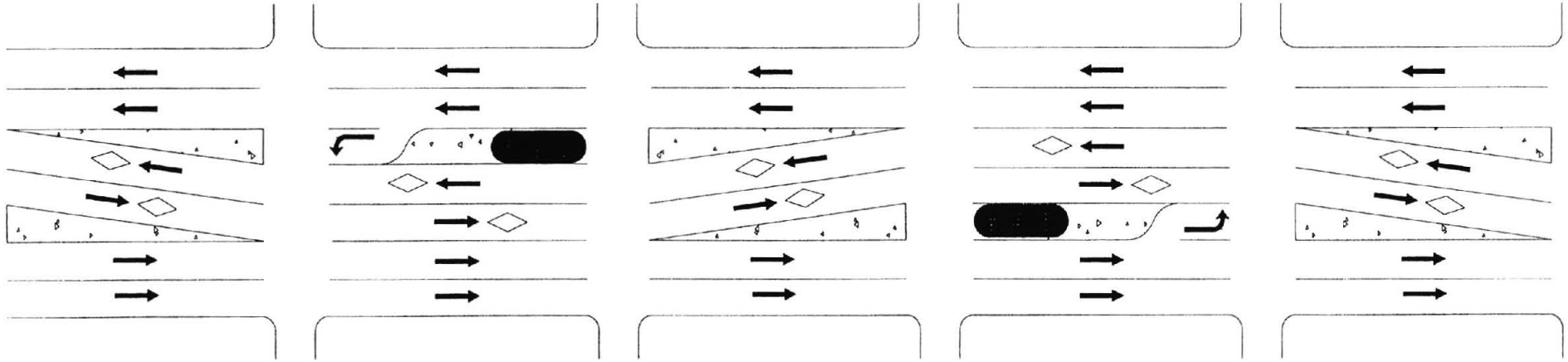
FIGURE 2.8

WILSHIRE BRT - OPTIONS 1 AND 3



MEDIAN WITH LEFT TURNS MAINTAINED (30% TO 35%)

OPTION 2a



MEDIAN WITH LEFT TURNS MAINTAINED (20% TO 25%)

OPTION 2b

LEGEND :

- EXCLUSIVE BUS LANES
- STATION
- PEAK HOUR TRANSIT ONLY (PARKING ALLOWED IN OFF-PEAK HOURS)
- LANDSCAPED MEDIAN

NO SCALE

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FIGURE 2.9

WILSHIRE BRT - OPTIONS 2a AND 2b

This option operates with express buses traveling in the median, with both bus stations located at the far side of intersections (separated by a block). Patrons must use two different crosswalks to access the bus stations. This option also has the advantage of providing an exclusive lane for express buses, and also allows for curb parking and loading/unloading in the curb lane during off-peak hours. Some existing left turn lanes and/or landscaped medians may be preserved. The disadvantage is a reduction in the lane width to 10 feet for the curb lane if a 9-foot wide left turn lane is used. Also, there is only one travel lane in each direction on Wilshire if curb parking is allowed during off-peak hours. The one lane shift described in Option 2a would occur between two intersections with ample room left for a 20:1 taper, allowing the bus to maintain a 35-mph speed.

Option 3: Bus station located in the center of Wilshire with bus lanes on both sides (Figure 2.8).

This option allows the median to be preserved by having the bus station occupy the area in the median on either side of the key intersection. Patrons would use the crosswalk at the intersection to access the station. The advantages are the exclusive express bus lane, curb lane parking, and loading/unloading during off-peak hours, and existing landscaped medians would remain. The disadvantages are that bus doors have to be on the left side to access the center platform, which means that only dedicated BRT buses with special doors could use the express bus lane (also means non-standard buses are required); only one travel lane in each direction along Wilshire if curb parking is allowed during off-peak hours; and no left turn movements are allowed at the key intersections (left turn lanes could exist at intersections where there is no bus station).

It is possible that no single option would work for the entire Wilshire Corridor between Vermont and San Vicente, but a combination of options could be implemented that fit individual areas along the corridor. Such a scenario would have to be worked out with the individual neighborhoods of this alternative is carried forward into Phase 2 of this study.

Vehicles. If warranted by ridership demand high capacity articulated buses would operate in this alternative. Standard vehicle dimensions for an articulated bus currently operated by MTA is 60 feet long, 8.5 feet wide and 10 feet in height. These vehicles are available in two configurations: a forty-foot front section and a twenty-foot rear section, or two thirty-foot sections per bus. Both designs provide an average seated capacity of 65 passengers, with space available for another 13 to 30 standees, depending on the load factor.

Stations. Station locations for the BRT system would occur at a minimum of once every mile or at key intersections. There are fourteen proposed station locations: Vermont Avenue, Western Avenue, Crenshaw Boulevard, La Brea Avenue, Fairfax Avenue, La Cienega Boulevard, Beverly Drive, Santa Monica Boulevard, Westwood Boulevard, Federal Avenue, Bundy Drive, 20th Street, and Ocean Avenue/Broadway. These locations were considered to be the major cross-streets occurring in the corridor.

Due to the differences in the proposed alignments, the actual location of the stations within the Wilshire ROW will vary. Option 1 would have stations positioned next to the curb lane within the width of the existing sidewalk (Figure 2.10). Options 2a, 2b & 3 would require side-loading platform stations to be located within the median island of Wilshire Boulevard, with Option 3 requiring buses with left-side doors (Figure 2.11).

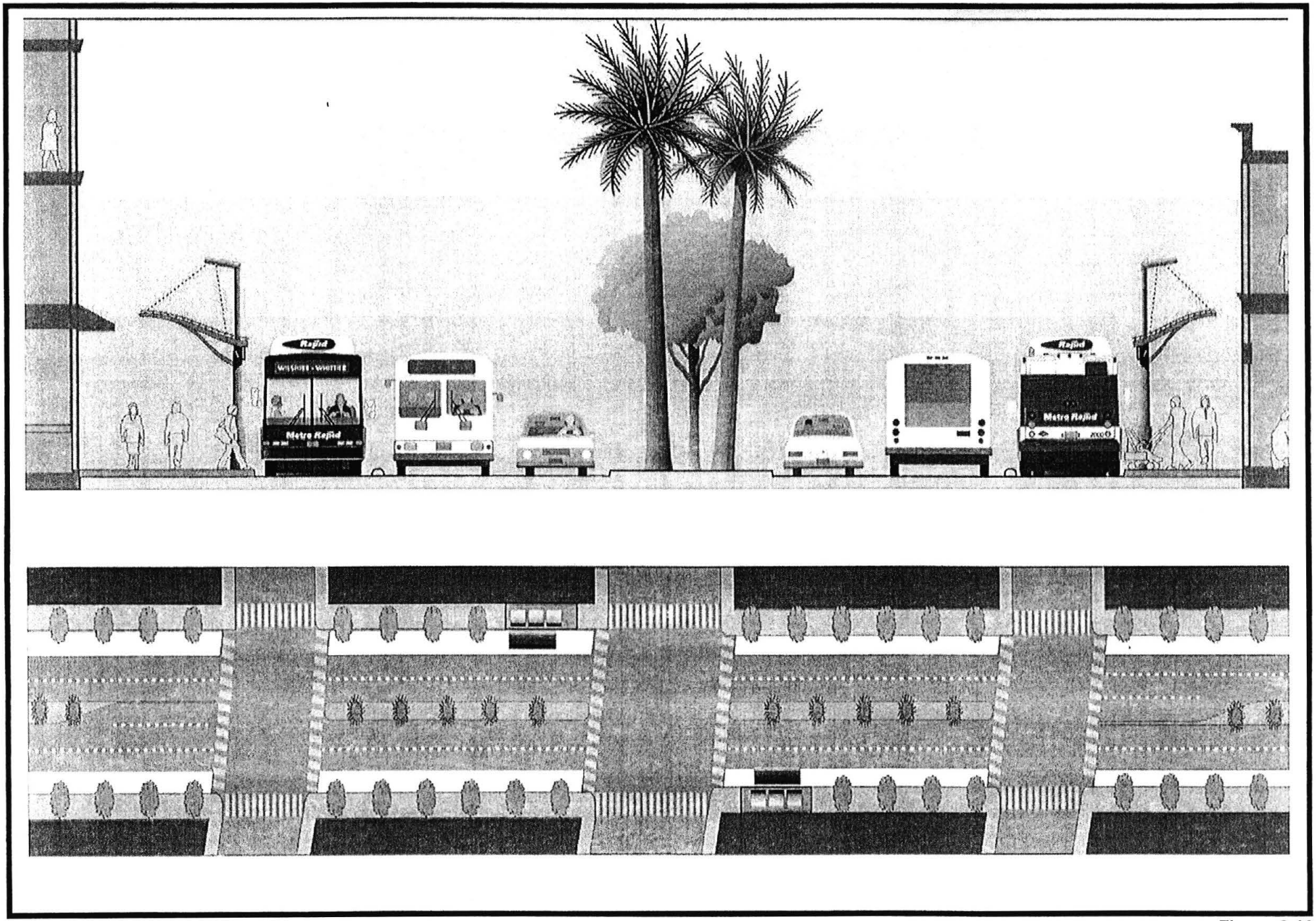

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Figure 2.10
STATIONS - WILSHIRE BRT OPTION 1

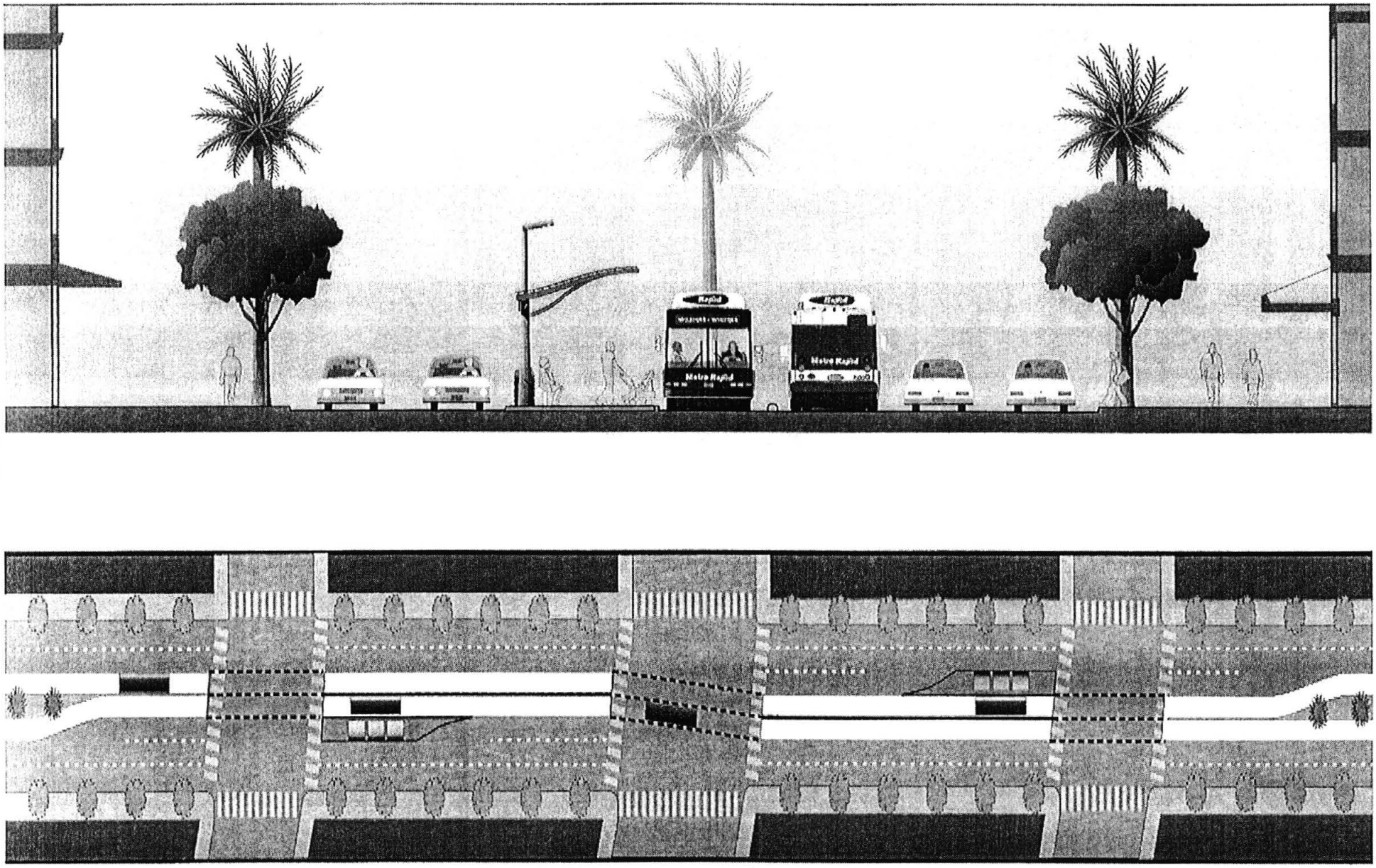

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Figure 2.11
STATIONS - WILSHIRE BRT OPTIONS 2a, 2b, & 3

The typical station configuration would have a 9 to 10-inch raised platform loading area that is 9 feet in width and 100 feet in length. An overhead canopy containing electronic message signs would protect the station. For Options 2a, 2b and 3, a small wall or other type of barrier would separate the platform from regular street traffic or the opposite busway lane.

Park and Ride. Several stations will have park and ride facilities. These are shown in Table 2.4 below.

Table 2.4
Parking Spaces For Alternative 1 - Wilshire BRT

STATION	PRIVATE PROPERTY	MTA PROPERTY	SHARED PARKING	TOTAL
Crenshaw	--	50	--	50
La Brea	--	100	--	100
Fairfax	100	--	--	100
Federal	--	--	600	600
Bundy	50	--	--	50
20th Street	50	--	--	50
TOTALS	200	150	600	950

Major Issues. There are a number of issues to consider:

1). Converting two lanes on Wilshire for peak hour exclusive transit use would have some impact to existing traffic patterns. This may not prove as severe as one might think, for the following reasons:

   a) Not all the lanes on Wilshire are presently used to full capacity.

   b) Some existing traffic would divert to other streets.

   c) Some nonessential driving would be discouraged.

   d) Some drivers would opt to take the new BRT.

   The actual modal split will be determined after the modeling study is completed. Specific impacts can then be identified. This would be accomplished in Phase 2 of this study.

2). Option 2a, 2b and 3 would eliminate some or all existing left turn movements. This may result in some loss of business due to a greater difficulty in accessibility. While most patrons would probably adapt to this situation by making around the block right turns, some may prefer to shop elsewhere. The effect on businesses and traffic patterns will be investigated in Phase 2 of this study.

3). Between Western Avenue and San Vicente Boulevard, there are presently 280 curbside spaces (including taxi and loading zones) that would be affected by the BRT system. For Option 1, the major impact might occur only during peak hours when the curb lane would be exclusively transit. At other times, the BRT buses could operate in mixed traffic. For Options 2a, 2b, and 3, the existing curbside spaces would be eliminated entirely. In all options, replacement parking may have to be provided.

These issues would be carefully evaluated in Phase 2 of this study when the modeling is completed and the full impact is realized to the study area. Possible actions might include upgrading parallel streets to allow a greater capacity, better utilization of existing streets without having to do major upgrading and negotiating for shared parking with private owners.

Operating Characteristics

The following table provides a summary of the operating characteristics of the Wilshire BRT alternative as it was modeled:

Table 2.5
Wilshire BRT Operating Characteristics

Bus Service:	BRT route modeled at 1.2-minute peak headways and 5 minute base headways, which is a significant upgrade from Wilshire/Whittier Rapid Bus frequencies assumed in the No Build and TSM. Remaining bus network is same as TSM, which assumes route recommendations from Westside Bus Service Improvement Study and rapid bus routes on Santa Monica Boulevard and Crenshaw Boulevard.
Operations:	Articulated (65-70 feet long) buses would run on the facility. Proof of payment fare collection would be required to reduce dwell time at stops. Passengers board and alight buses through both front and rear doors. Average dwell time of 20 seconds is assumed.
Signal Preemption:	Signal priority and preemption would be applicable to Options 2a, 2b, and 3 where exclusive lanes would be in place. Ridership projections are presented for both the signal priority and signal preemption scenarios. In Option 1, only signal priority would be applicable, since there would be intermingling right-turn traffic. The interconnected ATSAC system would ensure maximum speed for parallel and cross traffic flow.
Grade Separation:	None
Length:	14.0 miles; Vermont Avenue Red Line Station to Santa Monica
Stations:	15
Avg. Station Spacing	1.0 miles
Max Speed:	35 mph
Avg. Speed:	14.1 mph, including stops, and delays at intersections; 26.1 mph with full preemption.

Financial Characteristics

The estimated cost for design and construction of Option 2a or 2b for the full route length from Vermont Avenue to Ocean Avenue in Santa Monica (14.0 miles) is approximately $169,000,000 (1999 dollars). Option 3 would cost somewhat less because the existing median would be preserved. Option 1 would cast considerably less since minimal street work is required and no replacement parking would be required. The cost estimate for the minimum operational segment (MOS) from Vermont Avenue to La Cienega Boulevard (4.9 miles) with Option 2a or 2b would be approximately

$62,000,000, with commensurate cost reductions for Options 1 or 3. All estimates include costs for traffic related impacts and development of off-street parking.

It should be noted that while the above estimated costs give a reasonably accurate accounting of the expected design and construction elements, they will be subject to a certain amount of refining during the Phase 2 work when additional data (including final modeling figures) become available.

2.2.4 Alternative 2 - Exposition Bus Rapid Transit (BRT)

Physical Characteristics

Alignment. This alternative would connect Metro Center (7th and Flower Streets) in downtown Los Angeles to Ocean Avenue in Santa Monica using a 15.6-mile BRT system along the Exposition ROW, currently owned by MTA. The BRT would operate as a Rapid Bus using regular mixed-flow traffic lanes or in an exclusive on-street bus only lane between Metro Center and Figueroa Street, potentially following Flower Street in the southbound and Figueroa Street in the northbound direction (Figures 2.12 and 2.13). The alignment would then turn west on Exposition Boulevard and proceed on a dedicated busway, beginning just west of Figueroa Street on the Exposition ROW to Olympic Boulevard in Santa Monica. West of this point, the BRT alignment would operate as a Rapid Bus in mixed traffic or in an on-street exclusive bus lane following Olympic Boulevard, 11th Street, Broadway (westbound) and Santa Monica Boulevard (eastbound) to 6th Street. Between 6th Street and the terminus at Ocean Avenue the route would use the proposed downtown transit mall on both Broadway and Santa Monica Boulevard.

For this alternative to operate efficiently, BRT vehicles must be able to travel independently from mixed flow traffic. This ability becomes extremely important as the system intersects high volume streets along the corridor. In order to achieve an adequate timesaving margin over personal automobile use and to remain cost-efficient, grade-separated crossings (either overpasses or underpasses) are recommended at the following major cross-street intersections: La Brea Avenue; National, Washington, Robertson, and Venice Boulevards; and Gateway and Pico Boulevards. The existing (railroad) grade separations over Motor Avenue and National Boulevard would be maintained due to the existing topography. Other grade separations may be desired (such as Overland Avenue) as a community mitigation measure.

Bikeway. Previous planning studies for the Exposition ROW have considered the inclusion of a bikeway. While the concept of a bikeway is very appealing, there are some reaches along the length of the right-of-way where there is insufficient space within the MTA owned portion to construct both a bikeway and a busway or LRT tracks. It can be seen in Figure 2.14 that a combination of fixed guideway (busway or LRT) and a bikeway generally requires a minimum ROW width of approximately 50 feet. Unlike the Burbank Branch in the San Fernando Valley where the ROW width generally varies between 60 feet and 100 feet and where 60 feet (not 50 feet) is considered a desirable minimum, the Exposition ROW is less than 50 feet wide in many stretches, effectively precluding a bikeway at those locations.

The inclusion of a bikeway where the ROW is only 50 feet wide may also preclude enhancements to the busway or LRT such as linear landscaping or special architectural treatments. It is recommended, however, that a bikeway be included within the ROW whenever feasible, and at the very least be placed in parallel streets to provide a continuous route along the entire corridor. A definitive alignment for a bikeway would be developed in Phase 2 of this study.

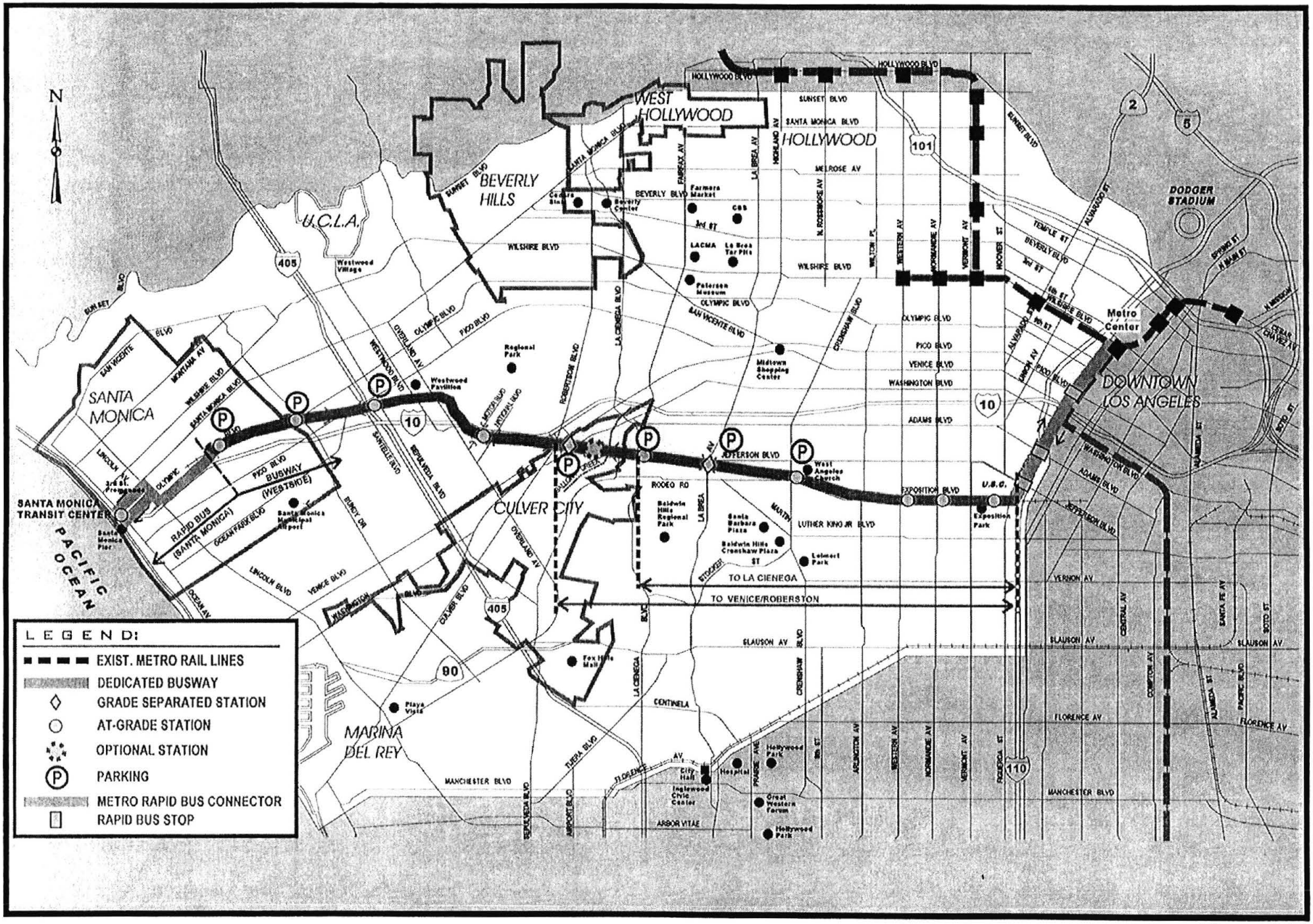

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Figure 2.12
ALTERNATIVE 2
EXPOSITION BUS RAPID TRANSIT (BRT)

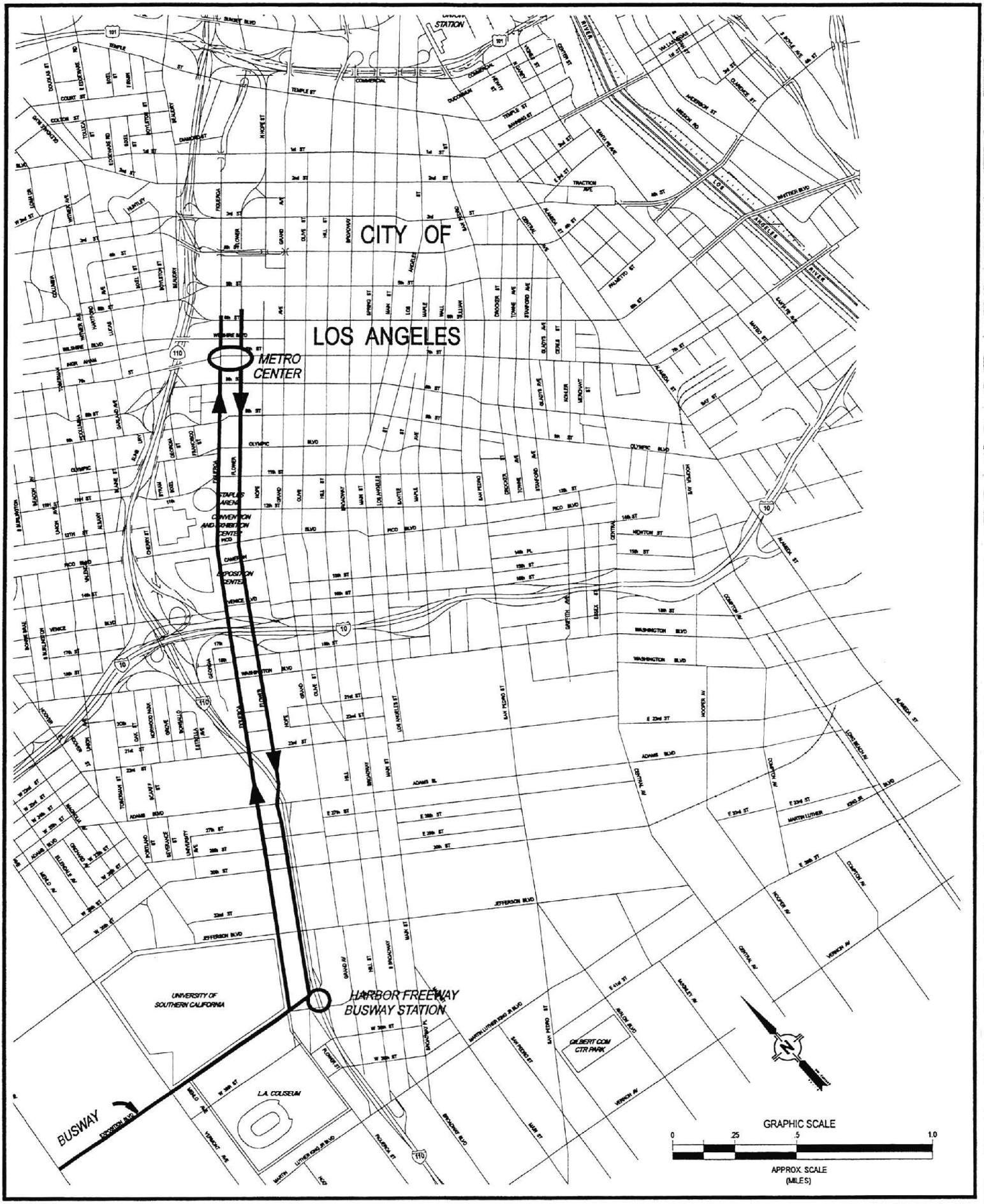

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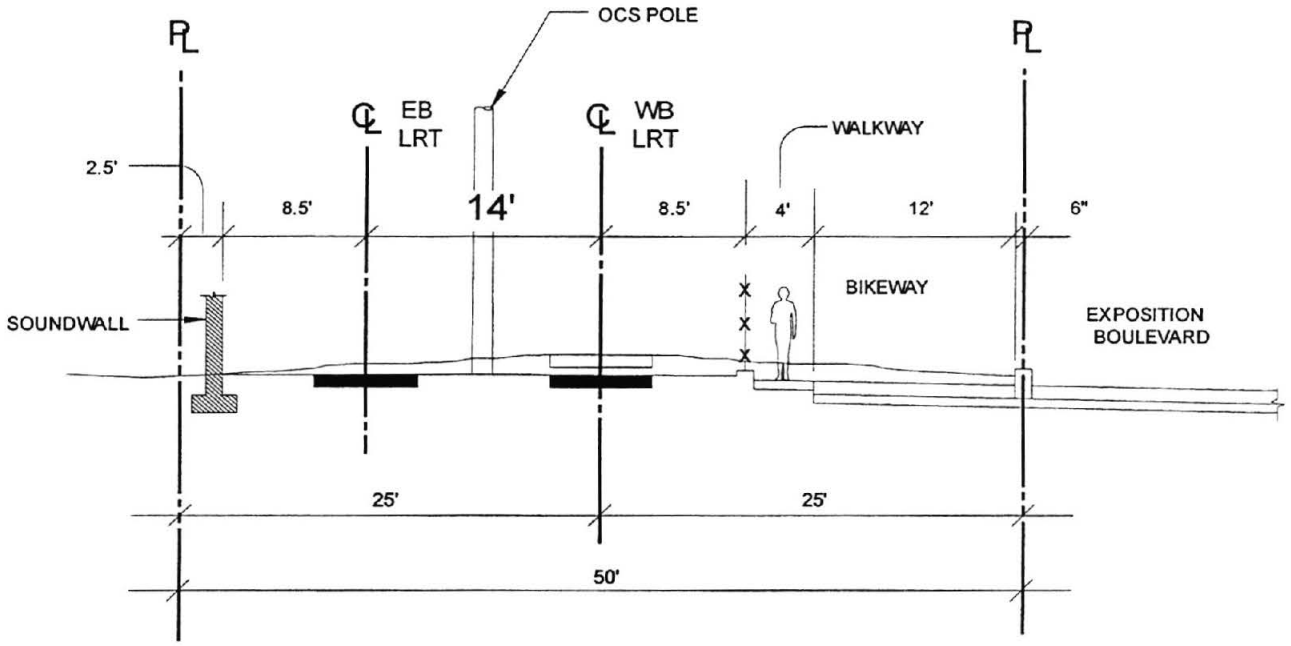
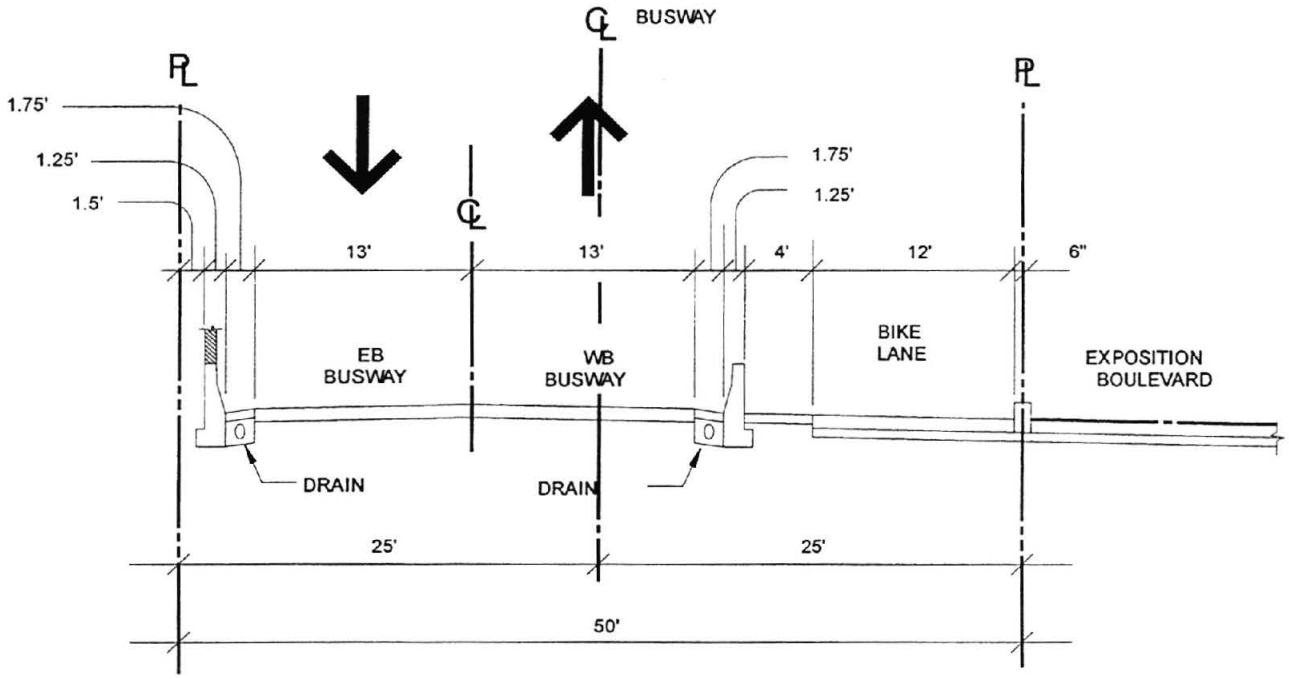
FIGURE 2.13

LOS ANGELES DOWNTOWN ALIGNMENT - EXPOSITION BRT



LRT WITH BIKEWAY



BUSWAY WITH BIKEWAY

LEGEND :

- THROUGH LANE (MIXED FLOW)
- TURN LANE (MIXED FLOW)
- BUS LANE
- P PARKING
- S/W SIDEWALK

NO SCALE

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FIGURE 2.14

TYPICAL SECTION WITH BIKEWAY

Vehicles. A second assumption of this alternative is the utilization of high capacity articulated buses in this corridor. These vehicles would provide an average seated capacity of 65 passengers, with space available for another 13 to 30 standees, depending on load factors. The capacity required to serve the expected patronage for this line is too large to be handled by conventional 40-foot buses.

Stations. Station design for this alternative is dependent upon the location of the station within the corridor. Stations located between Metro Center and Figueroa Street and between Olympic Boulevard/Exposition ROW and 6th Street in Santa Monica would use curbside stations typical of those now being built for the Rapid Bus System. On the Exposition ROW (between Figueroa Street and Olympic Boulevard in Santa Monica) a full busway would be built that would include 11 stations (including two on aerial structure: La Brea and Washington/Venice). Three stations would be at-grade in the median of Exposition Boulevard: Vermont Avenue, Normandie Avenue, and Western Avenue (Figures 2.15 and 2.16). The following stations would be at-grade in open ROW: Crenshaw Boulevard, La Cienega Boulevard, Motor Avenue, Sepulveda Boulevard/I-405, Bundy Drive, and Cloverfield Boulevard (Figure 2.17). Except for Motor Avenue, all would have park and ride facilities.

An optional station at Hayden Street (midway between La Cienega and National/Venice stations) was considered in previous studies based on input at that time from Culver City residents. However, the distance between La Cienega and National/Venice stations would be only approximately 0.8 miles. This station can be looked at in more detail in the Phase 2 environmental evaluation.

Park and Ride. Several stations will have park and ride facilities. These are shown in Table 2.6 below.

Table 2.6
Parking Spaces for Alternative 2 - Exposition BRT

STATION	PRIVATE PROPERTY	MTA PROPERTY	SHARED PARKING	TOTAL
Crenshaw	150	--	--	150
La Brea	130	30	--	160
La Cienega	120	--	--	120
Venice/Robertson	30	120	--	150
I-405	300	--	--	300
Bundy	--	50	--	50
Cloverfield	--	100	170	100
TOTALS	730	300	170	1200

Major Issues. For the purpose of this study, it was assumed that the typical maximum operating speed of the BRT on dedicated busway would be 55mph, equal to that of a LRT system. But there are a number of possibilities that may make this speed unattainable. As an example, a bus traveling 55 mph would likely require railroad type gates at highway crossings. While gates on a rail system

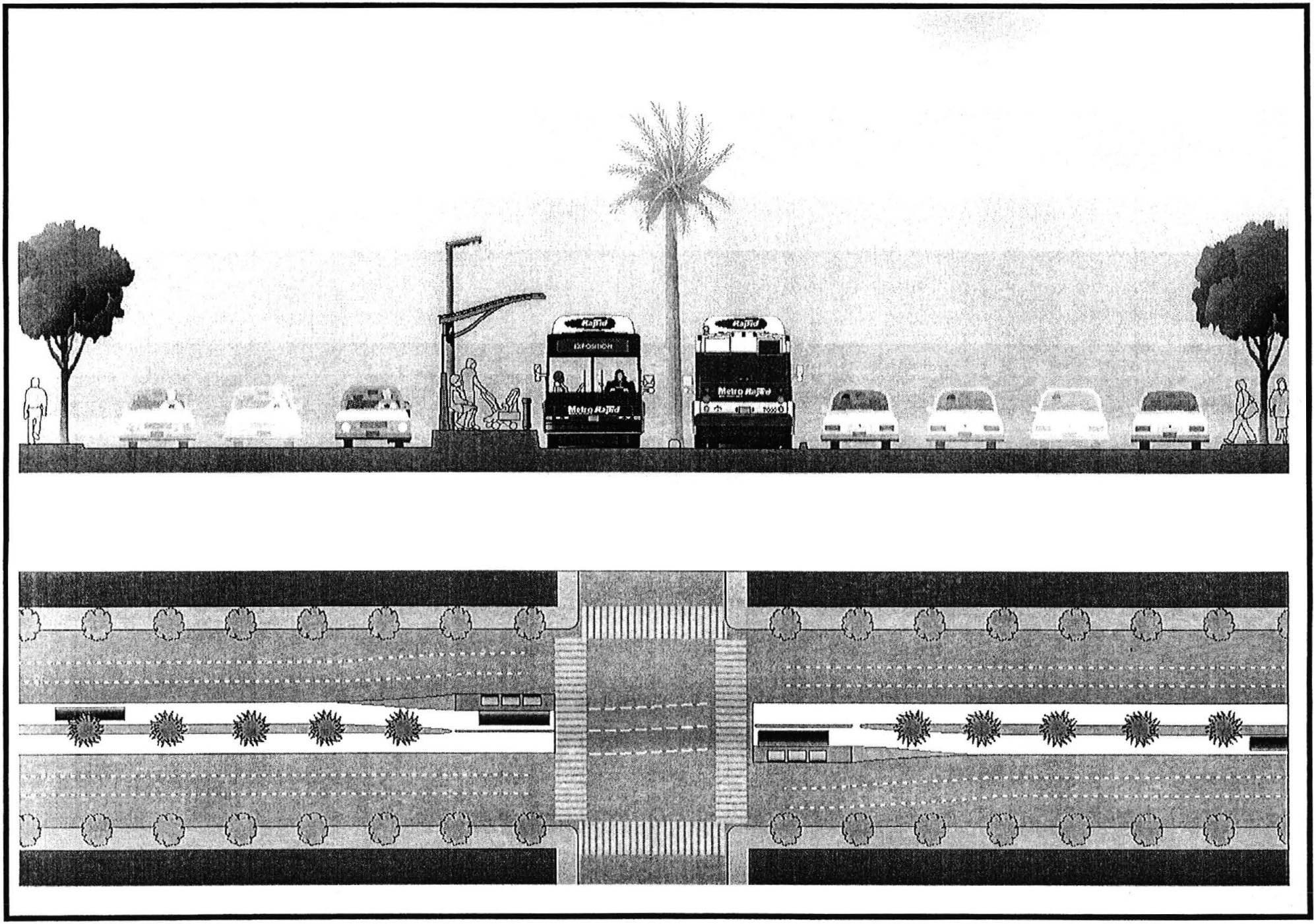

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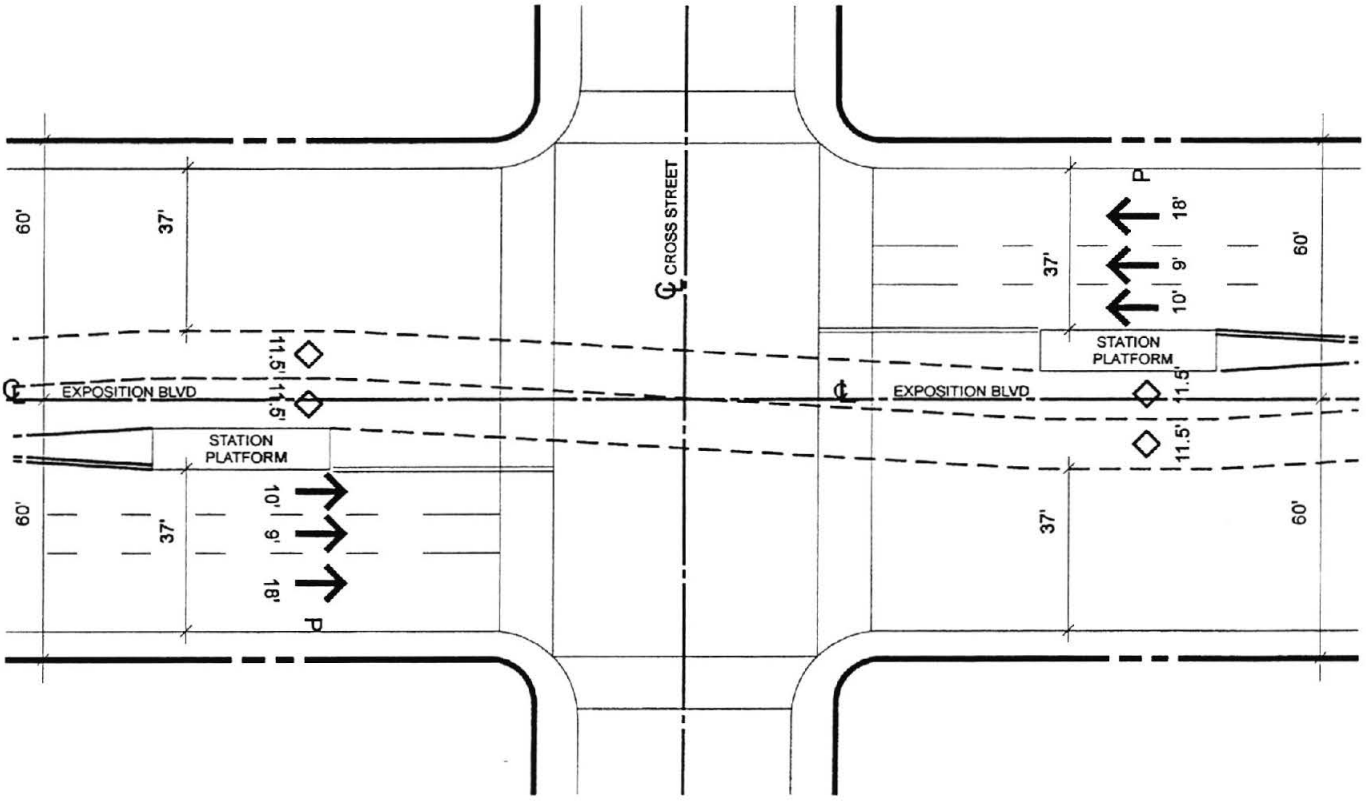
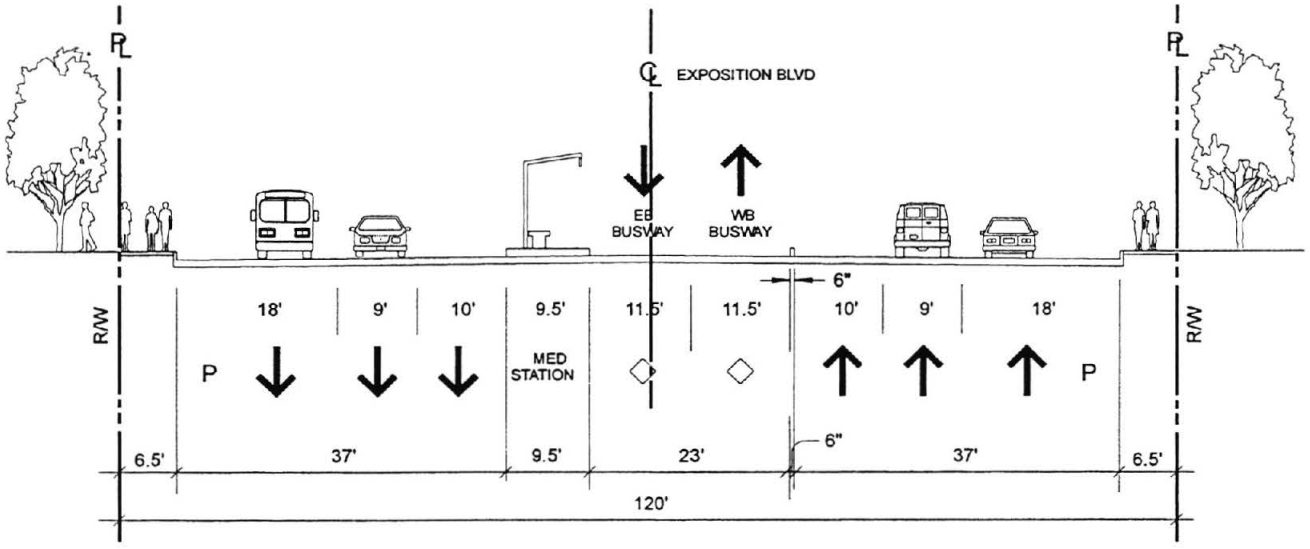
Figure 2.15
EXPOSITION BOULEVARD - BRT STATION IN MEDIAN (typical)





TYPICAL BUSWAY STATION IN EXPOSITION MEDIAN

LEGEND :

- THROUGH LANE (MIXED FLOW)
- TURN LANE (MIXED FLOW)
- BUS LANE
- P PARKING
- S/W SIDEWALK

NO SCALE

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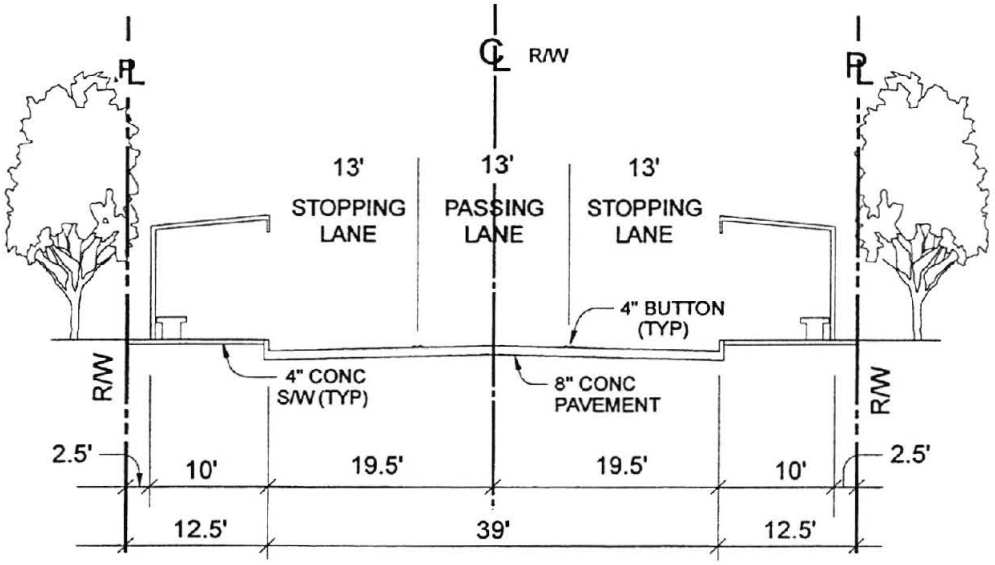
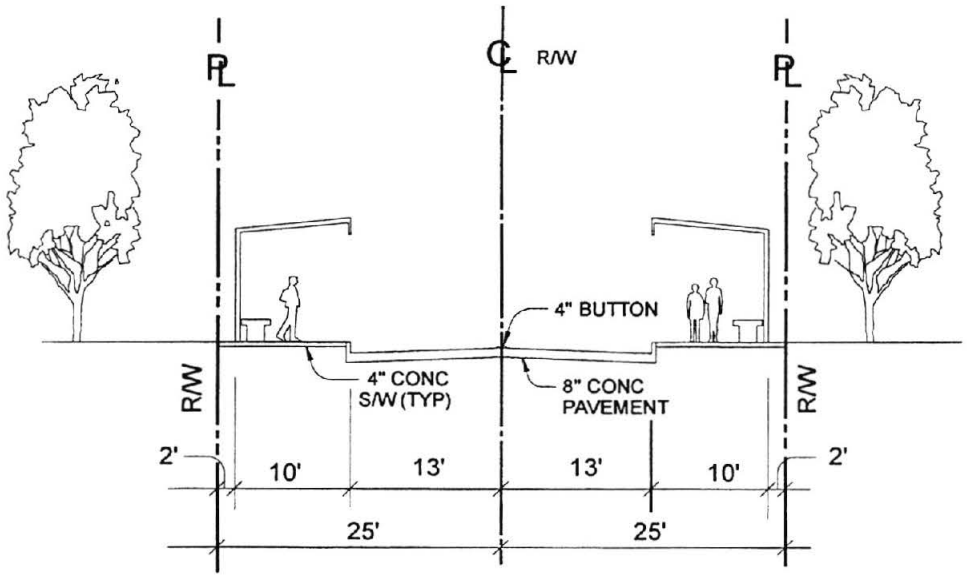
FIGURE 2.16

TYPICAL BUSWAY STATION IN STREET MEDIAN



TYPICAL BUSWAY STATION

64' to 100' ROW



TYPICAL BUSWAY STATION

50' ROW

LEGEND :

- THROUGH LANE (MIXED FLOW)
- TURN LANE (MIXED FLOW)
- ◇ BUS LANE
- P PARKING
- S/W SIDEWALK

NO SCALE

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FIGURE 2.17

TYPICAL BUSWAY STATION IN OPEN ROW

operate in a fail-safe mode, gates on a busway may not have this luxury. At present, there are no such installations in the United States and loop detectors alone may not provide the necessary threshold of safety appropriate for this speed. If busway highway crossing are governed solely by traffic signals, the maximum bus speed at the crossing may be much slower than 55 mph, primarily doe to a lack of a positive barrier that a gate would provide.

Another issue is the frequency of headways on the busway. On a LRT system, up to three cars can operate as one train, allowing a minimum headway of 4 to 6 minutes. This would only minimally impact the surrounding traffic patterns if the traffic signals were properly coordinated with train movements. To maintain similar ridership, a BRT system using a single articulated bus would have to decrease its headway three to four times, substantially reducing the time the crossing is open to vehicular traffic. This could result in a significant impact to surrounding traffic. To reduce this impact the BRT could utilize signal priority rather than full preemption, thereby causing less disruption to cross traffic.

A third issue is operating a BRT system that would have a significant portion of the alignment operating in mixed traffic on city streets. A fast running time between Santa Monica and Los Angeles is critical in attracting new ridership. It should be emphasized that any deviation from the Exposition ROW would increase the end to end travel time and may result in lower patronage. The running time using the ROW would be approximately 44 minutes between Metro Center and downtown Santa Monica. An alternative alignment using Venice Boulevard between La Cienega and Sepulveda Boulevards would increase that time approximately 12 to 13 minutes. If the line continued on Venice Boulevard to Lincoln Boulevard, and finally north to Santa Monica, the running time may be nearly double that of using the Exposition ROW for the entire route. The Phase II modeling will allow a more definitive analysis of these scenarios.

Other major issues related to BRT operation occur primarily in residential areas and include potential noise and vibration, air pollution, visual impacts, and pedestrian safety. Noise and vibration impacts would depend upon the bus frequency, speed of operation, and the type of bus used. Air pollution could significantly be reduced by the use of non-diesel buses. Landscaping similar to that described for a LRT system could reduce visual impacts. Pedestrian safety issues at crossings could be addressed through the use of special audible devices activated by the bus, tactile warning strips, and pedestrian gates. This and all the issues noted above will be thoroughly analyzed in Phase 2 of this study.

Operating Characteristics

The following table provides a summary of the operating characteristics of the Exposition BRT alternative as it was modeled:

Table 2.7
Exposition BRT Operating Characteristics

Bus Service:	BRT would be an all-stop route modeled at 5-minute peak, 10 minute base headways, with skip-stop route providing 10-minute peak service only. Several express routes would be rerouted to feed onto busway (MTA 436, 439; LADOT 431, 438). Two local routes would convert part of their frequency to provide limited stop service and use busway (MTA 40 and 42). In some segments of the route, this will result in headways of 1.6 to 2.1 minutes during peak hours. Other routes would be modified to connect with busway stations. Remaining bus network is same as TSM, which assumes route recommendations from Westside Bus Service Improvement Study and rapid bus routes on Wilshire/Whittier, Santa Monica and Crenshaw Boulevards.
Operations:	Articulated (65-70 feet long) buses would run on the facility. Proof of payment fare collection would be required to reduce dwell time at stops. Passengers board and alight buses through both front and rear doors. Average dwell time of 20 seconds is assumed.
Signal Preemption:	Signal priority or preemption in busway (Exposition ROW); Signal priority, but no preemption in street running sections outside the busway (in Santa Monica and downtown Los Angeles). Delay on Flower Street estimated to be 1.95 minutes per mile, based on actual experience of the Blue Line on Flower Street/Washington Boulevard.
Grade Separation:	At several intersections.
Length:	15.6 miles from Ocean to 7th/Flower
Stations:	15; skip stop route serves 9 stations (excludes on-street segment west of Cloverfield)
Avg. Station Spacing	1.05 miles (1.70 miles for skip stop route)
Max Speed:	55 mph
Avg Speed:	25.3 mph from Cloverfield to 7th/Flower (28.14 mph for skip stop route)

Financial Characteristics

The estimated cost for the full route length of Alternative 2 from 7th/Flower to Santa Monica (15.6 miles, 10.8 miles of which would be in a dedicated busway, and the remainder a Rapid Bus on city streets), including 36 BRT vehicles (and a credit of 17 standard buses that would no longer be required in regular MTA service) is approximately $188,000,000 (1999 dollars). Alternative segment lengths to La Cienega Boulevard (7.7 miles), and Venice Boulevard (8.5 miles) would cost approximately $76,000,000; and $87,000,000, respectively.

It should be noted that while the above estimated costs give a reasonably accurate accounting of the expected design and construction elements, they will be subject to a certain amount of refining during the Phase 2 work when additional data (including final modeling figures) become available.

However, two significant cost reductions may be realized by implementing either or both of the following measures:

- Construction of an overpass rather than underpass at Pico/Gateway. Sufficient distance is not available for the construction of an aerial to at-grade transition between Gateway and Sawtelle Boulevards. To remedy this situation, an aerial structure would need to be extended over Sawtelle. The required vertical clearance for this new aerial structure to

pass under the existing I-405 overpass could be accomplished if Sawtelle were lowered approximately 3 feet. Even with this additional improvement, the overall cost would likely be significantly less than the underpass configuration previously considered for this location.

- At-grade station at La Brea Avenue. This configuration could be constructed if the station were relocated a distance of 600 feet to either the east or west. Further study of this location will determine the more advantageous location, particularly in regard to park and ride opportunities.

2.2.5 Alternative 3 - Exposition Light Rail Transit (LRT)

Physical Characteristics

Alignment. In this alternative, an LRT operation would start from Metro Center (7th and Flower Streets), utilizing the existing Long Beach Blue Line tracks to Washington Boulevard. At this location, it would branch off the Blue Line and proceed south on Flower Street to the Exposition ROW, which it would follow to downtown Santa Monica via the Exposition ROW (Figure 2.18). Two similar alignments are being considered for this line, Alternative 3a (Baseline) and Alternative 3b (Minimum Grade Separations).

Alternative 3a (Figure 2.19) would leave the Long Beach Blue Line at Washington Boulevard and Flower Street and proceed south along Flower Street to the Exposition ROW. The tracks would follow the Exposition ROW westerly all the way to Olympic Boulevard in Santa Monica. At that point, the tracks would then be placed within Olympic Boulevard and continue in mixed traffic until 12th Street where they would transition, using an existing median, to an aerial structure and continue aerial from 11th Street all the way to its terminus at 4th Street And Colorado Avenue. The entire length of this line from Metro Center to 4th Street in Santa Monica would be 15.1 miles. There are four additional alternatives for track alignment routing in downtown Santa Monica (Figures 2.20 through 2.23), which could be analyzed in Phase 2 of this study.

Between Flower Street/Washington Boulevard and Vermont Avenue/Exposition Boulevard, Alternative 3a would follow the Mitigated Alignment (Base Line) as described in the 1992 Gruen EIR study. While the Mitigated Alignment (Base Line) has since been precluded by the widening of the Harbor Freeway for the I-110 HOV/Busway project, it is reflected in this study's Preliminary

Cost Estimate to allow a consistent comparison to the original EIR costs. To build the Baseline Option (Flower Street) today would involve constructing a separate LRT bridge over the I-110 Freeway and building a portion of the route along the west side of Flower Street (which was not in the EIR). It should be noted that a surface LRT along the east side of Flower Street between Adams Boulevard and just north of Jefferson Boulevard (also not in the EIR) has also been precluded by the freeway widening.

This study's Alternative 3a (baseline) would still employ a cut and cover underpass for both Flower and Figueroa Streets as indicated in the EIR Subway Alignment (Alternative "C"). All stations would be at-grade.

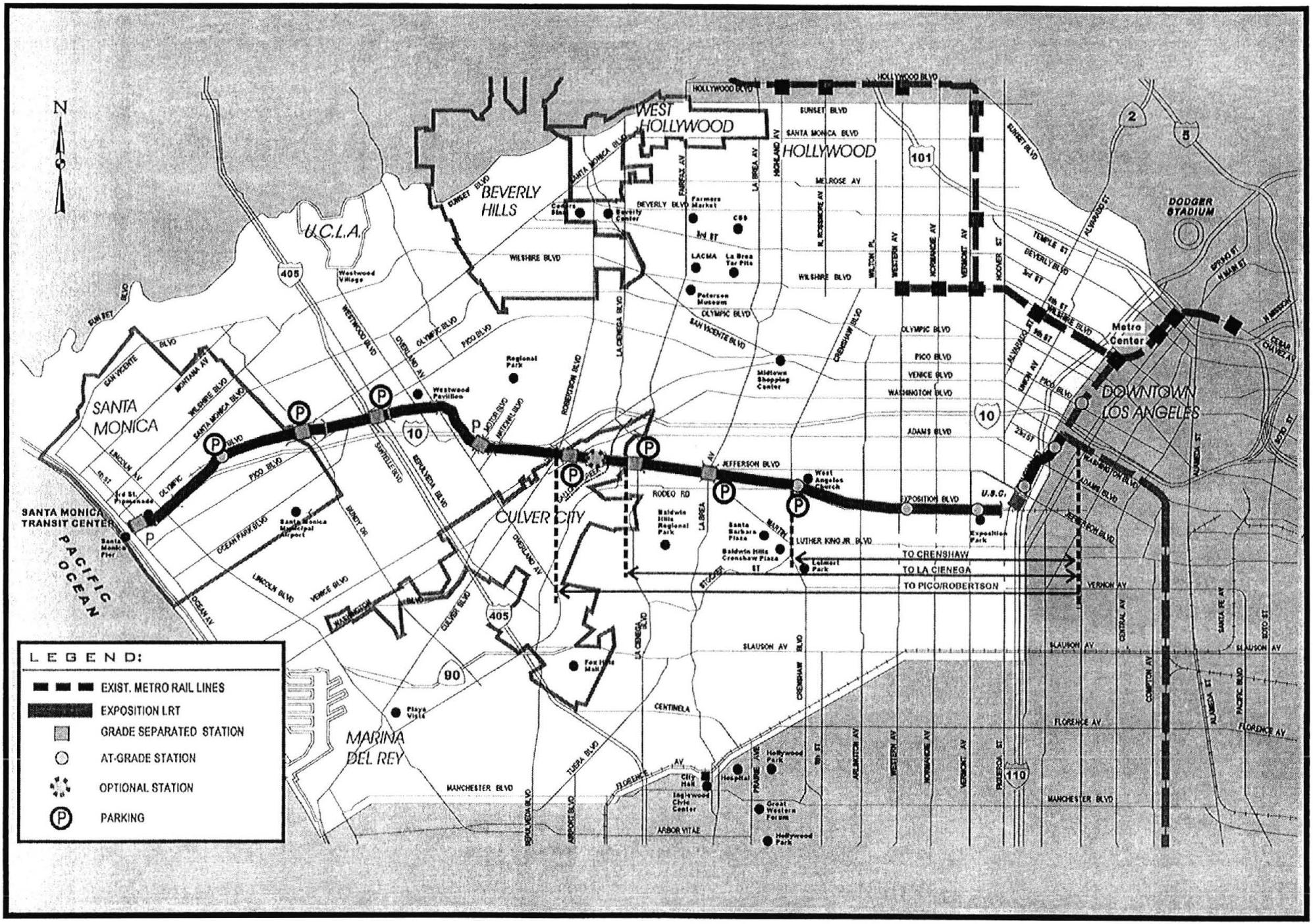

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Figure 2.18
ALTERNATIVE 3a
EXPOSITION LIGHT RAIL - TRANSIT (LRT)

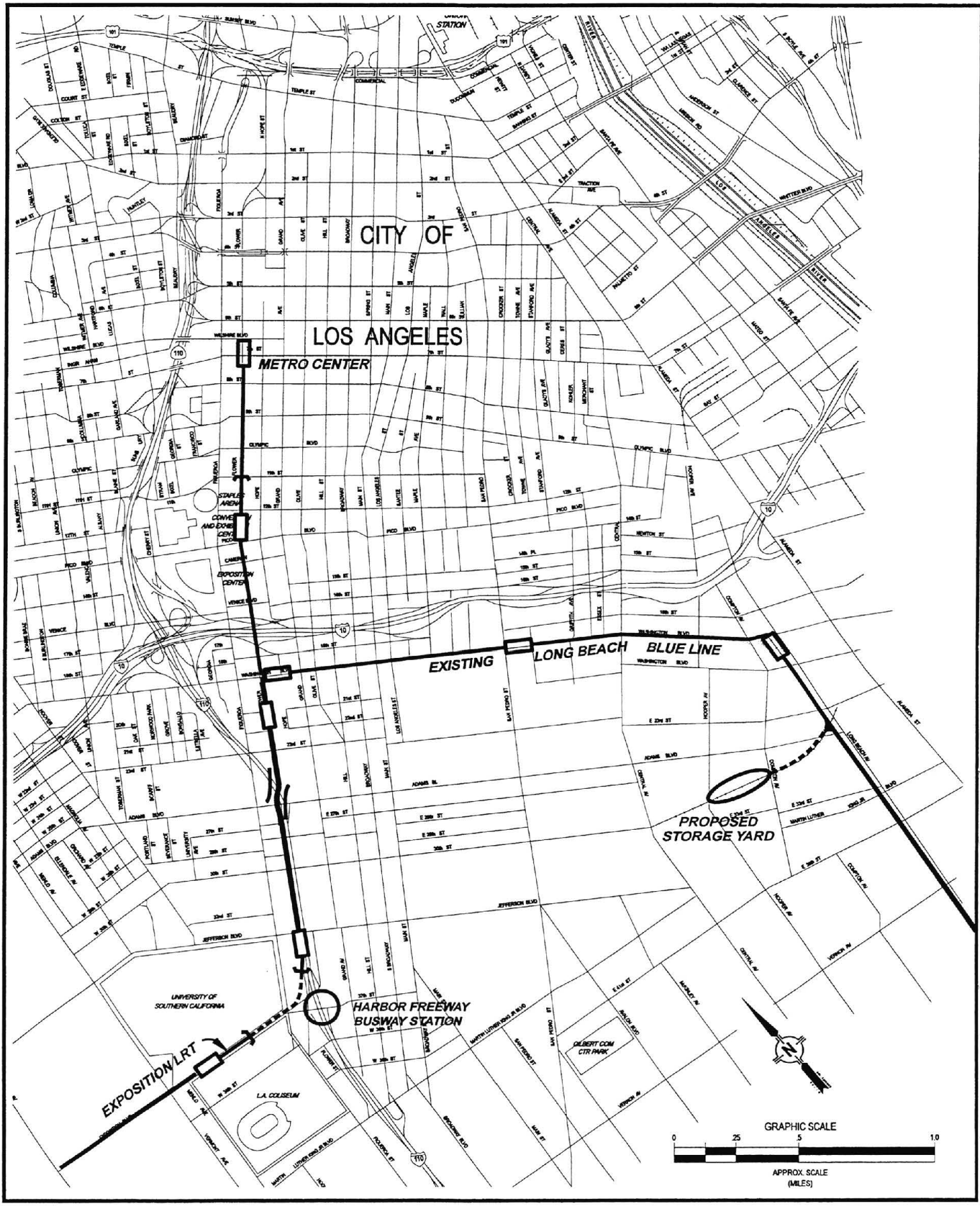

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FIGURE 2.19

EXPOSITION LRT - BASELINE OPTION (FLOWER ST)

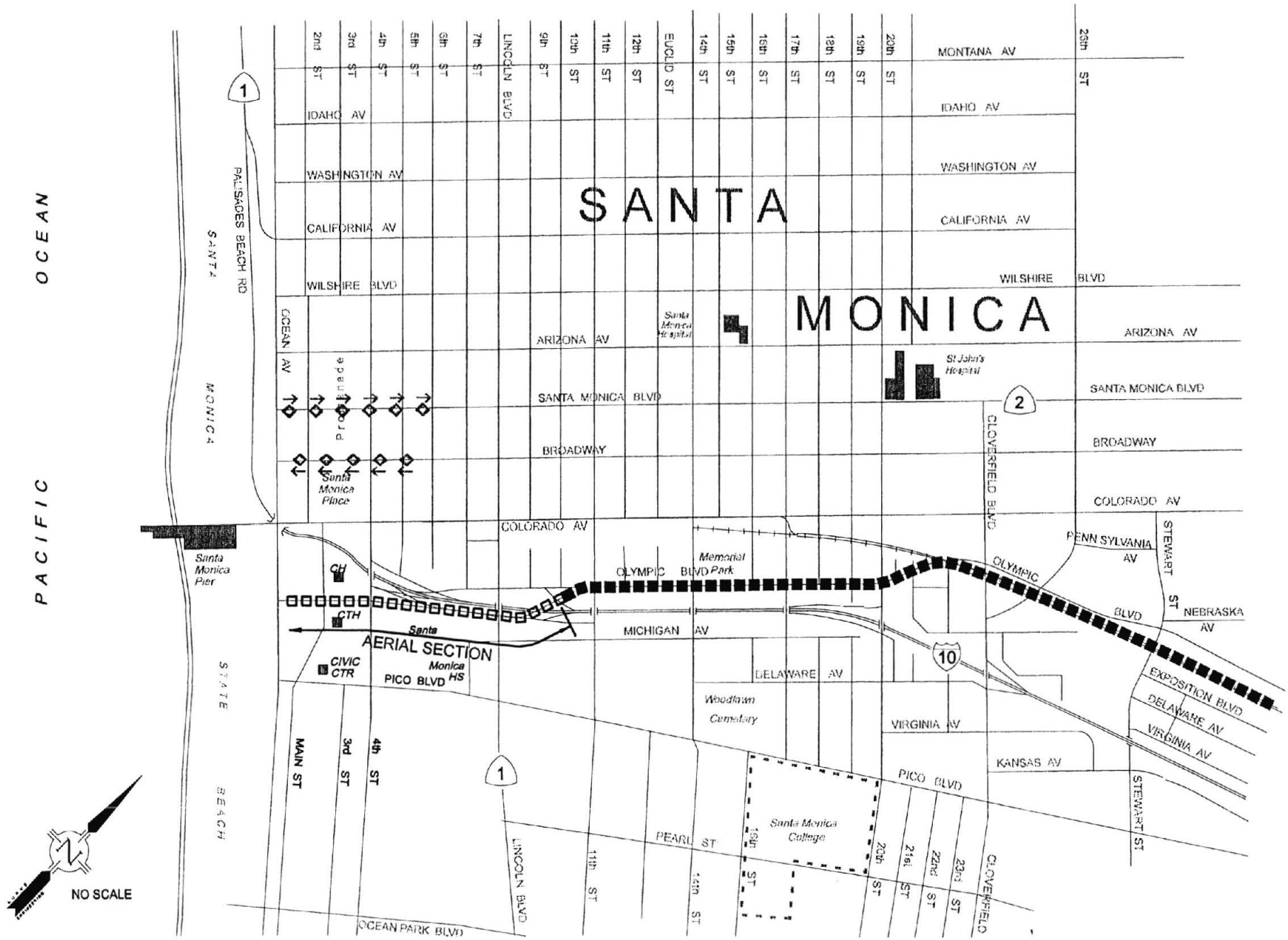

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FIGURE 2.20

DOWNTOWN SANTA MONICA - ALTERNATIVE A

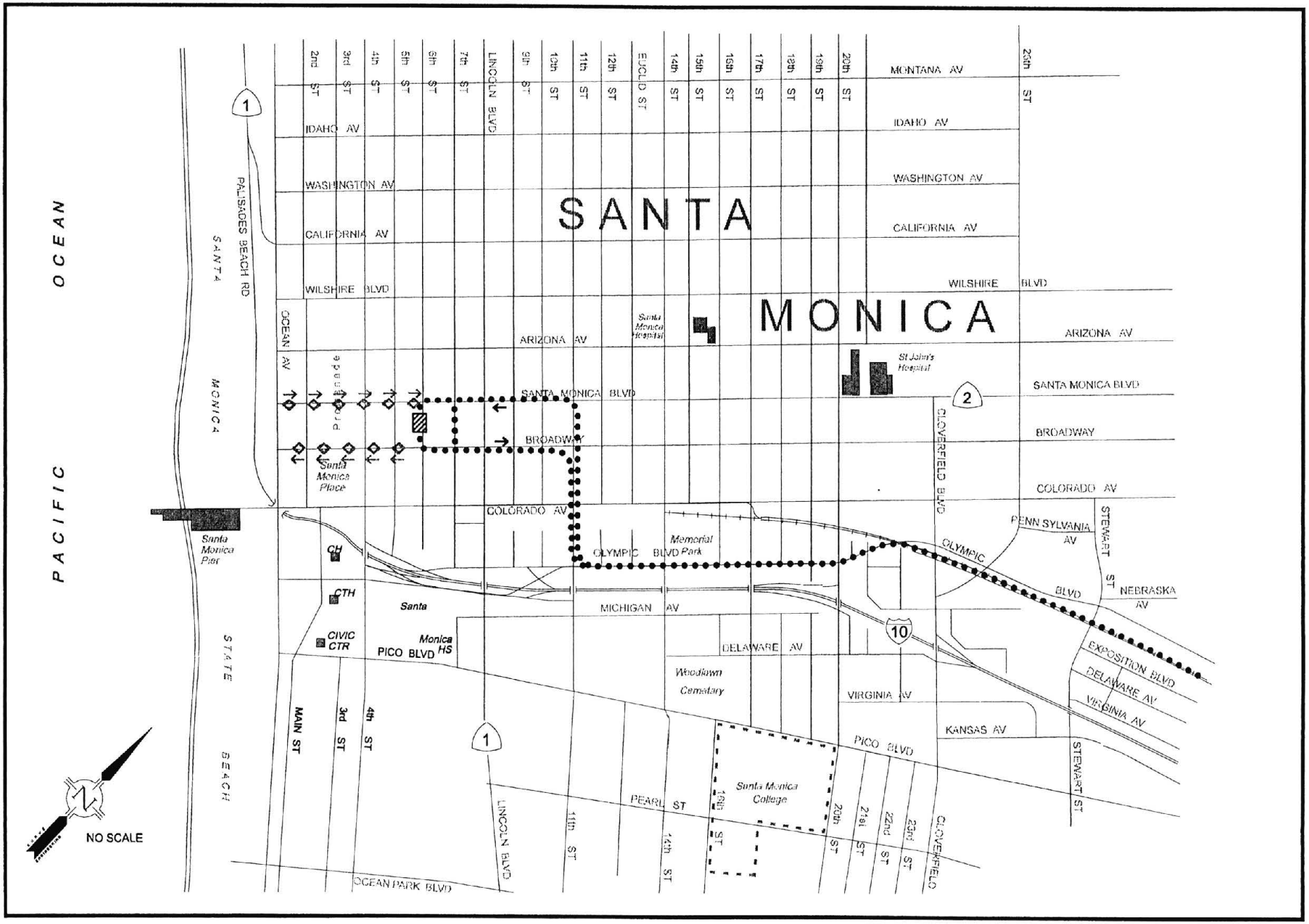

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FIGURE 2.21

DOWNTOWN SANTA MONICA - ALTERNATIVE B

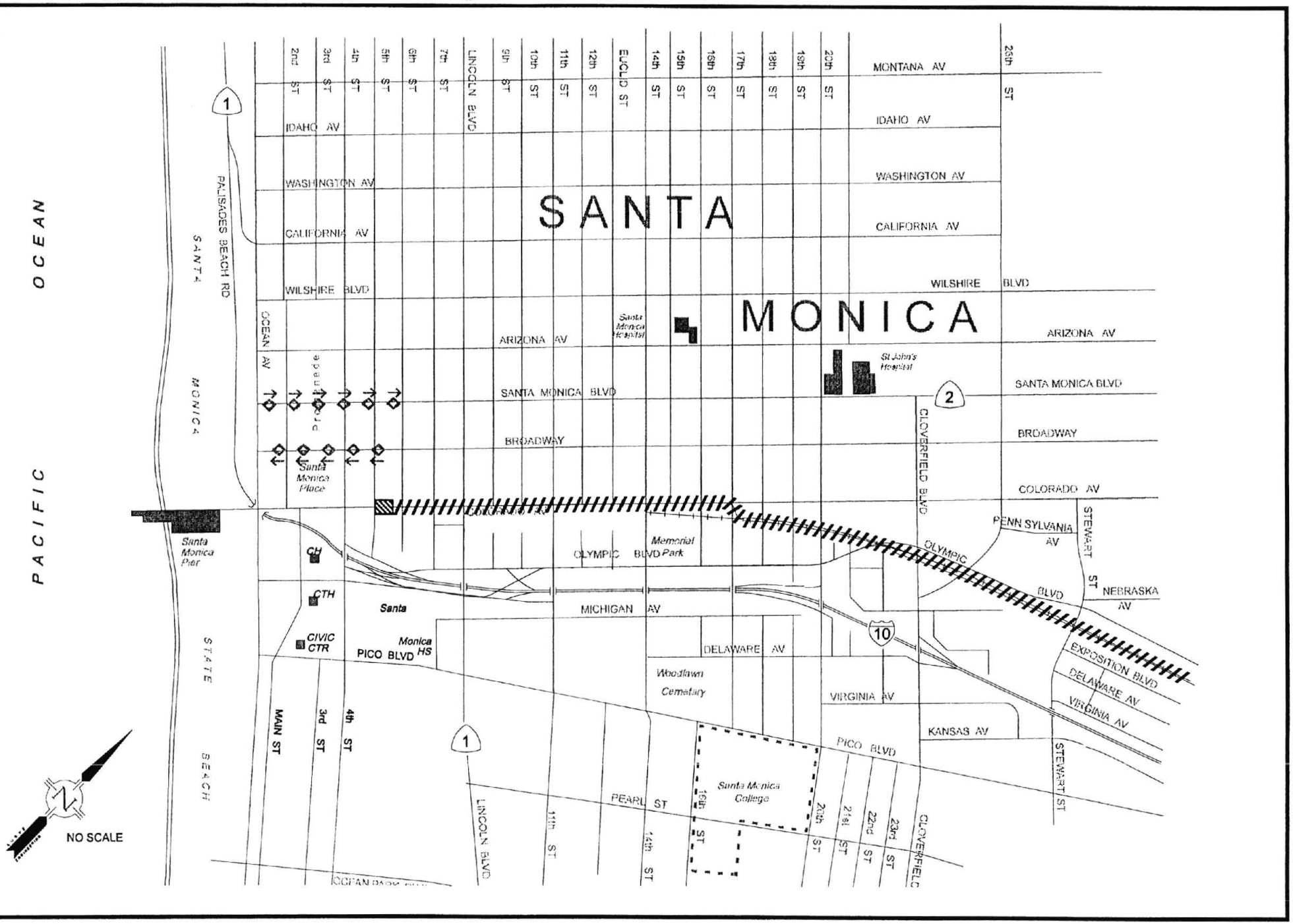

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FIGURE 2.22

DOWNTOWN SANTA MONICA - ALTERNATIVE C

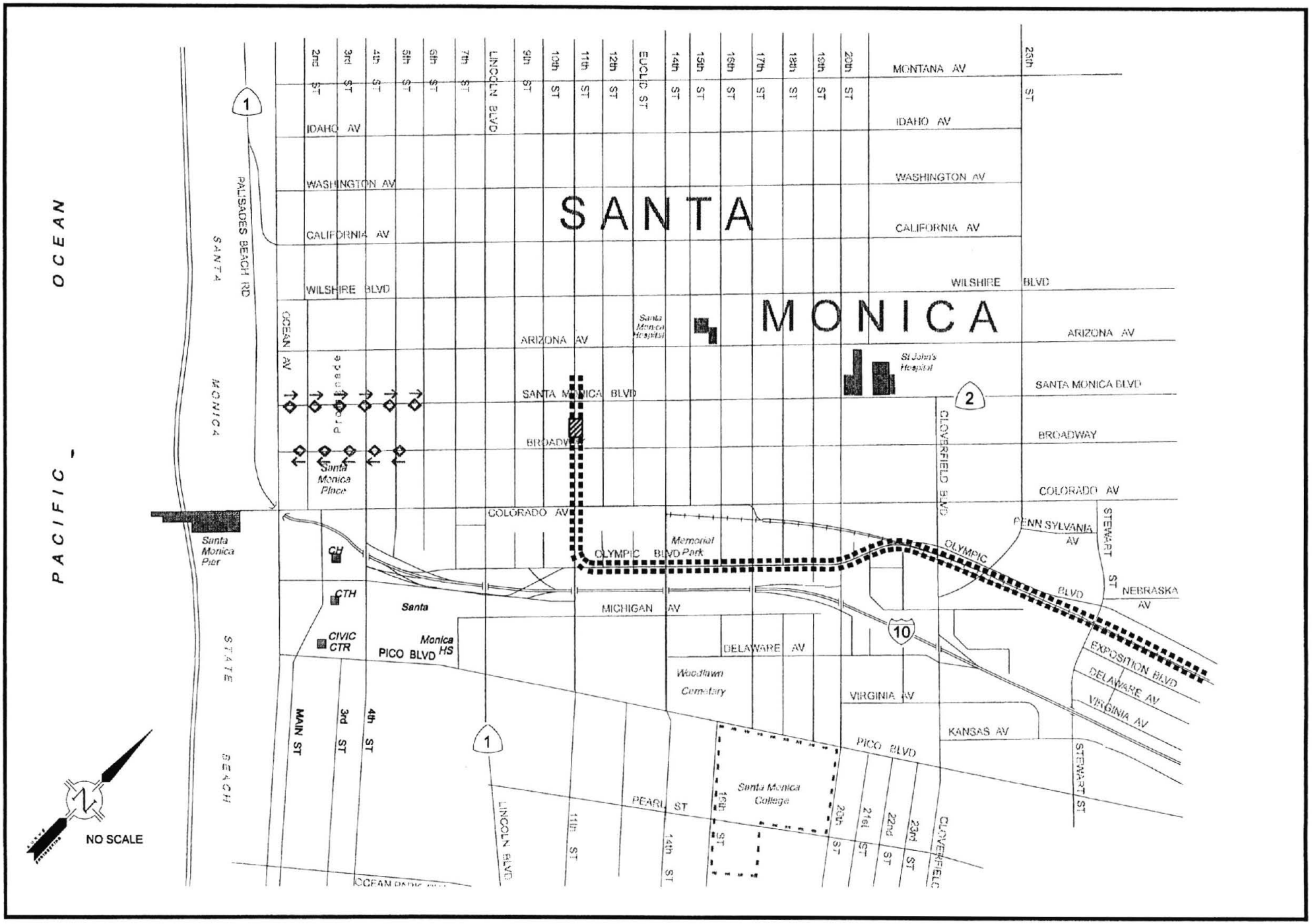

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FIGURE 2.23

DOWNTOWN SANTA MONICA - ALTERNATIVE D

Alternative 3b (Figures 2.24 and 2.25) uses Hill Street to avoid the difficult traffic movements that are present for the at-grade portion along the west side of Flower Street, particularly for ingress and egress to and from local businesses, and pedestrian safety issues resulting from these movements. Alternative 3b would place the LRT tracks in mixed flow down the middle of the street, with minimal impact to the existing traffic flow patterns (Figure 2.26).

From Vermont Avenue to downtown Santa Monica, Alternative 3a (baseline) would follow the refined alignment submitted to the LACTC (now MTA) in the 1994 Draft Alternatives Refinement Study prepared by BRW, Inc. It would employ grade separations at La Brea Avenue; La Cienega and Jefferson Boulevards; National, Washington, Robertson, and Venice Boulevards; and Bundy Drive. The cost estimates in this study are for aerial separations at these locations, but below grade crossings may be considered to mitigate community concerns. Box cut & cover grade separations at Overland Avenue; and Sepulveda, Sawtelle, Gateway, and Pico Boulevards were also part of the study. Existing grade separations at National Boulevard (east of Motor Avenue) and Motor Avenue would remain unchanged. An aerial structure would be built between 11th Street and 4th Street and Colorado Avenue in Santa Monica and would utilize the present Sears parking lot at that location. The estimated cost presented herein for Alternative 3a (baseline) is fully reflective of the previous Gruen and BRW studies so that the Booz Hamilton/MTA estimate prepared in 1998 can be compared to Alternative 3a (baseline) on an equal basis.

From a subsequent investigation under taken as part of Phase 1 of this study, it was found that at several locations, notably at Overland Avenue, there are existing major storm drains crossing the ROW that would preclude the construction of a minimal LRT underpass arrangement. To construct this configuration, the LRT track would have to be approximately 35 to 40 feet below grade, effectively creating the need for a tunnel structure for a significant distance. Confronted with this order of expenditure, it would seem appropriate to seriously explore other less costly mitigation solutions during Phase 2 of this study.

Alternative 3b for this segment would also follow the Alternative 3a alignment but would only have the following aerial grade separations: La Brea Avenue; the existing railroad separations at National Boulevard and Motor Avenue; Overland Avenue; Sawtelle/Pico Boulevards; and an aerial structure between 10th Street and the Santa Monica Civic Center complex on the south side of I-10 near Ocean Avenue. The overall length of this line from Metro Center would be 15.5 miles.

It should be noted that if Sawtelle Boulevard were lowered approximately 3 feet, an aerial LRT crossing (in lieu of a box cut and cover underpass) could be constructed for Pico/Gateway and Sawtelle Boulevards that would have a minimum 15 foot vertical clearance under the existing I-405 Freeway bridge (Figure 2.27).

Portions of both Alternatives would have at-grade segments in the median of Exposition Boulevard (Figure 2.28), along the south side of Exposition Boulevard (Figure 2.29), and on either side of the existing landscaped median of Olympic Boulevard in Santa Monica (Figure 2.30).

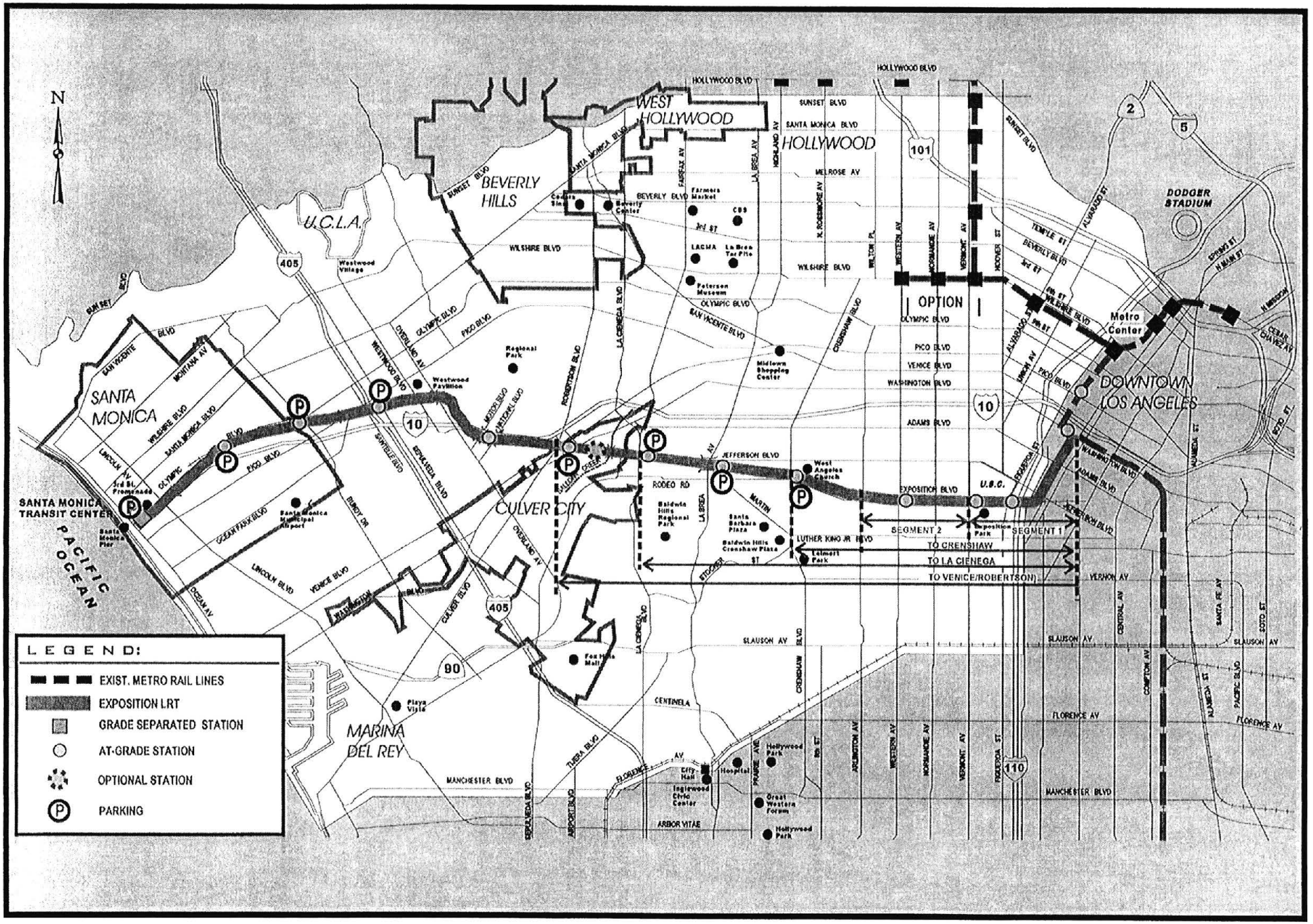

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Figure 2.24
ALTERNATIVE 3b
EXPOSITION LIGHT RAIL TRANSIT (LRT) (MINIMUM GRADE SEPARATIONS)

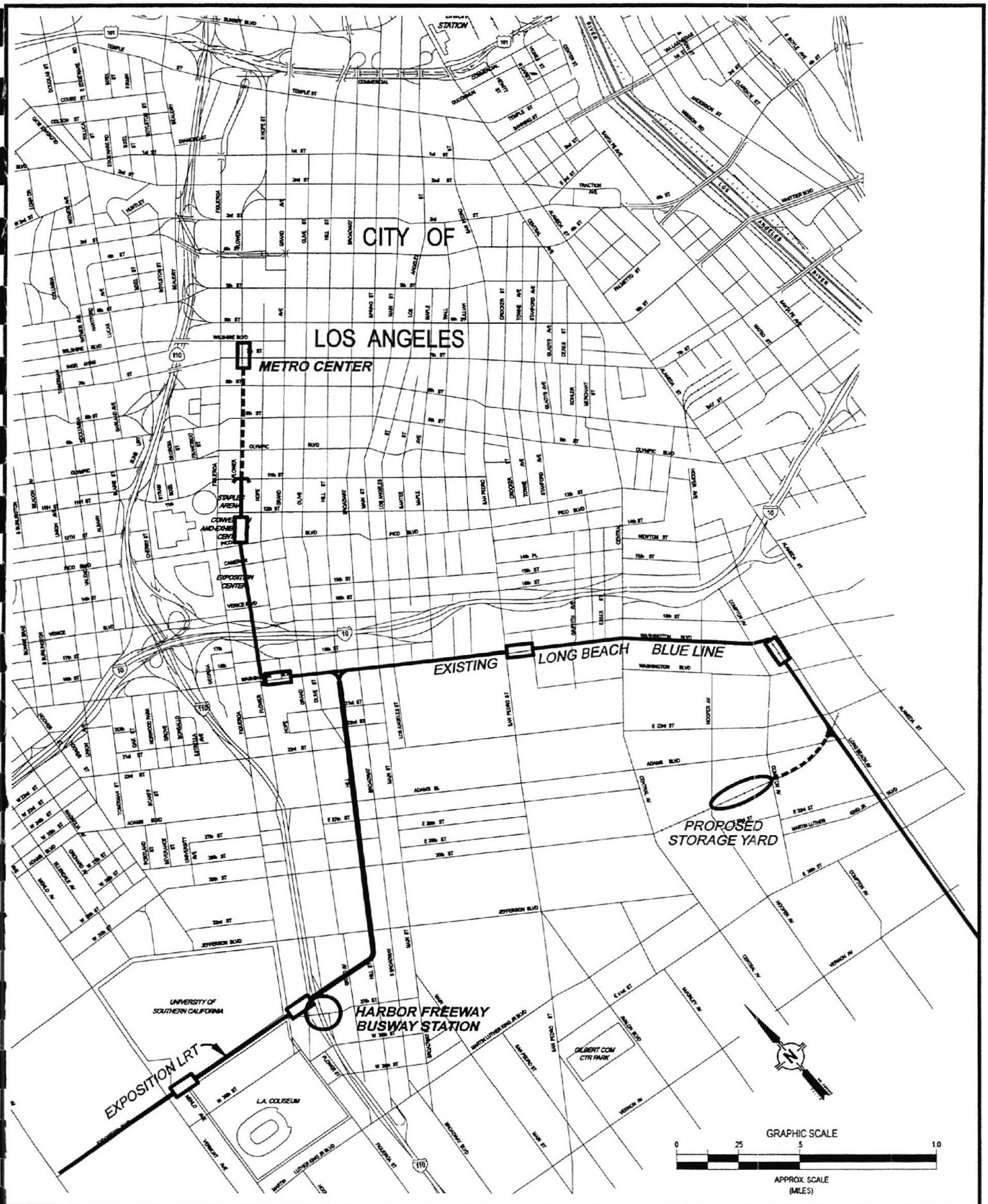

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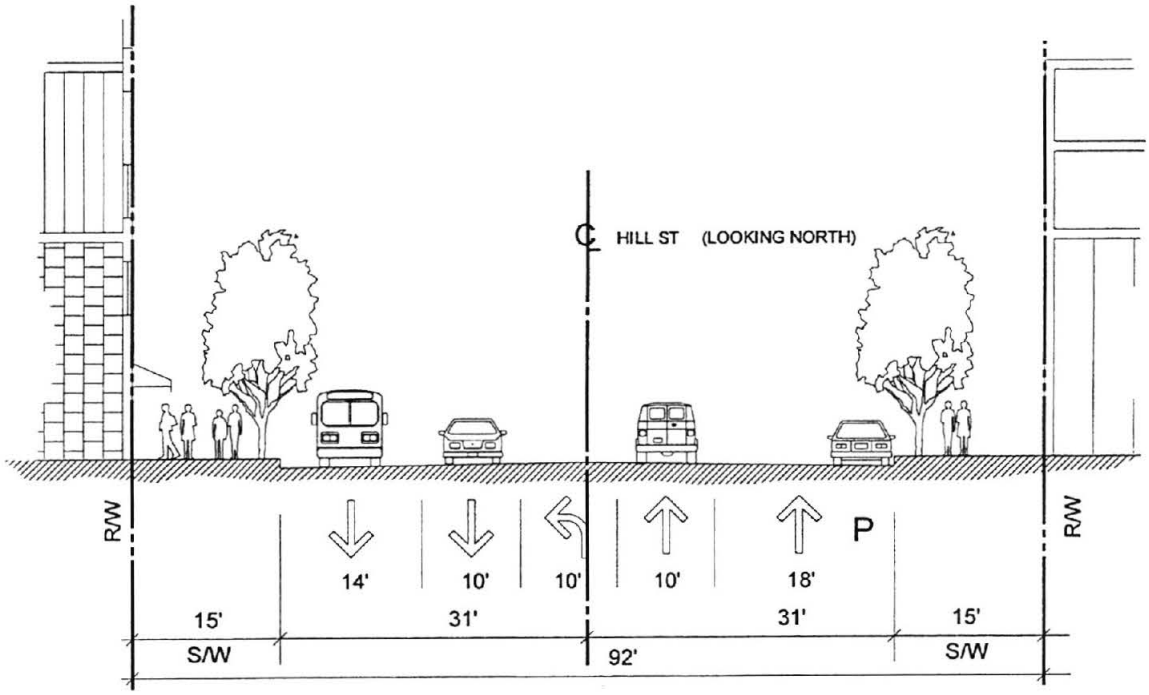
FIGURE 2.25

EXPOSITION LRT MINIMUM GRADE SEPARATION (HILL ST)



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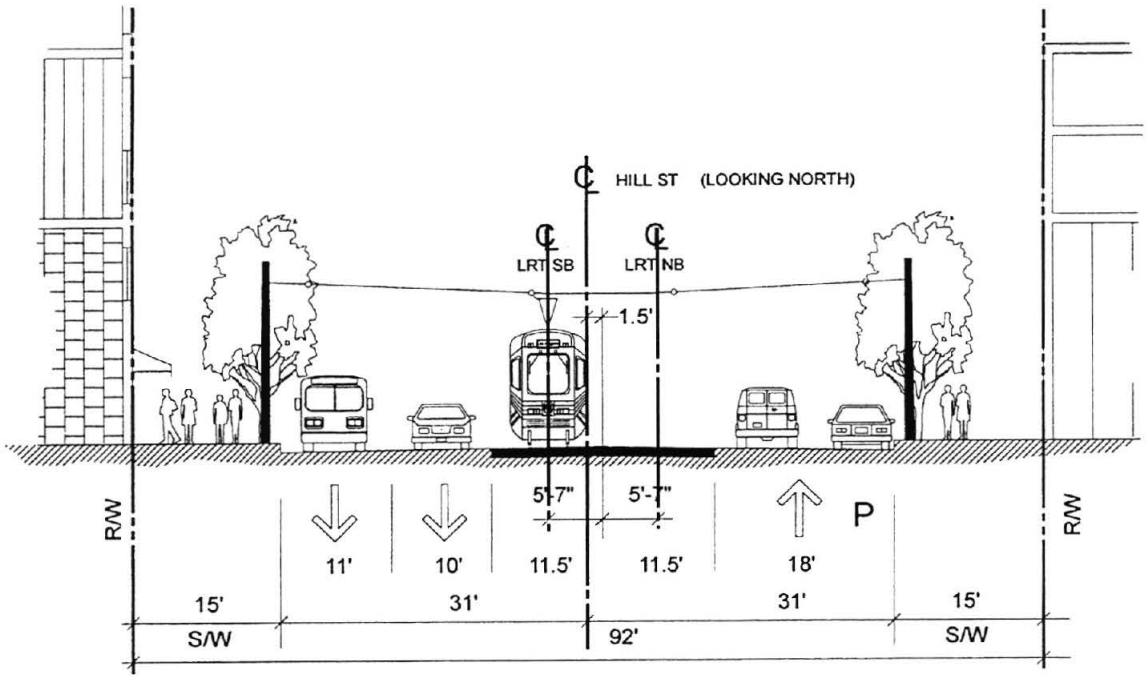

PROPOSED

LEFT HAND TURNS PROHIBITED
BETWEEN HILL & JEFFERSON

LEGEND :

- THROUGH LANE (MIXED FLOW)
- TURN LANE (MIXED FLOW)
- BUS LANE
- P PARKING
- S/W SIDEWALK

NO SCALE

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FIGURE 2.26

LRT IN MIXED FLOW

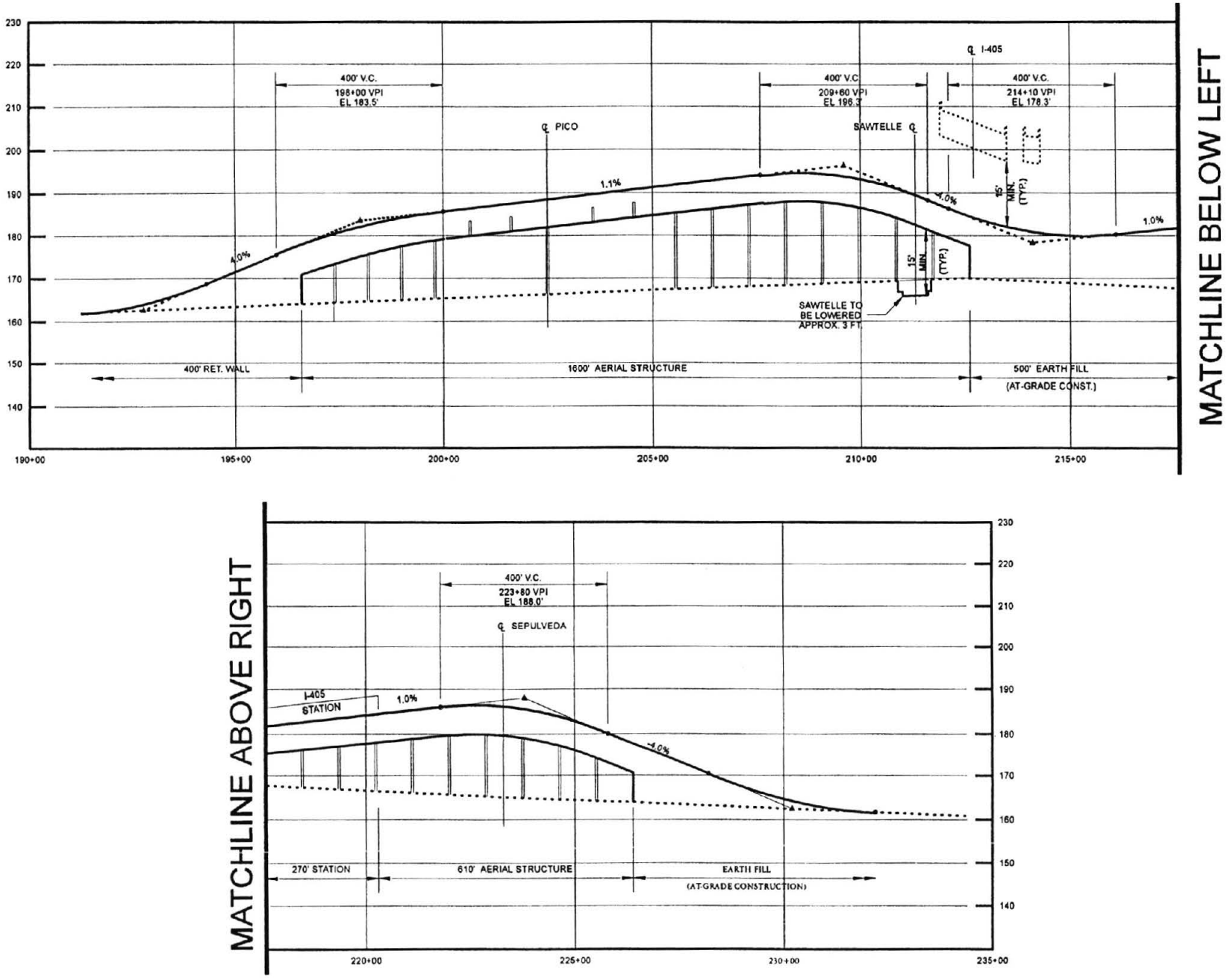
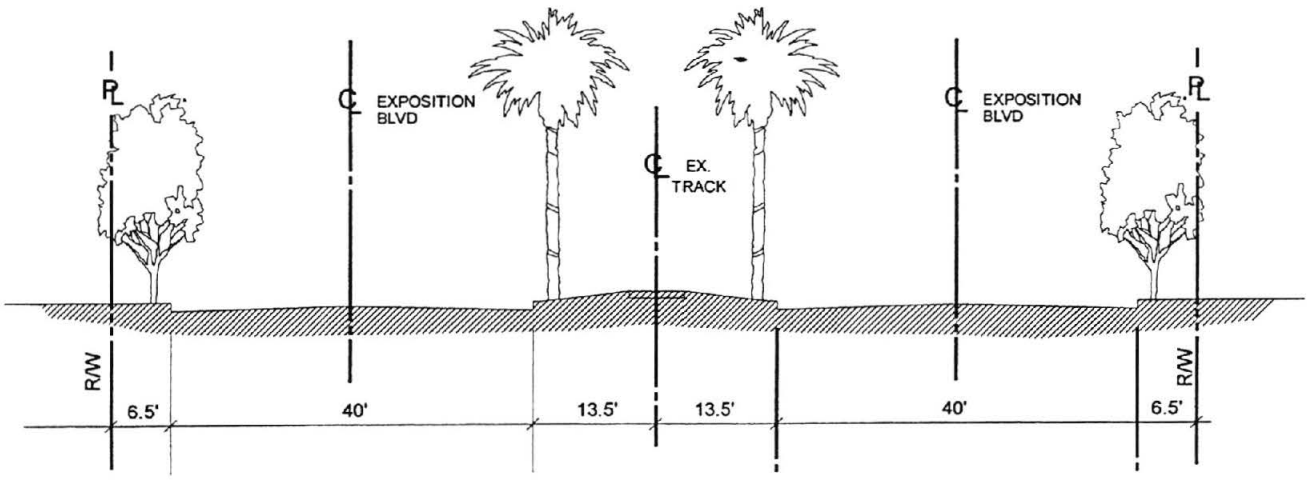


FIGURE 2.27

AERIAL STRUCTURE OVER SEPULVEDA, SAWTELLE AND PICO BOULEVARDS



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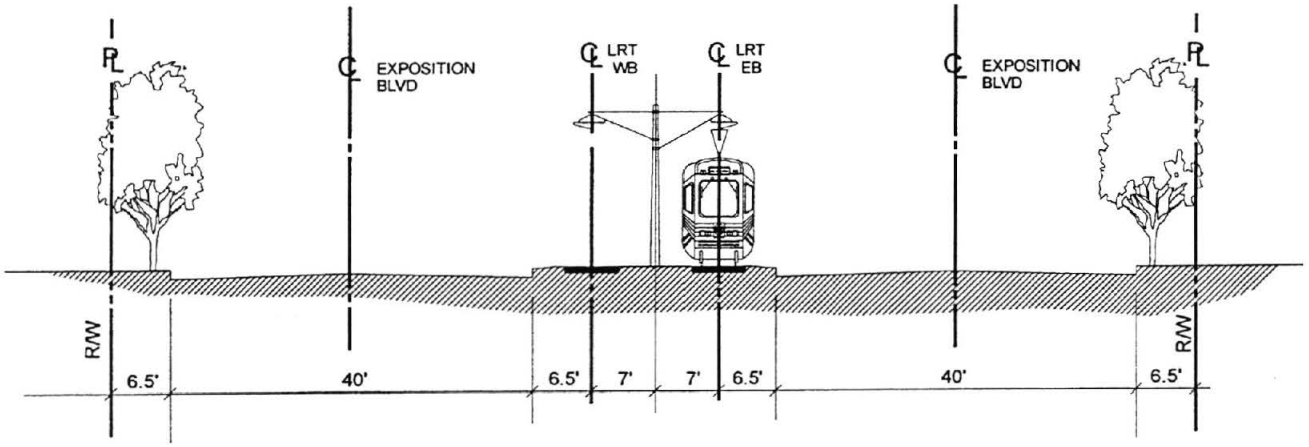
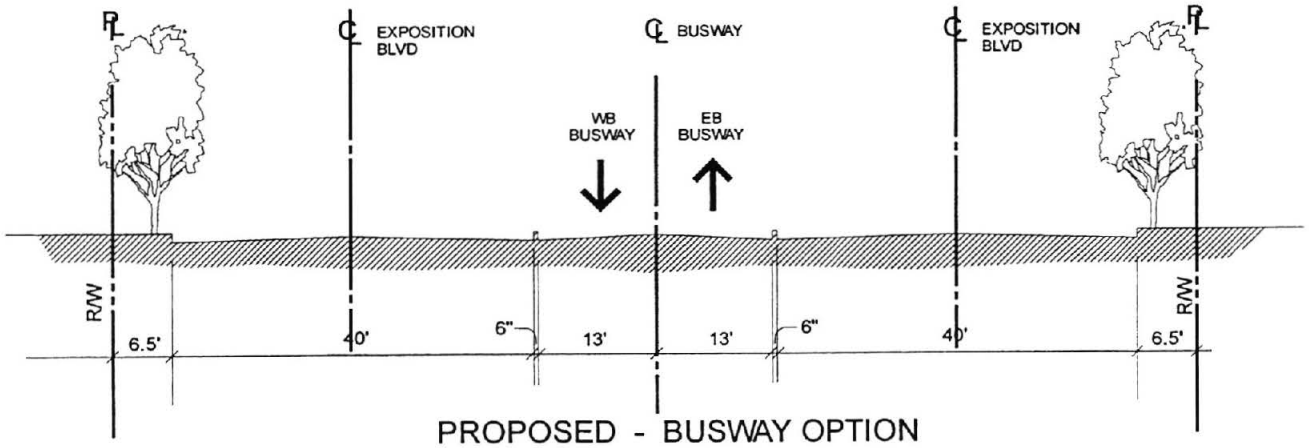


PROPOSED - LRT OPTION



PROPOSED - BUSWAY OPTION

LEGEND :

- THROUGH LANE (MIXED FLOW)
- TURN LANE (MIXED FLOW)
- BUS LANE
- P PARKING
- S/W SIDEWALK

NO SCALE

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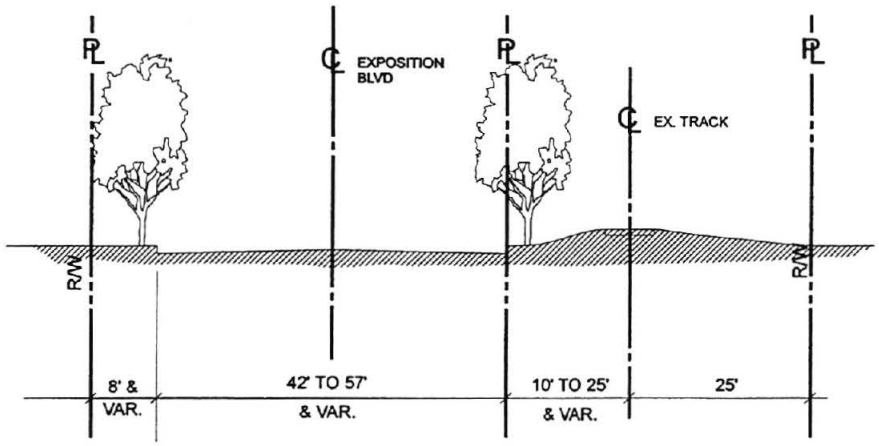
FIGURE 2.28

EXPOSITION BLVD - RODEO RD TO VERMONT AVE



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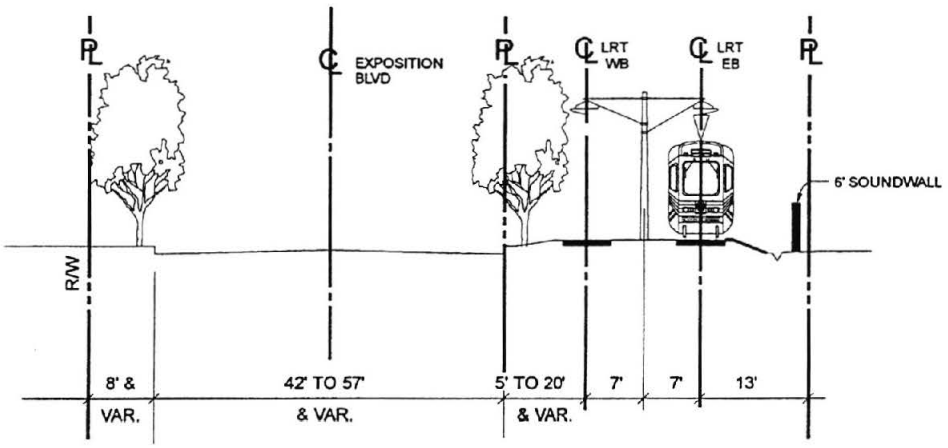
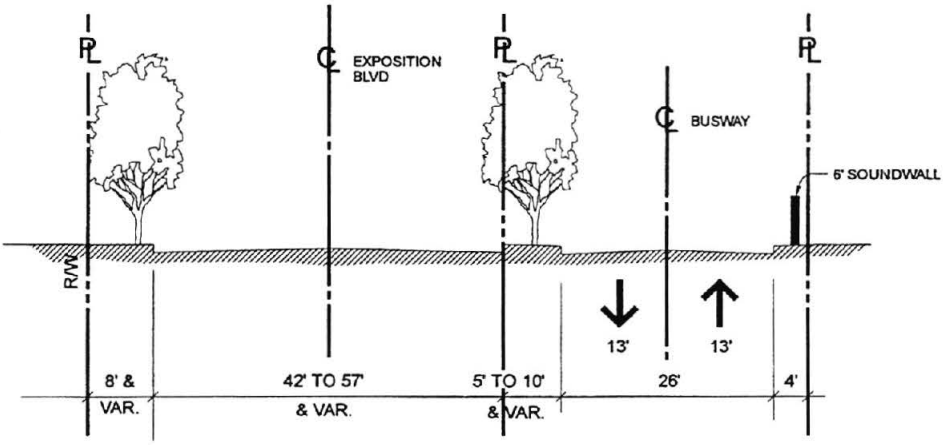


PROPOSED - LRT OPTION



PROPOSED - BUSWAY OPTION

LEGEND :

- THROUGH LANE (MIXED FLOW)
- TURN LANE (MIXED FLOW)
- BUS LANE
- P PARKING
- S/W SIDEWALK

NO SCALE

Mid-City/Westside Transit Corridor
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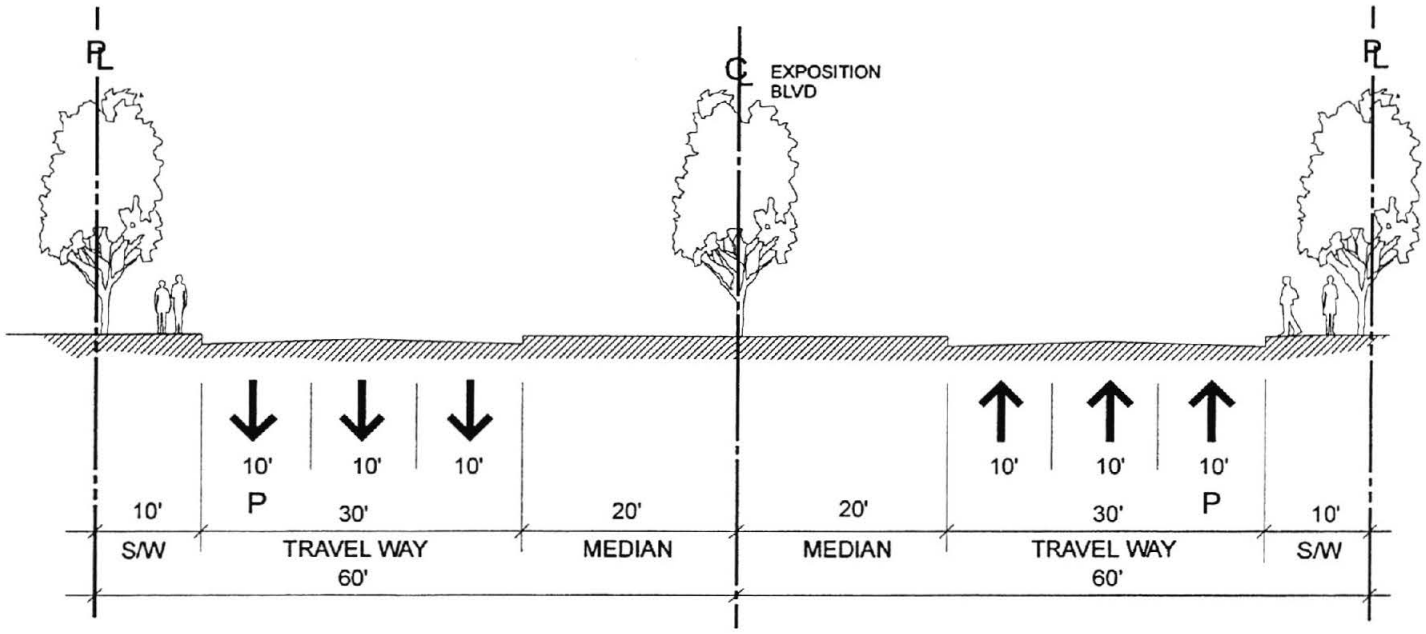
FIGURE 2.29

EXPOSITION BLVD - JEFFERSON BLVD TO RODEO RD



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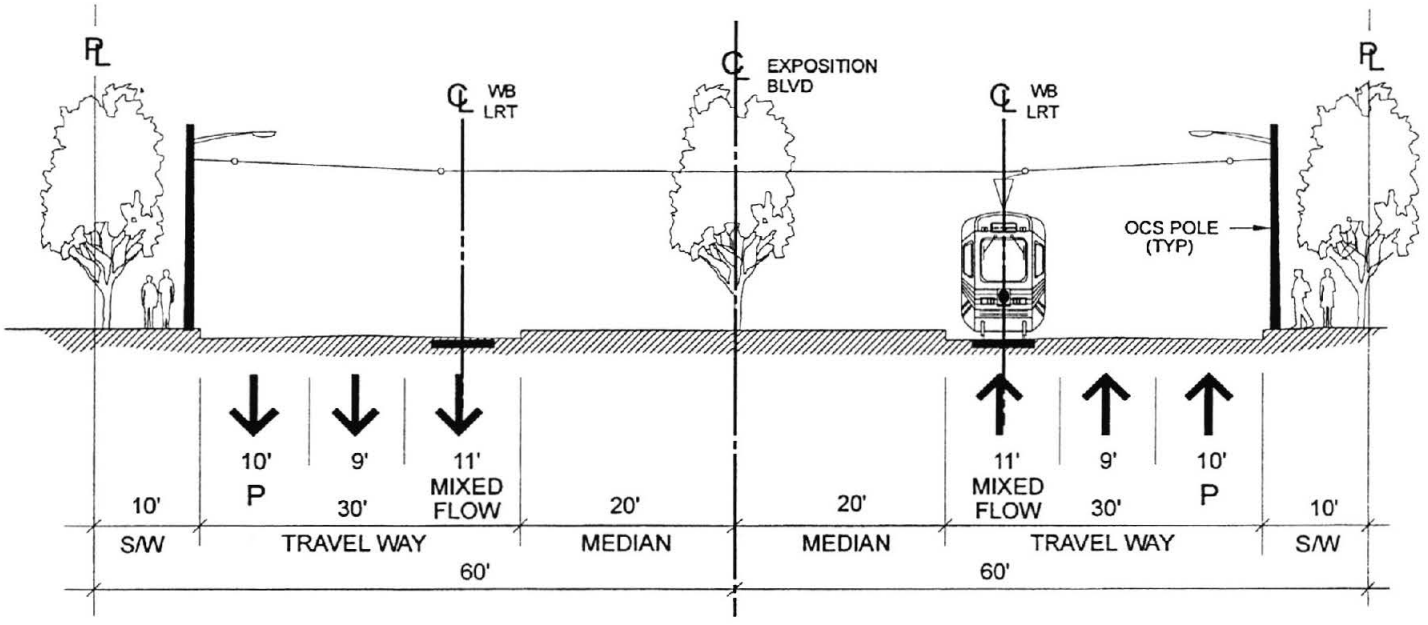

PROPOSED - LRT OPTION

LEGEND :

- THROUGH LANE (MIXED FLOW)
- TURN LANE (MIXED FLOW)
- BUS LANE
- P PARKING
- S/W SIDEWALK

NO SCALE

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FIGURE 2.30

OLYMPIC BLVD WITH LRT IN MIXED FLOW

Recent advances in traffic signal coordination with railroad crossings (such as now being employed on the Alameda Corridor East Project) could result in LRT crossings with minimum impact to traffic flow, yet able to maintain a high degree of safety. Preliminary indications suggest that a number of the Exposition Corridor crossings may not require grade separations, as were determined in previously studies. In Phase 2 of this study supporting calculations and diagrams will be developed at each crossing to evaluate this.

Vehicles. The light rail vehicles (LRVs) to be used on the Exposition Corridor would be identical to those in service along the Metro Blue Line. Each vehicle is an articulated car 89 feet in length, 8.7 feet in width and 12 feet in height. The power source is a 750-volt direct current overhead catenary suspended above the track. Multiple-unit operation with a maximum of three is envisioned. With a design capacity for each vehicle of 76 seated passengers and space available for an additional 79 standees, the maximum capacity of a three-car train is 465 passengers.

Stations. As mentioned previously, there are two alignment alternatives between the connection to the existing Blue Line and Vermont Avenue. Alternative 3a would follow Flower Street similar to the route shown in the 1992 EIR document (Figure 2.19) and would have three at-grade stations: Flower/23rd; Flower/Jefferson; and Vermont/USC/Exposition Park (located just east of Vermont Avenue). Connectivity to the existing I-110 Busway Station would involve a one-quarter mile walk from Jefferson Boulevard.

Alternative 3b would travel south on Hill Street from a connection with the existing Blue Line at Washington Boulevard (Figures 2.24 and 2.25), then turn west on the MTA owned Exposition ROW. Proceeding along the ROW, the alignment would pass under the I-110 Harbor Freeway using an existing underpass (wide enough for two LRT tracks) to an at-grade station near the Harbor Freeway Transitway Bus Station.

This station would directly serve the I-110 Busway Station, the Main Entrance to USC, and the northeast entrance to Exposition Park. This would greatly reduce the need for a station at Jefferson/Flower (Alternative 3a) since the Flower/Figueroa Station could also act as a transit center with DASH Bus connections serving the Flower/Figueroa Corridor.

A second station would be located just east of Vermont Avenue and would serve the southwest portion of the USC campus, the northwest entrance to Exposition Park, and provide direct connectivity to the heavy MTA Vermont Avenue bus line (Figure 2.31 and 2.32). The Flower/23rd Street Station of Alternative 3a (Flower Street) would not be needed since the existing Blue Line station at Washington/Grand would serve the same purpose and would also be used by Alternative 3b. Alternative 3b would also provide a pedestrian crossing between Figueroa and Vermont (Figure 2.33) that would maintain the traditional mid-street access to Exposition Park from USC which would not be possible with Alternative 3a. Between Vermont Avenue and the terminus in Santa Monica there would be ten stations in both Alternatives.

Sepulveda/I-405 station In Alternative 3a, six of the stations would be grade separated, namely: La Brea; La Cienega; Washington/Venice; Motor; Bundy; and Santa Monica (4th Street and Colorado Avenue). The cost estimates in this study are for aerial stations at these locations, but below grade stations may be considered to mitigate community concerns. The Sepulveda/I-405 station would be a below grade but open-air station. There would be three at-grade stations at Western Avenue, Crenshaw Boulevard, and Cloverfield Boulevard.

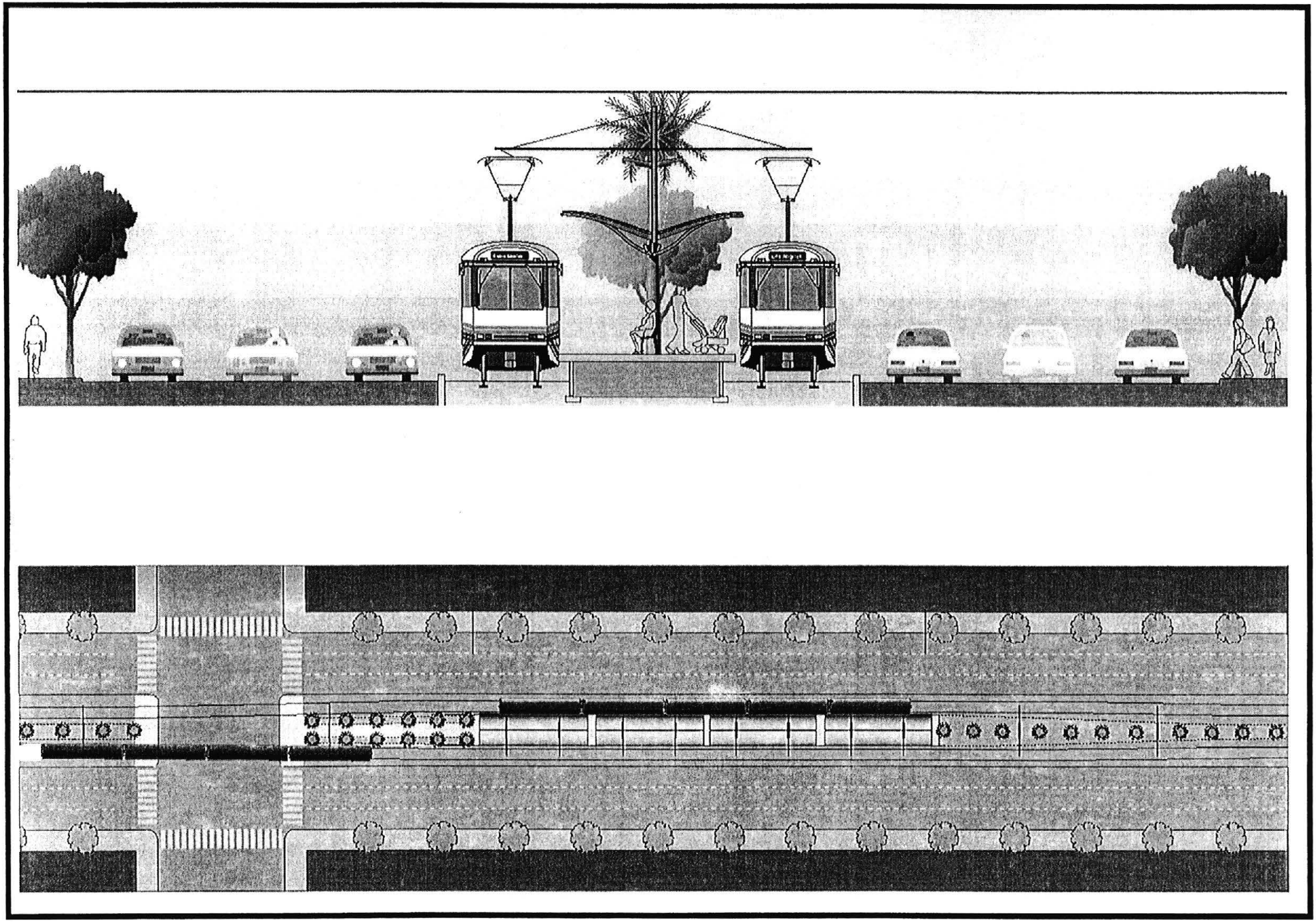

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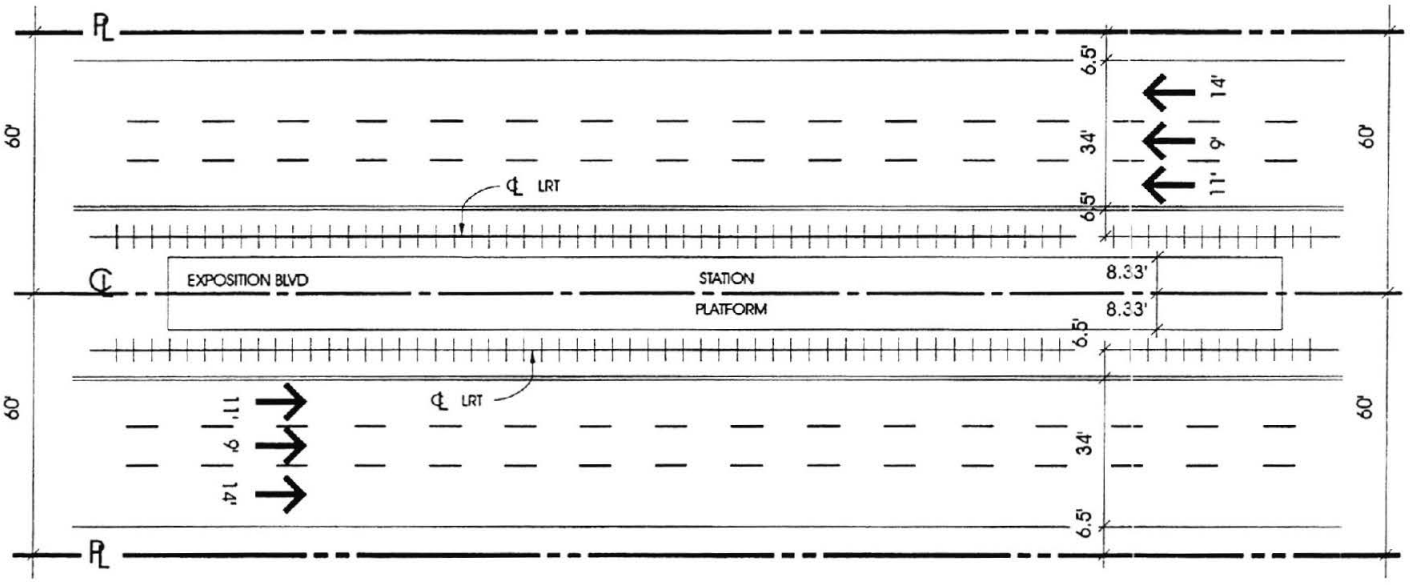
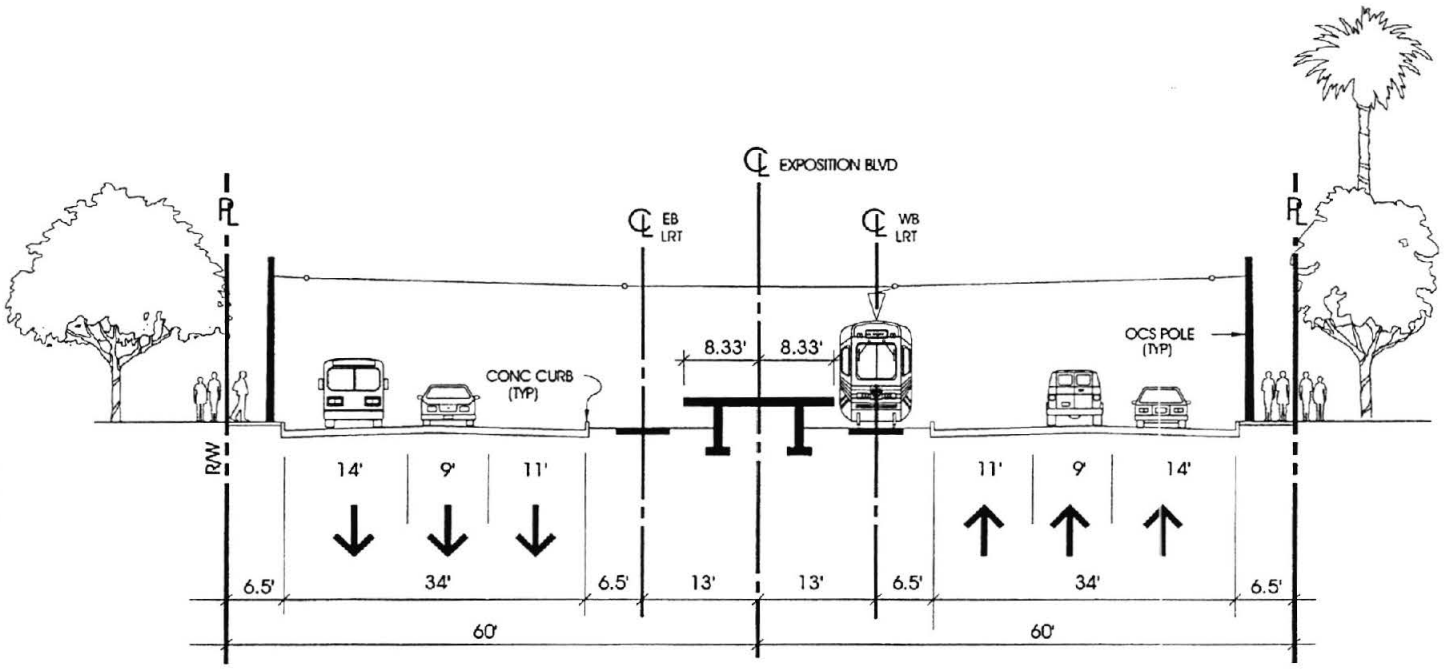
Figure 2.31
EXPOSITION BOULEVARD -LRT STATION IN MEDIAN





TYPICAL LRT STATION

IN EXPOSITION BLVD

LEGEND :

THROUGH LANE (MIXED FLOW)

TURN LANE (MIXED FLOW)

◆ BUS LANE

P PARKING

S/W SIDEWALK

NOT TO SCALE

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FIGURE 2.32

TYPICAL LRT STATION

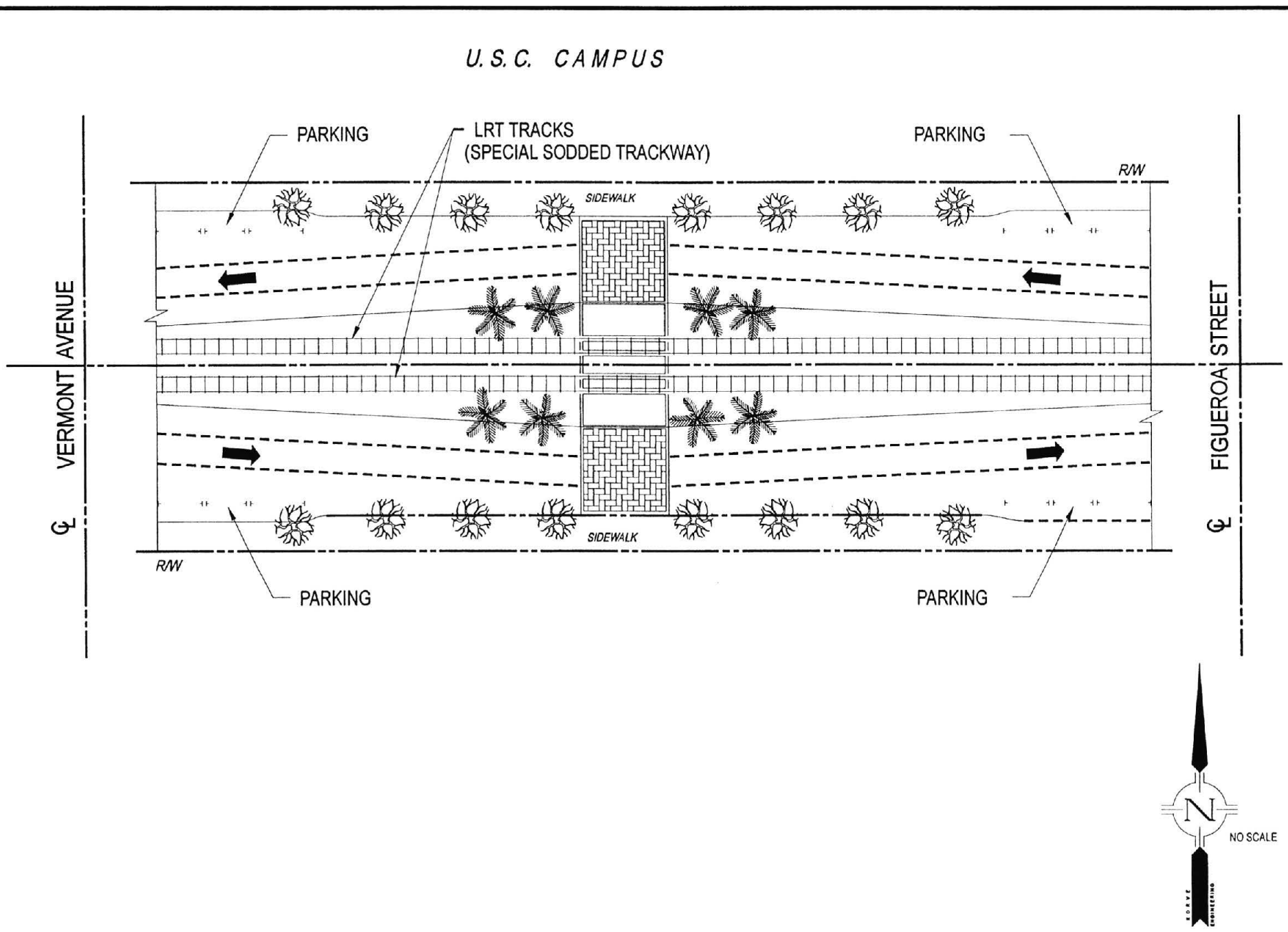

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FIGURE 2.33

EXPOSITION PARK - 30 FOOT WIDE PEDESTRIAN WALKWAY

Alternative 3b would have only one station on aerial structure at Santa Monica (Civic Center); the rest being at-grade. The combined bridge/aerial station proposed for Motor Avenue in the BRW report would not appear to be feasible due to the very narrow 30 foot ROW width at that point. In Alternative 3b, this station would be located at-grade 500 feet to the east where the ROW is approximately 80 feet wide. Walking distance to the station platform would be less than 400 feet from the intersection of National Boulevard and Motor Avenue.

The below grade open-air station in the BRW report at Sepulveda/I-405 would no longer be required since both Pico and Sawtelle Boulevards can be crossed with an aerial structure and there is room west of Sepulveda Boulevard for an at-grade station.

An optional station at Hayden Street (midway between La Cienega and National/Venice stations) was considered in previous studies based on input at that time from Culver City residents. The distance between the La Cienega and National/Venice stations would be approximately 0.8 miles. This station can be considered in the Phase 2 environmental analysis.

Park and Ride. Several stations would have park and ride facilities. These are shown in Table 2.8 below.

Table 2.8
Parking Spaces for Alternative 3a or 3b - Exposition LRT

STATION	PRIVATE PROPERTY	MTA PROPERTY	SHARED PARKING	TOTAL
Crenshaw	150	--	--	150
La Brea	130	30	--	160
La Cienega	120	--	--	120
Venice/Robertson	30	120	--	150
I-405	300	--	--	300
Bundy	--	50	--	50
Cloverfield	--	100	170	100
Santa Monica	--	--	300	300
TOTALS	730	300	470	1500

Major Issues. Issues related to LRT operation occur in residential areas and include noise and vibration, visual impacts, and pedestrian safety. Noise primarily comes from bells and train horns at crossings while vibration is related to the type of track bed and the distance to nearby structures. An aerial structure would eliminate bells and train horns at crossings and certainly ensure pedestrian safety, but would cause increase track noise and produce greater visual impact. An open-air trench would eliminate bells and train horns and minimize vibrations but would be more acceptable.

Phase 2 of this study will explore the development of an at-grade alignment that will fully address the above issues and meet EIR mitigation requirements as well as provide design and cost estimates for aerial and below grade crossings. The following methods are under consideration:

1) Simulated train horn sounds could emanate from a device at the crossing itself that would be focused only on the immediate area. No horn noise would come from the train, except in emergency situations. State of the art electronic crossing bells (as opposed to the typical bells used today) could be aimed toward the sidewalks and street centers and toned down significantly.

2) An alternative to the crossing noises produced by gate mechanisms would be to reduce train speeds to 35 mph and allow the crossings to be controlled solely by traffic signals. This approach has been safely used on other LRT systems and would meet all CPUC requirements.

3) Between crossings, major landscaping on each side of the tracks could greatly reduce the visual impact of the trains.

4) Special pedestrian safety treatments (now being developed for the LRT in Portland) could be employed at all crossings that would discourage unsafe passage. These treatments include directional audible devices for pedestrians, tactile warning strips, pedestrian gates, and electronic signs activated by the train.

5) Timber ties and special ballast could substantially reduce vibration and noise.

6) Special lubrication techniques could be implemented to reduce the noise emitted from the wheel-brake interface.

Providing sufficient parking is a major concern. The alignment options were modeled to determine the desired parking at each station. In the 1994 BRW report, parking was anticipated at Crenshaw, La Brea, La Cienega, Washington/Venice, Sepulveda/I-405, Bundy, and Cloverfield. In some locations the development of new parking may be a problem due to the changes in land use of the area. For example, at the Cloverfield Station it was assumed that adjacent land owned by the City of Santa Monica could be developed into a sizable parking facility. However, this area is now used by the Bergamot Station Cultural Center and would presumably not be available for MTA's sole use. A shared parking agreement may be advantageous here where a portion of the present parking for Bergamot could be used for daytime transit needs. There are several other station locations where shared parking may be the answer. If this alternative is selected for further development, Phase 2 of this study would thoroughly review each proposed park/ride facility and recommend the best approach for each.

There have been suggestions to reroute the LRT north on La Cienega Boulevard, turning southwest at Venice Boulevard and traveling to Sepulveda Boulevard. At Sepulveda, the alignment would turn northwest and continue back to the Exposition ROW. This alignment would allow the LRT system to avoid traveling through residential areas. This detour would add nearly 1.5 miles to the project, extend travel times by 12 minutes, and increase the overall cost by approximately $120,000,000.

Bikeway. The same issues concerning the construction of an Exposition LRT/Bikeway system combination occur as previously discussed in the Exposition BRT/Bikeway alternative.

Operating Characteristics

The following table provides a summary of the operating characteristics of the Exposition LRT alternative as it was modeled:

Table 2.9
Exposition LRT Alternative 3a (Baseline) Operating Characteristics*

Bus Service:	Selected bus routes modified to connect or truncate at LRT stations. Remaining bus network is same as TSM, which assumes route recommendations from Westside Bus Service Improvement Study and rapid bus routes on Wilshire/Whittier, Santa Monica and Crenshaw Boulevards.
Operations:	Trains would run every 5 minutes in the peak period on Expo Line. Combined train frequency in common track section with LB-LA Blue Line (on Flower) would be 2.5 minutes. In the off-peak, trains would run every 12 minutes with a combined train frequency of 6 minutes in the common track section with LB-LA Blue Line.
Signal Priority/Preemption:	Signal preemption for LRT in Exposition ROW; Signal priority, but not preemption in street running sections outside the ROW (in Santa Monica and downtown Los Angeles). Delay on Flower Street estimated to be 1.95 minutes per mile, based on actual experience of the Blue Line on Flower Street/Washington Boulevard.
Grade Separation:	At some intersections.
Length:	15.1 miles form 7th/Flower to 4th Street in Santa Monica (14.2 miles of new track).
Stations:	15, including 2 existing on Blue Line**
Avg. Station Spacing	1.08 miles
Max Speed:	55 mph
Avg Speed:	23.85 mph, including stops, and delay in street-running sections.

* Alternative 3b (Minimum Grade Separations) has similar characteristics.
** Alternative 3b (Minimum Grade Separations) also has 15 stations, but with 3 existing on the Blue Line.

Financial Characteristics

The estimated cost for the full route length of Alternative 3a from its connection to the existing Blue Line (14.2 miles), including 21 LRT vehicles (and 14 additional standard buses to supplement the existing fleet to allow better station connectivity) is approximately $589,000,000 (1999 dollars). Alternative segment lengths to Crenshaw Boulevard (4.4 miles), La Cienega Boulevard (6.8 miles), and Venice Boulevard (7.6 miles) would cost approximately $178,000,000; $312,000,000; and $398,000,000, respectively.

The estimated cost for the full route length of Alternative 3b from its connection to the existing Blue Line (14.4 miles), including 21 LRT vehicles (and 14 additional standard buses to supplement the existing fleet to allow better station connectivity) is approximately $431,000,000 (1999 dollars). Alternative segment lengths to Crenshaw Boulevard (4.5 miles), La Cienega Boulevard (6.9 miles), and Venice Boulevard (7.7 miles) would cost approximately $135,000,000; $209,000,000; and $227,000,000, respectively.

It should be noted that these costs are significantly lower than previous estimates. There are several reasons for this:

1) A number of cost saving measures were employed in the preparation of the alignments for this study. These are listed below.

2) Historical "soft costs" were also significantly reduced, reflecting a concerted effort on the part of MTA and the consultants representing the corridor studies for the Eastside, San Fernando Valley and Mid-City/Westside to simplify and economize procedures in design and construction and apply "lessons learned" in past projects.

3) Reductions in vehicle fleet requirements that were reflective of the latest ridership modeling.

4) Revised "immediate" ROW needs also contributed to lower costs. Some of the ROW ultimately needed is still under lease, but will expire prior to 2016. The project can be staged to obviate the need to buy out the leases ahead of time.

Assumed Cost Reductions for both Alternative 3a and Alternative 3b

1) The BRW report assumes the land now occupied by the Bergamot Station Cultural Center would be developed as a full-scale LRT maintenance facility. In light of its current use, it would appear that an alternative maintenance site should be given serious consideration. There would likely be a significant operational and capital cost savings if a small portion of the Exposition ROW near the Long Beach Blue Line (on land already owned by MTA) were developed as a mini maintenance facility. Light maintenance and car washing would be performed at this site while heavy maintenance would be sent to the existing facilities in Long Beach and Hawthorne. The yard could service approximately 41 cars and would be available for use by Long Beach Blue Line trains as well (Figure 2.34). For the purpose of this study, both Alternatives would utilize this satellite maintenance facility.

Assumed Cost Reduction for Alternative 3b Only

1) Eliminating grade separated structures between La Cienega and National Boulevards; National and Venice Boulevards; Sepulveda Boulevard; and Bundy Drive. Recent safety oriented technical advances in train/traffic coordination equipment would likely permit at-grade crossings at these locations that meet DOT guidelines.

2) Using Hill Street, instead of Flower Street, would avoid having to build a separate station to serve the Trade Technical College (proposed 23rd Street Station on Flower Street) since it would use the existing Long Beach Blue Line station at Flower/Grand. It would also provide an at-grade station between Flower and Figueroa Streets that would directly serve the Caltrans Busway Station, USC Main Entrance, and the northeast entrance to Exposition Park. The Vermont Avenue Station would serve the northwest entrance to Exposition Park, and obviate the need for a special station between Vermont Avenue and Figueroa Street to serve special events at the Coliseum.

3) Building at-grade stations, instead of grade separsted, at La Brea Avenue, La Cienega Boulevard, Washington/Venice Boulevards, Motor Avenue, I-110/Sepulveda Boulevard, and Bundy Drive.

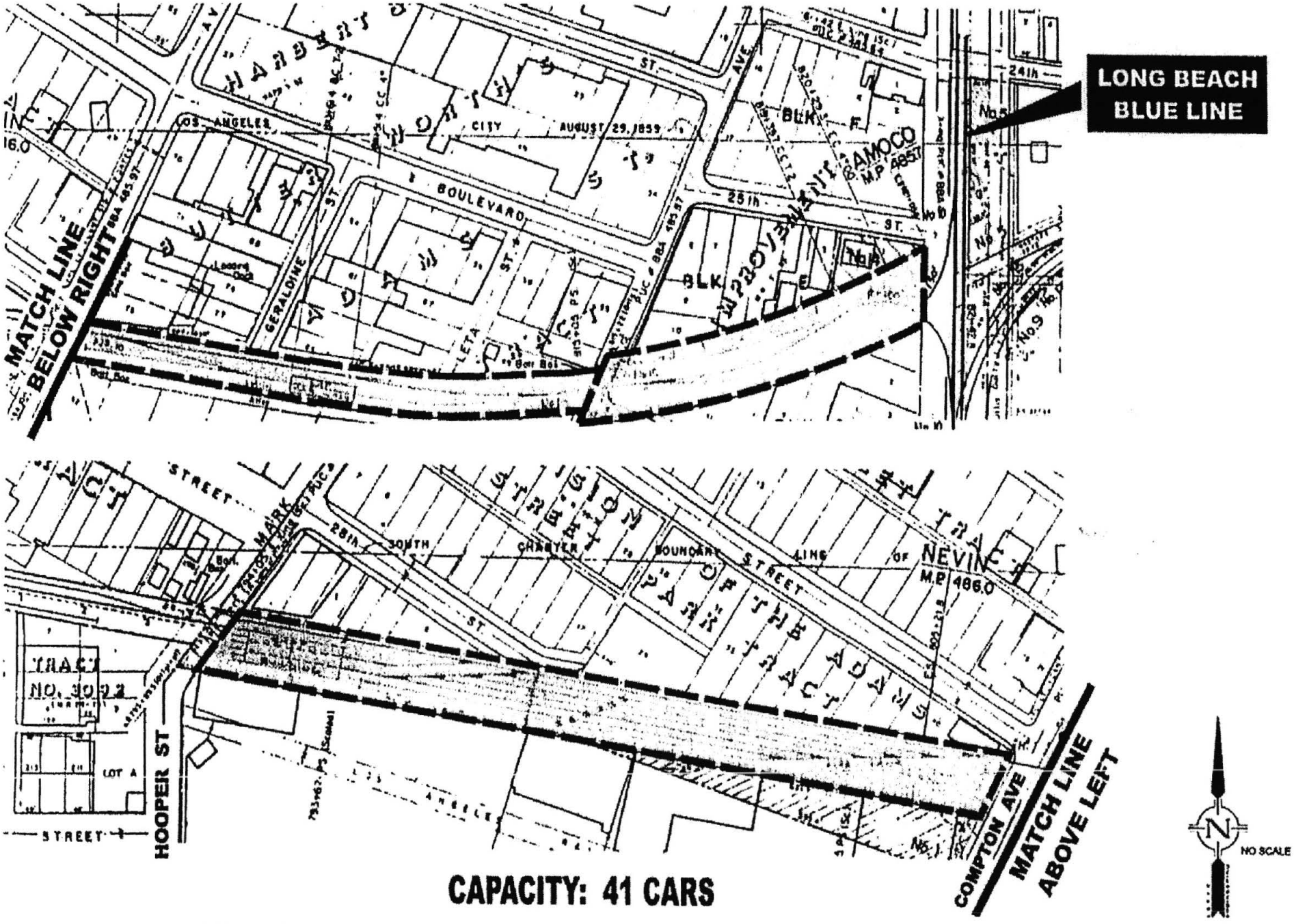

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FIGURE 2.34

LRT SATELLITE YARD

4) An overpass, as opposed to an underpass, between Pico and Sawtelle Boulevards and also at Overland Avenue. (The underpass proposed at Pico/Sawtelle in the 1994 BRW report would actually be an aerial structure if Sawtelle Boulevard were lowered approximately three feet. The underpass at Overland Avenue is not practical due to the presence of a major storm drain in Overland Avenue).

Possible Cost Reductions that could be Considered in Phase 2 of this Study

1) Initial single track operation due to right-of-way constraints between La Cienega and Ballona Creek; National and Motor; and Pico and Centinela. The route would be fully double tracked by 2020 when all previous Southern pacific leases have expired and the additional right-of-way made available to MTA at no extra cost. It should be noted that all cost estimates prepared for this study reflect a fully double tracked guideway system and the single track option, if implemented, would simply defer the full cost until the origonal ROW would become available.

2) A simplified embedded track structure for in street operation similar to that being constructed for the Portland Streetcar Project. The structure is such that it virtually eliminates the need to relocate underground utilities since repair to these utilities can be made while the track remains in service. The roadway cut is only 8 feet wide and 13 inches deep (for Portland Streetcar), 18 inches deep (for Portland MAX). The track section would use girder rail (Ri59) encapsulated by a special elastomer boot (to prevent stray current leakage and to protect the surrounding pavement). The track rails would be placed in mass concrete with the surface matching the surrounding roadway, allowing the existing roadway drainage to remain intact. This track structure runs about half the historical MTA cost for embedded track and would apply to both Hill Street in Los Angeles and Olympic Boulevard in Santa Monica.

3) A simplified open track structure and drainage system. Where feasible, the drainage will be carried in open ditches on either side of the trackway with outlets to the existing city storm drains at grade crossings. This would allow considerable cost savings over an underdrain system.

4) Use of relay rail of 112# or greater. The relay rail would generally come from main line US railroads that are in the process of upgrading to heavier rail. The quality of relay rail is excellent for LRT loading and would be 65 to 70 percent of the cost of new track. (Relay rail was used in the St. Louis Metrolink LRT Project).

5) Placing traction power feeds on the OCS poles instead of underground. This would save the cost of underground conduits and manholes and would be relatively easy to install on the poles.

6) Employing automatic block signals and voice train controls instead of a complex system of ATS, ATP, or ATC controls. This would not be in conflict with the present Long Beach Blue Line control system since the Exposition LRV's would use these controls while on Long Beach track.

7) A simplified OCS catenary system such as is being considered for the Pasadena Blue Line.

8) Employing simpler Traction Power Sub-Stations (TPSS) similar to those in service in San Diego.

9) Using traffic signal modifications in lieu of gates for crossing protection where parallel roads exist and where LRT speeds are limited to 35 mph.

2.2.6 Alternative 4 - Wilshire Subway Heavy Rail Transit (HRT) (via Pico/San Vicente)

Physical Characteristics

Alignment. The entire alignment (Figure 2.35) would be approximately 10.1 miles long and would be in tunnel except at stations where cut and cover construction would be used. The twin bores would begin at the end of the existing tail tracks at the Wilshire/Western Station and immediately begin a 1200-foot radius curve turning south below Wilton Place. A station would be built at Olympic Boulevard where the alignment would then continue under Arlington Avenue. The alignment would then turn westerly on an 1800-foot radius curve and follow Venice Boulevard to a terminus at Pico and San Vicente Boulevards. The top of rail would be approximately 60 feet below existing grade, and would likely encounter at least some pockets of methane and H_2S gas deposits. While this alignment was in the environmental clearance stage when work was stopped, it never officially reached LPA status.

An optional alignment (which remains the official LPA) would also run between Wilshire/Western and Wilshire/Federal and would be approximately 9.6 miles long (Figure 2.35). This alignment would follow Crenshaw and Pico Boulevards with a station at Olympic and Crenshaw Boulevards. The advantage of this alignment is it's shorter length and has a better station location serving Olympic Boulevard. While this optional alignment was at one time not considered viable due to the dangerous presence of gases, subsequent development in tunneling techniques able to safely mitigate these dangers have allowed it to again be a viable alignment, although odor at the two stations could still be an issue. These costs for gas mitigation may be greater than the Wilton/Arlington alignment.

In the October, 1999 memorandum "RTAA – Technical Input and Comments on Red Line Subway Extension Alternatives", prepared for the Regional Transit Alternatives Analysis (RTAA), it was confirmed that investigations on the Wilton/Arlington option had found limited concentrations of H_2S along the route in the unsaturated zones of the San Pedro formation, particularly south of Country Club Drive and along Pico Boulevard. This document concluded that this alignment is technically feasible today now that more experience in coping with methane and H_2S gas in underground construction is readily available within Los Angeles.

The construction methods include the use of the Advanced Tunnel Boring Machine (ATBM) with a full-face cutting wheel. This ensures the effective placement of protective insulation to mitigate the gases contained in the surrounding soil. In station areas there would probably still be some gas leakage. This would have to be dispersed or removed by forced ventilation equipment, which is already part of a typical station complex.

A westerly extension of this alignment would travel northwest beneath San Vicente Boulevard to Wilshire Boulevard and follow the Wilshire HRT Subway alignment described later in this report.

Vehicles. The heavy rail vehicle currently used on the Metro Red Line is a typical subway-type car. The overall dimensions are 75 feet in length, 10.5 feet in width and 12 feet in height. Traction power is generated by a 750-vDC electrified third rail mounted beside the track.

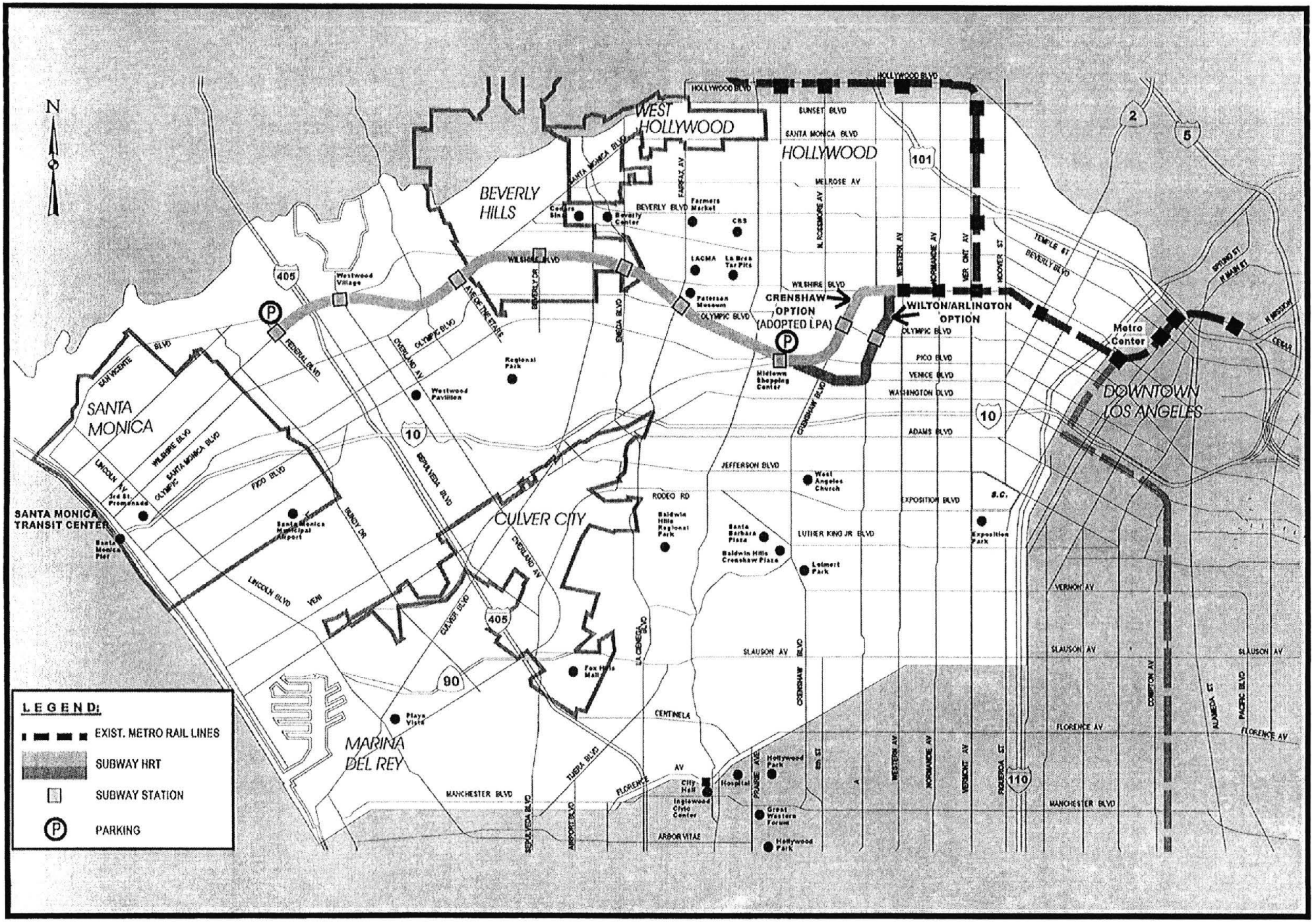

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Figure 2.35
ALTERNATIVE 4
PICO/SAN VICENTE - SUBWAY (HRT)

Metro Red Line vehicles currently in use can accommodate 59 seated passengers and 109 standees. These trains are operated in 6-car train sets, with a total capacity of 1,008 passengers.

Stations. Standard Red Line stations (or variations thereof that could employ shallow depth or semi "open air" designs) would be located at Olympic Boulevard/Arlington Avenue and Pico/San Vicente Boulevards and would both be constructed by cut and cover method. The Olympic/Arlington Station would primarily serve a residential area but would make connections with a heavily used MTA bus line on Olympic Boulevard. Parking would not be provided. The Pico/San Vicente Station would be a major hub that would act as a terminus for several bus lines serving the Westside. This station would also be in close proximity to local businesses and a sizable residential area. The site also has the potential for the construction of a major residential/business complex that would be an ideal development for a station of this nature.

Since H_2S gas is heavier than air, it would tend to linger at the lower reaches of the stations, and would not likely be safely dissipated with an "open air" or other naturally ventilated station. Therefore, special ventilation equipment would be required to maintain the H_2S gas at acceptable levels at these stations.

Additional stations located along the full length of this alignment would occur at Wilshire/Fairfax; Wilshire/La Cienega; Wilshire/Beverly; Century City; Wilshire/Westwood; and Wilshire/Federal.

Park and Ride. There are two stations in this alternative that would have park and ride facilities. These are shown in Table 2.10 below.

Table 2.10
Parking Spaces for Alternative 4 – Wilshire (Subway) via Pico/San vicente

STATION	PRIVATE PROPERTY	MTA PROPERTY	SHARED PARKING	TOTAL
Pico/San Vicente	600	--	--	600
Wilshire/Federal	--	--	600	600
TOTALS	600	--	600	1200

Major Issues. The following major issues are associated with this alternative:

1) The route must still meet strict guidelines for the safe handling of H_2S and methane gas. This could significantly add to the cost of the project. A semi "open air" station at Pico/San Vicente may not necessarily offer significant relief of this problem for the simple reason that H_2S is heavier than air and would tend to linger at the lower reaches of the station (i.e. train platform level). Regardless of the station configuration, a forced air system would still be required to remove the H_2S.

2) Community acceptance for a station at Olympic/Arlington remains to be fully determined primarily because it is almost entirely in a residential area and the Draft Supplemental EIR/EIS

was never completed. Deleting this station would lose an important point of connectivity with the heavy MTA Olympic Boulevard bus line.

3) This alignment was originally proposed to avoid the methane gas zone along Wilshire Boulevard. A later phase would return it to Wilshire Boulevard via San Vicente Boulevard, then proceed west to Beverly Hills and Westwood. It was subsequently found that, in addition to some methane gas, pockets of H_2S were also present on this route and appear to be in greater concentrations than on Wilshire Boulevard. It should be noted that this alignment is nearly a mile longer and would cost significantly more than a more direct route along Wilshire Boulevard. This route would also serve a less densely populated corridor than the Wilshire alignment.

4) This alignment would provide a good connection to a possible Crenshaw Corridor extension terminal point. If this option were not built, a future Crenshaw connection to the Metro Red Line is problematic due to the existence of an office building north of the proposed track alignment. This precludes the construction of the necessary tail tracks and would result in considerably longer than normal transfer distances between station platforms.

5) Other impacts related to construction of the subway tunnel are anticipated at the ground surface in the vicinity of stations. Since the stations will be cut-and-cover sections of the tunnel, impacts at station areas will include:

   - Disruption to street traffic while the initial box is excavated and then covered with planking or wooden beams.
   - Noise and disruption in traffic patterns from construction equipment.
   - Possible disruption in utilities while being relocated.
   - Possible disruption or relocation of businesses in the vicinity of the station construction areas.

Operating Characteristics

The following table provides a summary of the operating characteristics of the Metro Red Line Extension to Pico/San Vicente alternative as it was modeled:

Table 2.11
Wilshire Subway HRT (via Pico/San Vicente) Operating Characteristics

Bus Service:	Local bus service on Wilshire Boulevard scaled back by about 40% in peak and base periods. Wilshire/Whittier rapid bus route assumed in TSM is truncated to maintain eastern end (outside of study area); between Westwood and downtown Santa Monica, rapid bus route reverts to basic limited-stop service at a longer headway than TSM, since remaining route essentially has same limits as SMMBL 2. Other bus routes modified to connect or truncate at rail stations as appropriate. Remaining bus network is same as TSM, which assumes route recommendations from Westside Bus Service Improvement Study and rapid bus routes on Santa Monica and Crenshaw Boulevards.
Operations:	Trains would run every 4 minutes in the peak period from Union Station to Westwood. Combined train frequency from Union Station to Vermont would be 2.0 minutes. Off-peak service would be every 8 minutes, with a combined train frequency from Union Station to Vermont at 4 minutes.
Length:	10.1 miles from Wilshire/Western to Wilshire/Federal (West Los Angeles).*
Stations:	8 additional
Avg. Station Spacing	1.27 miles for extension; 0.99 miles for entire line from Union Station
Max Speed:	70 mph (attainable only between Century City and La Cienega); otherwise 55 mph.
Avg. Speed:	32.0 mph, including stops, from Union Station to Wilshire/Federal.
Signal Preemption:	N/A

* If the Crenshaw option were used, this alignment would only be 9.6 miles long.

Financial Characteristics
The estimated cost for the full 10.1-mile route (via Wilton), including 16 HRT vehicles and a credit of 27 standard buses no longer required for regular MTA service, is approximately $2,643,000,000 (1999 dollars). The 2.6-mile MOS segment to Pico/San Vicente would cost approximately $675,000,000.

The estimated cost for the 9.6-mile route (via Crenshaw), including 16 HRT vehicles and a credit of 27 standard buses no longer required for local service, is approximately $2,574,000,000 (1999 dollars). The 2.1-mile MOS segment to Pico/San Vicente would cost approximately $606,000,000.

2.2.7 Alternative 5 - Wilshire Subway Heavy Rail Transit (HRT)

Physical Characteristics
Alignment. This alternative proposes the extension of the Red Line in subway along Wilshire Boulevard to San Vicente Boulevard (Figure 2.36), using construction methods that mitigate the effect of working in the methane and H_2S gas zones. While this alternative was at one time considered not viable due to the dangerous presence of gases, subsequent development in tunneling techniques that can safety mitigate these dangers has allowed it to be "revisited" as a viable option.

In the October 1998 memorandum, "RTAA – Technical Input and Comments on Red Line Subway Extension Alternatives", prepared for the Regional Transit Alternatives Analysis (RTAA), it was pointed out that investigations conducted in 1996 found no H_2S gas concentrations within the San Pedro or Lakewood Formations on Wilshire, as these were saturated with water. It did note the finding of dense oil-saturated sands beyond La Brea Avenue and that significant concentrations of methane gas had been found in the area. However, it concluded that this alignment is technically

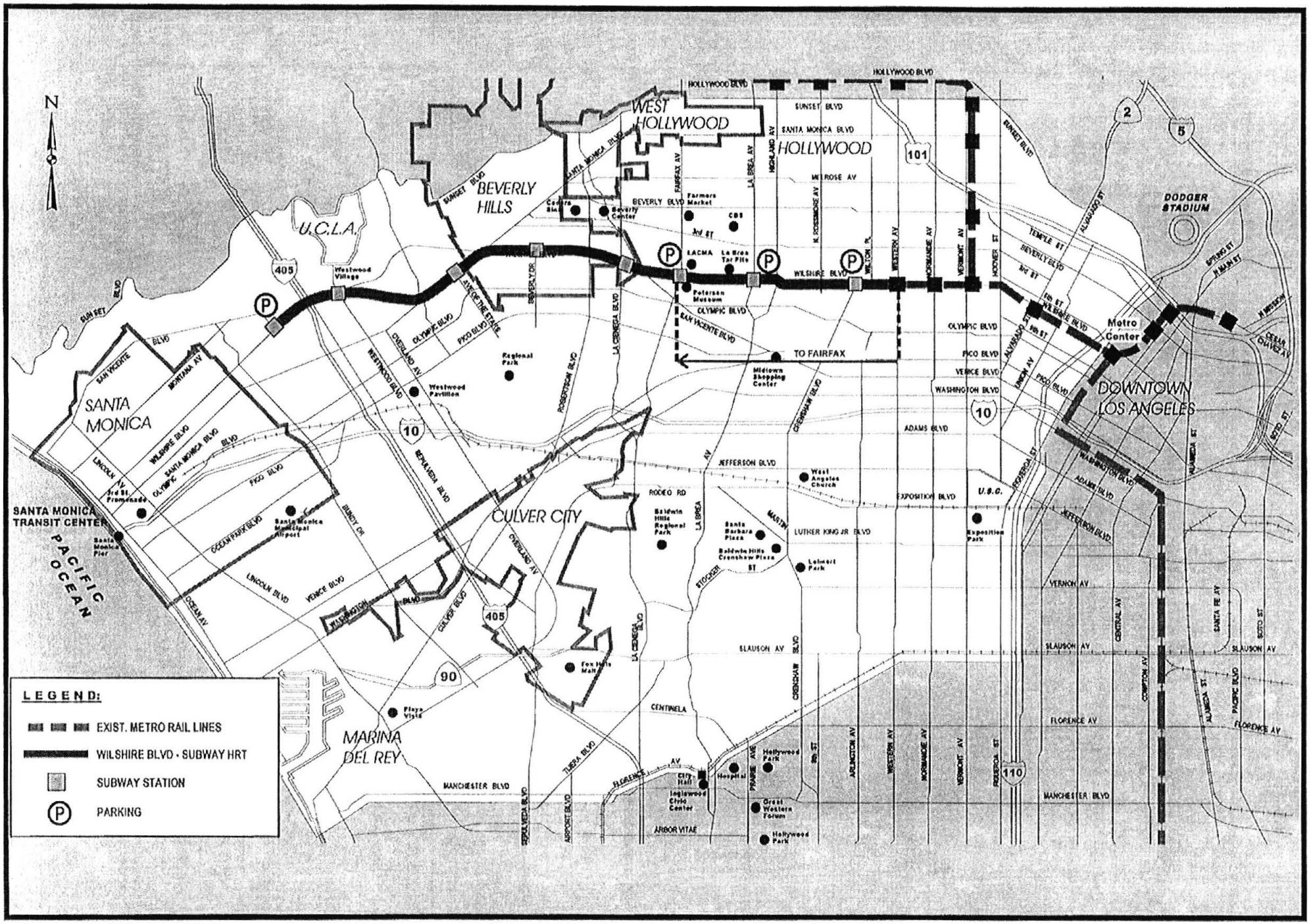

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Figure 2.36
ALTERNATIVE 5
WILSHIRE BOULEVARD - SUBWAY (HRT)

feasible today now that a large body of experience in coping with methane and H_2S gases in underground construction is readily available in Los Angeles and across the country.

The construction methods include the use of Advanced Tunnel Boring Machines (ATBM) with a full-face cutting wheel to ensure the effective placement of protective insulation from the gases contained within the surrounding soil. In station areas, there would probably still be some gas leakage that would have to be dispersed or removed through the use of forced ventilation equipment, a typical part of standard underground station design.

Vehicles. The same vehicles described in the Metro Red Line Extension to Pico/San Vicente will be utilized for this alternative.

Stations. Eight typical Red Line subway stations would be located at or in the vicinity of Crenshaw Boulevard, La Brea Avenue, Fairfax Avenue, La Cienega Boulevard, Beverly Drive, Century City, Westwood Boulevard, and Federal Avenue. These stations would be in a cut and cover box structure and would connect to the portals of the bored tunnel sections.

Park and Ride. Several stations would have park and ride facilities. These are shown in Table 2.12 below.

Table 2.12
Parking Spaces for Alternative 5 – Wilshire (Subway) via Wilshire Boulevard

STATION	PRIVATE PROPERTY	MTA PROPERTY	SHARED PARKING	TOTAL
Crenshaw	--	50	--	50
La Brea	--	100	--	100
Fairfax	100	--	--	100
Wilshire/Federal	--	--	600	600
TOTALS	100	150	600	850

Operating Characteristics
The following table provides a summary of the operating characteristics of the Metro Red Line Extension along Wilshire (Subway) alternative as it was modeled:

Table 2.13
Wilshire Subway HRT Operating Characteristics

Bus Service:	Local bus service on Wilshire Boulevard scaled back by about 40% in peak and base periods. Wilshire/Whittier rapid bus route assumed in TSM is truncated to maintain eastern end (outside of study area); between Westwood and downtown Santa Monica, rapid bus route reverts to basic limited-stop service at a longer headway than TSM, since remaining route essentially has same limits as SMMBL 2. Other bus routes modified to connect or truncate at rail stations as appropriate. Remaining bus network is same as TSM, which assumes route recommendations from Westside Bus Service Improvement Study and rapid bus routes on Santa Monica and Crenshaw Boulevards.
Operations:	Trains would run every 4 minutes in the peak period from Union Station to Westwood. Combined train frequency from Union Station to Vermont would be 2.0 minutes. Off-peak service would be every 8 minutes, with a combined train frequency from Union Station to Vermont at 4 minutes.
Length:	9.0 miles from Wilshire/Western to Wilshire/Federal (Westwood).
Stations:	8 additional
Avg. Station Spacing	1.13 miles for extension; 0.94 miles for entire line from Union Station
Max Speed:	70 mph (attainable only between Century City and La Cienega); otherwise 55 mph.
Avg. Speed:	31.6 mph, including stops, from Union Station to Wilshire/Federal.
Signal Preemption:	N/A

Financial Characteristics
The estimated cost for the full 9.0-mile route, including 16 HRT vehicles and a credit of 27 standard buses no longer required for regular MTA service, is approximately $2,469,000,000 (1999 dollars). The 3.2-mile alternative segment to Wilshire/Fairfax would cost approximately $891,000,000.

2.2.8 Alternative 6 - Wilshire Aerial Heavy Rail Transit (HRT)

Physical Characteristics
Alignment. An alternative to tunneling entirely through the methane and H_2S gas zones under Wilshire Boulevard is to construct an aerial guideway over part of the route. This would involve transitioning the alignment from subway just west of Crenshaw Boulevard to an open cut, onto retained fill section and then to aerial structure. As explained below, there is not sufficient distance immediately west of Western Avenue to complete a transition before reaching Crenshaw Boulevard. The length of the transitioning section would be dictated by the need to keep the grade to a 4 percent maximum and the use of vertical curves at the bottom and top of the grade consistent with Red Line construction standards. A Wilshire Boulevard Aerial HRT alignment is shown in Figure 2.37.

A total distance of 2,775 feet would be required for the construction of a transitioning section traveling from a tunnel depth of 60 feet below the ground surface at top of the subway rail, along a 4 percent grade, to top of rail on an elevated structure 25 feet above ground. A vertical transition from subway to elevated structure immediately west of Wilshire/Western (where the top of rail in the existing tunnel is approximately 50 feet below existing grade) would result in reaching level elevated track at a point roughly 500 feet west of Crenshaw Boulevard. The elevated Wilshire/Crenshaw station would have the end of platform at least 600 feet west of the street intersection, and the intersection itself would be blocked by the transitional structure.

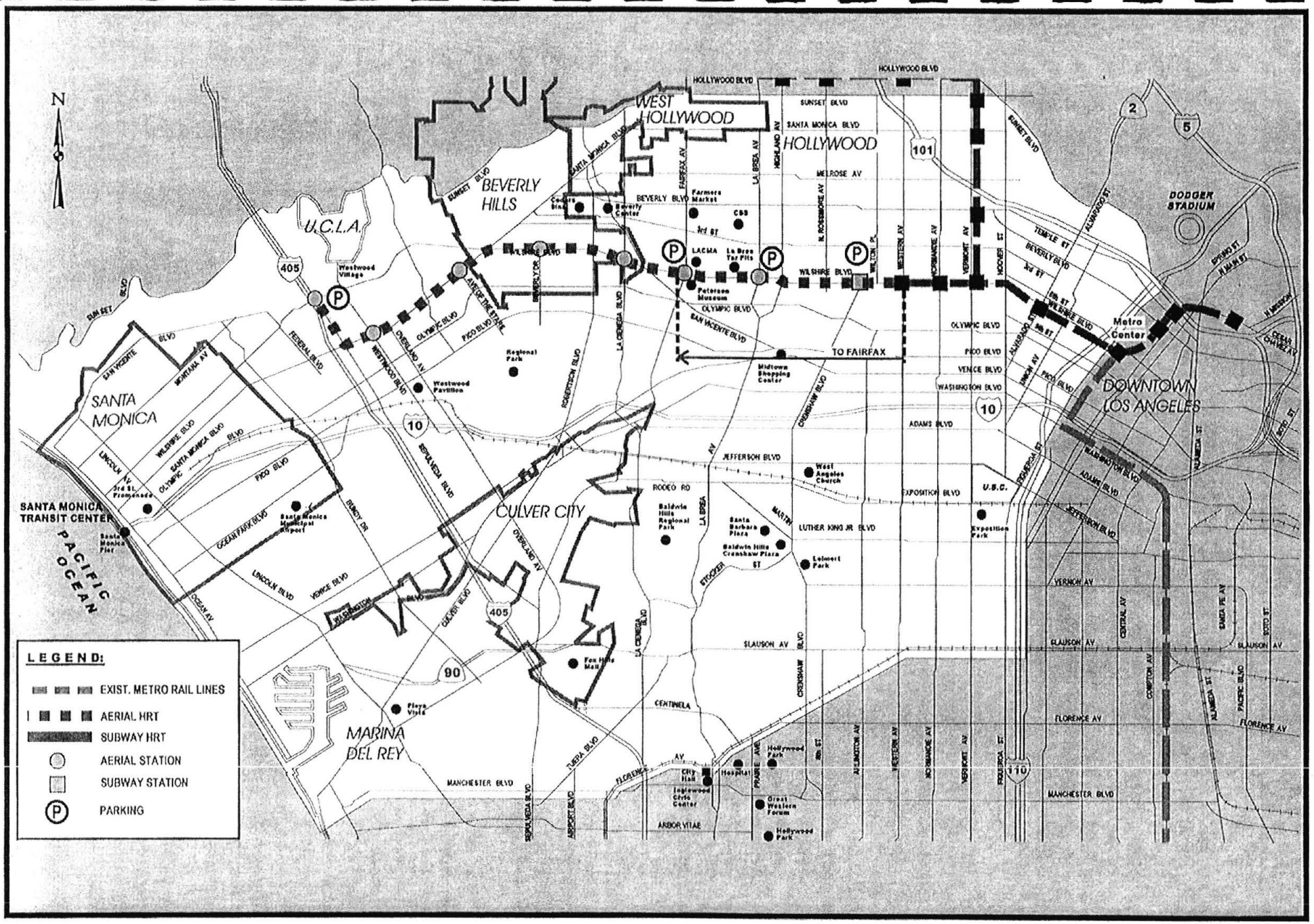

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Figure 2.37
ALTERNATIVE 6
WILSHIRE BOULEVARD - AERIAL RAIL (HRT)

Accordingly, it is recommended that the Red Line continue in subway from the Wilshire/Western station through the Wilshire/Crenshaw station and then transition to an elevated aerial structure.

Transition Structure. The transition structure raises significant urban design issues. The wall effect of the structure will limit cross movement for vehicles and pedestrians, as well as block existing views. This barrier would be minimized in two ways: by climbing to the necessary elevation as quickly as possible and by designing the structure to minimize barrier qualities. This can be achieved through careful contouring of the overall form and cross-section of the structure, as well as through the sensitive and creative selection of materials and treatment of the structure's surface.

Different types of retaining walls can be designed for this section, such as cast-in-place cantilever vertical walls. This advances in concrete construction, forming and workmanship will allow the aesthetics of the structure to be enhanced by introducing indented patterns on the wall. Concrete color admixture also can be used to accentuate specific themes. Stone facing is another technique that can be used in different patterns and colors. Other possibilities include the use of a Mechanically Stabilized Earth Wall (MSE). These walls can enhance the aesthetics of the transitional structure with pre-cast concrete modules. The architectural design can utilize different color, pattern or sand blasting techniques.

Aerial Structure. Two options for the aerial guideway are identified for the Wilshire Boulevard alignment: a twin track guideway (aligned with the center of the roadway) and separate single-track guideways (placed in the curb lanes next to the sidewalk). In both options, the minimum clearance between the top of street pavements to bottom of aerial structure would be 15 feet to comply with city standards.

From an urban design perspective, an aerial structure aligned with the center of the roadway has the advantage of minimizing the obstruction of views of adjacent buildings and uses. It also provides shade in the middle of the roadway where there is usually considerable glare. This shade can also minimize the apparent width of the street, a possible advantage in areas trying to redress the balance between street and sidewalk.

The shadow from the structure may be viewed as excessive and gloomy. Splitting the guideway into two closely spaced tracks allows some sunlight to penetrate the middle of the shadowed area. This creates more balanced daylight in the street as a whole, with an illumination pattern as follows: shadowed sidewalk on the south; illuminated roadway; shadow from first track; sunlight from gap; shadow from second track; illuminated roadway; and illuminated sidewalk on the north (with shadows from trees, if any). This banding effect will normally bounce light in ways that reduce glare and create a more agreeable daylight environment.

In those segments where there are existing landscaped medians, the proposed use of a centrally aligned aerial structure will undoubtedly rouse considerable opposition. This is particularly true where the medians have been recently updated, as is the case in the Miracle Mile area. In that segment, a single-track twin guideway may be preferable (see below).

A double track guideway could be constructed in the median of Wilshire Boulevard. The median would be 9'-0" wide with the column for the aerial structure at the center straddled by Caltrans K-type barriers. Under this condition, two traffic lanes and one 10'-6" traveled way/parking lane/bus stop can be provided in both directions. Note that because of the center pier there would not be a

left-turn pocket at a typical intersection (unless straddle bents were used in lieu of the center pier). Straddle bents would, of course, be used at stations in order to support the mezzanine and at the same time would allow the left turns to be retained.

The foundation would consist of CIDH piles extended by a smaller single column to the soffit of the superstructure. The column for a typical 80-foot span would be 6'-6" circular cylindrical shape. Other aesthetically preferred oblique shapes similar in size could also be designed.

The superstructure could be as narrow as 25'-6" for segments with tangent alignments and up to 26'-6" wide for cured sections. The emergency evacuation walkway would be located between the tracks. By using steel grating for the Emergency Walkway, it is possible to allow sunlight through the deck, reducing the amount of shadow below and permitting some landscaping in the median. A variety of structures can be designed that would minimize the "bulkiness" effect often found in structures supporting rail type systems, including the use of pre-cast segmental girders.

The other option is to place separate guideways directly over the existing curb lanes or sidewalks. From an urban design perspective, such a structure could have the effect of a columned arcade, providing strong definition to the sidewalk and adding shade to the northern side. The structure would be place in very close proximity to many existing buildings and will likely block views to which the public has become accustomed. Some of the adjacent buildings are of historic importance and a view of them may be seen as worthy of protection. The noise of the train will be closer to existing buildings and the visual adjacencies, particularly to second, third or fourth story windows, may be viewed as unacceptable invasions of privacy.

If constructed, a single-track guideway on either side of Wilshire Boulevard would have columns in the parking lane. The space between the piers could be used for parking or bus stops. The Emergency Walkway would be on the street side away from the building to maximize the space between the guideway and the buildings. Wilshire Boulevard would have two traffic lanes and one 8'-0" parking/bus stop lane in each direction. Left turn pockets could be provided at all the intersections.

The foundation would consist of CIDH piles extended by a smaller single column to the soffit of the superstructure. The column for a typical 80-foot span would be 5'-0" circular cylindrical shape. Aesthetically preferred oblique shapes similar in size could also be used.

The superstructure will be 15'-3" wide for segments with tangent alignments and up tp 16'-0" wide for cured sections. A variety of structures can be designed that would minimize the "bulkiness" effect often found in structures supporting rail type systems, including the use of pre-cast segmental girders.

Vehicles. The same vehicles described in the Wilshire Subway Heavy Rail Transit will be utilized for this alternative.

Stations. There would be eight stations in this alternative: Wilshire/Crenshaw; Wilshire/La Brea; Wilshire/Fairfax; Wilshire/La Cienega; Wilshire/Beverly; Century City; Westwood/Santa Monica; and Wilshire/Sepulveda. The Wilshire/Crenshaw Station would be a typical Red Line station as described in the Metro Red Line Extension along Wilshire (Subway) alternative. The other seven would be on aerial structure. For both the La Brea and Fairfax stations, the previously proposed

locations just east of La Brea and west of Fairfax are again recommended. From an urban design perspective, this avoids the effect of a massive structure over the intersection. At La Brea, MTA's ownership of a large property at the northwest corner of the intersection provides an excellent opportunity for handling the vertical circulation, preferably in concert with joint development. At Fairfax, the station location west of the intersection avoids impacts to the historic May Company Building and the Peterson Museum opposite, while taking advantage of relatively underdeveloped properties west of Fairfax. The Fairfax station and the five remaining stations to the west would have structural characteristics similar to the La Brea station.

Typically, outrigger bents would support the guideway at station locations. The columns for the bent could be located outside of the street right-of-way on either side of Wilshire Boulevard and other major streets, necessitating the acquisition of property at station locations. At the intersection there would be two through lanes, a left-turn land and a right-turn lane in both directions. Top of the rail elevation at the station would be approximately 35' above the street elevation. A higher profile is needed to accommodate a pedestrian crossing under the guideway, providing access to both westbound and eastbound tracks. A higher profile also would accommodate a deeper superstructure for the guideway to span a greater distance over and beyond the intersection.

Figure 2.38 depicts an arrangement for a station on the aerial structure. The station would use the double track structure with a platform outside of each track.

Park and Ride. Several stations would have park and ride facilities. These are shown in Table 2.14 below.

Table 2.14
Parking Spaces for Alternative 6 – Wilshire (Aerial) via Wilshire Boulevard

STATION	PRIVATE PROPERTY	MTA PROPERTY	SHARED PARKING	TOTAL
Crenshaw	--	50	--	50
La Brea	--	100	--	100
Fairfax	100	--	--	100
Wilshire/Sepulveda	--	--	600	600
TOTALS	100	150	600	850

Major Issues. The foremost impact of this alternative that must be considered is the impact of the transitional structure on the traffic lanes of Wilshire Boulevard. The twin bored tunnels are approximately 26 feet in diameter and 40 feet apart. The beginning of the transition involves bringing two tracks together as they start the ascent towards the surface, using a cut-and-cover box structure. As the top of rail reaches an elevation of approximately 20 feet below the ground surface, the structure now becomes an open cut, with the tracks still converging toward a track center of approximately 14 feet. The maximum width of the ramp structure is about 50 feet. Since the street width is only about 75 feet, there would only be room for a single lane of traffic on each direction.

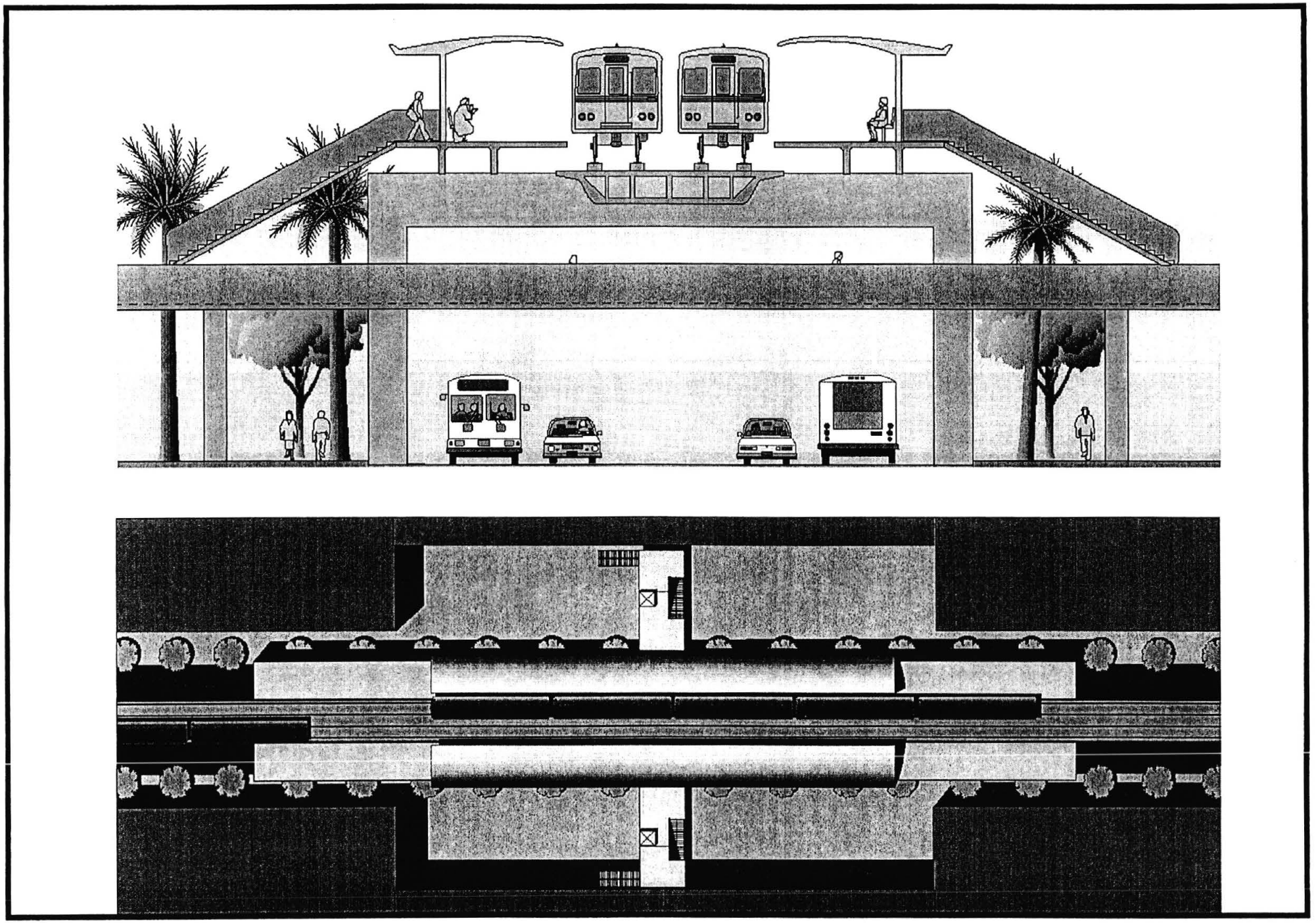

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Figure 2.38
WILSHIRE BOULEVARD - AERIAL STATION (typical)

However, if several hundred feet of the bored tunnel were constructed by the cut-and-cover method instead, there would be ample room for the tracks to fully converge before going into open cut.

This scenario would only require about 36 feet of roadway space, allowing room for 2 lanes in each direction if the sidewalks were reduced from 12.5 feet to 10 feet.

After reaching the surface of the street, the Red Line track would continue to rise on a retained earth structure until the aerial structure begins. This conversion could take place before the tracks are elevated enough to clear automotive vehicles underneath. During this transition from subway to aerial, no cross traffic from either side of Wilshire Boulevard would be possible from the point where the open cut begins until the aerial structure is high enough to provide at least 15 feet of clearance beneath, a distance of approximately 1300 feet.

In addition, many of the utilities within Wilshire Boulevard would have to be relocated from the point where the transition cut-and-cover structure begins to the point where the aerial structure begins. It is possible that during construction of the transitional structure Wilshire Boulevard could have to be closed at that location.

There would be visual and noise impacts related to trains operating on an aerial structure. Overall visual impacts for people traveling on Wilshire Boulevard would be less with the two separate aerial structures, but would be significantly greater for people in buildings that face the street. There would also be construction impacts the length of the transition from subway to aerial along Wilshire, affecting traffic on Wilshire and on cross streets, particularly where stations were being constructed.

Operating Characteristics

The following table provides a summary of the operating characteristics of the Metro Red Line Extension along Wilshire (Aerial) alternative as it was modeled:

Table 2.15
Wilshire Aerial HRT Operating Characteristics

Bus Service:	Local bus service on Wilshire Boulevard scaled back by about 40% in peak and base periods. Wilshire/Whittier rapid bus route assumed in TSM is truncated to maintain eastern end (outside of study area); between Westwood and downtown Santa Monica, rapid bus route reverts to basic limited-stop service at a longer headway than TSM, since remaining route essentially has same limits as SMMBL 2. Other bus routes modified to connect or truncate at rail stations as appropriate. Remaining bus network is same as TSM, which assumes route recommendations from Westside Bus Service Improvement Study and rapid bus routes on Santa Monica and Crenshaw Boulevards.
Operations:	Trains would run every 4 minutes in the peak period from Union Station to Westwood. Combined train frequency from Union Station to Vermont would be 2 minutes. Off-peak service would be every 8 minutes, with a combined train frequency from Union Station to Vermont at 4 minutes.
Length:	8.9 miles from Wilshire/Western to Wilshire/Sepulveda.
Stations:	8 additional
Avg. Station Spacing	1.11 miles for extension; 0.94 miles for entire line from Union Station
Max Speed:	70 mph (attainable only between Century City and La Cienega); otherwise 55 mph.
Avg. Speed:	31.6 mph, including stops, from Union Station to Wilshire/Federal.
Signal Preemption:	N/A

Financial Characteristics
The estimated cost for the full 8.9 mile route, including 16 HRT vehicles and a credit of 27 standard buses no longer required for regular MTA service, is approximately $1,269,000,000 (1999 dollars). The 3.2-mile alternative segment to Wilshire/Fairfax would cost approximately $543,000,000.

2.2.9 Monorail on Wilshire Boulevard

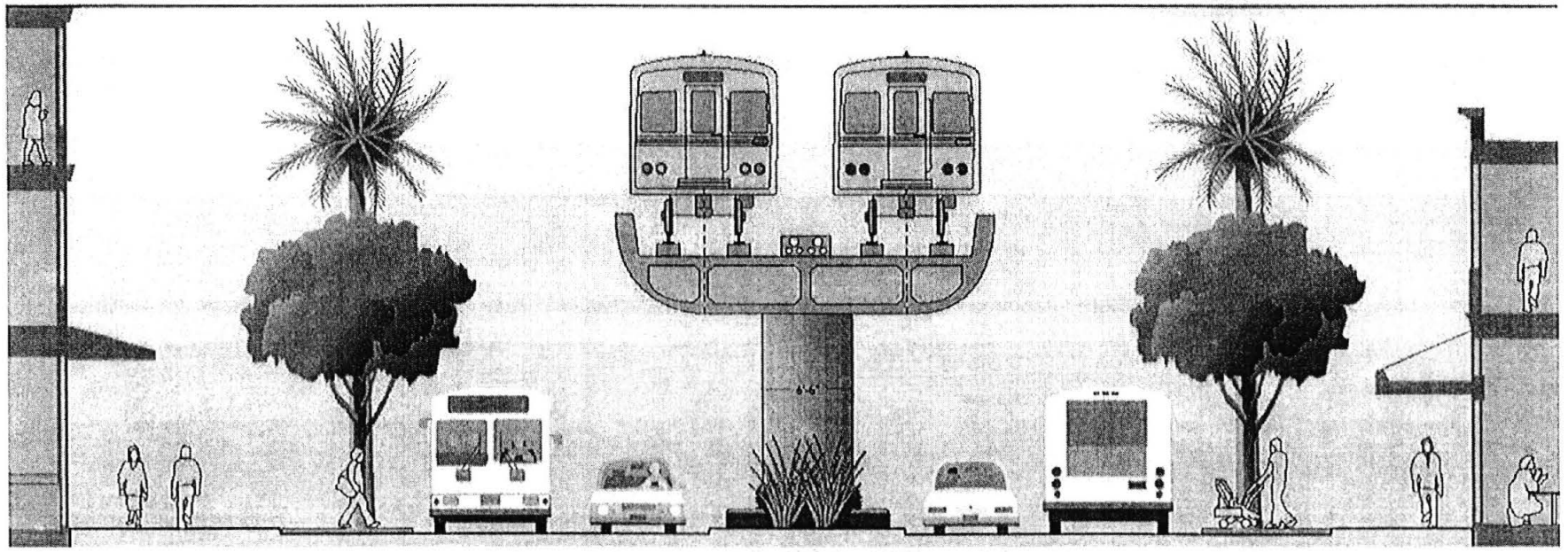
During the community outreach process, suggestions were made by members of the public that an aerial monorail train on Wilshire Boulevard should be evaluated as an alternative to Bus Rapid Transit and Heavy Rail Transit alternatives. Such an alternative would be configured on an aerial guideway in the center median of Wilshire Boulevard. For purposes of comparison, the monorail has been reviewed as a subset of Alternative 6- Wilshire HRT Aerial. Similar to Alternative 6, stations have been assumed at Wilshire/Western (current terminus of the Metro Red Line subway), Crenshaw, LaBrea and Fairfax. Future extension to the west, as with the other options, would be possible. Contacts were made with two different monorail manufacturers and examples of successful systems were reviewed for compatibility with the Wilshire Boulevard corridor.

- American Monorail Examples: No examples could be found of a monorail system that has been implemented by an American transit agency in the United States during the past fifty years. Efforts were made by transit agencies in Houston and Honolulu, but neither of these programs were successful. Examples of monorail systems that were implemented in theme parks and airports were found. These are generally classified as short distance people-movers. Examples of such systems were found in Disneyland, Disney World, Seattle (developed as a demonstration World's Fair people mover), and Newark Airport. These systems are generally short and are designed as closed loops or shuttle systems between a limited number of stations.

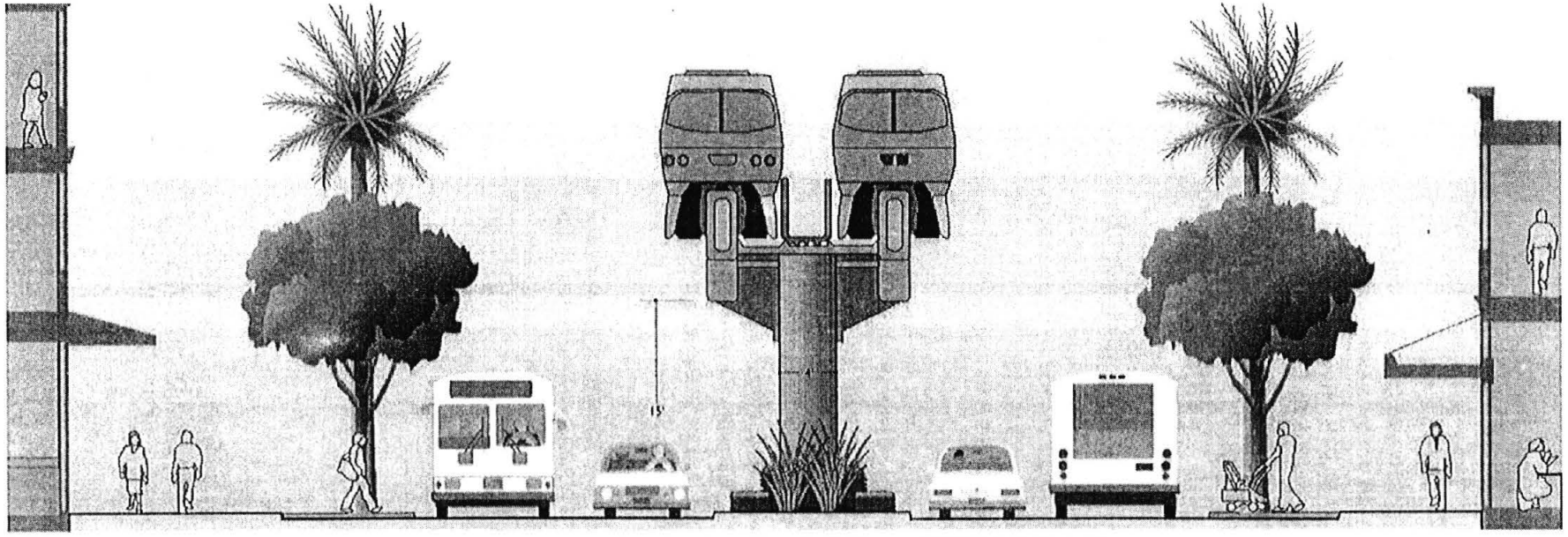
- Japanese Monorail Examples: The Japanese government has sponsored a significant amount of research and development into the development of monorail systems in that country. High capacity monorail systems have been implemented in at least two Japanese cities, and the manufacturer of the Osaka Monorail system was contacted for information about design specifications which could be applied to such a project in Los Angeles.

Based on a review of the above information, the following conclusions were reached:

- Aerial Guideway Dimensions: As shown in Figure 2.39, the monorail guideway would the same height as a Red Line aerial guideway, but it would be slightly narrower. The outside dimensions of the monorail guideway are about 15 feet, while the Red Line would be about 27 feet. Likewise, the columns for a monorail guideway would be 4-5 feet in diameter, while the columns for the Red Line would be about 6.5 feet in diameter. Although the aerial guideway is slightly smaller, this difference would not be significant in terms of environmental impacts. Both guideways would block views and cast shadows into the street. Similarly, both guideways would require removal of median palm trees and reconstruction of the existing medians to accommodate the aerial



WILSHIRE BOULEVARD • AERIAL



WILSHIRE BOULEVARD • MONORAIL

Figure 2.39
WILSHIRE MONORAIL ALTERNATIVE COMPARED TO HRT AERIAL

guideway columns. It would be possible to provide shrubs and landscaped groundcover without trees in the remaining portions of the median. Both guideways would require removal of most of the left turn lanes located in the median area of the street (unless straddle bents are used at intersections in lieu of center piers). This is due to the aerial guideway columns that would block the left turn lanes. Based on the above factors, there would be very little benefit to be derived from the slightly smaller width of the monorail aerial guideway in comparison to the Red Line aerial guideway, other than the slightly lighter visual appearance of the structure.

- Station Configuration: As shown in Figure 2.38, the Red Line aerial station would be quite large and would require property takings from both sides of Wilshire Boulevard. A review of requirements for the monorail station concludes that the design of a monorail station may allow for shorter station platforms, but the width of the stations would be similar in size to the Red Line aerial stations. Both stations would require property takings from both sides of Wilshire Boulevard. This is because the station boarding platforms must be located on the outside of the trackway for both systems and structural components would be required to span the entire street. There is not enough room on the existing sidewalks for the necessary stairs, escalators, elevators and structural supports. Furthermore, the monorail would require an aerial station at Wilshire/Western that would not be required by the Metro Red Line. This new station would be immediately adjacent to the historic Wiltern Theater. No such station would be required for the Red Line extension, since the subway station already exists.

- Rail Storage & Maintenance Facility- The monorail system would require a new rail storage & maintenance facility. These facilities are generally quite large (10-15 acres) and are located in industrial areas, as far away as possible from sensitive land uses such as homes, schools, parks and religious facilities. The Metro Red Line rail storage & maintenance facility is located in downtown Los Angeles, adjacent to other Amtrak and mainline railroad facilities. As a result, no new facility is required for extension of the Red Line. The monorail system would require an entirely new facility located adjacent to the project. In the Park Mile and Miracle Mile areas, no such suitable sites were identified for such a facility. Even if such a facility could be designed to be smaller, or camouflaged as another type of use, it is unlikely that approvals could be obtained to locate such a facility in the project area. If the rail storage and maintenance facility were located outside of the project area, a non-revenue aerial guideway would need to be constructed to take the monorail vehicles to and from the Wilshire Boulevard facility. The cost of such an aerial guideway connector and maintenance facility would not be required for a Red Line extension.

- Noise Impacts: The monorail vehicles employ rubber wheels on a concrete guideway and are therefore quieter that the Metro Red Line vehicles, which employ steel wheels on steel track. Standard mitigation for Red Line aerial guideways provides for a low sound absorbing panels that are placed on the edge of the aerial guideway just above the track level to block sounds from the steel wheels. With installation of such sound panels, there would be virtually no difference in noise levels between the monorail and the Red Line guideway when measured from adjacent properties along Wilshire Boulevard.

- Costs: Based on a review of the requirements for a monorail system in the Wilshire corridor, it is estimated that a cost savings of approximately 20-30% could be obtained on the basic guideway and station components. This is due to the reduction in size of structural components such as columns and aerial guideway beams. This savings, however, would be largely offset by the additional needs of a monorail system, such as a rail storage and maintenance facility (property acquistion/condemnation, facility construction and non-revenue aerial guideway connector). Monorail proponents have stated that monorail systems can be build for $30-$40 million per mile. This may be true for systems like Disneyland when only the bare construction costs are included. Cost estimates prepared for this Major Investment Study also include significant other costs, such as feeder bus lines, property acquisition, programs such as Art for Transit, Buy America provisions, federal procurement regulations and other such factors. Major differences in cost between the monorail and the Metro Red Line aerial guideway construction are therefore more the result of the method of procurement and the package of project support facilities, than between the different technologies.

- Service/Capacity: The monorail would require a transfer at Wilshire/Western Station between the Metro Red Line subway and the aerial monorail system. This would result in an inconvenience to transit riders that would result in lower ridership for the monorail system in comparison to an extension of the Metro Red Line. Furthermore, the capacity of monorail systems is lower than the Metro Red Line; 6-car Red Line trains are approximately 450 feet in length and can carry up to 366 seated passengers plus 700 standing passengers per train. This results in a capacity of more than 15,000 riders per hour on the Red Line system (4-minute typical headways). Typical monorail systems such as the Disneyland system provide 3-car trains that are approximately 100 feet in length. These can be doubled to create 6-car trains that are approximately 200 feet long including 156 seated passengers plus 144 standing passengers per train. The equivalent capacity of the monorail train is 4,500 passengers/hour, or approximately 30% of the Red Line System. The monorail system therefore provides substantially less capacity than the Red Line system in one of th

Table 2.16
Comparison of
Metro Red Line Aerial to Monorail Aerial Guideway

Issue	Metro Red Line Aerial	Monorail Aerial
Guideway Size & Impacts	Median palm trees would be removed and medians would be reconstructed. Most left turns would be displaced due to placement of aerial guideway in center of Wilshire Boulevard (unless straddle bents are used at intersections in lieu of center piers).	Although the monorail guideway structure is narrower (15 feet instead of 27 feet) and column diameters are less (4-5 feet instead of 6.5 feet), all of the other impacts are the same.
Station Size & Impacts	Station length would be 450 feet and width would extend beyond the building lines of the street requiring property takings on both sides of Wilshire for each station.	Monorail stations would be approximately 200 feet in length but the width would be comparable to Red Line stations, thus requiring property takings at stations along both sides of Wilshire Boulevard at each station.
Rail Storage & Maintenance Facility	No new support facilities are required.	Monorail requires a new rail storage and maintenance facility. Such a facility will require property displacement and acquisition (10+ acres) and necessary non-revenue connector tracks in the Park Mile/Hancock Park or Miracle Mile communities. No reasonably feasible sites for such a facility have been identified.
Service/Capacity	No transfer is required at Wilshire/Western Station. Red Line capacity is 15,000/hr.	Transfer is required at Wilshire/Western Station. Monorail capacity is 4,500/hr.
Visual & Noise Impacts	Red Line guideway would block views and cast shadows. Noise of Red Line trains is louder than monorail trains, however, low sound absorbing panels on the edge of the guideway could reduce noise levels to comparable levels.	The monorail guideway is somewhat smaller than the Red Line and would create slightly less impact. Blockage of views and impacts to historic properties would be similar. Monorail trains are very quiet, however, noise from Red Line trains can be mitigated with provision of sound absorbing panels on the edge of guideway.

3. TRANSPORTATION ANALYSIS

3. *TRANSPORTATION ANALYSIS*

3.1 Transit Analysis

This section provides a description of transit service under each of the alternatives and analyzes ridership as provided by the MTA's transportation simulation model.

3.1.1 Service

Service characteristics were summarized under subsections entitled "Operating Characteristics" in the previous chapter. Key characteristics are repeated here.

No Build

This baseline alternative contains only those existing rail transit and bus systems currently in use, finishing out commitments. Therefore, beyond the existing Blue and Green Lines, the Red Line is extended to North Hollywood and the Pasadena Blue Line is completed. Slight improvements to rail service frequency are assumed. Trains would run every 7.5 minutes in the peak period for the two branches of the Red Line from Union Station to Wilshire/Western and to North Hollywood. The peak period train frequency on Blue & Green lines are increased to 5 minutes. The peak period headway for Pasadena Line is assumed at 5 minutes. Off-peak service is set at 10 minutes for each of the two Red Line branches; and 12 minutes for the Blue, Green and Pasadena Lines.

In general, 1998 existing bus routes are used. Service frequencies are adjusted as necessary to accommodate future growth. Parallel bus routes are rerouted onto new freeway HOV's as applicable. The existing fare structure is retained, with inflationary growth.

Transportation System Management Alternative

This alternative defines improvements in the corridor without the construction of major new transit facilities. Three Rapid Bus lines are included along three corridors:

- Wilshire/Whittier corridor. As defined in the Los Angeles Metro Rapid Bus Demonstration Program, this route proceeds from downtown Santa Monica to Montebello, primarily using Wilshire Boulevard on the western segment and Whittier Boulevard on the eastern segment.

- Santa Monica Boulevard. The route is assumed to follow the existing MTA 304 from Santa Monica to downtown Los Angeles.

- Crenshaw Boulevard. The route is assumed to follow the existing MTA 310 from Hollywood to the South Bay.

Rapid Bus routes on these corridors call for upgraded service (especially in the off-peak) as well as improved speeds. Articulated (65-70 feet long) buses would be used on the rapid bus lines. Proof of payment fare collection would be required to reduce dwell time at stops. Passengers board and alight buses through both front and rear doors.

Other bus routes represent implementation of Westside Bus Service Improvement Study recommendations. Changes include modifying service frequencies to more closely match demand on various routes (mostly minor, since major service improvement recommendations appear to have since been implemented under the Consent Decree); route extensions to connect to major destinations and/or transit hubs; route truncations to eliminate unproductive service segments or duplication; consolidation of service to simplify route structure and use; replacement of unproductive routes and creation of new routes.

Service on the Red Line is upgraded over No Build levels. Red Line trains would run every 4 minutes in the peak period from Union Station to Wilshire/Western and to North Hollywood. Combined train frequency from Union Station to Vermont would be 2.0 minutes (maximum frequency). Blue, Green and Pasadena line train service would remain at the same levels as in the No Build system.

Alternative 1 - Wilshire Bus Rapid Transit (BRT)

This alternative involves exclusive, peak period bus lanes on Wilshire Boulevard, from Vermont Avenue (Red Line Station) to downtown Santa Monica, with buses using other local streets to terminate in the vicinity of Ocean Avenue & Broadway. Frequent BRT service would stop approximately once per mile. Proof of payment fare collection would be required to reduce dwell time at stops. Passengers board and alight buses through both front and rear doors.

The BRT service was modeled at 1.2 minute peak headways and 5 minute base headways, which is a significant upgrade from the Wilshire/Whittier rapid bus frequencies assumed in TSM. This service would enhance existing local service on Wilshire (MTA Line 20 series and Santa Monica Municipal Bus Lines (SMMBL) Line 2). The remaining bus network is the same as TSM, which assumes route recommendations from Westside Bus Service Improvement Study and rapid bus routes on Santa Monica Boulevard and Crenshaw Boulevard.

Alternative 2 - Exposition Bus Rapid Transit (BRT)

This alternative provides a two-lane busway on the Exposition ROW, from Figueroa Street to Cloverfield Avenue in Santa Monica. Buses run in mixed traffic on both ends of the route (west of Cloverfield in Santa Monica, and past Figueroa Street along Flower to 7th Street in downtown Los Angeles).

Two end-to-end BRT routes serve full length of busway (one all-stop, and one skip-stop), with other express routes feeding onto busway:

Figure 3.1 illustrates how express buses would feed into the Exposition BRT system while Table 3.1 below describes the service frequency for the main BRT and entry points and service frequencies for the feeder buses.

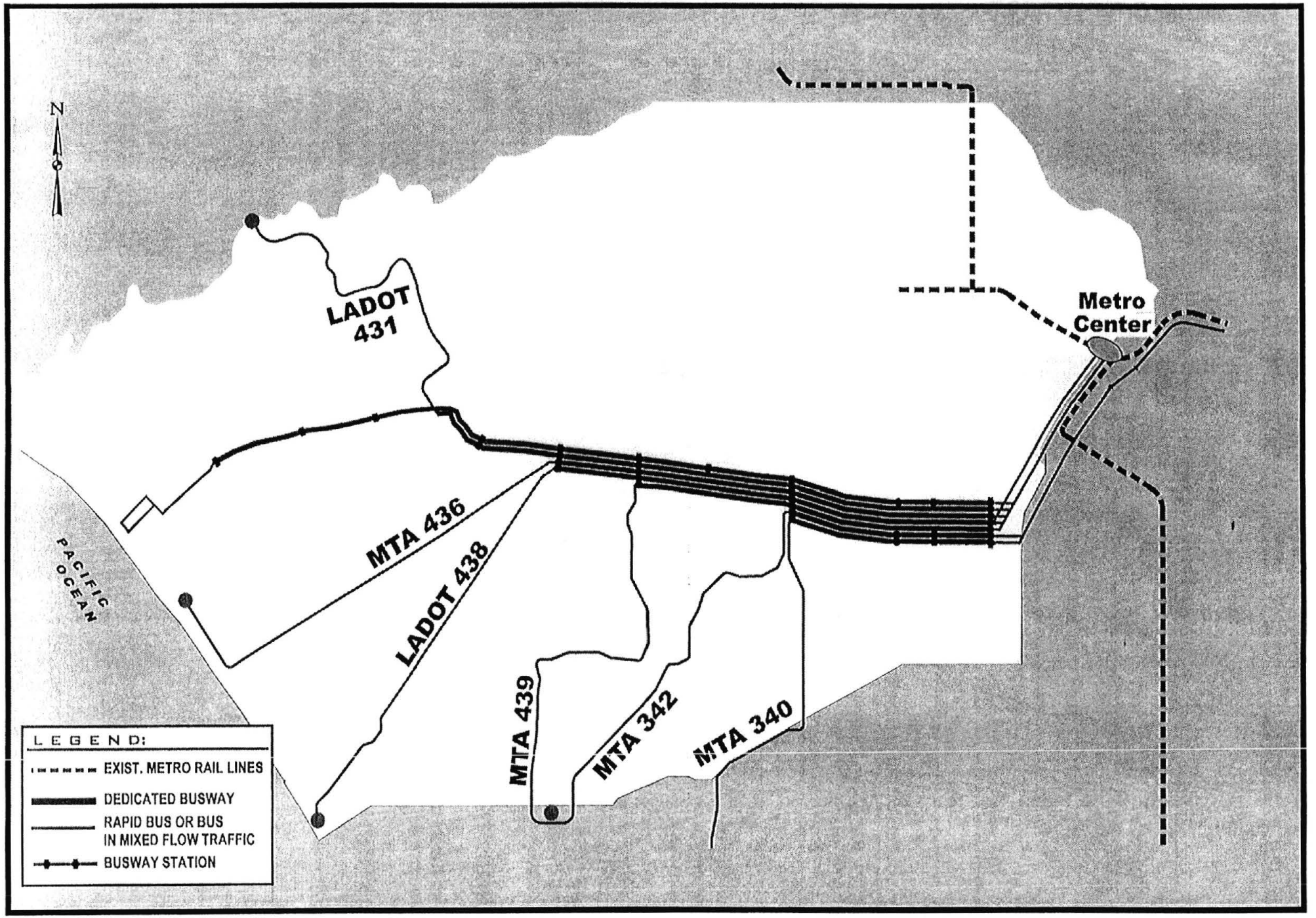


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FIGURE 3.1

EXPOSITION BRT EXPRESS BUS FEEDER LINES

Table 3.1
Bus Service on Exposition Transitway

Route	Transitway Entry Point	Service Frequency (peak, base minutes)
B-1 BRT (all stop)	4th/Colorado	5, 10
B-2 BRT (skip stop)	4th/Colorado	10, 0
LADOT 431 Rancho Park - Palms (Peak service to Palisades)	Overland	20, 30
MTA 436 Venice (Venice Blvd)	Venice/Robertson	20, 30
LADOT 438 (Culver Blvd; reconfigured to Marina del Rey per restructuring study)	Venice/Robertson	20, 0
MTA 439 Redondo Beach - LAX - LA	La Cienega	30, 60
MTA 342 Westchester - LAX	Crenshaw	30, 30
MTA 340 Inglewood - Hawthorne	Crenshaw	10, 30

Articulated (65-70 feet long) buses would run on the end-to-end BRT service (B-1). Proof of payment fare collection would be required to reduce dwell time at stops. Passengers board and alight buses through both front and rear doors.

The remaining bus network is essentially the same as TSM, which assumes route recommendations from the Westside Bus Service Improvement Study and rapid bus routes on Wilshire/Whittier, Santa Monica and Crenshaw Boulevards. Minor modifications are made to connect applicable routes with busway stations. Two local routes (MTA 40 and 42) convert part of their service frequency to provide the new limited stop service using the busway (MTA 340 and 342).

Alternative 3a and 3b - Exposition Light Rail Transit (LRT)

For this alternative, trains would run every 5 minutes in the peak period on the Exposition ROW. Because this alternative connects to the existing 7th/Flower station in downtown Los Angeles and shares the same alignment with the Blue Line to Long Beach along Flower Street, the combined train frequency in the common track section with LB-LA Blue Line would be 2.5 minutes. In the off-peak, trains would run every 12 minutes with a combined train frequency of 6 minutes in the common track section with LB-LA Blue Line.

Selected bus routes are modified to connect or truncate at LRT stations. The remaining bus network is same as TSM, which assumes route recommendations from Westside Bus Service Improvement Study and rapid bus routes on Wilshire/Whittier, Santa Monica and Crenshaw Boulevards.

Alternatives 4, 5 and 6 - Red Line Extension Alternatives

Red Line service characteristics are identical for all of the Red Line extension alternatives, regardless of alignment or profile. Trains would run every 4 minutes in the peak period from Union Station for each of the two Red Line branches to the Westside and to North Hollywood. Therefore, the combined train frequency from Union Station to Vermont would be 2.0 minutes. Off-peak service would be every 8 minutes, with a combined train frequency from Union Station to Vermont at 4 minutes.

As the rail lines are extended to Westwood, local bus service on Wilshire Boulevard would be scaled back by about 40% in peak and base periods. Wilshire/Whittier rapid bus route assumed in TSM is truncated to maintain eastern end (outside of study area); between Westwood and downtown Santa Monica, rapid bus route reverts to basic limited-stop service at a longer headway than TSM, since remaining route essentially has same limits as SMMBL Line 2. Other bus routes modified to connect or truncate at rail stations as appropriate. The remaining bus network is same as TSM, which assumes route recommendations from Westside Bus Service Improvement Study and rapid bus routes on Santa Monica and Crenshaw Boulevards.

3.1.2 Ridership

For all project alternatives, ridership is largely a function of travel time and cost. All else being equal, the faster technologies attract more riders. Longer segments have higher ridership because they serve a larger area, incorporate more stations, and potentially reduce transfers. Alignment choice also affects ridership. The choice of subway versus aerial profiles does not affect ridership, nor does subway construction method (deep-bore, cut-and-cover, or open-air). At-grade profiles, however, may reduce ridership if transit vehicles do not have signal priority at street crossings, creating longer travel times.

Ridership has been estimated for each alternative through the MTA's travel simulation model, based on the forecast year 2020. Individual model runs were performed for the following scenarios:

- No Build
- TSM
- Wilshire Bus Rapid Transit (Alternative 1)
- Exposition Bus Rapid Transit (Alternative 2)
- Exposition Light Rail Transit (Alternatives 3a and 3b)
- Wilshire Heavy Rail Transit to Pico/San Vicente (Alternative 4-MOS)
- Wilshire Heavy Rail Transit to Fairfax (Alternative 5-MOS and Alternative 6-MOS)
- Wilshire Heavy Rail Transit to Westwood (Alternatives 5 and 6)

Some ridership runs represent more than one alternative if distinguishing project elements would lead to barely discernable differences in the model.

The projected ridership for each alternative is shown below. The "boardings" column represents the number of boardings on the system *within* the study area, that is, boardings at stations constructed as part of the Mid-City/Westside project. Boardings give an indication of how many boardings will be attracted to the project. These numbers should not be used in trying to assess how

many more riders are attracted to transit versus, for example, from automobiles. The "new transit riders" column is the appropriate measure for determining the number of additional riders, since this measure deals with new "linked" (end-to-end) transit trips. New linked transit trips are reported for each alternative as increments over the No Build and TSM alternatives, per FTA guidelines.

Table 3.2
Ridership in Forecast Year 2020

Alternative	Daily Fixed Guideway Boardings	Incremental New Linked Transit Trips (Daily)	
		to No Build	to TSM
TSM	N/A	6, 600	N/A
1 - Wilshire Bus Rapid Transit	11,000 [34,000]*	8,300	1,700 [10,600]*
2 - Exposition Bus Rapid Transit	23,000	12,400	5,800
3a - Exposition Light Rail Transit 3b - Exposition Light Rail Transit**	38,600 38,600	15,300 15,300	8,700 8,700
4 - Wilshire Heavy Rail Transit (HRT) to Pico/San Vicente	11,400	10,400	3,700
5 - Wilshire HRT to Fairfax subway 5 - Wilshire HRT to Westwood subway	15,800 33,500	8,800 15,800	2,200 9,200
6 - Wilshire HRT to Fairfax aerial 6 - Wilshire HRT to Westwood aerial	15,800 33,500	8,800 15,800	2,200 9,200

* Brackets [ ] indicate Sensitivity Model Run results assuming full signal preemption.

** A single model run was performed to represent both Alternatives 3a and 3b, since project distinctions would be relatively insignificant in the transportation model.

Not surprisingly, the Red Line extensions to Westwood are able to capture the greatest amount of new linked transit trips. The Exposition LRT alternatives providing rail service all the way to downtown Santa Monica follows closely behind.

While the Wilshire BRT option reports the lowest added new riders for any of the alternatives, this is likely to be a function of very frequent local bus service on Wilshire in the No Build condition. Bus service was essentially doubled from existing levels so that No Build combined peak headways on Wilshire are less than one minute apart. The TSM alternative includes rapid bus service on Wilshire, which further improves the headway as well as improving speed for the rapid bus route. The surprisingly low performance of the Wilshire BRT alternative may in part be explained by the transportation model not recognizing the service as distinguishably improved over TSM rapid bus service despite improved frequencies, perhaps due to approaching saturation of bus service.

Significant new ridership would only be attracted if there were a significant improvement in bus speeds. The degree to which this is possible is a traffic design issue of how much signal preemption can be granted, given the need to handle tremendous north-south traffic volumes. The traffic

operating environment would translate directly to estimated run times. A faster run time for this alternative is critical for improving its performance. Any future study of this alternative would require the refinement of this traffic design issue. Correspondingly, refinements will be made to the transportation model to try to distinguish the attractiveness of the transitway mode.

3.2 Highway Transportation Analysis

This section presents a generalized comparative evaluation of the project alternatives based on various traffic, transportation, mobility, and highway performance criteria. The following paragraphs describe in more detail the rationale behind the analysis under each category.

The evaluation category is related to direct effects that a particular alternative will have on overall mobility and levels of congestion at or near intersections in the study area. These effects and impacts may be related to the following items:

- Direct conflicts of transit (bus and rail) vehicles with mixed flow vehicular traffic at intersection and/or mid-block locations.
- Loss of capacity for intersecting (cross) street traffic due to increased traffic volumes and/or traffic signal priority given to transit (BRT or LRT) vehicles along the transit corridor.
- Increased delay and congestion due to additional signal phases along the transit corridor to accommodate and/or protect conflicting turning vehicle.
- Localized congestion impacts created by additional vehicles attracted to park and ride stations along the corridor.
- Loss of capacity for mixed flow vehicles due to conversion of an existing travel lane to a dedicated transit lane.
- Reduction in congestion due to highway trips being diverted to the transit corridor as "new transit riders".
- Redistribution of traffic due to prohibition of certain turn movements (e.g., left turns).
- Loss of on-street parking or spillover of park-and-ride activity onto streets and/or neighborhoods near stations.

3.2.1 *Traffic Congestion and Circulation Impacts*

Traffic congestion and circulation issues are generally indicated in terms of:

- Delays at intersections.
- Travel speeds relative to the capacity of the roadway geometrics.

The factors affecting congestion and circulation effectiveness/ efficiency are usually associated with such variables as:

1. Roadway geometrics – i.e., the number of lanes in each direction, presence of channelization (left and/or right turn lanes).
2. Type/capability of traffic control at the intersections such as stop signs, signalization, dedicated turn phases.

3. Availability of a circulation network system that is capable of moving traffic in all directions.

Alternatives 1 - Bus Rapid Transit (BRT) on Wilshire Boulevard

Intersection Impacts

Due to its full at-grade configuration, the Alternative 1 - BRT along Wilshire Boulevard will have the most at-grade crossings of major and secondary arterials. Consequently, this would have the most negative traffic impacts relative to congestion and circulation, primarily due to the number of intersections encountered and the loss of two lanes (one lane in each direction). Along much of the Wilshire Corridor, the buses will be located in dedicated lanes, thus minimizing bus and vehicle conflicts. However, in segments along the corridor, where the buses may not be able to use an exclusive lane, impacts to traffic will be greater due to direct vehicular conflicts caused by sharing the road with mixed-flow traffic. The challenge in the next phase of the study will be to quantify whether the street can handle traffic with the reduction of lanes, if enough people can be attracted to the BRT to reduce congestion.

In addition, depending on the actual design of the BRT facility, this Alternative may result in a significant reduction of existing left turn movements. While these movements would remain intact in Option 1, they would be completely eliminated in Option 3. Option 2a would eliminate 65% to 70% and Option 2b would eliminate 75% to 80% of these left-turn movements. Consequently, this will have a major impact delays to highway flow and could result in traffic dispersing to alternate routes, or diverting to minor streets thus affecting north/ south circulation as well. The delay effects will also be greater on traffic making right and left turns across the BRT from parallel arterials. These movements however can be controlled via separate signal phases to minimize conflicts and enhance traffic safety.

This alternative will also require various degrees of traffic signal prioritization at the intersections for bus movement along the Boulevard, thereby resulting in loss of signal green-time from, and increased delays to, cross-street traffic. Although these impacts and delays will be minimized or mitigated utilizing the latest vehicle detection and signal timing/ synchronization technology, it will result in increased delays, especially at locations where new traffic signals will be installed.

Street Capacity

This evaluation category is related to negative traffic impacts due to actual loss of traffic carrying capacity along the transit corridor, not just at intersections. It is expected that overall traffic capacity and mobility will be most negatively impacted with the Wilshire Boulevard BRT Alternative. As noted earlier, this alternative will result in loss of a travel lane in each direction, which will reduce traffic capacity and may result in shifts of traffic volumes to parallel streets, such as Sixth or Seventh/ Eighth and others. It should be noted that the two travel lanes would be maintained on Wilshire Boulevard, which in theory is similar to current off-peak conditions where parking is allowed. However, under this Alternative, the two lanes will likely carry less traffic than the present two-lane condition in each direction. This is because of the local buses using the curb lane and stopping at bus stops, trucks making deliveries, or autos dropping/picking up people along the curb, all of which will further reduce the usefulness of the curb lane.

Alternatives 2 & 3a or 3b - Bus Rapid Transit (BRT) and Light Rail Transit (LRT) in the Exposition Corridor

Intersection Impacts

The BRT in Alternative 2 and the LRT in Alternatives 3a and 3b would use the existing Exposition ROW for approximately 12.3 miles of their respective routes. The remaining portions of these routes would either be in exclusive guideway, exclusive bus lanes, or in mixed traffic flow. While the portion of the alignment within the Exposition ROW will be free from direct conflict with vehicular traffic along the corridor, there would still be a number of grade crossings that would likely affect local traffic movements, at least to some degree. The overall effect of these crossings, however, may be quite minimal due to recent advances in the technology of regional traffic control and in particular rail / vehicular interface.

Where the ROW is in the median of Exposition Boulevard (between Figueroa Street and Rodeo Road), left turn lanes using the median would be precluded since both the BRT and LRT would minimally require the full median width for their operation. This situation would result in left-turn prohibitions at seven intersections along Exposition Boulevard, which in turn would cause delays to turning movements and result in traffic dispersing to alternate routes thus affecting north/south circulation. There will be moderate impacts, however, relative to traffic on the cross streets.

In the case of the LRT alternatives, the bulk of the non-ROW portion of the route would be either in existing exclusive guideway (the Long Beach Blue Line) or possibly on aerial structure (downtown Santa Monica), with the remainder using existing city streets. While the portion of LRT alternatives within city streets are not expected to remove any existing traffic lanes (since mixed-flow operation is envisioned) there would at least be some impact to the surrounding street traffic, particularly left turn movements.

The non-ROW portion of the BRT alternative would either be in mixed flow traffic (with impacts similar to the LRT alternatives) or in exclusive bus lanes which would displace existing vehicular traffic, and for that reason could have a significant impact to the surrounding traffic movements.

Any level of transit priority treatment for buses or light rail vehicles will result in loss of green time for cross traffic and increased delays. Again, it is expected that modern signal system technology will minimize these delays, optimizing and balancing available signal capacity and efficiency in both directions. Moderate traffic delays and impacts will also be associated with vehicles making turns from adjacent streets, which are parallel to Exposition Boulevard. In order to minimize vehicle conflict and increase safety, these turn movements will be controlled by separate left and right turn phases.

Grade Separations

Grade crossings can have a significant effect to cross traffic. Depending on the level of disruption caused by the traffic signal priority or gate systems that will be used in the Exposition alternatives, it may be desirable to provide grade separations at certain key locations. It should be noted that since the 1994 BRW study on the Exposition corridor, there have been major advances to traffic management, and particularly pedestrian safety, at railroad grade crossings. There are a number of crossings in this corridor that could safely and functionally remain at-grade using today's state of the art technology. Other crossings are either too complex or would have serious traffic impacts if they were to remain at-grade. To address these impacts, Alternative 2, the BRT alternative along Exposition, proposes to grade separate a total of twelve (12) streets. Alternative 3a, the LRT

(baseline) proposes twenty-five (25), while Alternative 3b, the LRT (minimum grade separations) proposes twelve (12).

Street Capacity
Alternatives 2 and 3, which use the Exposition right-of-way, would have virtually no impacts associated with a loss of traffic carrying capacity on streets along the transit corridor. There will be no lanes lost or narrowed as a result of these alternatives.

Alternatives 4 & 5 - Heavy Rail Subway along Pico/San Vicente and Wilshire Boulevards

Intersection Impacts
Alternatives 4 and 5, the two heavy rail subway alignments along Pico/San Vicente and Wilshire, respectively are on the opposite side of the impact scale for this evaluation criterion. In these cases, there will be virtually no direct traffic impacts related to transit vehicles, with the exception of the bus connector west of the I-405 Freeway. In fact, it is expected that due to the service frequency and lack of mode transfers with the Red Line service, these two alternatives will produce the highest reduction of overall vehicle trips in the system, as well as the highest transit patronage.

Street Capacity
Alternatives 4 and 5, which will have subway configurations for heavy rail, will also not result in any loss of traffic lanes or street capacity along the corridor east of the I-405 Freeway. There may be some moderate impacts west of the Freeway, depending on the configuration of the bus connector to downtown Santa Monica. If this connector is designed as a BRT system, it may result in loss and/or narrowing of lanes along Wilshire Boulevard. If this connection is a conventional, but higher-frequency bus system in mixed-flow traffic, it will have virtually no negative impacts on loss of traffic capacity along Wilshire Boulevard.

Alternative 6 - Aerial Heavy Rail Transit (HRT) on Wilshire Boulevard

Intersection Impacts
Alternative 6, the Wilshire Aerial alternative, is also expected to have relatively moderate-to-neutral levels of traffic impacts. These impacts are expected to be mostly due to localized park-and-ride access issues, and possible loss of turning movement capacity on Wilshire Boulevard due to placement of columns supporting the aerial structure or station access stairways, escalators and elevators. Some moderate impacts to vehicular traffic can also be expected with the bus or BRT connections west of the I-405 (San Diego Freeway). There will also be some loss of lanes in Wilshire Boulevard (particularly median left-turn lanes) in the area west of Crenshaw Boulevard, where the transition from subway to aerial structure will occur, as well as in the center of the street where the supports for the guideway would be located.

Street Capacity
The Wilshire Aerial alternative is expected to have relatively less negative impacts on traffic capacity and mobility. This alternative is not expected to result in loss of travel lanes, however, the placement of columns may result in loss of or negative impact on left turn pockets. In addition, in some cases where right-of-way may be more limited, travel lanes on Wilshire may need to be narrowed (but not eliminated) to accommodate the additional width required for the aerial structure columns.

3.2.2 Access to Stations

This evaluation category is related to the level of convenience, safety and accessibility of the Alternatives to riders via the bus transit, safety of pedestrian relative to transit vehicle conflicts, and the availability and ease of access to park-and-ride facilities along the routes.

Bus Interface / Access

The BRT scenarios under Alternative 1 and 2 will provide the most flexibility to riders in the corridor in terms of accessing the corridor via bus service. This would be accomplished through the enhanced connectivity via transfers at the stations and direct access to the busway at various locations where buses serving wider areas of the Mid City/ Westside would proceed along the busway (see Figure 6.). The various rail alternatives would provide the least convenient bus connectivity since transfers would be required at each rail station. However, these impacts are considered to minor or neutral.

Safety Issues

This category is related to potential safety concerns associated with conflicts between transit vehicles and pedestrians given the specific alternative. Generally speaking, BRT and LRT alignment options will result in different access and safety impacts relative to accessing each respective station.

Access to stations in Alternative 1 – Wilshire BRT will be relative safe since there will be either curb loading (with minimal traffic interaction), or median loading (with access provided by existing crosswalks). In the Exposition ROW alternatives (2, 3a, and3b) the safety issues are more pronounced. This is mostly due to the introduction of a transit mode along a vacant right-of-way that is relatively new or unknown to residents along side it. Buses or trains will operate at relatively high speeds within this exclusive ROW and likely to be a number of pedestrian crosswalks, occurring at stations and various grade crossings. Special measures must be applied at these points to ensure maximum safety.

Given the subway configuration of Alternatives 4 and 5, these two alternatives will not have any negative impacts on pedestrian access and safety. The Wilshire Aerial alternative will have aboveground stations located in the median with the increased pedestrian activity utilizing escalators/elevators to reach the rail platform. These will probably result in a somewhat heightened concern for pedestrian safety, compared to the subway alternatives where all increased pedestrian activity near station portals will be completely separated from street traffic.

Access to Park-and-Ride Lots at Stations

Finally, it is anticipated that there will be additional traffic created by transit patrons driving their vehicles to access the various planned park-and-ride facilities at the stations along the route alignments. Where park-and-ride facilities are provided at stations common to more than one alternative, the access points to the parking is similar in all alternatives. Consequently, access related impacts (in terms of movement into/out of parking areas) to the stations from adjacent streets is primarily influenced by the size of the parking areas or facilities.

3.2.3 *Parking Facilities*

This category is related to the size and impacts of the park-and-ride facilities that will be provided and the potential of parking spillover to adjacent neighborhoods. This section deals with loss of parking, proposed parking facilities and their respective number of parking (private, MTA- owned and shared) spaces, and finally a discussion of spillover impacts upon adjacent neighborhoods.

Loss of On-Street Parking
This category is related to impacts due to actual loss of on-street parking spaces, as a result of the particular transit alternative. Various alternatives will require taking of street right-of-way (either lanes or parking) to accommodate the particular transit operation.

Park and Ride Facilities / Number of Parking Spaces
This category is related to the number and size of parking facilities provided within each alternative.

- **Alternatives 1 & 6 - Wilshire BRT and Aerial**

Wilshire BRT and Aerial Alternative will potentially result in loss of on-street parking spaces. This loss will reduce the amount of all-day and/or peak hour parking, which may result in parking impacts spilling over to adjacent streets and neighborhoods. These impacts will be mitigated through implementation of off-street parking facilities, to the extent possible, where the loss of on-street parking spaces will be the highest. For the Wilshire BRT and Aerial Alternatives, potential off-street parking spaces could be negotiated local property owners, or entirely new parking facilities provided. This will be investigated in Phase 2.

Park and Ride facilities are proposed at six (6) locations– with a planned parking supply of 200 private spaces, 150 spaces on MTA-owned property, and 600 shared-parking spaces - for a total of 950 spaces. Similarly for the Wilshire HRT Aerial Alternative, there would be 100 private spaces, 150 spaces on MTA property, and 600 shared-parking spaces - for a total of 850 Park and Ride spaces.

- **Alternatives 2 & 3 - Exposition BRT and LRT**

Alternatives 2 and 3, along Exposition ROW will not result in loss of any on-street parking spaces except for the stretch between Vermont Avenue and Gramercy Drive. In this reach the existing curb parking would be retained except at stations, and left turns would be prohibited. Nonetheless, the Exposition ROW has eight (7) proposed Park and Ride facilities, with a planned parking supply of 730 private parking spaces, 300 spaces on MTA-owned properties, and 170 shared-parking spaces – for a total of 1200 spaces, and an additional 300 shared parking spaces in downtown Santa Monica for Alternatives 3a and 3b.

- **Alternatives 4 & 5 - Wilshire HRT and Pico/San Vicente HRT**

The heavy rail Alternatives 4 and 5 will not have parking loss impacts east of the I-405 Freeway where the facility will be subway. However, it may result in the loss of some parking space west of the Freeway, particularly if the bus connection is implemented as a BRT facility along Wilshire. Alternative 4 -the Wilshire HRT on Wilshire has four (4) proposed Park and Ride facilities, with a planned parking supply of 100 private parking spaces, 150 spaces on MTA-owned properties, and 600 shared-parking

spaces – for a total of 850 spaces. Alternative 5 – Wilshire HRT (via Pico/ San Vicente) has two Park and Ride facilities proposed, with a planned parking supply of 600 private parking spaces and 600 shared-parking spaces – for a total of 1200 spaces.

3.2.4 Transportation Performance Measures

This section discusses in general the need for selection of transportation performance measures (TPM) to quantify the benefits of each alternative and to provide performance measures that are related to person movement and travel time based measures for all major investment studies. Generally, the selected TPM are most concerned with the overall effect of the transportation improvement on the transportation system and the direct impact of alternatives. The primary objective of TPM is to support decisions on significant investments, and that all alternatives are considered at the planning level. TPM is part of measure of effectiveness (MOE) required for a major investment study. It is important to select appropriate evaluation measures to match the goals and objectives set forth early under purpose and need of the project.

The selection of TPM is a critical element in a major transportation investment study (MIS) such as this study. The measures selected should be able to evaluate alternatives and provide necessary information for good decision- making. For a multi-modal transportation analysis such as this study, there are several important TPM elements that could be estimated using standard transportation models such as the LACMTA regional travel model.

The TPM measures selected will be estimated using the regional model and evaluated as part of Phase 2 under environmental analysis. Currently the preferred TPM are predominantly related to persons and time. The focus on persons and time matches the focus of most MIS studies where the objective is to provide a safe and efficient movement of people and goods.

The most significant factors that should be considered when selecting MOE's for a major investment study per FHWA/FTA (U.S D.OT) are:

- Match the MOE's with goals and objectives of MIS;
- Develop and select the MOE's early in the study with key input from decision makers;
- Use comprehensive set of measures, but do not substantially duplicate or restate benefits or impacts;
- When possible, quantify impacts and don't simply use subjective judgements;
- Provide perspective on the magnitude of the impacts; and
- Identify the error level and assumptions of calculations in relation to measured values.

Based on the above criteria the following TPM will be obtained from the LACMTA Regional Transportation Model for evaluating the alternatives. The TPM considered are:

- *Person Trips*: This measure will provide the total daily Los Angeles County person trips for each alternative based on trip purposes. Person trips include all trips made by individuals.

- *Transit Trips*: Similar to person trips, this measure includes all trips made by individuals using different transit related modes such as bus and rail within the county.

- *Vehicle Trips*: This measure provides an indication of the total number of trips made by automobiles within the county. Using appropriate ridership factors, it is possible to convert vehicle trips into person trips.

- *Transit Mode Split*: Mode split in general is suitable for comparison of various modes being used for travel within the county.. Also this measure is sensitive to many factors such as population, access, cost and poverty level. The values of mode split can be interpreted to observe the effect of transportation improvement on the system.

- *Drive-alone Trips*: A very interesting measure that provides the total number of single-occupant driver population who are making trips in the system. The majority of these trips are home based work trips. Home based work trips form an important part of the study and relieving the congestion is mainly aimed at this group. The loss of production can be estimated by the delay caused to this group. This is also a surrogate measure of the usage of HOV lanes. The greater the drive-alone trip, less usage of HOV lanes and vice-versa.

- *Vehicle Miles of Travel (VMT)*: An ideal TPM for multi-modal comparisons and can easily be estimated using the model. This TPM is applicable for all roadway modes and can be easily interpreted.

- *Vehicle Hours of Travel (VHT)*: This TPM measure provides information on the total hours of travel spent by all vehicle trips within the system. VHT can also be used as an indicator of the extent of delay in the system. Travel delay can be estimated using the vehicle traffic per lane and traffic speed.

- *Average Speed*: A suitable measure for comparing peak and off-peak performance of the transportation system with the alternatives. This is suited for technical analysis and understood by most audiences. The travel speed is estimated for each roadway link using the daily traffic volume per lane values. Each link can be categorized as congested or uncongested based on the level of service criteria used. Also, speed could be used to calculate delay and excess fuel consumption.

Most of the above TPM can be estimated for both peaks (a.m. and p.m.) and off-peak periods. Also, they can be estimated for total daily numbers using the model. Peak travel periods in urban areas such as Los Angeles are the morning and evening "rush hours." The length of the rush hours varies, but normally it is 3 hours during a.m. (6:00 a.m. to 9:00 a.m.) and 4 hours during p.m. (3:00 p.m. to 7:00 p.m.). The rush hours are known to exhibit delays, as the existing transportation system cannot handle the demand within these rush hours. Also, during the rush hours there will be a "peak hour" during which the system seems to collapse. In Phase 2, a summary of TPM will be estimated for base 1998, base 2020 no build condition and the alternatives, including TSM. The TPM of the alternatives will be compared with TSM results. Also each alternative will be compared relatively to determine the competing benefits and impacts.

Based on experience with, and current understanding of the Los Angeles County transportation system and project alternatives proposed in this study, it is expected that the alternatives will perform better in reducing the total vehicle trips and drive-alone trips when compared with TSM

alternative. The TSM alternative may show relative modest decrease in VMT and increase in transit ridership over the no build condition. The shorter Redline extension would not show any dramatic reduction in vehicle trips because in the Wilshire corridor many of the trips are already using transit. The Exposition alternatives may provide significant reduction in trips because they provide a new transit alternative in the east-west corridor, parallel to the congested Santa Monica Freeway (I-10). The Wilshire alternatives enhance service in a corridor that is already served by bus transit.

The reduction in home based work trips for each alternative indicates the impact on transit ridership. It is expected that all the alternatives will increase transit ridership for work trips, particularly with BRT and LRT. The transit mode split is expected to stay fairly constant for all future scenarios.

The VMT may be higher in 2020 due to the fact that the length of a typical trip may increase due to congestion and also due to increase in number of vehicles and trips. The daily VMT is the average daily traffic of a section of roadway multiplied by the length of that section of roadway in miles. The changes observed in VMT may reflect the effectiveness of alternatives to cause a shift from the auto mode to the transit mode.

The VHT is a measure of total time spent in travel within the system, which considers travel time and delay. Higher VHT is typically an indicator of higher congestion levels and more delay to all commuters. Both VMT and VHT have been increasing steadily according to SCAG data. The increase in VHT will also indicate indirectly the effects on overall system speed. Lower speeds will indicate that people are spending more time on the roadway and congestion has increased.

It is expected that TSM will a have minimal impact on VHT. Where as HRT would have greater impact on VHT reduction. Also, it can be expected that Exposition LRT with grade separation at major intersections would reduce VHT. Finally, the Wilshire BRT may have the least beneficial impact on VHT.

The projected growth in the SCAG region between 1998 and 2020 is significant. According to SCAG, the region will add nearly six million people, which is the equivalent of adding two Chicago's to the region. Therefore, the above selected MOE's would assist in evaluating the alternatives to improve the existing transportation system in an objective manner and lend assistance to the decision making process.

MOE's and Modeling Requirements

The selection of MOE's for inclusion with MIS documents should be undertaken very carefully as it determines which alternative may be selected for implementation. As mentioned earlier, the MOE's are obtained as an output from the LACMTA Regional Transportation Model. The accuracy of the model in duplicating the existing and future transportation system will be the key in understanding the real benefits and impacts due to the alternatives proposed in this MIS. In modeling the transportation system, several key parameters are input such as population, socio-economic data (SED), roadway links, number of lanes, capacity, transit headways, modes of travel, area type, speeds and several other important variables. The accuracy of these input data and the efforts put in validating the model determines the accuracy of the output. It is essential that the key parameters required to develop and run a model should be thoroughly tested before using the output for obtaining the MOE parameters listed above.

4. ENVIRONMENTAL BENEFITS AND CONSEQUENCES

4. ENVIRONMENTAL BENEFITS AND CONSEQUENCES

4.1 Land Use and Economic Development

Proximity to Existing Transit Supportive Land Uses. Uses considered to be supportive of transit include higher density residential areas, intensive commercial and industrial developments that represent significant job centers, colleges and universities, institutional facilities such as medical centers and civic centers, and regional recreational facilities. It is desirable to serve these destinations with transit to enhance their accessibility and simply because they attract people from within and outside the study area. Conversely, because of their intensity of development and/or level of activity (in terms of people coming and going), they are natural sources for transit riders.

The Wilshire Corridor conveniently links a number of activity centers and much of the corridor is bounded by transit supportive uses. Table 4.1 indicates that nearly 4,500 acres of land within 0.5 mile of the Wilshire bus and heavy rail alignments would be supportive of transit. This represents over 40 percent of the total land area in the corridor. The Exposition Corridor is lined with more than 2,800 acres of transit supportive land uses, or about 30 percent of the total land area in this corridor. There is a higher proportion of transit-supportive land uses in each of these corridors than in the overall study area, which contains about 26 percent transit supportive uses (Figures 1.7).

Transit supportive land uses exist throughout the Mid-City/Westside study area. In particular, there is a particularly high concentration of such uses along the Santa Monica Boulevard between Hollywood and Wilshire Boulevard. This observation, combined with the high travel demand seen earlier in the "spider diagram," suggests that the Mid-City/Westside study area potentially has three viable transit corridors: Wilshire, Exposition, and Santa Monica.

Table 4.1
Transit Supportive Land Use Within 0.5 mile of Corridors (in acres)

Land Use	Wilshire Corridor	Other land uses	% of Total	Exposition Corridor	Other land uses	% of Total
Commercial	705	1,339	34%	650	874	43%
Institutional	610	--	100%	605	--	100%
Higher Density Residential	2760	622	81%	1325	531	71%
Regional Recreational	410	--	100%	260	--	100%
Other Non-Supporting Uses	--	4,362	0%	--	5,247	0%
Total	4485	10,858	41%	2840	9,492	30%

Source: SCAG 1994 and EIP Associates 1999

Accessibility to Existing and Future Population and Employment. The proximity to supportive land use can also be measured in terms of the population and employment served by the various alternatives. The number of persons and employees within 0.5 mile of a proposed transit station indicates the convenience of the transit service and the potential ridership, since 0.5 mile is considered the maximum distance people will walk to access transit. Table 4.2 reveals that a substantial number of people and employees is within 0.5 mile of the proposed transit stops.

Population increases around the Wilshire Corridor transit stops are projected to parallel the population growth of 19 percent forecast for the study area; growth in the Exposition transit stop areas would leap by about 26%, according to SCAG growth forecasts. By contrast, employment growth around the transit stops is expected to be similar to the employment growth in the study area for all alternatives. Current demographer projections predict that growth around the Exposition BRT or LRT stops and around the Wilshire Aerial stations would be slightly greater that the 15% anticipated for the entire study area; whereas, Wilshire Boulevard BRT and subway would be slightly less.

Table 4.2
Population and Employment Increases (1997 – 2020)

Alternative		Population (in thousands)			Employment (in thousands)		
		1997	2020	% Increase	1997	2020	% Increase
1	Wilshire BRT (10 stops)	107	125.1	17	133.1	151.4	14
2,3	Exposition BRT or LRT (12 stops)	117	147.3	26	90.6	106.1	17
5	Wilshire Subway HRT (8 stops)	98.6	116.8	18	134.8	152.4	13
6	Wilshire Aerial HRT (7 stops)	60.2	71.9	19	94.7	111.7	18

Conformance with Public Policy. The City of Los Angeles General Plan Framework has aggressively directed growth towards the Wilshire Corridor, which has been designated a "Transit Priority Highway," in anticipation of a transit system. The Beverly Hills General Plan also discusses Wilshire Boulevard as a possible transit corridor. The Exposition Corridor has been examined to a lesser degree in policy.

The Cities of Santa Monica and Culver City have proposed some form of transit along the Exposition Corridor in their General Plans. Land use patterns have direct impact on the efficiency and desirability of transit in an urban environment. Long-range planning policy documents from westside cities have addressed the importance of linking land use development patterns, densities, and urban form surrounding the potential alignments and station locations to city policies such as zoning that support and encourage the use of transit. The four jurisdictions that would potentially benefit from transit interventions on the westside include Los Angeles, Culver City, Beverly Hills, and Santa Monica. The intensification and mix of uses in the City of Los Angeles are intended to enhance walkability of neighborhoods and districts and enhance access to public transportation. Existing zoning in the City attempts to correlate growth and transportation from two perspectives:

(a) promoting the intensification of density and enhanced mix of uses in proximity to existing and planned transportation corridors and stations and

(b) establishing new transportation corridors in response to existing and planned high density, activity centers.

Culver City policies include specific discussion about the Exposition Right of Way being developed as a fixed-guideway transit corridor, but that support for the fixed-guideway be balanced against protection of existing established neighborhoods. In order to facilitate and

support transit, the City strives to encourage high trip-generating uses near transportation corridors, specifically encouraging and providing incentives for increased residential and commercial density for areas accessible to transportation facilities, and allow reduced parking requirements for land uses that share parking facilities.

In the City of Santa Monica commercial corridors, such as Wilshire Boulevard (Wilshire Alignment) and Olympic and Pico Boulevard (adjacent to and near the Exposition alignment), are designated to have intense garden office development (Olympic Boulevard east of 20th Street) in a Special Office District, and development on Pico Boulevard to include high-density residential and service commercial. As an implementation measure, the Olympic Corridor is designated to support future light rail through the joint development of commercial land uses at station locations. The area immediately adjacent to the Exposition Alignment is designated for preservation as linear public open space.

4.2 Catalyst for Public/Private Economic Revitalization

This discussion focuses on the question as to whether there a significant differences between the Mid-City/Westside alternatives affecting economic development potential, and inducing growth within adjacent communities and neighborhoods. The concept of a "catalyst" for economic revitalization has been described over the years as: joint development, transit-oriented development, transit-focused development, and transit-integration strategies. In general, all of these terms relate to the idea that mutual benefit is derived by providing enhanced economic benefit to the developer while allowing the transit entity to capture some of the value from the project through assessments, fees, shared equity arrangements, as well as decreased construction and operating costs, and increased system ridership. Examples of joint development opportunities around the country have been numerous. Some of these include: MTS/James R. Mills Building (MTDB, San Diego, California), American Plaza (MTDB, San Diego, California), Laguna West (Sacramento, California), and Fruitvale Transit Village (BART, Oakland, California).

The potential for joint development opportunities exist for alternatives in the Mid-City/Westside study area. The degree to which the opportunities can be successful, in general, depends on the type of system proposed and other key factors, as discussed below. The mix of factors leading to the success of transit-oriented development are complicated and extremely dynamic.[1] Some of the key ingredients have been found to be the following:

- station area design features which enhance transit appeal,
- regional planning programs and transportation and land use policies which increase entitlements in station areas,
- efforts by local governments to permit and promote development around stations, and
- the willingness of transit agencies to coordinate station development activities with transit operations.

Market characteristics and trends are also critically important as a framework for local economic and development changes. Transit is not a "stand alone" factor that can in itself stimulate growth and

[1] *Transit Integration Program*, South Coast Air Quality Management District Mobile Source Reduction Committee, Prepared by Stevens/Garland Associates, Inc. with the cooperation of the City of Pomona, November 1998.

development changes. Experience has shown that transit is more than likely to support or enhance existing market opportunities. Where overall regional or local economic conditions are poor, transit-related development potentials are greatly reduced.

The overall affect of transit improvements on adjacent and surrounding land uses is magnified by the nature of the transit improvement. Modes carrying high patronage and involving the development of extensive station areas have the greatest potential to induce change, if consistent with local entitlement policies and in sync with local market and development trends.

Given the elements discussed above and the different modal options under consideration in the Mid-City/Westside Corridor, the potential for a transit based catalyst are likely to be varied, with no clearly distinguishing factor between modes or corridors. Specifically, the subway HRT, aerial HRT, and LRT alternatives along the Wilshire and Exposition Corridors would present relatively better opportunities for induced development compared to the bus alternatives. This is largely true because the HRT alternatives attract the highest patronage and require significant amounts of land area for stations. The LRT and bus alternatives lack the patronage levels and visible land use presence to stimulate major change and reinvestment.

On a corridor specific basis, both the Wilshire Corridor and the Exposition Corridor exhibit conditions that may be conducive to further economic changes. The sections of Wilshire Boulevard, east of Beverly Hills have declined somewhat in recent years in part due to the overall inaccessibility of the Mid Wilshire area. Reinvestment is taking place in terms of the reuse of office buildings, conversion of office to residential uses, and the introduction of new higher density residential uses. HRT would represent a positive reinforcing element to these emerging trends. From a public policy standpoint (City of Los Angeles Land Use and Transportation Policy and General Plan Framework), HRT operations along Wilshire would likely further reinforce ties between the many activity centers and destinations concentrated in this corridor.

LRT options in the Exposition Corridor would likely benefit local redevelopment and revitalization actions in Hoover Redevelopment Area, and Crenshaw/Mid City Redevelopment area in the City of Los Angeles. LRT could also function as a value-added attraction/amenity to the Haden industrial tract in Culver City --which has undergone significant private reinvestment in recent years, and has attracted entertainment and internet-related firms). In the Palms area, an LRT station could reinforce local reinvestment in neighborhood businesses and services. Further west, the low scale nature of adjacent neighborhoods and the minimal amount of commercially zoned land would tend to reduce any growth effects associated with transit.

In sum, although there are potential induced development opportunities with LRT in the Exposition Corridor, the greater patronage, station infrastructure requirements and emerging market trends would favor HRT improvements along the Wilshire Corridor to have the greater catalytic effect.

4.3 Neighborhoods and Community Resources

Community Cohesion and Quality of Life. A significant effort has been made to involve the community in the planning process in order to identify those neighborhood qualities that are considered an important element of community cohesiveness and quality of life. Outreach efforts for previous studies in the Mid-City/Westside Corridor were also reviewed and utilized in the

analysis. The neighborhood qualities identified by the community during the stakeholder meetings include land use changes, traffic and congestion, aesthetics, noise and vibration, crime, and safety.

The primary neighborhood concern regarding bus rapid transit on Wilshire Boulevard is the elimination of two lanes of travel (one in each direction) and the potential for a resultant overflow of traffic onto neighborhood streets. Business owners were concerned about the loss of parking on Wilshire Boulevard, as well as narrowing sidewalks to accommodate a busway. In addition, because the medians have recently been enhanced by landscaping along a segment of Wilshire Boulevard, all stakeholders were concerned about the potential for removal of this landscaping and the associated visual impacts.

Subway heavy rail along both Wilshire Boulevard and Wilshire Boulevard via Pico/San Vicente did not generate any major quality of life concerns; instead, the primary issue was the cost effectiveness of this mode of transportation.

There is a group of supporters for a monorail system along Wilshire Boulevard, however, some neighborhood groups vehemently opposed this alternative due to potential noise impacts, visual intrusiveness, and lack of privacy for adjacent land uses.

Bus rapid transit along the Exposition Corridor was generally perceived as potentially unsightly and noisy, with the potential to cause traffic impacts at intersections due to presumption of signals. There were also some concerns about the ability of a busway to provide adequate capacity. There was some support for a busway by some groups only if it diverted around their neighborhoods. Light rail transit along this corridor was received with mixed reactions. There are many residents who oppose light rail along the Exposition right-of-way. Some individuals, as well as homeowner's associations; however, support light rail. Lack of privacy, noise, traffic impacts, and safety are seen as obstacles, especially in residential areas.

Community Cohesion. Transit fixed guideway projects can pass through existing neighborhoods and communities, severing or impeding social interaction, circulation patterns, or worse, destroying community fabric. Although the Wilshire BRT and Aerial would greatly transform the appearance and character of Wilshire Boulevard through the Mid-City areas, either would not disrupt a cohesive social unit. The Wilshire subway alternatives would be below ground and would not be a visual or physical separator. The Wilshire aerial alternative would cause significant visual and physical disruption, but would not separate a cohesive social unit: the communities north and south of Wilshire Boulevard have been and remain separate and distinct. The Exposition BRT and LRT alternatives would operate within an historic rail right-of-way. The introduction of bus or rail service would not be expected to significantly affect community cohesion. The Exposition LRT would require security fences along the right-of-way that could slightly alter existing pedestrian circulation.

Service to transit dependent populations. Both the Wilshire and Exposition Right-of-Way Corridors are located within densely populated regions of the Mid-City/Westside study area. As a requirement of satisfying Federal Transit Administration (FTA) guidelines associated with New Starts Criteria, the number of households located within a one-half mile radius of proposed stops along the full length of both corridors were identified. In 1997, approximately 75,000 and 80,000 households were located within this radius for the Exposition Right-of-Way and Wilshire Corridors respectively. These figures are projected to rise to 97,000 and 99,000 by 2020. Figures 4.2 and 4.3

illustrate the respective population and employment densities for these same time periods along each corridor. These were compared to the overall county average to recognize the sizable differences that occur.

Figure 4.1
Population Density within One-Half Mile of Proposed Stops

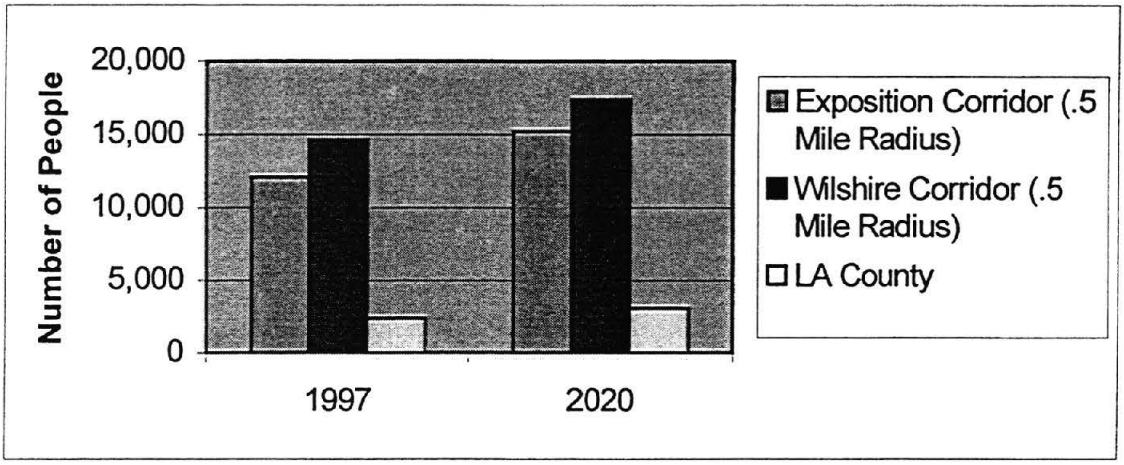
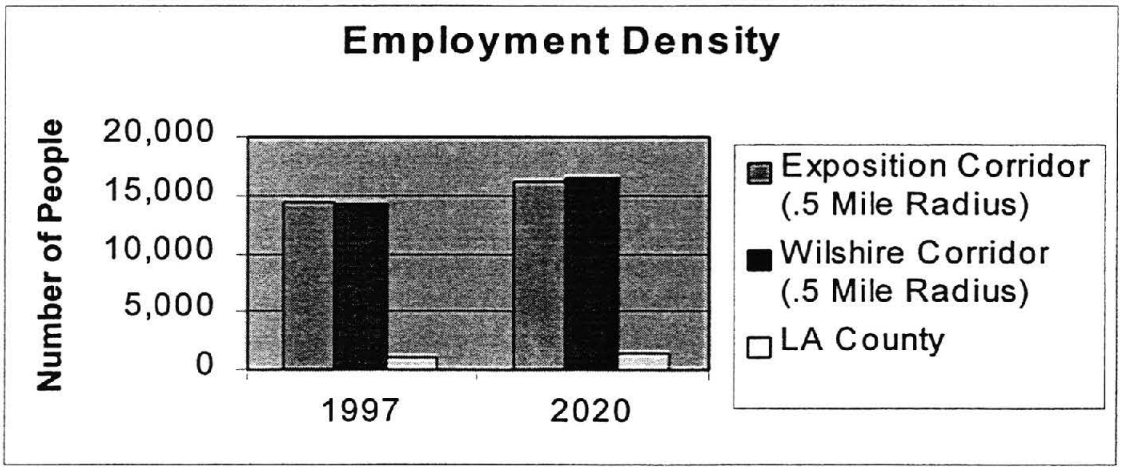


Figure 4.2
Employment Density within One-Half Mile of Proposed Stops



Several census tracts within the study area contain high proportions of household that have no automobile available, as well as those households that have lower incomes, as seen in Figures 1.11 and 1.12. These two factors are considered to be indicative of transit dependency. According to the 1990 Census of the 18 percent of households in the study area did not have a vehicle, compared to 11 percent in the County. Moreover, over 20 percent of the households have incomes below poverty stakes, compared to 15 percent in Los Angeles County.

The figures strongly suggest that the majority of these households are concentrated in the eastern portion of the study area. Although a portion of the eastern study area is served by the existing Metro Red Line with stations in Downtown, Mid Wilshire, and Hollywood, there is no significant transit infrastructure that allows the population in the eastern portion of the study area to travel westward where there is expected to be significant growth in higher paying industries and jobs. The lack of westward serving transit infrastructure significantly affects job accessibility and socioeconomic mobility of lower income and transit dependent households. In addition, the lack of higher capacity transit service to the west also limits access to services such educational centers as UCLA in Westwood, West LA College, and Santa Monica City College, as well as to major medical facilities, also located in Westwood and Santa Monica. Any alternatives that would bring high capacity transit service to the Westside would increase access to the services, as well as other activity centers, housing, and employment.

While the alternatives along the Wilshire Corridor extending to Ocean Avenue in Santa Monica would provide access to more activity centers than the alternatives along the Exposition Corridor or the Wilshire Alternatives to Federal Boulevard in West Los Angeles, each of the alternatives would provide high capacity transit service to the Westside. This would be considered a beneficial impact.

4.4 Visual and Aesthetic Qualities

Transit investments, largely because of the infrastructure they create at the transit stops, have the potential to alter the visual landscape in the study area. On the positive side, transit stops can enhance pedestrian activity; enliven the streetscape through architecture, signage, lighting, and landscaping; and support larger revitalization efforts to transform and rejuvenate areas. On the other hand, certain modes require overhead wires or structures that can detract from the visual setting.

Loss of Street Trees or Landscaping. Significant segments of the Wilshire Corridor – notably Wilshire Center and Miracle Mile – and Exposition Boulevard – notably near USC and Exposition Park – have landscaped medians which have been recently reconstructed. The Wilshire and Exposition BRT alternatives would involve the removal or reconstruction of these medians. On the other hand, properly designed, both alternatives could mitigate this impact with extensive new medians of different width and configuration, plus additional landscaping on the sides of the street, where possible. Furthermore, BRT could add medians and landscaping in segments where none now exist.

The Exposition LRT would involve the loss of street trees on existing landscaped medians. Because of the overhead catenary system (OCS), any replacement landscaping would be restricted to certain types of trees and plants that would not eventually grow into the OCS. As with the BRT alternative, an LRT project could add landscaped medians along certain segments of Exposition Boulevard where none now exist. The impacts on the Exposition right-of-way segments are not significant, since there is little existing landscaping.

A Wilshire aerial HRT would have a major landscape and visual impact. Significant segments of Wilshire have landscaped medians, as noted above in the discussion of the Wilshire BRT. An aerial structure would generally preclude the replacement of lost trees, although it is conceivable that some shorter species could be used. However, planting trees under an overhead structure is not a favorable environment for plant growth. Some low landscaping could be established under the

aerial structure, although the shadows from the structure and associated vehicle fumes make a harsh growing environment.

In contrast to the above alternatives, the Wilshire subway HRT alternatives would have no effect on street trees or landscaping, except possibly at station locations.

Alteration of Streetscape. Because of the reconstruction of the roadway, the removal and/or reconstruction of existing medians, and the establishment of fixed transit facilities in the middle of the roadway where none has ever existed, a BRT, whether on the Wilshire or Exposition corridor, would be considered a major transformation of the streetscape (Figure 2.15). Through careful urban design and mitigation, the project could have a net positive impact on the streetscape. This notwithstanding, the impacts of BRT on the Exposition Corridor are less signficant than on the Wilshire Corridor. This conclusion reflects the many segments of the Exposition Corridor that are in separate rights-of-way of industrial character, and because Exposition Boulevard is not as significant historically or architecturally as Wilshire. BRT impacts could be limited to low barriers and compact station stops approximately once every mile. However, there are segments of sensitivity and importance, particularly the historic landscapes and buildings of the USC/ Exposition Park complex and segments adjacent to residential uses. These must be sensitively handled with urban design measures.

While Exposition Boulevard is not as historically or architecturally significant as Wilshire, it would be impacted by the Exposition LRT project because of the OCS (Figure 2.32). This impact can be mitigated.

Wilshire Subway HRT alternatives generate visual impacts that are very localized rather than continuous, being limited to subway portals. The portals themselves are of limited impact, and may actually improve the streetscape through the use of lighting, landscaping, plazas, kiosks, public art, and other elements. Where the portal is incorporated into a structure, the impact is virtually nil.

By contrast, the Wilshire Aerial project would have a dramatic and permanent impact on the streetscape of Wilshire Boulevard (Figure 2.39). No precedent exists in Los Angeles for aerial rail structures along major boulevards. While some mitigation through urban design and architectural design is possible, there are unavoidable negative impacts on the streetscape, such as excessive shading, blocking of views, blocking of storefronts and upper story windows, visual privacy encroachments between rail passengers and building occupants, loss of landscaping and street trees. These conclusions confirm the assessment performed of an aerial alignment in the 1987 SEIS/SEIR for the Los Angeles Rapid Rail Transit Project and became the basis for rejecting an elevated guideway as a viable alternative. For the same reasons cited in that report, an aerial alignment would result in unacceptable environmental impacts.

4.5 Public Art and The Design Process

As part of the process of designing any of the alternatives, whether light rail, dedicated busways or a combination of the two, artists will be hired to participate from the earliest stages of conceptual design. Prior to hiring any artists, the Metro Art staff will invite interested members of the communities (residential, business and institutional) adjacent to stations and the alignment, to form a Metro Art Advisory Group. This Advisory Group will research and assemble information unique to the community. This process of community participation follows FTA policy (Circular 9400.1A)

which states: "To create facilities that are integral components of communities, information about the character, makeup, and history of the neighborhood should be developed and local residents and businesses could be involved in generating ideas for the project."

Selected members of the Advisory Group will be added to a selection panel who will be charged with selecting artists to participate in the design team after an open public RFQ. Artists shall be hired prior to, or simultaneous with, the hiring of the architect and other team members. Before the design team begins any design, they will have available to them the research and report provided by the community and assembled by Metro Art (the Community Profile). That information will be a starting point for design decisions.

A budget will be established for public art which will be based on a percentage of the hard costs (construction costs) for the project and will cover design fees and fabrication of art elements, engineering/architectural support, administration, and conservation. Again, as directed by the FTA (Circular 9400.1A), "Funds spend on the art component of the project should be appropriate to the overall costs of the transit project and adequate to have an impact. The FTA guidelines propose that these costs should not exceed 5% of overall construction costs" (i.e., New York City 's is 1%, Miami's is 1.5%, Chicago's is 1.33%, Philadelphia's is 1%, Seattle's is 1%, San Francisco's is 1% and Sacramento's is 2%).and also recommend that the agency "provide adequate administrative and technical support."

Artwork and artist ideas will be presented as part of the overall design. Fabrication of art elements and their future conservation will be the responsibility of Metro Art. Metro Art will ensure that the community continues to participate and is educated about the artwork and design before, during and after the construction process.

Design Excellence. .Following policy established by the FTA for design and art in transit projects (Circular 9400.1A), MTA commits to the idea that: "Good design and art can improve the appearance and safety of a facility, give vibrancy to its public spaces, and make patrons feel welcome. Good design and art will also contribute to the goal that transit facilities help to create livable communities." To continue its commitment to these ideals, design excellence will be the leading criteria for selection of design team members and for evaluation of design proposals.

To ensure design excellence, the MTA will follow the award-winning model for "Excellence in Public Architecture" established by the General Services Administration of the U.S. Government. That process attracts large numbers of qualified design firms through a streamlined process and utilizes the insight of outside peer advisors.

Graphics and Wayfinding. The quality of graphic signage and wayfinding within the system and within the adjacent neighborhood greatly affect the ease and comfort with which patrons will use the system. Station names, station identification, directional signage, logos, maps, and informational signage shall adhere to the MTA Graphics Standards. The guiding principals for the standards are to simplify Metro signage systems in a way that makes sense for patrons, using uniformity in text styles, a rational hierarchy of sign sizes, clear directional arrows, and the like.

4.6 Cultural Resources

Significant cultural resources, including historic properties, archaeological sites, and paleontological deposits, are protected by Section 106 of the National Historic Preservation Act and by the California Environmental Quality Act. Projects that have the potential to physically disturb these resources or indirectly alter their visual, audible, or circulation settings must be reviewed by the State Historic Preservation Office (SOHP). One objective of the SOHP is to identify prudent alternatives if such disturbance is anticipated or, at a minimum, to formulate design and mitigation measures to reduce the potential effect.

Earlier transportation studies have identified a number of significant buildings along both the Wilshire and Exposition Corridors, archaelogical sites in the vicinity of the La Brea Tar Pits, and extremely high paleontological sensitivity along the Wilshire Corridor between Citrus Avenue and Crescent Heights.

The Wilshire and Exposition BRT alternatives would be expected to have minimal impacts to cultural resources, since they operate in existing rights-of-way and do not involve substantial new construction that could affect historic property settings. The Exposition LRT is not expected to have direct physical impacts on cultural resources but may alter the visual setting of historic properties fronting on the Exposition right-of-way because of the introduction of the overhead electrical lines and supporting poles.

In contrast to the BRT and LRT alternatives, the heavy rail alternatives pose potentially significant concerns. Wilshire Subway via Pico/San Vicente traverses an alignment passing 10-15 properties that may be eligible for the California Register and nearly 10 additional properties that might be eligible for the National Register of Historic Properties within the Mid-City area. Underground subway construction for this alternative could pose vibration, groundborne noise, and settlement impacts. As the previously approved environment documentation for the existing LPA, the Mid-City HRT, demonstrates, however, these types of impacts can generally be successfully mitigated.

The Wilshire Subway HRT alternative would pass through or near archaeological sites in the vicinity of the La Brea Tar Pits, through the high sensitivity area for paleontological resources, and affect about 15-20 potentially significant resources in the Mid-City area.

Wilshire Aerial would avoid the impacts of the subway options, but the aerial guideway could adversely affect the visual and audible character and setting for historic properties along Wilshire Boulevard. While mitigation and design measures are available to address effects of subway construction, they are not as available or feasible with aerial HRT systems.

4.7 Air Quality

MTA Board policy calls for new bus purchases to be Compressed Natural Gas-fueled so BRT alternatives will be clean fuel. LRT and HRT alternatives create no significant emissions. Alternatives that carry the most new passengers for the longest distances will likely have the greatest beneficial impact on air quality. Further assessment of any air quality impacts will be evaluated in the Phase 2 environmental evaluation.

4.8 *Noise and Vibration*

FTA has developed noise and vibration screening distances within which different transit modes may adversely affect neighboring land uses. The sensitivity of neighboring land use to increased noise and vibration levels is a function of current ambient conditions along the corridors and the magnitude of the increase. The screening distances are a function of the transit mode, its vertical alignment, the maximum operating speed, and the frequency of service. Table 4.3 indicates the acres of noise-sensitive land uses that lie within the screening distances. Noise-sensitive land uses include: single-family residential uses, local parks, elementary and junior high schools, pre-schools and day-care centers, special care facilities, and religious institutional facilities.

The acreage of sensitive land use exposure was calculated using a Global Information System (GIS) as follows. A noise contour was drawn, based upon the specific transit mode, speed, frequency, and the alignment's elevation with respect to grade, then the noise sensitive land use area within the contour was calculated. The purpose of this computation was to obtain relative differences of exposure between the Wilshire Boulevard and Exposition Right-of-Way corridors and the modes under consideration. All calculations were conducted for full length alternatives.

Table 4.11
Noise Sensitive Land Uses (in acres)

Alternative		Residential Uses	Recreation	Institutional	Total
1	Wilshire BRT	6.0	1.7	3.6	11.3
2	Exposition BRT	45.5	3.4	1.4	48.3
3	Exposition LRT	127.8	11.8	6.7	146.3
5	Wilshire Subway	0	0	0	0
6	Wilshire Aerial	68.4	8.0	23.3	99.9

There are special noise considerations to be taken into account with each of the at-grade and aerial alternatives. The BRT alternatives along either the Wilshire or Exposition Corridor would involve vehicles and related noise levels comparable to medium-sized trucks. The Exposition LRT would involve bells and horns at crossings to ensure pedestrian and vehicular safety. Furthermore, the LRT steel wheels on the steel rails can produce noticeable noise levels. Where elevated grade separations are proposed to separate at-grade crossings of the LRT from vehicular traffic, raising the rail line without mitigation can expose a greater number of nearby land uses to undesired noise levels. These latter two issues also apply to the Wilshire Aerial HRT. As shown in Table 4.11, a greater number of residential uses lie proximate to the Exposition right-of-way than to Wilshire. These uses are also not screened by large commercial and office structures, as on Wilshire.

4.9 *Ecosystems*

There are no sensitive biological habitats or communities that would be affected by any of the transit alternatives.

4.10 Water Resources

Flood Hazard Areas. Although each of the alternatives traverse limited portions of flood hazard areas (which are defined as 100-year or 500-year floodplains for purposes of this study area), the actual flood risks of one alternative is no greater in comparison to the remaining alternatives. In fact, the flood risks associated with new construction in either the Wilshire or Exposition Corridor are no greater than the flood risks associated with the rest of the Los Angeles Basin. It is expected that localized ponding or flooding may occur where the alternative requires below-ground structures, such as the Wilshire Subway HRT alternatives, or where the right-of-way is depressed, such as along segments of the Exposition BRT and LRT alternatives; however, appropriate mitigation is available to reduce these impacts to a less-than-significant level.

Surface Water Resources. None of the alternatives would require a notable change in the direction, amount, or flow of surface water resources.

Groundwater Resources. Because the project area is largely impervious, the infiltration of surface water into the groundwater is negligible, and none of the alternatives would change this pattern by creating greater areas of impervious surfaces. However, the Subway alternatives along the Wilshire Corridor may require groundwater dewatering during construction activities, particularly on those portions of the corridor that traverse relatively shallow and perched water conditions, which are estimated to be 60 feet below the ground surface. Any dewatering activities would be conducted according to all prevailing Waste Discharge Regulations and in a manner that would avoid impacts related to ground subsidence or differential settlement.

Water Quality. Construction of any of the alternatives would require a National Pollutant Discharge Elimination System Permit, as well as the preparation of an associated Stormwater Pollution Prevention Plan. Construction and long-term operation of each of the alternatives would not result in any adverse impacts to designated "beneficial uses" of surface or groundwater resources.

4.11 Geology and Subsurface Conditions

Issues that may present constraints to development of a high capacity transit system related to geology and subsurface conditions include: seismicity, soils, and subsurface gases.

4.11.1 Seismicity

Faults And Groundshaking. The entire study area is located within the Los Angeles Basin. The basin, given its location along two crustal plates, is an area with a number of active and potentially active faults, and relatively frequent earthquakes. Active faults are those that are believed to have moved within the last 11,000 years, while potentially active faults are believed to have moved between 11,000 and 2 million years ago.

All of the alternatives cross or are parallel to active or potentially active faults. And while they all would have the potential to be impacted by an earthquake or groundshaking, the at-grade bus or rail alternatives are likely to be the least impacted. The two subway alternatives would likely be impacted to a greater extent given the potential for the horizontal movement of bedrock during an earthquake, and the aerial alternative would be impacted to the greatest extent given its location on

elevated structure. It should be noted, however, that these occurrences and their impacts are difficult to predict. According to the Metro Red Line Mid-City Segment SEIS/SEIR (Sept., 1997), the Northridge Earthquake of 1994 created substantial structural damage to residential, commercial, and industrial facilities. However, the Metro Red Line tunnels and stations experienced no interruption in service and little or no damage to segments under construction or to existing Metrolink tunnels.

Surface Fault Rupture Hazard Areas. The California Division of Mines and Geology mapped Earthquake Fault Zones in accordance with the Alquist-Priolo Earthquake Fault Zoning Act of 1979. The intent of the Act is to mitigate the hazard of surface faulting to structures for human occupancy and to prevent construction of buildings used for human occupancy on the surface trace of active faults.

Surface rupturing occurs when active fault movement breaks through to the surface. The rupture always follows pre-existing fault lines. The Cities of Los Angeles, Culver City, and the County of Los Angeles all contain fault rupture hazard areas. These areas are known as Alquist-Priolo Earthquake Fault Zones. Active fault zones (according to the Maps of Known Active Fault Near-Source Zones in California and Adjacent Portions of Nevada, February 1998) in the study area include the Santa Monica Fault Zone, the Hollywood Fault Zone, and the Newport-Inglewood Fault Zone. The Santa Monica Fault traverses east-west from south of Griffith Park, through Beverly Hills and West Los Angeles, to Pacific Palisades and beyond. The Hollywood Fault also trends east-west from approximately South Pasadena, north of downtown, through Griffith Park, north of West Hollywood, to approximately UCLA. The Newport-Inglewood Fault Zone, which contains numerous active faults trending north-south, extends from approximately north of the I-10 Freeway, east of Culver City toward Inglewood, Gardena, Compton, and Long Beach.

All of the alternatives would traverse or be parallel to each of these faults therefore the potential for surface fault rupture exists with all the alternatives. The alternatives along the Wilshire Corridor would traverse and be parallel to the Santa Monica Fault. The alternatives along the Exposition Corridor would traverse the Newport-Inglewood Fault Zone, as well as the Overland and Charnock Faults. Surface fault ruptures to the greatest extent would impact the light rail, aerial, and subway alternatives. Fault ruptures would also potentially impact the at-grade bus alternatives but not to as great of an extent as the other alternatives.

4.11.2 Soils

Soils and Liquefaction. Liquefaction occurs in areas of loosely packed, fine-grained soil that is saturated by ground water. As a result of the saturation, the particles of the fine-grained soil move freely, with the water acting as a lubricant. With repeated shock waves, the soil takes on the characteristics of gelatin or liquid. Where ground water may not be a factor, the uncompacted soil tends to amplify shock waves and intensify local shaking.

The liquefaction susceptibility areas of Los Angeles County were mapped as part of the preparation of the 1990 Safety Element of the General Plan. The Mid-City/Westside study area contains areas with liquefiable, as well as potentially liquefiables soils. All of the alternatives would traverse the liquefiable or potentially liquefiable areas to approximately the same extent. These areas would have a greater impact on the light rail, aerial, and subway alternatives as compared to the at-grade bus

alternatives. In addition, the elevated structures associated with grade separations of the Exposition bus alternative would also be potentially affected by liquefiable soils.

Hazardous Underground Gases. The geology of the Mid-City/Westside study area is conducive to the development of economic deposits of oil and gas. The Salt Lake and La Cienega oil fields cover parts of the study area and these have been commercially exploited for some time. Hazardous and potentially hazardous gases (methane, hydrogen sulfide) tend to occur in association with the accumulation of petroleum, and therefore are most frequently encountered in the sediments overlying oil fields. The potential for release of hazardous levels of accumulated CH_4 and H_2S is well documented in the various reports reviewed for this study. Along the proposed tunnel alignments, hydrogen sulfide was measured at concentrations in excess of 10,000 ppm and methane at concentrations exceeding 90 percent by volume. These findings lead to the creation of the Methane Risk Zone as shown in Figure 4.3.

Methane is a hydrocarbon gas that is lighter than air. It is odorless and colorless and can not be detected by the human senses. When present in air in concentrations of between 5% and 15% by volume, it can be ignited. The 5% concentration is known as the Lower Explosive Limit or LEL. Gas levels are generally expressed as a percentage of the LEL. Thus 20% LEL represents a concentration of 1% in the air.

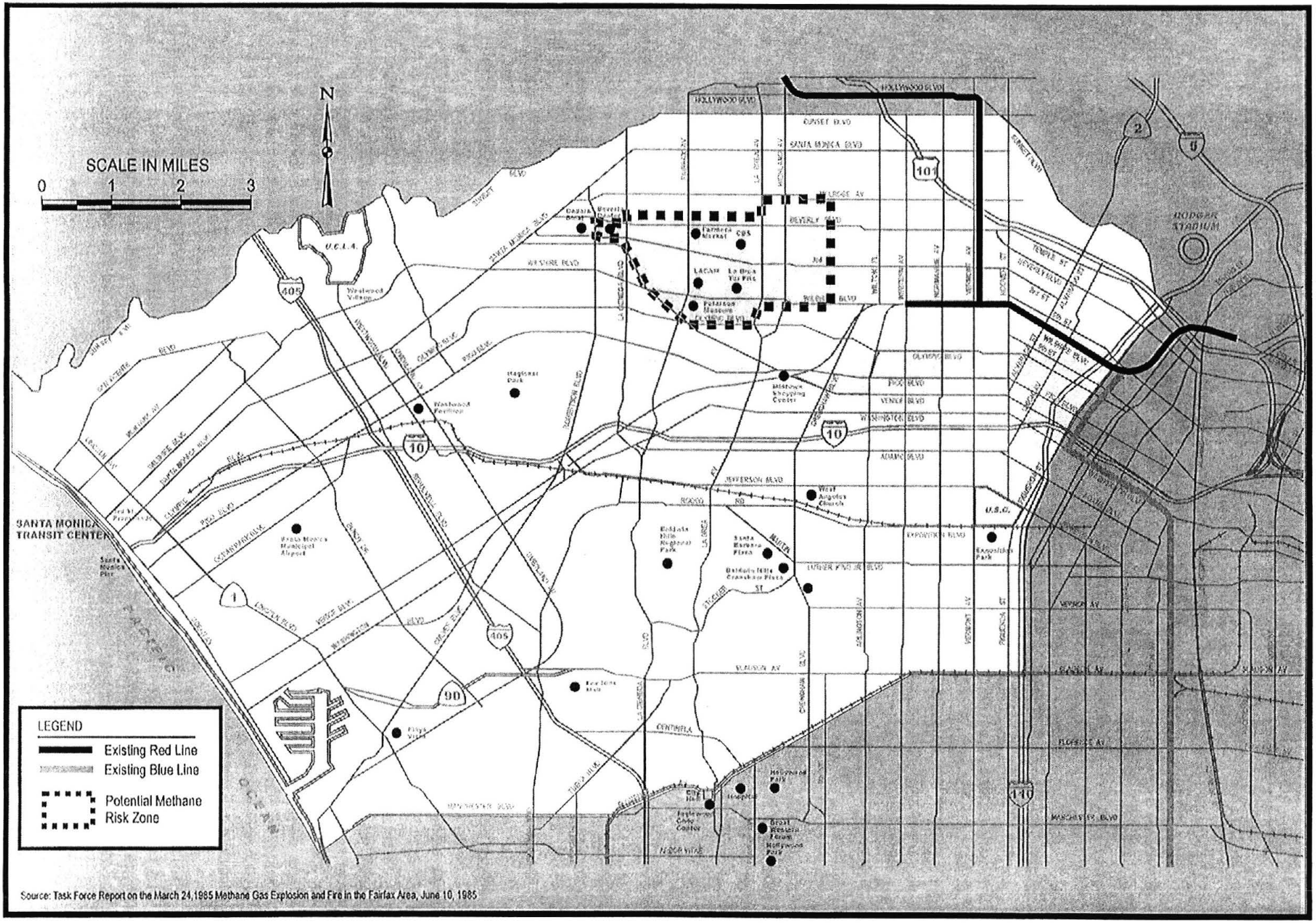
From the various studies that have been conducted throughout the area to the west of the downtown core, it is highly probable that whatever alignment is ultimately adopted, there will be the potential for methane encounters. There is no obvious advantage in choosing one route over another if methane is the major issue. If the rail line is placed in tunnel, proper regard must be given to the potential for methane, and appropriate measures taken to guard against accidents.

If the safeguards relating to gassy tunnels are properly enacted, the tunneling operation can proceed safely despite the presence of methane. It is a similar situation with revenue operation of the tunnels. Ventilation and monitoring continue to be the main safeguards against build up of gas. Indeed, the LACMTA now has considerable experience with operating subway tunnels in potentially gassy environments. To date it has had no problems in this regard.

While encounters with methane gas are to be avoided if possible, even in 1985 it was believed that the technology existed to tunnel through gassy ground safely. Following the explosion, the SCRTD established the In-House Board of Review whose remit was to review all plans for tunneling and operating in areas classified as gassy. It's general conclusion was that despite the explosion, there was no reason to deviate from the existing plan to tunnel along Wilshire.

Much tunneling has been accomplished on the LA subway system since that time. There have been limited encounters with gas and these have been dealt with safely. On the wider front, the industry has become more sensitized to the problems explosive gases pose and this has seen a considerable improvement in training for employees. Furthermore, equipment, systems, and technology for underground construction have all become more sophisticated and it has been established that it is possible to tunnel through gassy ground without placing workers at undue risk.

Attempts to eliminate the potential dangers of methane by rerouting around the risk zones have failed. The alternative alignments have shown not only that methane will still be an issue but also that by moving south, it is possible that more lethal hydrogen sulfide will be encountered.



Mid-City/Westside Transit Corridor
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FIGURE 4.3

METHANE RISK ZONE

Hydrogen sulfide is a gas that is heavier than air. Like methane, hydrogen sulfide is potentially explosive at certain concentrations. Its explosive range is between 4.3% (43,000 ppm) to 46% by volume in air. However, of more concern is its toxicity. The gas is toxic at far lower concentrations than those at which it is explosive, with death possible at concentrations of only 500 ppm. The gas has an insidious effect on the human senses. Its "rotten eggs" odor is detectable at very low concentrations (2 ppm). However, after even a short period of exposure at higher concentrations it will "deaden" the sense of smell. Nausea and death can follow. Even when the concentration is not sufficient to cause health problems, the smell is unpleasant and may cause discomfort.

The gas investigations that were conducted in the area, reported many intercepts of hydrogen sulfide gas, with measured concentrations up to almost 20,000 ppm. The alternative alignments pursued after Wilshire was abandoned, appear to be considerably more likely to intercept significant quantities of the gas than the Wilshire alignment itself. The studies done along the Wilshire alignment were not as comprehensive as those done elsewhere so it may be that more information will need to be gathered before a definitive statement about likely concentrations of H_2S can be made.

In regards to Cal-OSHA, it may be that the potential for encounters with hydrogen sulfide would cause them to classify the tunnel as "extrahazardous". The specific regulation covering classification appears to speak only to explosive gases for this classification, although there is later language in the regulations about "tunnels where the classification is based on toxic gases". That said, Cal-OSHA has broad latitude to impose on operations rules that are outside the written law. It can do this under its "Special Orders" powers which can be invoked whenever the agency perceives there is a risk that is not adequately covered by existing regulations.

In addition, there is a regulation covering airborne contaminants, which specifically mentions hydrogen sulfide. This states what the monitoring requirements are when the gas is suspected to be present. It should be noted that in the event that "a toxic or suffocating gas in concentrations dangerous to health or life is encountered", then "all underground work shall cease, employees shall be removed, and re-entry except for rescue purposes shall be prohibited until the Division has been notified and has authorized re-entry in writing". The concentration of H_2S considered dangerous can be as low as 15 ppm. This same provision is also to be applied when there is an ignition of flammable gas or 20% of LEL is exceeded.

The issue of dealing with hydrogen sulfide was considered in depth by a blue ribbon committee, the "Technical Review Board", established by the tunnel designer, EMC in 1993. This initiative was taken in response to a growing concern that it would not be prudent to release contract documents for bidding given the most recent site information on hydrogen sulfide concentrations. The findings of the Board were inconclusive, although they did suggest that by raising the elevation of the tunnels it might be possible to reduce the potential for gas. This is discussed below. At the same time, the Board expressed a concern that it might not be possible to completely eliminate the odor of the gas from the subway system.

The issue was addressed again in 1998 in the context of the Metro Rail Eastside Extension, where H_2S had been detected in the ground. A study by Enviro-Rail concluded that the gas could be controlled during tunneling by the use of pre-treatment and slurry-TBM's. However, it should be noted that these measures are believed to be unproven. As such, their cost-effectiveness cannot be

accurately determined. Avoiding known areas of high H_2S concentrations may be the most prudent approach to mitigation.

4.12 Hazardous Materials and Waste

Potential adverse impacts on human health from hazards that could result from project construction and operation include exposure to contaminated soil or groundwater, and exposure to hazardous materials used, generated, stored, or transported as a result of the project.

The Wilshire and Exposition BRT alternatives would not result in an increased risk of exposure to hazardous materials as a result of project implementation. Daily operations would increase the amount of gasoline used and stored; however, it is assumed that existing fuel storage facilities and maintenance activities would occur at locations currently being used for these activities or new maintenance yards dedicated to these services. Because construction for the bus alternatives would be limited, construction-related risks associated with hazardous materials would be negligible.

During construction of the Exposition LRT or the Wilshire alternatives, there is a potential for exposure to hazardous materials that are within or migrate to the rights-of-way. Hazardous materials sites known to exist along the Exposition and Wilshire Corridors all stem from leaking underground storage tanks. The CORTESE (Hazardous Waste and Substances Site List) list identifies eight leaking tanks in the Exposition Corridor and 12 leaking tanks along the Wilshire Corridor. The greatest potential for encountering contaminated soils or groundwater exists with the Wilshire Subway alternatives. None of the rail alternatives would result in the transport, use, or storage of hazardous materials after project construction is complete.

4.13 Energy

There are three components to energy consumption associated with provisions of transit service:

- Propulsion and maintenance to operate the service and stations;
- Construction activities associated with required infrastructure; and
- Potential conservation of energy resulting from diversion of automobile traffic to other modes of transit.

The Exposition and Wilshire BRT alternatives would be beneficial due to the more efficient use of fossil fuels by providing an alternative to personal automobile use. These alternatives would require the least amount of energy. The Exposition LRT and the Wilshire Aerial alternatives would require more energy than the BRT alternatives. Both the Wilshire Subway alternatives would result in the most extensive use of energy. However, these operational requirements would be more than offset by a long-term transportation energy savings that would result from the increase in persons using public transit. In general, it is expected that the HRT alternatives would attract more transit users than BRT and LRT alternatives due to their speed and convenience. The Exposition LRT would likely be less than the HRT alternatives.

4.14 Parklands

Public parklands, significant cultural resources, and natural wildlife refuges are afforded special protection by Section 4(f) of the US Department of Transportation Act of 1966. Direct use (i.e. encroachment) of Section 4(f) lands by federally funded transportation projects is prohibited unless it can be demonstrated that there are no prudent alternatives. If no prudent alternatives exist, design and mitigation measures must be crafted to reduce the effects. Indirect effects to Section 4(f) lands may involve impeding or altering access, introducing significant noise or vibration, casting shadows, or other substantive changes to the visual setting.

Table 4.11 provides a comparison of parklands (see the "recreation" column) adjacent to each of the six alternatives. It should be noted that "recreation" refers to local parks that are located adjacent to or in the vicinity of an alternative. Since the various project alternatives would operate within public rights-of-way, the potential for direct use of parklands is unlikely. There may be indirect effects, however, to significant cultural resources, which are also covered by Section 4(f), as described previously under "Cultural Resources."

Parkland and recreational facilities on the Exposition Corridor that may be indirectly affected by the Exposition BRT or LRT include Rancho Cienega Sports Center Park, Syd Kronenthal Park, Palms Park, Stewart Street Park, and Memorial Park. Exposition LRT has the potential for greater indirect effects due to the need for overhead electrical lines and the generation of noise.

The linear footage of parkland and recreational facilities potentially affected by the Wilshire Corridor alternatives is less than along the Exposition Corridor. Potentially affected lands include the La Brea Tar Pits and Carthay Circle Park in Los Angeles and Douglas and Lincoln Parks in Santa Monica under Wilshire BRT and both subway alternatives. Wilshire Aerial would also potentially affect Westwood Park.

4.15 Summary

The following conclusions emerge when the environmental benefits and consequences of the transit alternatives with respect to key environmental considerations are reviewed:

- The Wilshire BRT would be most problematic for traffic impacts because of the loss of a travel lane and possible delays for streets crossing Wilshire Boulevard. By contrast, the subway HRT alternative would have neutral to highly beneficial effects on traffic.

- All alternatives follow alignments that link activity centers and are characterized by transit supportive land uses. The Exposition ROW is projected to experience greater population growth within the station areas and serve a greater number of targeted redevelopment/reinvestment areas.

- All alternatives would enhance mobility and accessibility to and within the Mid-City/Westside area. The HRT alternatives would be rated higher because of their higher peak-hour carrying capacity and average speeds. The Exposition Corridor would likely serve a higher percentage of households that have no automobiles or are lower income.

- Only the subway alternatives would have neutral visual effects; the BRT, LRT, and aerial alternatives would significantly change the visual setting along their alignments. The most dramatic impacts would be expected for the aerial HRT along Wilshire Boulevard.

- The Exposition LRT and Wilshire Aerial HRT would have the greatest noise and vibration effects.

- The HRT alternatives have the greatest potential to disturb cultural resources, including historic properties, archeological sites, and paleontological resources.

- All alternatives, except the subway HRT alignments, would avoid the hazardous gas zone west of Crenshaw. Interestingly, the Wilshire subway to Pico/San Vicente, selected as the Locally Preferred Alternative in 1992, now appears to encounter worse gas hazards than an alignment proceeding due west along Wilshire Boulevard.

5. COST ANALYSIS

5. *COST ANALYSIS*

5.1 FTA Criteria

The Federal Transit Administration considers both Capital costs and annual Operating and Maintenance (O&M) costs in their evaluation of a particular project. They are used to derive such efficiency measures as cost effectiveness, total annualized cost, annualized cost per new transit rider, and operating cost per passenger mile. The financial feasibility is based on both existing and potential capital revenue sources and O&M revenue sources.

Aside from No Build, all the alternatives under consideration (including TSM) will generate new revenue for MTA through passenger fares and incidental revenues such as advertising. However, these revenues will only cover a portion of the project's total funding. Generally Capital costs will come from two sources: Federal Section 5309 New Starts funds and local matching funds.

5.2 Capital Costs

Capital costs are the expenses associated with design and construction and include acquisition of right-of-way, guideway and station construction, environmental mitigation and urban design, park and ride lots, vehicles, and system equipment and maintenance facilities. Capital cost estimates for the TSM and the four rail alternatives were based on MTA historical costs with some input from actual costs of other transit projects throughout the country. Costs for Alternatives 1 and 2 (Bus Rapid Transit) were developed from existing projects nationwide and in-house engineering judgement.

Methodology

A key factor in this cost estimation process has been to compare historic MTA costs to costs based on the national and local experiences of several consultant groups. The combined experiences of Parsons Transportation Group, Parsons Brinkerhoff Quade and Douglas, Korve Engineering, and Gruen Associates have contributed towards the development of reasonable capital cost estimates for the three study areas: Eastside, Mid-City/Westside, and the San Fernando Valley.

The costs for each alternative were calculated using values from both the MTA and the consultants, confirming the savings over traditional MTA costs. Each total cost is based on unit costs for individual line items required to build and operate an alternative. Both the MTA and the consultants provide prices for items such as Guideways, Stations, Systems, Vehicles, Parking Spaces, Urban Design, Maintenance Facilities, and other components of a project. Certain percentages, commonly called "soft costs" were applied to the unit costs to develop the final, total cost for an alternative. These percentages provide a way to account for costs such as Design Services, Insurance, Artwork, and Contingencies.

Alternative Costs

Table 5.1 summarizes the capital costs for the TSM alternative.

Table 5.1
TSM Alternative Capital Costs

TSM Component	Estimated Capital Cost in 1999 Dollars	Comments
3 Rapid Bus Lines + Stations • Wilshire/Whittier • Crenshaw • Santa Monica Boulevard	$30,000,000	Cost of Rapid Bus Lines @ $10 million each – Cost not included in the Mid-City/Westside Build Alternatives
78 Standard buses for increased north-south and east-west service in the Mid-City/Wesrtside Corridor over No Build condition (MTA fleet expands from 2600 to 2678 busses)	$37,070,000	Cost not included in the Mid-City/Westside Build Alternatives
Bus Maintenance Facility Expansion Allowance	$25,000,000	Cost not included in the Mid-City/Westside Build Alternatives
Total	**$92,070,000**	

Capital cost estimates for the alternatives currently being considered are shown in Table 5.2.

Table 5.2
Capital Cost Estimates of Alternatives under Consideration*

Alternative		Full Length	Alternative	Length	Option
	TSM	$92	N/A	N/A	N/A
1	Wilshire BRT	$169 To Santa Monica	$62 To San Vicente	N/A	N/A
2	Exposition BRT	$188 To Santa Monica	$76 To La Cienega	$87 To Venice Blvd.	N/A
3a	Exposition LRT (Baseline)	$589 To Santa Monica	$178 To Crenshaw	$312 To La Cienega	$398 To Venice Blvd.
3b	Exposition LRT (Minimum Grade Separations)	$431 To Santa Monica	$135 To Crenshaw	$209 To La Cienega	$227 To Venice Blvd.
4	Wilshire HRT Subway via Pico/San Vicente	$2,640 To Federal	$673 To Pico/San Vicente	N/A	N/A
5	Wilshire HRT Subway	$2,469 To Federal	$891 To Fairfax	N/A	N/A
6	Wilshire HRT Aerial	$1,269 To Sepulveda	$543 To Fairfax	N/A	N/A

* All costs are expressed in millions and use 1999 dollars.

5.3 Operating and Maintenance (O&M) Costs

Operating and Maintenance (O&M) costs were determined using the MTA's O&M cost model. This cost model was developed to estimate O&M costs for MTA's bus, Blue Line, Green Line, and Red Line operating modes, as well as support department costs related to operations.

The MTA O&M cost model estimates staffing requirements, labor costs, and non-labor expenses by transit mode (i.e., Motor Bus, Blue Line, Green Line, Red Line) and department within each mode. The model is calibrated to MTA's FY 1998-99 Adopted Budget[1]. Overhead costs are allocated to the transit modes based on the allocations made for MTA's Adopted Budget. The model uses operating characteristics (e.g., peak vehicles, number of stations, passengers) to determine future costs. As future operating plans change (e.g., new rail lines are constructed), costs will also change.

The model meets FTA guidelines[2] for estimating operating costs. These guidelines specify that: costs are computed by estimating labor and materials needed to provide a given level of service, and then unit costs are applied to the estimated future labor and material cost items; costs are calculated based on operating characteristics for each mode (e.g., Red Line train hours), rather than for all modes combined (e.g., systemwide passengers); each reported labor and non-labor expense are calculated separately, which ensures that equations are mutually exclusive and cover all operating costs; and, most cost items are variable, meaning that cost estimates will change with projected changes in service.

The model calculates costs separately for each labor and non-labor item in MTA's FY 1999 budget. The driving variables used in the O&M cost model are presented below.

Table 5.3
Driving Variables for MTA O&M Cost Model

Input Statistic	MTA Bus	Rail Modes
Annual Boardings (Unlinked Passengers)	X	X
Peak Vehicles	X	X
Active Fleet Vehicles	X	X
Operating Divisions	X	X
Annual Revenue Bus/Car Miles	X	X
Annual Revenue Bus/Train Hours	X	X
Contract/BDOF Service Hours	X	
Route Miles		X
Elevated Stations		X
At-Grade Stations		X
Subway Stations		X
Total Stations		X
Automated Operation (Green Line)		X

[1] Los Angeles County Metropolitan Transportation Authority. *Fiscal 1998-1999 Adopted Budget.* June 1998.
[2] Federal Transit Administration. *Procedures and Technical Methods for Transit Project Planning* (Supplement). U.S. Department of Transportation, February 1993.

For each alternative, O&M costs were calculated for the entire MTA system of bus, Red Line, Green Line and Blue Line service. The annual O&M cost for operating No Action is $848 million. The following table reports incremental costs over No Action, as well as incremental costs over TSM.

Table 5.4
Summary of Annual MTA O&M Costs

Alternative	Annual MTA O&M Cost (millions)		
	MTA Systemwide Total	Increment to No Action	Increment to TSM
No Action	$848	N/A	N/A
TSM	$873	$24	N/A
1 - Wilshire Bus Rapid Transit	$889	$41	$17
2 - Exposition Bus Rapid Transit	$880	$32	$7
3A - Exposition Light Rail Transit	$893	$45	$21
3B - Exposition Light Rail Transit	$893	$45	$20
4 - Wilshire Heavy Rail Transit (HRT) to Pico/San Vicente	$877	$29	$5
5 - Wilshire HRT to Fairfax subway	$880	$31	$7
5 - Wilshire HRT to Westwood subway	$890	$41	$17
6 - Wilshire HRT to Fairfax aerial	$879	$31	$6
6 - Wilshire HRT to Westwood aerial	$890	$41	$17

The Exposition BRT and Wilshire HRT partial extensions (to Fairfax or Pico/San Vicente) have the lowest incremental operating costs compared to TSM, ranging from $5 to $7 million more than TSM annually. The incremental operating costs for the remaining alternatives are at least doubled, ranging from $17 to $21 million more than TSM annually.

6. COMPARATIVE COST AND BENEFITS

6. *COMPARATIVE COST AND BENEFITS*

6.1 Approach to FTA Criteria

The measures used for evaluating alternatives in the Mid City/Westside Transit Corridor MIS are also based on Federal Transit Administration (FTA) guidelines for assessing major investments.[1]

Enactment of the Transportation Equity Act for the 21st Century (TEA-21) in 1998 requires that FTA evaluate and rate candidate New Starts projects as the basis for approving projects for federal funding. Based on a comprehensive review of mobility improvements, environmental benefits, cost-effectiveness, operating efficiencies, transit-supportive land use and other considerations, the FTA rates projects as "highly recommended," "recommended," or "not recommended."

FTA criteria and measures have been addressed in various sections of this report as follows:

FTA Criteria and Measures	Section
Mobility Improvements	Chapter 6, Operating and Performance Features
Environmental Benefits	Chapter 4, Air Quality
Operating Efficiencies	Chapter 6, Operating Efficiencies
Cost-Effectiveness	Chapter 6, Cost-Effectiveness
Transit Supportive Land Use	Chapter 4, Land Use and Economic Development

Beyond the mandated FTA measures, other factors are relevant in local decision-making. This chapter provides a comparative analysis on the following:

- Operating and Performance Features
- Cost Effectiveness (Incremental Cost per Incremental Passenger)
- Operating Efficiency (Operating Cost per Passenger Mile)

6.2 Operating & Performance Features

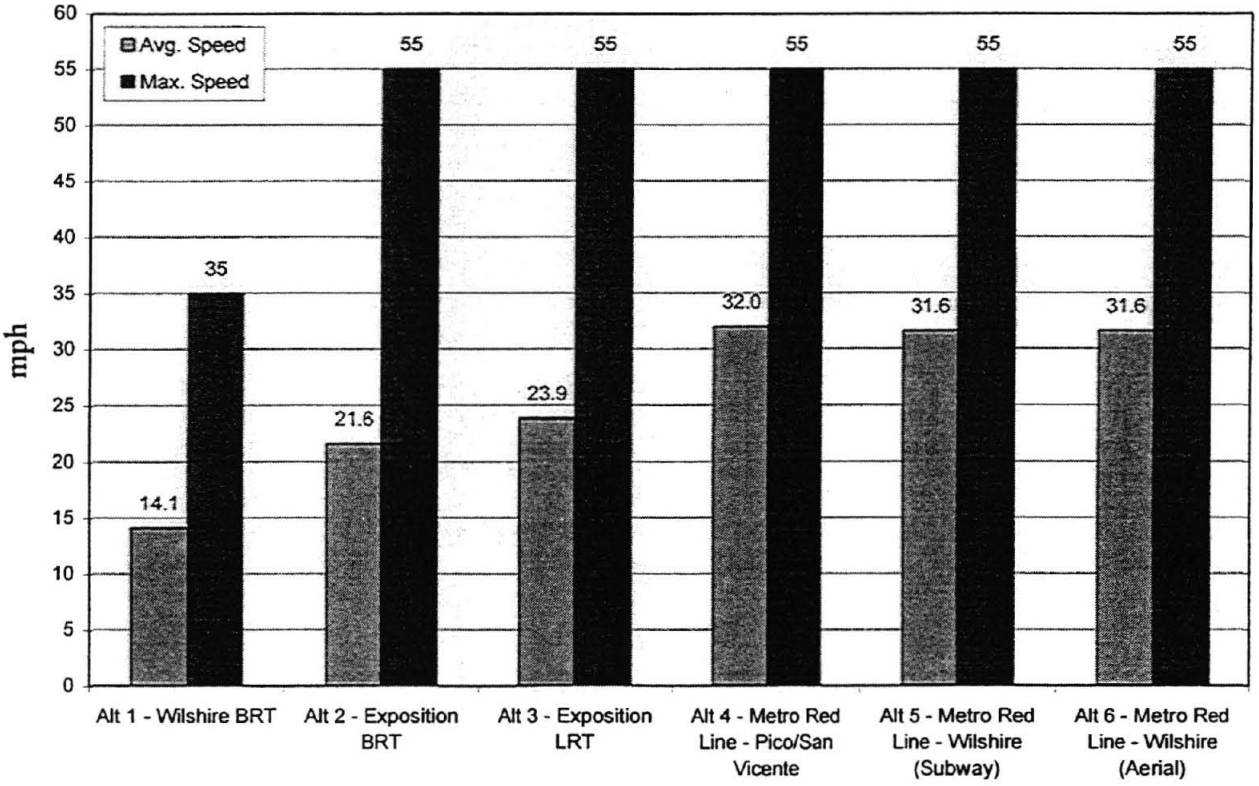
The following tables summarize major operations and performance features for each of the alternatives. A model was used to calculate the expected travel times for each of the alternatives, accounting for acceleration/deceleration characteristics of vehicles; maximum achievable speeds given vehicle specifications, operating environment, and alignment characteristics; station dwell time; and intersection delay as applicable. Key comparisons between the alternatives are summarized below:

[1] *Technical Guidance on Section 5309 New Starts Criteria,* Federal Transit Administration Office of Planning, July 1999.

Average station spacing: All the build alternatives, including busway alternatives, maintain station spacing at about a mile apart, ranging from an average of 1.0 miles for the Wilshire Line BRT to 1.23 miles for the Red Line extension to Westwood (Pico/San Vicente alignment).

Maximum speed: Fully grade-separated alternatives are able to achieve the highest maximum speeds since there are no conflicts with cross traffic or pedestrians. The Red Line extensions to Westwood are able to reach a maximum speed of 70 miles per hour (mph), though speeds this high apply to a limited segment of the alignment. A more representative maximum speed for the Red Line alternatives is 55 mph (Figure 6.1).

Figure 6.1
Average and Maximum Speeds



* Note: Average speed calculated for Exposition BRT and LRT were calculated for speeds along the Exposition ROW Corridor plus values for on-street, mixed flow travel in Santa Monica and Downtown Los Angeles.

While the Exposition Line corridor assumes mostly at-grade operations for either buses or light rail vehicles, this abandoned railroad right-of-way has consolidated street crossings and traverses areas that have less cross traffic than the Wilshire corridor. Therefore, a maximum speed of 55 mph is assumed for the BRT and LRT alternatives.

The Wilshire BRT is expected to have the lowest maximum speed given the congested street environment and heavy north-south traffic. A maximum speed of 35 mph is assumed.

Average speed: The average speed of each alternative is more useful than the maximum speed as an indicator of overall travel times. Average speeds are summarized below:

Table 6.1
Average Speeds

Alternative	Average Speed
1. Wilshire BRT	14.1 mph
2. Exposition BRT	21.6 mph
3. Exposition LRT	23.9 mph
4. Red Line (Subway) to Wilshire/Federal via Wilshire	31.6 mph
5. Red Line (Aerial) to Wilshire/Federal via Wilshire	31.6 mph
6. Red Line Subway to Wilshire/Federal via Pico/San Vicente	32.0 mph
7. Red Line Subway to Wilshire/Fairfax via Wilshire	33.2 mph

This exercise demonstrates that while Red Line, Exposition LRT and Exposition BRT maximum speeds are all generally 55 mph, when accounting for different maximum speeds along different segments, overall the Red Line alternatives clearly lead to measurably faster average speeds. This analysis also demonstrates that for the Wilshire corridor in particular, a grade-separated facility is expected to be over twice as fast as buses in dedicated lanes at street level.

6.3 Cost Effectiveness

The FTA's cost effectiveness criterion is measured by the incremental cost per incremental passenger in the forecast year. This measure is based on the annualized total capital investment and annual operating costs, divided by the change in annual transit system ridership, expressed as the following equation:

$$\text{Cost Effectiveness Index} = \frac{\Delta\text{Capital Cost} + \Delta\text{O\&M Cost}}{\Delta\text{Linked Transit Trips}}$$

To calculate the change in capital cost, project costs were annualized according to their assumed useful life, using FTA annualization factors:

Table 6.2
Life Cycle Assumptions

Project Element	Useful Life	Annualization Factor
Right-of-way	100 years	0.070
Structures, trackwork, signals, electrification	30 years	0.081
Rail vehicles	25 years	0.086
Buses	12 years	0.126

Source: Technical Guidance on Section 5309 New Starts Criteria, FTA, July 1999.

Annual operating and maintenance costs were calculated using the approach described in Chapter 5, Cost Analysis. The change in linked transit trips for the forecast year 2020 was determined using the MTA travel forecasting model.

The following set of tables summarizes the data used in the calculation of the cost-effectiveness index, and the resulting incremental cost per incremental passenger.

Table 6.3
Cost Effectiveness Calculation: Incremental Values over No Build

Alternative	Annualized Capital Cost (millions)	Annual O&M Cost (millions)	Annual Linked Trips (millions)
TSM	$9.13	$24.48	2.09
1 -Wilshire Bus Rapid Transit	$22.62	$40.98	2.63
2 - Exposition Bus Rapid Transit	$22.86	$31.61	3.92
3A -Exposition Light Rail Transit 3B - Exposition Light Rail Transit	$54.95 $42.14	$45.05 $44.79	4.81 4.81
4 - Wilshire Heavy Rail Transit to Pico/San Vicente	$61.24	$29.30	3.26
5 - Wilshire HRT to Fairfax subway 5 - Wilshire HRT to Westwood subway	$78.77 $206.34	$31.36 $41.26	2.78 4.97
6 - Wilshire HRT to Fairfax aerial 6 - Wilshire HRT to Westwood aerial	$50.60 $109.12	$30.76 $41.26	2.78 4.97

Table 6.4
Cost Effectiveness Calculation: Incremental Values over TSM

Alternative	Annualized Capital Cost (millions)	Annual O&M Cost (millions)	Annual Linked Trips (millions)
1 -Wilshire Bus Rapid Transit	$15.93	$16.51	0.54
2 - Exposition Bus Rapid Transit	$16.16	$7.14	1.83
3A -Exposition Light Rail Transit 3B - Exposition Light Rail Transit	$48.25 $35.45	$20.58 $20.32	2.73 2.73
4 - Wilshire Heavy Rail Transit to Pico/San Vicente	$54.54	$4.83	1.18
5 - Wilshire HRT to Fairfax subway 5 - Wilshire HRT to Westwood subway	$72.07 $199.64	$6.88 $16.78	0.69 2.88
6 - Wilshire HRT to Fairfax aerial 6 - Wilshire HRT to Westwood aerial	$43.90 $102.43	$6.28 $16.78	0.69 2.88

Table 6.5
Cost Effectiveness: Incremental Cost per Incremental Passenger in Forecast Year (2020)

Alternative	Incremental Cost per Incremental Passenger	
	to No Action	to TSM
TSM	$16	N/A
1 - Wilshire Bus Rapid Transit	$24	$60
2 - Exposition Bus Rapid Transit	$14	$13
3A - Exposition Light Rail Transit 3B - Exposition Light Rail Transit	$21 $18	$25 $20
4 - Wilshire Heavy Rail Transit (HRT) to Pico/San Vicente	$28	$50
5 - Wilshire HRT to Fairfax subway 5 - Wilshire HRT to Westwood subway	$40 $50	$114 $75
6 - Wilshire HRT to Fairfax aerial 6 - Wilshire HRT to Westwood aerial	$29 $30	$72 $41

Compared to No Action, the TSM and Exposition BRT alternatives are the most cost effective. The Exposition LRT and Wilshire BRT alternatives follow next. Red Line subway alternatives are the most expensive per incremental passenger.

Compared to TSM, the Exposition BRT alternative is the most cost effective, followed by the Exposition LRT alternatives. The Wilshire-related alternatives (whether BRT or heavy rail) fare less well, most likely because the transit service on the Wilshire corridor is so robust under TSM (see discussion of transit ridership in Chapter 3).

6.4 Operating Efficiency

The FTA uses a single measure for the Operating Efficiencies criterion, which is change in operating cost per passenger mile for the entire regional transit system. The basic calculation involves dividing the system annual operating cost for transit service by the system annual passenger-miles projected for the year 2020. Calculation of the total transit operating costs is discussed under Chapter 5, Operations and Maintenance Costs. System annual passenger-miles are produced from the MTA transportation model.

It should be noted at operating costs were based on adjusting model output statistics so that modeled statistics for 1998 are similar to existing MTA operations in 1998. Passenger-miles (which are not needed for the O&M model) remain unadjusted so it is likely that the cost per passenger-mile should be higher for all alternatives. Regardless, the relative standing of all alternatives should be the same. Table 6.6 presents the operating cost per passenger mile.

Table 6.6
Operating Efficiencies: Operating Cost per Passenger Mile

Alternative	Operating Cost per Passenger Mile
No Action	$0.260
TSM	$0.264
1 - Wilshire Bus Rapid Transit	$0.269
2 - Exposition Bus Rapid Transit	$0.264
3A - Exposition Light Rail Transit 3B - Exposition Light Rail Transit	$0.263 $0.262
4 - Wilshire Heavy Rail Transit (HRT) to Pico/San Vicente	$0.265
5 - Wilshire HRT to Fairfax subway 5 - Wilshire HRT to Westwood subway	$0.265 $0.265
6 - Wilshire HRT to Fairfax aerial 6 - Wilshire HRT to Westwood aerial	$0.265 $0.265

This measure leads to small distinctions between alternatives. All alternatives are more expensive per passenger-mile than No Action. Somewhat surprisingly, the Exposition LRT alternative leads to lower costs per passenger-mile than TSM, and the Exposition BRT alternative is tied with TSM. The Red Line extensions along the Wilshire corridor are all uniformly among the highest cost per passenger-mile, with the Wilshire BRT alternative having the highest cost per passenger-mile. This is likely due to the very bus frequent service (1.2 minute peak, 5 minute base) defined for this alternative, which does not lead to commensurate gains in ridership. While very frequent service was defined to justify taking out traffic lanes for dedicated bus lanes on Wilshire, refinement of this alternative would suggest revisiting this frequency of service.

6.5 Summary Evaluation

Table 6.7 presents a summary matrix that compares and contrasts the alternatives (including TSM) for the following key parameters:

- Capital Cost (full-length and alternative length options);
- Annual Operating Cost;
- New Daily Transit Trips;
- Daily Fixed Guideway Boardings;
- Annualized Cost per New Daily Transit Trip;
- Average and Maximum Speed;
- Travel Time (downtown Los Angeles to downtown Santa Monica);
- Environmental Issues (Qualitative Summary Indicator); and
- Community Concerns (Qualitative Summary).

These and other key findings from this MIS were employed to reach the recommendations contained in the Summary chapter.

ALTERNATIVE	CAPITAL COST (MILLIONS IN 1999 DOLLARS)				ANNUAL OPERATING COST (MILLIONS IN 1999 DOLLARS)		NEW DAILY TRANSIT TRIPS		DAILY FIXED GUIDEWAY BOARDINGS	ANNUALIZED COST PER NEW DAILY TRANSIT TRIP	
	FULL LENGTH	ALTERNATIVE LENGTH OPTION			COMPARED TO NO BUILD	COMPARED TO TSM	COMPARED TO NO BUILD	COMPARED TO TSM		COMPARED TO NO BUILD	COMPARED TO TSM
TSM	$92	N/A	N/A	N/A	$24	N/A	6,600	0	N/A	$16	0
1 Wilshire BRT	$169 To Santa Monica	$62 To San Vicente	N/A	N/A	$41	$17	8,300	1,700 [10,600]	11,000 [34,000]	$24	$60
2 Exposition BRT	$188 To Santa Monica	$76 To La Cienega	$87 To Venice Blvd	N/A	$32	$7	12,400	5,800	23,000	$14	$13
3a Exposition LRT (Baseline)	$589 To Santa Monica	$178 To Crenshaw	$312 To La Cienega	$398 To Venice Blvd	$45	$21	15,300	8,700	38,600	$21	$25
3b Exposition LRT (Minimum Grade Separations)	$431 To Santa Monica	$135 To Crenshaw	$209 To La Cienega	$227 To Venice Blvd	$45	$20	15,300	8,700	38,600	$18	$20
4 Wilshire Blvd HRT Subway (Via Pico/ San Vicente)	$2,643 To Federal	$673 To Pico / San Vicente	N/A	N/A	$29 (Pico/ San Vicente)	$5 (Pico/ San Vicente)	10,400 (Pico/ San Vicente)	3,700 (Pico/ San Vicente)	11,400 (Pico/ San Vicente)	$28 (Pico/ San Vicente)	$50 (Pico/ San Vicente)
5 Wilshire Blvd HRT Subway (Via Wilshire Blvd)	$2,469 To Federal	$891 To Fairfax	N/A	N/A	$41	$17	15,300	9,200	33,500	$50	$75
					$31 (Fairfax)	$7 (Fairfax)	8,800 (Fairfax)	2,200 (Fairfax)	15,800 (Fairfax)	$40 (Fairfax)	$114 (Fairfax)
6 Wilshire Blvd HRT Aerial (Via Wilshire Blvd)	$1,269 To Sepulveda	$543 To Fairfax	N/A	N/A	$41	$17	15,300 (Est)	9,200 (Est)	33,500 (Est)	$30	$41
					$31 (Fairfax)	$7 (Fairfax)	8,800 (Fairfax)	2,200 (Fairfax)	15,800 (Fairfax)	$29 (Fairfax)	$72 (Fairfax)

NOTE: Brackets [ ] indicate Sensitivity
Model Run results assuming full signal preemption.

TABLE 6.7

ALTERNATIVES SUMMARY EVALUATION MATRIX

Mid-City/Westside Transit Corridor
Re-Evaluation/Major Investment Study

APPENDIX

APPENDIX

COMMUNITY INVOLVEMENT/PERCEPTIONS

Description Of Public Involvement Program

The Mid-City/Westside Transit Corridor Study creates a blueprint for enhancing mobility from downtown Los Angeles to Santa Monica Beach using Wilshire Boulevard and the Exposition right-of-way. For more than 60 years, Los Angeles County Metropolitan Transportation Authority (LACMTA) and its predecessor agencies have identified the need for a transit route through the city to the Westside. Wilshire Boulevard has frequently been highlighted as the most promising east/west transit corridor due to its density, activity centers/destinations, and existing high transit ridership. However, in recent years, the Exposition right-of-way has become a promising alternative. In addition to technical data and forecasting, the first step to identifying a realistic, responsive and ultimately successful alternative is public participation. Consensus Planning Group, in cooperation with The Robert Group, developed a comprehensive public involvement program for the Major Investment Study (MIS) process and its associated transit corridor improvements. This plan for public participation was constructed in concert with and approved by the LACMTA and Korve Engineering.

The purpose of this document is to describe the Mid-City/Westside Transit Corridor Study Public Involvement Program process.

Goals. The goal of the Public Involvement Program for the MIS process has been to share project information with stakeholders, identify the issues and concerns of greatest importance regarding Westside transit, and integrate that feedback into the MIS. The Public Involvement Program was initiated to support the Metropolitan Transportation Authority (MTA) in building support to retain federal funding and identify a locally preferred alternative to enhance transit from downtown Los Angeles through the Mid-City and to the Westside.

Throughout the project, MTA, Consensus Planning Group and The Robert Group have involved hundreds of stakeholders and organizations throughout both corridors that have an interest in the project by:

- *informing them about the project,*
- *gathering feedback from them, and*
- *integrating their comments into the planning process.*

This document outlines the various opportunities for public involvement throughout the study process and illustrates the public's feedback for the recommendation of the Locally Preferred Alternative (LPA) at the conclusion of the MIS process.

Summary: Public Involvement Program

The Public Involvement Program for the Mid-City/Westside Transit Corridor Study was administered over the course of seven months. Key objectives were to identify and contact key

community stakeholders, to inform stakeholders and their communities about plans to improve transit on the Westside, and to gather public comment. The first sixty days were devoted to the preparation of the community outreach plan, an introductory fact sheet, involvement of key policy makers and influential stakeholders, and notification to the public.

Community Outreach Plan. The size of the study area and the complexity of potential financial and political impacts assisted in creating a community outreach plan focused on a broad approach to public involvement by including numerous community groups, various business interests, and other interested individuals. This strategy of community outreach relies on the power of leadership to reach as many people as possible. The leaders of business and civic organizations, homeowners groups, and other key stakeholders affected by the study were identified and invited to stakeholder roundtables in an effort to elicit responses and opinions from them as the main representative of their organization. Community leaders would then distribute information to the members of the organizations during monthly meetings, in newsletters and fact sheets. This approach allowed the MTA and the public involvement team to disseminate information and dialogue in a meaningful manner with stakeholders while outreaching to as many people as possible.

To initiate the process, a letter was sent to Los Angeles councilmembers, and the city managers of Beverly Hills, Culver City, Santa Monica and West Hollywood, as well as California state and federal elected officials, informing them of the initiation of the study and offering them briefings if desired. At their request, a majority of those contacted received personal briefings about the project. These briefings served as a tool for identifying community stakeholders and their potential issues and concerns. Briefings also helped in establishing communication protocols directing stakeholder contact and information materials distribution.

Project briefings and/or telephone interviews were held with the offices of:

Congressional Member Xavier Becerra
Congressional Member Julian Dixon
Congressional Member Henry Waxman
State Senator Tom Hayden
Assembly Member Wally Knox
Assembly Member Sheila Kuehl
Assembly Member Herb Wesson
Assembly Member Rod Wright

Councilmember Hal Bernson
Councilmember John Ferraro
Councilmember Mike Feuer
Councilmember Ruth Galanter
Councilmember Mike Hernandez
Councilmember Nate Holden
Councilmember Mark Ridley-Thomas

Additional meetings were given to city staff. They included:

City of Los Angeles Department of Transportation
City of Culver City
City of Santa Monica
City of West Hollywood
Westside Cities Sub-Regional Forum

Monthly meetings were also held with representatives from the MTA Board Staff with interests in the Mid-City/Westside area. These included Mayor Richard Riordan's Office and County Supervisors Yvonne Brathwaite Burke and Zev Yaroslavsky.

Following these briefings, special meetings and presentations on the MIS process were provided to targeted groups and individuals. These meetings, referred to as roundtables, served to encourage and maintain open and ongoing communication with interested parties and to provide them with information about the goals, alternatives under consideration, timeline, and steps in the MIS process. They also provided team members and stakeholders a preview of upcoming roundtables so that content could be refined and issues anticipated. By the completion of the process, over 30 meetings were conducted, including roundtables, technical briefings, and community meetings.

To achieve community outreach goals, Consensus Planning Group/The Robert Group and the public involvement team performed a variety of activities, including:

- **Stakeholder Identification**
- **Stakeholder Contact**
- **Documentation of Public Comment**
- **Public Information Materials Development**
- **Roundtable Arrangement and Facilitation**
- **Integration of Public Comment into MIS**

Summary of Public Comment

Described below are the concerns stakeholders raised often during ten (10) roundtable meetings for the MIS process. Each meeting included between 15 and 40 community representatives. Comments are organized according to project alternatives.

Roundtable comments were elicited through a variety of means. In addition to recording comments during roundtable discussions and other public meetings, comments were elicited through comment sheets and the MTA Mid-City/Westside Transit Corridor study hotline.

A. Alternative 1 - Wilshire Bus Rapid Transit (BRT)

Bus Rapid Transit on Wilshire Boulevard will require dedicated bus lanes on Wilshire (curb lanes or center median). Portions of the transit route could operate in mixed-flow traffic.

Traffic: Homeowners associations were concerned that a dedicated bus lane on Wilshire Boulevard will divert traffic to adjacent residential streets. Participants also indicated that a new bus system with partial mix-flow operation defeats the purpose of relieving congestion and adds to the nuisance. They offered suggestions of wider east/west corridors that could sustain the demand of transit and mix-flow traffic, such as Venice and Olympic Boulevards.

Design: Several concerns were raised by residential and business interests regarding the design of the proposed bus system, on-going maintenance and the new character of Wilshire Boulevard. Business interests were concerned about the loss of curbside parking, which has the potential to decrease patronage and could pose delivery problems. The landscaped medians were of particular concern to

business owners along Wilshire who spent a great deal of time and money getting them placed along the boulevard and are reluctant to have them removed. Some business representatives also indicated that the Wilshire corridor would no longer be a destination center, but rather a route where passengers merely pass through. Some participants opposed the alternatives because of these design issues.

North/South Transit Links: While participants raised several concerns, they agreed that improved transit was necessary and just addressing east/west traffic would not solve the problem. The Miracle Mile Homeowners Association, in particular, was concerned that holding the signal light for east/west traffic on Wilshire would have an adverse affect on north/south traffic crossing the Boulevard. Heavily traveled corridors like La Brea and La Cienega were used as examples.

Speed: Due to the limited stops associated with the BRT and the additional improvements such as prepaid passengers and curb level boarding, residents inquired about the speeds the buses will travel, the time of day, and the travel time from downtown to the beach in Santa Monica. A few participants questioned that if the changes were minimal, MTA may not really be meeting the demand for transit on the Westside and thus, the project's goal.

Funding: Many participants inquired about the proposed funding:

- Are you sure that the Federal Government will approve the designated LPA for funding?
- Is the money still available?
- How far can the route extend using the Federal funding allocated?
- Isn't it true that all three of the current transit corridor studies are seeking the same funding? And, if so, what guarantees that the Westside will get its fair share this time?

Education: Several participants were willing to assist in educating their neighbors about MTA's plans. However, they wanted to know if a more detailed educational campaign would take place. Supportive participants want more resources from MTA to educate the public about the positive benefits of transit. Examples from other cities should be stressed.

Ridership: There were a couple of reoccurring themes regarding ridership.

- Does the MTA anticipate that drivers will leave their vehicles and take public transit?
- How will this bus line impact the current bus lines on Wilshire?
- Will the BRT just shift ridership from current bus lines?

Environmental Issues: Participants inquired about the type of fuel the buses would utilize.

B. Alternative 2 - Exposition Bus Rapid Transit (BRT)

The BRT will place dedicated bus lanes on the abandoned Exposition right-of-way. Portions of either the full length or the LPA equivalent route could operate in mixed-flow traffic on adjacent city streets.

Design: Residents and business interests indicated that other transit systems such as light rail and heavy rail are cleaner, safer, and better maintained. Many participants wondered how a bus rapid transit system would be maintained since they perceived the current bus system as being poorly maintained.

It was also debated among participants that because MTA owns the right-of-way, light rail should be adopted as the locally preferred alternative rather than committing limited resources to BRT.

Participants discussed whether light rail has a higher capacity than articulated buses and whether or not light rail could substantially reduce travel time. The technical team notified the public that those studies were not yet complete and that, in fact, BRT may handle more passengers that a single car on a light rail line and that travel time may actually be equivalent to rail.

Speed: Culver City was particularly concerned about speed and intersections where the BRT would meet opposing traffic. The BRT would go behind residences and near schools, so emphasis was placed on safety in relation to street improvements. If the bus has signal preemption, how will this impact north/south traffic?

Education: Several participants were willing to assist in educating their neighbors about MTA's plans. However, they wanted to know if a more detailed educational campaign would take place. Supportive participants want more resources from MTA to help educate the public.

Funding: Many participants inquired about the proposed funding.

- Are you sure that the Federal Government will approve the designated LPA for funding?
- Is the money still available?
- How far can the route extend using the Federal funding allocated?
- Isn't it true that all three of the current transit corridor studies are seeking the same funding? And if so, what guarantees that the Westside will get its fair share this time?

Ridership: There were a couple of reoccurring themes regarding ridership.

- Does the MTA anticipate that drivers will leave their vehicles and take public transit?
- How will this bus line impact the current bus lines?
- Will the BRT just shift ridership from current bus lines?

Environmental Issues: Participants inquired about the type of fuel the buses would utilize. There were also concerns about the noise impacts of buses operating on the ROW. Some residents opposed the alternative due to environmental impacts.

C. Alternatives 3a and 3b - Exposition Light Rail Transit (LRT)

The light rail transit alternative will place an at-grade Blue Line extension on the abandoned Exposition right-of-way.

Participants did not comment regarding speed and funding. However, substantial discussion occurred regarding safety at crossings and how design features could accommodate safety concerns, and about environmental issues such as noise and vibration. Other issues included the loss of privacy and the introduction of criminal elements into the community.

North/South Transit Links: Recently, the L.A. Times has published a number of articles regarding MTA. One feature story focused on safety on the Blue Line, and how cars try to "beat" oncoming trains through intersections – invariably, this ends in tragedy. Participants were well read regarding the L.A. Times articles and had several questions regarding the safety of rail crossings at north/south links. Residents in Cheviot Hills and Culver City were particularly concerned about the rail crossings at Motor and Overland. There is significant pedestrian and vehicular traffic on those major streets, as well as a school at Overland. In fact, participants suggested that the light rail system should go underground at Motor and Overland.

Education: Participants from Culver City and Cheviot Hills were particularly interested in educating their neighbors about the process. The purpose and need sections of the presentations that included SCAG forecasting for population growth on the Westside as well personal experiences with increasing congestion prompted several participants to support some form of transit along the right-of-way. Those who supported using the right-of-way acknowledged that it would be an uphill battle building support for light rail. Although there has been a significant shift of support in Cheviot Hills, the homeowners agreed that a well thought out educational campaign would be a better alternative than being at odds with their neighbors. They proposed some of the following suggestions:

- *Identify residents near the Blue Line who initially opposed the transit system, but have since favored and perhaps even use the Blue Line;*
- *Emphasize how the new light rail system will assist those adjacent to the right-of-way; and,*
- *Illustrate how transit in the region will be positively affected by the new light rail system.*

Environmental Issues: Residents in Cheviot Hills were concerned about noise from the rail line including the bells at crossings and horn from the rail car. They noted a number of turns along the right-of-way and recalled that the old red cars used to brake loudly traversing those sections. In some sections along the right-of-way, residential properties are close to the right-of-way and the issue of vibration became a significant factor. Some residents opposed this alternative because of environmental and other concerns.

Ridership: Several participants agreed that a light rail system is more likely to appeal to motorists than a bus rapid transit system. Perceived reductions in travel time and continued maintenance were the prominent factors for that resolution.

D. Alternative 4 – Wilshire Subway Heavy Rail Transit (HRT) via Pico/San Vicente

The heavy rail subway alternative from the current terminus at Wilshire/Western to Pico/San Vicente Blvd is the former LPA.

E. Alternative 5 - Wilshire Subway Heavy Rail Transit (HRT)

The heavy rail subway along Wilshire Boulevard alternative is the former candidate LPA.

Both of the heavy rail subway alternatives were perceived by most participants as being "non-alternatives" due to the subsurface gases on Wilshire, and the passage of Proposition A, whereby voters passed an initiative prohibiting further use of local sales tax dollars to build subways. Additionally, the subway project was suspended due to the MTA's lack of matching local dollars. The public did not see the point of discussing subway options in great detail. However, a few homeowners conceded that public transit on Wilshire Boulevard would not be effective unless subway rail is adopted. They contended that a subway system would maintain:

- the character of Wilshire;
- mix-flow traffic on the Boulevard;
- public curb-side parking;
- the landscaped median; and,
- provide increased speed and passenger capacity.

F. Wilshire Aerial Heavy Rail Transit (HRT)

The heavy rail aerial alternative along Wilshire Boulevard is also a former candidate LPA. None of the participants supported the heavy rail aerial alternative.

G. Other Community Proposals

A variation to the heavy rail aerial alternative was suggested. Business interests in the Mid-Wilshire area proposed a monorail system similar to the system in Seattle, Washington. It was proposed that the monorail be located in the existing landscaped median. Some homeowners in the Mid-Wilshire area, however, were not supportive of an aerial monorail system along Wilshire Boulevard.

H. Conclusion

There were three areas of consensus that were identified:

1. Stakeholders believe that public transit must be improved to enhance mobility through the Mid-City to the Westside.
2. Stakeholders realize that improving transit on Wilshire Boulevard or adding transit on the Exposition right-of-way will not entirely resolve mobility problems. It will also be necessary to improve the 10 Freeway and other transportation management systems in conjunction with improving public transit on either, or both, corridors.
3. While there is unanimous agreement that public transit through the Mid-City to the Westside needs improvement, there is no preferred method for increasing mobility.
4. While there is no preferred method, increased traffic congestion and drive time has resulted in a noticeable shift with communities adjacent to both corridors now supporting improved transit through the Mid-City to the Westside.

Outcome Of Public Involvement Program

As stated previously, public comment has been continuously integrated into the MIS process. Each step in the process has involved a feedback loop whereby the public has helped to guide and shape the direction of the project. This feedback process has culminated in the attached recommendations, which are documented in this report.

RESOURCE LIST

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86. MTA/SPTC Track Maps for Exposition Right-of-Way (31 plan sheets)

87. Technical Appendix - 1998 Regional Transportation Plan (SCAG, Adopted 4-16-98)

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Visual Resources

1. Wilshire Boulevard: Western to La Cienega then back to Vermont, videotape shot by Brent, September 1999.

2. AIn Our Lifetime,@ videotape of Curitiba busway system produced by Martha Welborne.

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Transportation Planning and Patronage Modeling
Michael Meyer
Viggen Davidian

Suisman Urban Design
Land Use and Urban Design
Doug Suisman

Terry A. Hayes Associates
Environmental Assessment and Documentation, MIS Process, Purpose and Need
Terry Hayes
Elizabeth Atwell
Keith Cooper

The Robert Group
Agency and Public Outreach (Co-Lead)
Christine M. Robert
Clarissa Filgioun
Christina Cobb

Wagner Engineering & Surveying, Inc.
Base Mapping, Aerial Photography
Stephanie Wagner
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W. Koo & Associates, Inc.
Conceptual Engineering (aerial structures)
Wei Koo
Shafi Sharifan