

STATUS OF ENVIRONMENTAL  
MITIGATION MEASURES FOR  
LOS ANGELES METRO RAIL PROJECT  
MINIMUM OPERABLE SEGMENT (MOS-1)

Prepared by:

Environmental Engineering Section  
Southern California Rapid Transit District  
Los Angeles, California

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INTRODUCTION

The Los Angeles Metro Rail Project is the backbone of a 150-mile transit system approved by Los Angeles County voters as Proposition A in 1980 and shown in Figure 1. The first 4.4 miles of the Metro Rail Project, shown in Figure 2, is known as the Minimum Operable Segment (MOS-1) and will run from the yard and shops near Union Station to the Wilshire/Alvarado Station. This report has been prepared in fulfillment of a requirement of Section 3A of the Full Funding Contract (FFC) for the construction of MOS-1, between the Urban Mass Transportation Administration and the Southern California Rapid Transit District dated August 27, 1986. Groundbreaking ceremonies for the MOS-1 Project were held September 29, 1986.

BACKGROUND

In 1983, the District and the Urban Mass Transportation Administration (UMTA) published a Final Environmental Impact Statement (FEIS) containing measures to mitigate impacts of the 18.6 mile Metro Rail Project on the environment. In May 1984 UMTA informed the SCRTD that were insufficient Federal funds to construct either the full 18.6 or 8.8 mile rail alternatives evaluated in the FEIS. Because of this information SCRTD analyzed its options for the Los Angeles Rail Transit Project. It determined that a 4.4 mile transit project from Union Station to the Wilshire/Alvarado Station on the original proposed system would be consistent with federal funding constraints and would perform an important, independent function in alleviating severe downtown traffic congestion. In August 1984 an Environmental Assessment (EA), with mitigation measures, was prepared to evaluate MOS-1.

On September 13 and October 25 of 1984, in connection with a lawsuit challenging the adequacy of the Final Environmental Impact Report (FEIR), the District's Board of Directors clarified fifteen findings made in their November 10, 1983 Statement of Findings. The clarified findings amplified the project mitigation measures and the rationale for the decision.

In December 1985, the U.S. Congress passed a resolution requiring the District to study the potential methane gas risks relating to the proposed alignment of the Metro Rail Project beyond MOS-1 and to avoid tunneling into or through areas identified as "potential risk" or "potential high risk" zones. A Los Angeles City Task

# PROPOSITION A TRANSIT DEVELOPMENT IN LOS ANGELES COUNTY

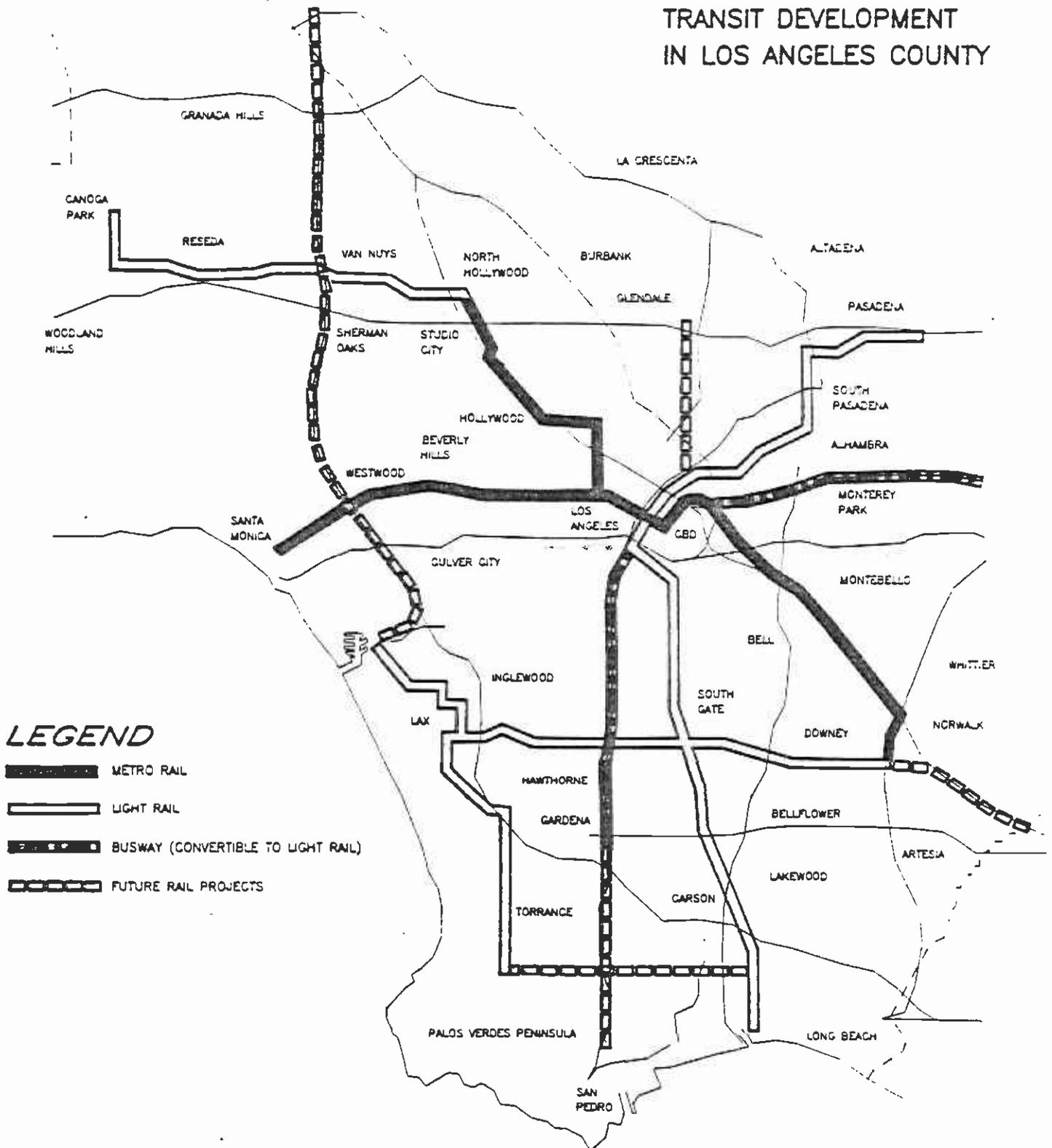


FIGURE 1

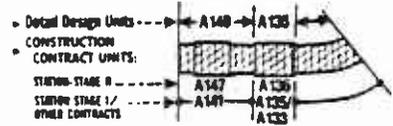
# SOUTHERN CALIFORNIA RAPID TRANSIT DISTRICT

## MINIMUM OPERABLE SEGMENT-1 ROUTE MAP

JULY 1986



### METRO RAIL PROJECT PROJECT UNIT INDEX



METRO RAIL TRANSIT CONSULTANTS  
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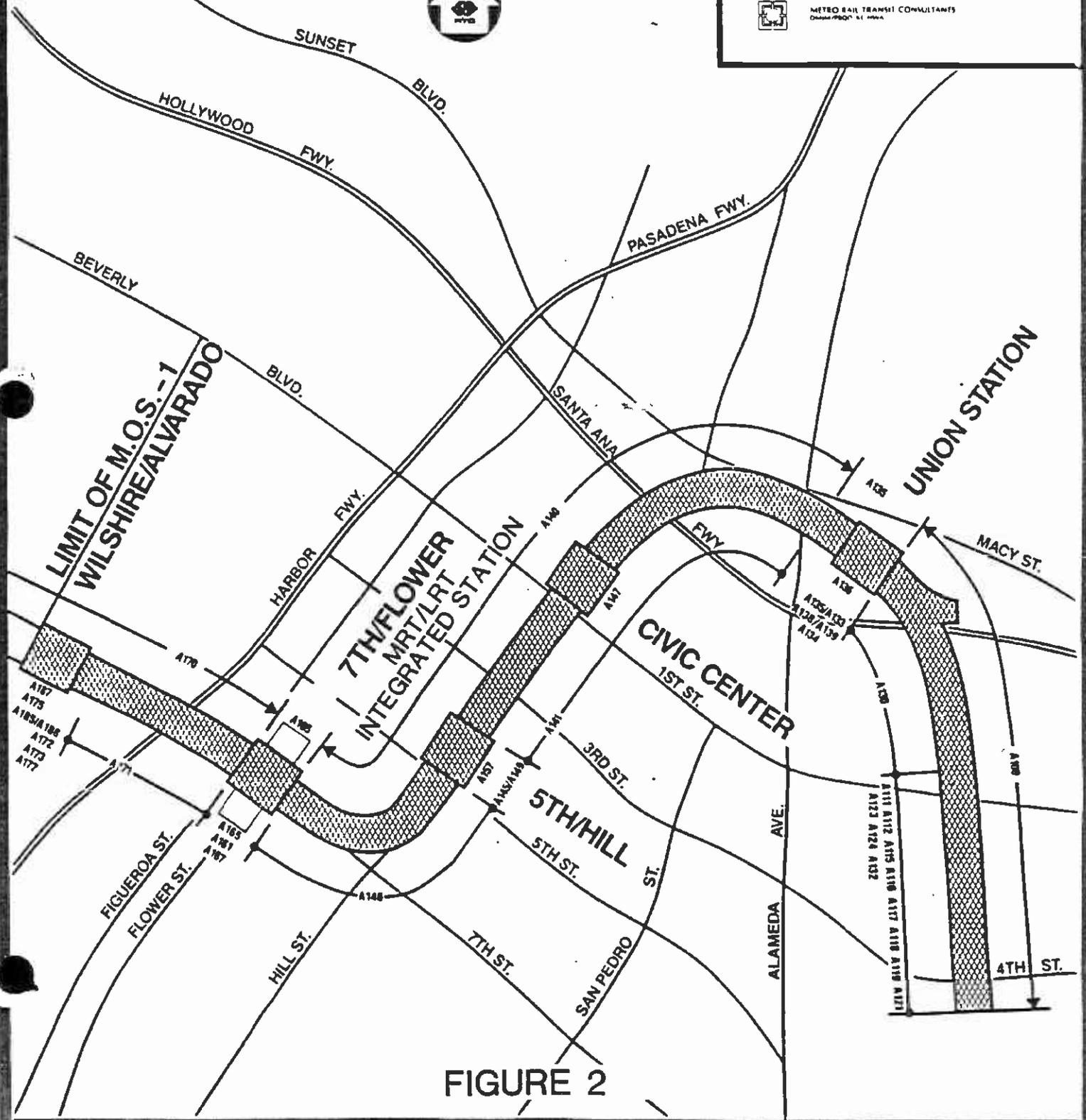


FIGURE 2

Force report, dated June 10, 1985, identified these zones. The Los Angeles City Council established an Independent Technical Review Committee to evaluate the safety of the design and construction methods for MOS-1. The Committee proposed recommendations to improve the safety of design and construction for the Metro Rail Project. These twenty-three recommendations were adopted by the Board of Directors of the District on February 13, 1986.

The District and UMTA executed a FFC for the construction of MOS-1. Section 3A of the FFC (Mitigation Measures) incorporates by reference the mitigation measures described in the FEIS, dated December 1983; the Environmental Assessment of August 1984 and the Comments and Responses thereto, dated October 1984; and the Reevaluation of Environmental Record, dated June 1986. The FFC requires the mitigation measures to be implemented as part of the Metro Rail Project. The District is responsible for submitting a report to the Government within sixty days after the FFC is executed, detailing the measures incorporated in the Metro Rail Project to mitigate environmental harm.

This report provides a comprehensive listing of all of the mitigation measures in the following documents:

U.S. Urban Mass Transportation Administration, Final Environmental Impact Statement for the Los Angeles Rail Rapid Transit Project, December 1983.

\_\_\_\_\_, Environmental Assessment for the Los Angeles Rail Rapid Transit Project, Union Station to Wilshire/Alvarado, August 1984.

\_\_\_\_\_, Comments and Responses on the Environmental Assessment for the Los Angeles Rail Rapid Transit Project, Union Station to Wilshire/Alvarado, October 1984.

\_\_\_\_\_, Reevaluation of the Environmental Record for the Los Angeles Metro Rail Project (Minimum Operable Segment), August 5, 1986.

Los Angeles, CA., Southern California Rapid Transit District, Clarifications of Findings with Respect to Metro Rail Project (COF) adopted by the Board of Directors on September 13, 1984 and on October 25, 1984.

\_\_\_\_\_, Adoption of Resolution to Incorporate in the Metro Rail Project (MOS-1) the Recommendations of the City's Independent Technical Review Committee, February 13, 1986.

The Mitigation Measures are grouped into the following major categories. Abbreviation letters that will be used to number mitigation measures in each category are also shown.

<u>Category</u>	<u>Abbreviation</u>
Traffic and Parking	TP
Feeder Bus Operation	FB
Land Use, Social and Economic	LU
Safety and Security	SS
Sub-Surface Conditions	SC
Aesthetics	A
Noise and Vibration	NV
Air Quality	AQ
Energy	E
Geology	GE
Construction	C
Cultural Resources	CR

Each adopted Mitigation Measure is assigned a number within the major categories. Each Mitigation Measure is followed by a reference to the document in which the measure is required, the applicable construction contract unit, and the status of implementing the measure. MOS-1 is divided into thirty-five Construction Contract Units, thirty-two Utility Contract Units, twelve Agency Contract Units, twenty-six Systemwide Contract Units, and the Project Archaeologist Contract. Most of the Mitigation Measures apply to the Construction Contract Units. These are shown in Figure 2. All contract units are also described in detail in the Contract Unit Descriptions Report dated July 1986.

## STATUS OF ENVIRONMENTAL MITIGATION MEASURES

### TRAFFIC AND PARKING (TP)

#### During Construction

Mitigation Measure TP1. Cut-and-cover construction will be minimized and used only at stations and other special structure locations.

- A. Reference: COF, October 25, 1984, Pages 6 and 13
- B. Contract Segment: All cut-and-cover segments
- C. Status: The Metro Rail Project has proposed cut-and-cover only at stations, crossovers, tunnel boring machine launch shafts, and the yard leads.

Mitigation Measure TP2. Construction in the Central Business District (CBD) will be phased so that all station areas are not impacted at the same time.

- A. Reference: COF, October 25, 1984, Page 6
- B. Contract Segment: A-141, A-145, A-165
- C. Status: Construction at these three CBD station sites is phased to start at different times. All excavations will be covered over immediately, and construction activities will be largely underground. Truck haul routes and Traffic Control Plans have been developed in coordination with and approved by LADOT to expedite and control traffic in and around each construction site.

Mitigation Measure TP3. Cut-and-cover construction will substitute integrated panel decking (typically asphaltic coated steel, precast concrete or composite wood panels) in place of wooden plank decking wherever feasible. Integrated panel decking presents a neater appearance and a smoother roadway surface.

- A. Reference: FEIS, Pages 3-172, 173
- B. Contract Segment: A-130, A-141, A-145, A-165
- C. Status: Contract Specification Section 01522 contains requirements for decking that will insure a neat appearance and smoother ride quality than traditionally provided by wooden plank decking.

Mitigation Measure TP4. Contractors will be required by SCRTD to control traffic during construction by following the "Work Area Traffic Control Handbook" ("WATCH") (1976 or most recent edition) prepared by the City of Los Angeles; Standard Plan S-160-12, "Notice to Contractors-Comprehensive" (1982 or most recent edition prepared by Bureau of Engineering, City of Los Angeles; and "Standard Specifications for Public Works Construction" (1982 or most recent edition). Comparable standards would be enforced for work conducted in the County of Los Angeles.

A. Reference: FEIS, Pages 3-172, 173

COF, October 19, 1984, Finding #2, Pages 6 and 7

B. Contract Segment: A-111, A-124, A-130, A-138, A-141, A-145, A-161, A-165, A-171, A-175

C. Status: Requirements are in Specification Section 01576, Controlling Traffic. Contracts contain Worksite Traffic Control Plans prepared by LADOT which conform to "WATCH" standards.

Mitigation Measure TP5. Before start of construction, possibly during Final Design, traffic control plans, including detour plans, will be formulated in cooperation with the City of Los Angeles and other affected jurisdictions (County, State).

A. Reference: FEIS, Pages 3-172, 173

COF, October 19, 1984, Finding #2, Pages 6 and 7

B. Contract Segment: A-130, A-141, A-145, A-161, A-165

C. Status: Where State facilities are involved plans were coordinated with Caltrans and permits obtained. Contract drawings include Worksite Traffic Control Plans and Traffic signal rearrangement plans developed by LADOT.

Mitigation Measure TP6. The plans will be based upon lane requirements and other special requirements obtained from the Los Angeles City Department of Transportation for construction within the city and from other appropriate agencies for construction in those jurisdictions.

A. Reference: FEIS, Pages 3-172, 173

COF, October 19, 1984, Finding #2, Pages 6 and 7

- B. Contract Segment: A-111, A-124, A-130, A-138, A-141, A-145, A-161, A-165, A-171, A-175
- C. Status: Worksite Traffic Control Plans have been prepared and approved by LADOT.

Mitigation Measure TP7. The excavation and decking of arterial streets crossing the rail alignments will be phased so that the capacity of these streets is not reduced unnecessarily.

- A. Reference: FEIS, Pages 3-172, 173  
COF, October 19, 1984, Finding #2, Pages 6 and 7
- B. Contract Segment: A-130, A-141, A-145, A-165, A-171, A-175
- C. Status: Worksite Traffic Control Drawings contained in Contract documents contain requirements to prevent simultaneous closure of adjacent streets.

Mitigation Measure TP8. Unless unforeseen circumstances dictate, no designated major or secondary highway will be closed to vehicular or pedestrian traffic. No collector or local street or alley will be completely closed preventing local vehicular or pedestrian access to residences, businesses, or other establishments.

- A. Reference: FEIS, Pages 3-172, 173  
COF, October 25, 1984, Finding #2, Pages 6, 7, and 13
- B. Contract Segment: A-130, A-141, A-145, A-161, A-165, A-171
- C. Status: Worksite traffic plans maintain traffic during construction. Major roads remain open during workdays. They may be closed at night and weekends when essential for construction. Specifications assure vehicle and pedestrian access to property.

Mitigation Measure TP9. Follow special traffic control measures of SCRTD and City of Los Angeles. Maintain access to all businesses as well as safety of walkways.

- A. Reference: FEIS, Page 3-174

- B. Contract Segment: A-130, A-141, A-145, A-161, A-165, A-171
- C. Status: Worksite Traffic Control Plans prepared and approved by LADOT, maintain access to buildings and safety of walkways during construction.

Mitigation Measure TP10. Provide community with announcements of construction procedures, traffic control, schedules and what to expect.

- A. Reference: FEIS, Page 3-174
- B. Contract Segment: All Contract Segments
- C. Status: The SCRTD MOS-1 Community Relations Construction Management Plan of November 1986 provides for notifying community of construction procedures, traffic control, and schedules. Major announcements will be made in media and by direct communication, including personal visits.

Mitigation Measure TP11. Master Agreements with city will be executed to develop specific (traffic control) plans for each station site.

- A. Reference: COF, October 25, 1984, Finding #2, Pages 7 and 8
- B. Contract Segment: A-130, A-141, A-145, A-161, A-165, A-175
- C. Status: An agreement was executed with LADOT. Worksite traffic plans were developed in coordination with and approved by LADOT for each site.

Mitigation Measure TP12. Comprehensive bus re-routing and detour plans will be adopted.

- A. Reference: COF, October 25, 1984, Finding #2, Pages 7 and 8
- B. Contract Segment: A-141, A-145, A-165
- C. Status: Bus detour plans have been prepared in coordination with LADOT and approved by the SCRTD Board. To ease the flow of traffic, Hill Street will be made one way southbound and bus lines will be shifted to less congested streets on the east side of downtown.

## During Operations

Traffic measures were analyzed for intersections with Level of Service E or F after completion of the Metro Rail Project or where the projected volume to capacity ratio increased by 0.02 or more over the no project alternative. The mitigation measures considered include:

- o Increasing approach capacity through installation of a parking restriction;
- o Restriping approach to provide an additional through lane and/or turn lane;
- o Installing left turn restriction/prohibition;
- o Adding or revising traffic signal phase to accommodate the projected traffic pattern;
- o Widening streets and approaches;
- o Providing reversible lanes, if peak period traffic is highly directional.

The application of these measures to specific intersections has been the subject of negotiations between the SCRTD and the City of Los Angeles. The results are shown below for each intersection or street segment considered.

### Mitigation Measure TP13. Widen Center Street and Santa Fe Avenue to 35' half width.

- A. Reference: Letter from J. E. Crawley, SCRTD to Donald Howery, LADOT, Re: Street Replacement Criteria, dated October 2, 1984

Letter from Donald Howery, LADOT to J. E. Crawley, SCRTD, Subject: Metro Rail Replacement Facilities Design Criteria, dated May 15, 1984

Memo from Donald Howery, LADOT to Philip King, Los Angeles Bureau of Engineering, Subject: Metro Rail - Union Station (A-135) Replacement Facilities, dated March 29, 1984

- B. Contract Segment: A-100, A-130

- C. Status: Widening the small section of Center Street impacted by the project is not practical. The only impact on Center Street will be where the cut-and-cover tunnel section crosses perpendicularly under Center Street near Ramirez Street.

As agreed with the City of Los Angeles, Santa Fe Avenue's current width will be maintained. SCRTD has executed an irrevocable offer to dedicate an easement to the City of Los Angeles to facilitate future street widening.

Mitigation Measure TP14. Provide traffic signalization at the Ramirez Street, Vignes Street and Santa Ana Freeway on/off ramp intersection with the entrance to the Union Station Park/Ride lot.

- A. Reference: Same as TP13A above
- B. Contract Segment: A-130, A-138
- C. Status: Under development with coordination between the City of Los Angeles and Caltrans

Mitigation Measure TP15. Provide two outbound and three inbound lanes for the driveway to the Union Station Park/Ride lot. Construct driveway entrance with 30' curb radii.

- A. Reference: Same as TP13A above
- B. Contract Segment: A-138
- C. Status: Three outbound and three inbound lanes are included in Contract A-138, Drawing No. C-004F, Sheet No. 9

Mitigation Measure TP16. Reconstruct the on and off ramps to the Santa Ana Freeway to streamline entrance to the park-n-ride lot.

- A. Reference: Same as TP13A above
- B. Contract Segment: A-130
- C. Status: Included in Contract, Sheet No. 65B, Drawing No. C074. Also see Sheet No. 46, Drawing Nos. C049

Mitigation Measure TP17. Reconstruct the dividing island at the Ramirez Street, Vignes Street and Freeway on/off ramps or widen the ramps to provide a left turn pocket lane and two northbound lanes at the entrance to the Union Station east parking lot.

A. Reference: FEIS, Page 3-23  
Same as TP13A above

B. Contract Segment: A-130

C. Status: Same as TP16C above  
Mitigation Measure TP18. Widen the south side of Ramirez Street from 32' with 8' of sidewalk to 35' with 10' of sidewalk between Vignes and Center Streets.

A. Reference: Same as TP13A above

B. Contract Segment: A-130

C. Status: Included in Contract A-130, Sheet Nos. 45 &46, Drawing Nos. C048 &C049

Mitigation Measure TP19. Widen Macy Street from 28' to 40' half width and install an eastbound right turn lane on Macy Street at Vignes Street. Make the transition from 28' to 40' street half width via an 80' long reverse curve beginning at the east portal of the underpass and continuing easterly to Vignes Street.

A. Reference: Same as TP13A above

B. Contract Segment: A-138

C. Status: Presently included in Contract A-136, Drawing No. C-010F, Sheet No. 15

Mitigation Measure TP20. Make the curb return radius at the south-west corner of Macy and Vignes Streets 35'.

A. Reference: Same as TP13A above

B. Contract Segment: A-138

C. Status: Presently included in Contract A-136, Drawing No. C-010F, Sheet No. 15

Mitigation Measure TP21. Widen Macy Street westbound and install a right turn lane on Vignes Street at Macy Street.

A. Reference: FEIS, Page 3-23

B. Contract Segment: A-138

C. Status: Subsequent study determined that widening Macy Street was not feasible. The right turn lane on Vignes Street at Macy Street is the responsibility of the LADOT and will be considered in their Transportation Improvement Program.

Mitigation Measure TP22. Widen Vignes Street northbound at Macy Street and install a right turn lane on Vignes Street at Macy Street.

- A. Reference: FEIS, Page 3-23
- B. Contract Segment: A-138
- C. Status: It was concluded jointly with LADOT that these street improvements are not necessitated by Metro Rail impacts. They are the responsibility of the LADOT and will be considered in their Transportation Improvement Program.

Mitigation Measure TP23. Restripe Ramirez and Vignes Streets near Union Station.

- A. Reference: FEIS, Page 3-23
- B. Contract Segment: A-138
- C. Status: As agreed with the City, will be done by LADOT during street restoration

Mitigation Measure TP24. Provide left turn channel northbound on Alameda Street at Macy Street. Widen the east side of Alameda Street and construct a right turn lane onto Macy Street.

- A. Reference: FEIS, Page 3-23
- B. Contract Segment: A-136
- C. Status: Same as TP22C above

Mitigation Measure TP25. Replace two railroad tracks in the center of Alameda Street with one track and provide three through lanes in each direction.

- A. Reference: FEIS, Page 3-23
- B. Contract Segment: A-136
- C. Status: Same as TP22C above

Mitigation Measure TP26. Encourage or require employer-sponsored ride-share or transit incentive programs to reduce potential parking usage.

- A. Reference: FEIS, Page 3-31
- B. Contract Segment: Not applicable. Can be used for downtown station areas

- C. Status: This measure requires the cooperation of other agencies or the private sector. Will be developed with the City of Los Angeles and the Community Redevelopment Agency

Mitigation Measure TP27. Encourage developers and employers to take advantage of the City's new parking management plan to reduce the cost of and the need for parking.

- A. Reference: FEIS, Page 3-31
- B. Contract Segment: Not applicable. Can be used for downtown station areas
- C. Status: Same as TP26C above

Mitigation Measure TP28. Provide 26 kiss and ride parking spaces at the Alvarado Station. If additional spaces are required, they could be built over the crossover east of Alvarado Station.

- A. Reference: EA, Page 42
- B. Contract Segment: A-185
- C. Status: Subsequent detailed engineering determined that 20 marked spaces and nine curb side spaces could be provided. Drawings C-004 and C-006 show these spaces.

Mitigation Measure TP29. Provide facilities for bicycle parking at Union Station.

- A. Reference: FEIS, Page 3-32
- B. Contract Segment: A-138
- C. Status: Included in Contract A-136, Drawing Nos. A-007 and A-008

FEEDER BUS OPERATION (FB)

Mitigation Measure FB1. Coordinate with Planning the re-routing of east-west local buses that will terminate at the Alvarado Station on Westlake Avenue.

- A. Reference: EA, Pages 37 and 38
- B. Contract Segment: Not applicable. Bus Planning arranges for changes in bus routes
- C. Status: The EA indicated the required re-routes. Bus Planning will arrange to execute these changes to coincide with the start of rail operations. Westlake Avenue will be resurfaced with concrete to accommodate bus operations.

Mitigation Measure FB2. Increase east side width of Alvarado Street from 33' to 50' in the vicinity of the station.

- A. Reference: Letter from J. E. Crawley, SCRTD to Donald Howery, LADOT, Re: Street Replacement Criteria, dated October 2, 1984

Letter from Donald Howery, LADOT to J. E. Crawley, SCRTD, Subject: Metro Rail Replacement Facilities Design Criteria, dated May 15, 1984

Memo from Donald Howery, LADOT to Philip King, Los Angeles Bureau of Engineering, Subject: Metro Rail - Union Station (A-135) Replacement Facilities, dated March 29, 1984

- B. Contract Segment: A-175
- C. Status: Existing street width is 41.25 feet. Contract Drawing No. C-037, Sheet 028 and Drawing No. C-039, sheet 030 shows east side of Alvarado Street half width will be 51 1/3 feet

Mitigation Measure FB3. Add a 10' wide bus lane on Alvarado Street at the station.

- A. Reference: Same as FB2A above
- B. Contract Segment: A-175
- C. Status: Contract Drawing No. C-037 shows a 12.08 foot wide bus lane included in the east side of Alvarado Street half width of 51 1/3 feet

Mitigation Measure FB4. Coordinate with LADOT to restrict left turn movements at Alvarado Station from all directions except for buses.

- A. Reference: EA, Page 37
- B. Contract Segment: Not applicable. Applies to traffic operations
- C. Status: Will be coordinated with LADOT in time for beginning of rail service

Mitigation Measure FB5. Additional measures are proposed for decision by LADOT and SCRTD. They include eliminating on-street parking on both sides of Alvarado Street and eliminating on-street parking on west side of Westlake Avenue in the vicinity of the station.

- A. Reference: EA, Page 37
- B. Contract Segment: Same as FB4B above
- C. Status: Same as FB4C above

LAND USE, SOCIAL AND ECONOMIC (LU)

Mitigation Measure LUI. Develop residential projects on commercially zoned land.

a. Rezone surplus commercially or industrially zoned land for residential uses. The City's Community Redevelopment Agency is to examine potential for residential development on commercially zoned land in the northwest corner of the Union Station area.

b. Require the construction of housing as part of large scale projects or the contribution to a housing fund for small projects.

c. Encourage the construction of housing as mixed use or independent projects through density bonuses and other incentives.

d. Undertake joint development projects which include a housing component.

A. Reference: FEIS, Pages 3-63, 64

B. Contract Segment: Not applicable - Union Station

C. Status: Since the completion of the Final EIS, the Community Redevelopment Agency has completed Cathay Manor, a 270 unit low and moderate income elderly housing development within the station area. Ground was broken for the 124 unit Hillside Villa low and moderate income apartments in August 1986. Completion is expected by August 1987. Two additional low and moderate income projects sponsored by the Community Redevelopment Agency are under construction or about to start in Chinatown just outside the defined study area, but within walking distance of Union Station. They are Bartlett Hill Manor Apartments (65 units, with groundbreaking scheduled for September 1986) and TC Apartments (20 units, under construction) scheduled for completion and occupancy prior to the end of calendar 1986.

The Community Redevelopment Agency has been approached by a developer requesting financial assistance for a 320 unit, two phase apartment complex to be located between Cathay Manor and Union Station on the block bounded by New High Street, Ord, North Spring, and Sunset. This project is currently in the discussion phase.

Mitigation Measure LU2. The Community Redevelopment Agency, as part of the Specific Plans for the 5th/Hill and 7th/Flower Stations, will address potential redevelopment impacts on and mitigation measures for the historic properties within the specific plan areas. The SCRTD and private developers will cooperate with the CRA's preservation program.

- A. Reference: FEIS, Pages 3-66, 67  
EA, Pages 49 and 50  
COF, October 25, 1984, Page 21
- B. Contract Segment: Not applicable - 5th/Hill and 7th/Flower Stations
- C. Status: Progress to date has centered on the establishment of historic districts to help ensure preservation of historic structures near these two stations. Two historic districts in this area have been added to the National Register of Historic Places. South Spring Street between Fourth and Seventh Streets has been designated a National Register Historic District. The Historic District includes 29 buildings that form the heart of what was once known as "The Wall Street of the West." One block to the west, Broadway between Third and Ninth Streets has been designated as the Broadway Historic Theatre District and is the largest Historic Theatre District on the National Register of Historic Places.

The Draft Core Area Development Framework Plan contains a listing of all buildings listed on the National Register of Historic Places, buildings eligible for listing on the National Register of Historic Places, buildings potentially eligible for listing on the National Register of Historic Places, and all Historic/Cultural Monuments of the Los Angeles Cultural Heritage Board.

The District has requested, in a letter dated November 11, 1986, that the Community Redevelopment Agency incorporate a special section in the Final Metro Rail Station Area Master Plan for the CBD, listing with specificity the mitigation measures that will be taken for all historic structures within the Plan Area and that the Environmental Impact Report for this Plan include a discussion of impacts on and

mitigation measures for the historic properties within the Master Plan Area.

Mitigation Measure LU3. Assist the City, County and Community Redevelopment Agency in the development of Specific Plans.

- A. Reference: FEIS, Page 3-104
- B. Contract Segment: Not applicable - All Station areas
- C. Status: The District provided funding assistance in the development by the City of Los Angeles of the Metro Rail Transit Corridor Specific Plan covering portions of the Central Business District (CBD), eight City developed Station Area Development Plans around individual non-CBD stations, and a CBD Master Plan, covering four CBD stations, developed by the Community Redevelopment Agency. A revised draft edition of the Transit Corridor Specific Plan is under preparation (in August 1986) and an EIR for the plan has been prepared, circulated, and public hearings have been held.

Three editions of the eight Draft Station Area Development Plans have been written and the District is preparing comments on them (August 1986).

Mitigation Measure LU4. Relocation Assistance for displaced residents, tenants, businesses and non-profit organizations will be provided in accordance with the Federal Uniform Relocation Assistance and Real Property Acquisition Policies Act (of 1970) and the California Relocation Act.

- A. Reference: FEIS, Page 3-104
- B. Contract Segment: Not applicable. All Station areas
- C. Status: All federal and federally assisted projects in the Metro Rail Corridor will comply with the Federal Uniform Relocation Assistance and Real Property Acquisition Policies Act (of 1970).

All projects in the Metro Rail Corridor where a public entity (including the state, the Regents of the University of California, a county, city, district, public authority, public agency, or other political subdivision) acquires real property for public use are required by law to provide relocation assistance under the terms of the California Relocation Act. In addition, the Community Redevelopment Agency requires compliance with the California Relocation Act as a condition of approval for all projects requiring discretionary Community Redevelopment Agency action.

RELOCATION

The relocation program is organized to comply with the provision of the Uniform Relocation Act. A Real Estate Specialist was assigned to each displaced occupant to completely inform them of the relocation benefits and services.

A community meeting was held with the commercial tenants displaced from the Wilshire/Alvarado station site to familiarize them with the route alignment and the relocation benefits. Other displacees were briefed on a one-on-one basis to discuss the Project and to explain their benefits. Four relocation brochures for Tenants and Homeowners and a brochure for Business and Non-Profit Organizations were prepared and distributed to each occupant displaced by the Project.

Listed below is a summary of the relocation work load.

	<u>CCU</u> <u>A100</u>	<u>CCU</u> <u>A130</u>	<u>CCU</u> <u>A145</u>	<u>CCU</u> <u>A165</u>	<u>CCU</u> <u>A171</u>	<u>CCU</u> <u>A175</u>	<u>TOTAL</u>
Total Relocation	5	5	3	0	5	41	59
Relocations Completed	5	3	0	0	0	33	41
Relocations Remaining	0	2	3	0	5	8	18
Residential	0	0	0	0	0	25	25
Commercial	5	5	3	0	5	16	34

## RESIDENTIAL RELOCATIONS

The twenty-five (25) residential relocations displaced in Construction Contract Unit (CCU) A175 consist of tenants occupying an apartment building. The tenants were primarily low-income, Spanish-speaking occupants who were living in substandard units. A Last Resort Housing Plan was submitted to UMTA and approved December 28, 1984. The plan authorized the payment of a relocation payment over and above the normal tenant supplement maximum authorized by the Uniform Act. All 25 tenants were relocated to decent, safe, and sanitary units.

## COMMERCIAL RELOCATIONS

Sixteen (16) commercial tenants have been relocated with the assistance of a Real Estate Specialist. The commercial tenants consisted of 2 transport companies, a wholesale grocery distributor, a sheet metal processor, a corn processor, a medical clinic including individual medical practices, a fast food restaurant, and retail clothing operations.

Individualized service will be provided to the remaining commercial occupants. Referrals to other commercial locations are routinely provided as well as other advisory services.

## SUMMARY

A total of \$132,000 has been paid to date in relocation expenses. The acquisition and relocation program will continue to be implemented with the remaining occupants.

Mitigation Measure LU5. The following mitigation options may be implemented by SCRTD or other public agencies such as the L.A. County: Community Redevelopment Commission and Department of Regional Planning; L.A. City: Department of Planning, Department of Transportation, Community Development Department, Economic Development Office, and the Community Development Commission.

a) Include affordable market rate housing on commercially zoned sites in lieu of increased density in adjacent neighborhoods.

A. Reference: FEIS, Pages 3-104, 105  
EA, Pages 66, 67

- B. Contract Segment: Not applicable. Civic Center, 5th/Hill, 7th/Flower Station areas
- C. Status: Page 67 of the Community Redevelopment Agency Draft Central Business District Station Area Master Plan requires new developments in the Central Business District which need agency discretionary action (desire to build higher than the by right plan limit of up to F.A.R. 6) to provide either onsite housing or make a direct contribution to the South Park Housing Fund (a Community Redevelopment Agency designated future housing neighborhood at the southwest end of the Central Business District.

b) Establish special rent control districts to avoid severe increases in rental rates in the station area.

- A. Reference: Same as LU5A above
- B. Contract Segment: Not applicable. All Station areas
- C. Status: The City of West Hollywood has enacted rent control to avoid severe increases in rental rates. This enactment of rent control was not directly tied to Metro Rail but will serve to avoid severe increases in rental rates in the station area.

c) As a last resort provide housing assistance for low income residential tenants in station areas to mitigate severe increases in rental rates.

- A. Reference: Same as LU5A above
- B. Contract Segment: Not applicable. All Station areas
- C. Status: Both the City and County of Los Angeles have Department of Housing and Urban Development (HUD) Section 8 housing programs. Under this program, low income residents qualify for a certificate which subsidizes their rent. They are then able to seek housing themselves at the location of their choice. This program applies throughout the City/County.

d) Implement measures to reduce parking spill-over into adjacent neighborhoods.

A. Reference: Same as LU5A above

B. Contract Segment: Not applicable. All Station areas

C. Status: The City of Los Angeles Department of Transportation has implemented a preferential parking program administered by a separate preferential parking section within the Department. A new district is established in an area of approximately six city blocks following the gathering of signatures of three-quarters of the residents on a standardized City form, technical studies by the City, and advertised public hearings. When a preferential parking district is established, on-street parking is limited to residents displaying permits. Permits cost \$15 a year. Up to three permits are permitted per household (four on written request, and temporary or visitor passes are available for lesser amounts).

e) Establish special commercial zoning or development review procedures to preserve existing small businesses that provide community services in the station areas.

A. Reference: Same as LU5A above

B. Contract Segment: Same as LU5B above

C. Status: The Draft Metro Rail Station Area Development Plans (Page VIII-3 of each plan) include a Development Area Review Team (DART) which will review development and could act to preserve existing small businesses that provide community services in the station areas.

f) Encourage tenancy and investment in joint development to displaced firms.

A. Reference: Same as LU5A above

B. Contract Segment: Same as LU5B above

(Bureau of Engineering), and Community Redevelopment Agency (CRA projects only). The DART chair would have the authority to call in other departments, including the City Economic Development Office (CEDO) and the Community Development Department as needed for specific cases.

The City intends to include SCRTD as a participant in DART meetings and City Planning Commission meetings when Metro Rail issues and land development in Metro Rail station areas are being discussed. The City also intends to place Metro Rail and related land use items on the DART agenda at SCRTD's request, with tasks arising from these meetings to be completed by each agency.

- i) Encourage the inclusion of displaced and new social services and facilities in joint development projects for the stations.
  - A. Reference: Same as LU5A above
  - B. Contract Segment: Same as LU5B above
  - C. Status: The District will encourage developers and municipal agencies to support this measure. The Draft Station Area Development Plans include density bonuses allowing developers additional buildable floor space over what they would receive by right for including community services in joint developments.
  
- j) Require 15% of all new housing constructed in the CBD to be low-moderate income housing.
  - A. Reference: Same as LU5A above
  - B. Contract Segment: Not applicable. Union Station, Civic Center, 5th/Hill, 7th/Flower Station areas
  - C. Status: The Community Redevelopment Agency requires 15% of all housing constructed as part of Community Redevelopment Agency projects in the CBD to be low-moderate income housing. This requirement is contained in the Bunker Hill Redevelopment Project, Chinatown Redevelopment Project, CBD Redevelopment Project, and Little Tokyo Redevelopment Project plans. See also the response to LU1.

k. The zoning roll back program to align the city's general plan with zoning, further specifies "rollback" zoning in the Wilshire/Alvarado area, creating additional protections for the existing low income housing stock.

A. Reference: EA, Page 50

B. Contract Segment: Not Applicable. Wilshire/Alvarado Station Area.

C. Status:

Mitigation Measure LU6. Identify the level of revenue contributed by the portion of the property that will be used for a Metro Rail station. Explore methods to compensate the taxing jurisdiction for the revenues they would have received. Identify the residual development potential for the parcel and seek to have housing development incorporated into station area development.

A. Reference: FEIS, Page 3-80

B. Contract Segment: Not applicable. All Stations

C. Status: Some land used for the MOS-1 will have joint development on it, which will result in equal or greater revenues to the taxing jurisdiction. Other land required for the project, such as entrances to the CBD stations, will remain on the tax rolls. Further development on land used for the yard and shops and at Alvarado Station will return property to the tax rolls.

## SAFETY AND SECURITY (SS)

Mitigation Measure SS1. Provide adequate emergency exits, power supplies, alarm systems, emergency communication systems, fire sprinklers, standpipes, and smoke and gas detectors. Use low combustion or non-combustible materials to the maximum extent. Low combustion material should be low smoke and toxic fume producing.

- A. Reference: FEIS, Page 3-110  
Comments and Responses to EA, Page 36
- B. Contract Segment: All Contracts
- C. Status: These measures are required by the Fire/Life Safety Criteria for the Project. The District's Fire/Life Safety Committee (FLSC) has reviewed all plans and specifications for conformance with Fire and Life Safety Criteria. Final plans are approved by the FLSC after all criteria provisions are incorporated. Any changes to final design require resubmittal to and approval by the FLSC.

Mitigation Measure SS2. Station design includes walking surfaces constructed from non-slip materials.

- A. Reference: FEIS, Pages 3-187, 188, 189
- B. Contract Segment: All Contracts
- C. Status: Metro Rail Design Criteria, Volume 3, Section 13, calls for slip resistant flooring such as granite and terrazzo tile with slip resistant finish. The Technical Specifications Sections 03300 (Concrete), 04465 (Granite), 09310 (Ceramic Tile), 09330 (Quarry Tile), and 09420 (Terrazzo Tile) indicate the finish to be used. To achieve a non-slip surface, a thermal finish is used on granite and an unglazed finish is used for floor tile.

Mitigation Measure SS3. Design station and surrounding site so that bus and automobile traffic patterns will safely interface with pedestrian and street traffic. Use clear sight lines and comprehensible signs. Provide clearly lighted station interiors. Monitor station interiors with closed circuit television. Provide telephone connections with the control center so that patrons can report criminal activities.

- A. Reference: FEIS, Page 3-109,-110

- B. Contract Segment: All Station Contracts
- C. Status: Bus and vehicle traffic is situated on the periphery of the station sites while pedestrian activity occurs on the interior of the station sites.

Stations have been designed with large open spaces and straight corridors that provide no place for criminals to hide. Station interiors are well lighted and are linked to the control center by telephones and television surveillance.

Mitigation Measure SS4. Provide station supervisors with a central command post so they can supervise and control the station through direct observation and use of modern communications.

- A. Reference: FEIS, Page 3-110
- B. Contract Segment: All Station Contracts
- C. Status: Central command post is provided for roving supervisors use, as required. For Contract A-141, Drawing No. A-006 shows a Staff Security Room with communications facilities on the mezzanine level. Other stations have similar facilities.

Mitigation Measure SS5. Design station to have safe pedestrian access to entrances.

- A. Reference: FEIS, Page 3-109
- B. Contract Segment: All Station Contracts
- C. Status: Same as SS1C above

Mitigation Measure SS6. Use vandal and graffiti resistant designs and materials.

- A. Reference: FEIS, Page 3-111
- B. Contract Segment: All Station Contracts
- C. Status: Metro Rail Design Criteria, Volume 3, Section 13.2.4, requires the use of materials that do not encourage vandalism and that are difficult to deface, damage or remove.

Mitigation Measure SS8. Provide art works in stations to give them a more human and personalized character.

- A. Reference: FEIS, Page 3-111
- B. Contract Segment: All Station Contracts
- C. Status: Under development. The Art-in-Transit Program has been established to commission major art works for each station in keeping with the station design theme. The artists have been selected for all stations. Five preliminary artwork designs are underway and one is complete.

## SUB-SURFACE CONDITIONS (SC)

Specific safety design measures to deal with sub-surface gas will be incorporated into the Metro Rail Project. In addition, construction safety requirements will comply with the regulations the State of California, Division of Occupational Safety and Health. The applicable controlling provisions are the most stringent tunnel safety orders in the country. These are the California Administrative Code, Title 8, Industrial Relations - Chapter 4 and Division of Industrial Safety - Sub-Chapter 20. The recommendations adopted by the SCRTD Board are as follows:

Mitigation Measure SC1. The SCRTD will conduct additional studies and research to improve the method of locating uncharted oil and gas wells before they are encountered and ruptured by a tunnel excavator and establish a procedure to safely plug and abandon any oil or gas well encountered.

- A. Reference: Board Adopted Recommendations of the City of Los Angeles, Board of Review  
EA, Comment 5 and Response, Pages 11 and 12
- B. Contract Segment: All tunnel excavation work
- C. Status: Detailed research conducted to date using all available historical records and photographs has indicated that there are no known abandoned oil wells along the MOS-1 tunnel alignment. SCRTD and its consultants are continuing their search for any data that could provide additional information on abandoned oil wells along the alignment.

The SCRTD has completed its investigation of a technology being used in oil fields to locate well casings. The technology involves the use of a magnetometer, located at the end of a probe, that is capable of detecting oil well casings with a ferrous material content. The finding indicates that this technology can be applied successfully to the Metro Rail alignment.

The District will conduct magnetometer surveys from probes installed at the tunnel headings. Technical Specifications Section 02311 (Shield Driven Tunnels) Parts 1.1.B.8, 1.2.B, 1.3.B.11-14, 1.6.H-J, and 3.1 implement this mitigation measure.

The District has established procedures to safely plug and abandon any oil or gas well encountered. Specification Section 02311 (Shield Driven Tunnels), Part 3.2 implements this mitigation measure.

Mitigation Measure SC2. Audible and visual warning devices will be installed on tunnel excavating machines and in the tunnels to alert employees when detectors have identified the presence of methane gas.

- A. Reference: Same as SC1A above
- B. Contract Segment: All tunneling work
- C. Status: The requirements for audible and visual warning devices are presently incorporated in the SCRTD Construction Specification. Before tunnel construction commences, the contractor will be required to demonstrate that the warning devices are properly functioning. The Construction Manager, together with the Cal-OSHA site representatives, will enforce the use of the devices.

The proper use of the devices will be monitored from the time construction begins until it is completed. The District's Construction Manager is fully aware of this requirement and it has prepared procedures to ensure compliance.

Mitigation Measure SC3. The SCRTD will provide all its available methane gas documentation and interpretations by qualified experts to those bidding on the construction contracts involving tunneling or stations construction, and the SCRTD will include in bid documents the requirements that the contractor provide all employees involved in underground construction work with at least eight hours of training in dealing with the hazards created by methane gas, safety precautions and emergency procedures to be followed when working underground, prior to those employees commencing underground work. In addition, periodic emergency drills and simulated rescues will be staged to reinforce the training.

- A. Reference: Same as SC1A above
- B. Contract Segment: All tunneling contracts

- C. Status: The Project contract documents contain a six page section entitled "Information Available to Bidders". This information lists all available methane gas documentation and reports interpreting the documents.

The SCRTD has developed a Construction Safety and Security Manual, which covers the training of employees involved in underground construction. Section 2.8.3 of the manual contains the requirement that a minimum of 8 hours of training is to be provided to all employees involved in tunneling operations classified as "Gassy" or "Extra Hazardous".

Section 6.4.5.B of the Construction Safety and Security Manual requires emergency response drills to be conducted every three months during construction to reinforce the training.

The Construction Safety and Security Manual has been reviewed and concurred in by Cal-OSHA and the use of the manual is a contract requirement.

Mitigation Measure SC4. Any tunnel excavating machine used to excavate the tunnels will be equipped with an enclosed cab and/or self contained oxygen supply for the machine operator. In addition, all other workers in the immediate vicinity of the face will have, at all times and in immediate proximity of their working location, self-contained "self rescuers" with an independent oxygen supply. Catalytic type "self rescuers" will not be relied upon since they are not effective in a methane environment.

- A. Reference: Same as SC1A above
- B. Contract Segment: All tunneling segments
- C. Status: Specification Section 01545 (Worksite Safety Requirements), Part 3.2 refers the contractors to CAL/OSHA Tunnel Safety Orders, which require the use of self-contained oxygen breathing units for equipment operators and all others within 100 feet of the tunnel face.

Compliance with these provisions of the construction contracts will be continuously monitored by the Construction Manager throughout the construction period.

Mitigation Measure SC5. The SCRTD will undertake additional study to determine the effects that the geological environment surrounding the tunnel route will have on the amount of water and gas likely to penetrate the tunnels. A more thorough study of the characteristics of the oil and gas reservoirs in the vicinity of the route will also be undertaken.

Provide a gas detection and monitoring system to detect the presence and pressure of gas in the ground ahead of the tunnel construction.

Where needed drill small holes ahead of the Tunnel Boring Machine to relieve gas pressure and sink gas collection wells from the surface along the alignment ahead of the tunneling operations. If these measures are not sufficient to avoid infiltration of gas into the tunnels, District will install an extensive gas pressure reduction system adjacent to the tunnels.

A. Reference: Same as SC1A above  
FEIS, Page 3-188

B. Contract Segment: Not applicable. Will be provided outside construction channels

C. Status: The SCRTD will continue its ongoing investigation of gas and water conditions along the alignment before and during construction. As part of this investigation the District has installed an extensive network of probes to measure the concentration and pressure of gas in the soil along the alignments. This effort will include evaluation of data from probes, analysis of all existing and new data by a reservoir engineer and a reservoir geologist, and analysis of all data by District and consultant specialists. As part of this detailed review and analysis of all pertinent data, the effects of the geological environment around the tunnel on the flow of water and gas will be evaluated. A reservoir engineer and a reservoir geologist were engaged to evaluate the geological environment.

A Draft Subsurface Conditions Report was issued in May 1986. The report concluded that subsurface facilities will be constructed using standard precautions and gas mitigation measures.

Mitigation Measure SC6. The SCRTD will review its decision not to provide some automatic mechanism to "back-up" the control room operators activation of emergency ventilation fans. An automatic system will be designed for the control room so that if the alarm should warn of increasing levels of methane gas and the appropriate actions required of a human operator do not occur within a specific period of time, a pre-programmed computerized sequence of events, known as an Emergency Gas Operating Procedure, will be initiated to activate the required fans, blowers, exhaust systems, etc.

- A. Reference: Same as SCIA above
- B. Contract Segment: A-640
- C. Status: SCRTD has completed its review of the Metro Rail emergency operations when gas is detected. The control software has been changed to automatically activate the ventilation system if no action is taken by the communications controller within a prescribed period of time. The communications controller will need some time to ascertain that the prescribed emergency fan activation regimen is correct considering all events that may be taking place.

The Metro Rail communications system Specification Section TP 9.2.9.E has been changed to provide that the computer recommended Emergency Gas Operating Procedure will be activated automatically if no action is taken by the communications controller in 30 seconds.

Mitigation Measure SC7. The SCRTD will, if it has not already completed such a review, assemble its own review panel to examine if its construction designs incorporate sufficient planning to accommodate adequately the special needs of the handicapped patron to use emergency accesses with as little assistance from employees or other patrons as can reasonably be expected.

- A. Reference: Same as SCIA above
- B. Contract Segment: Not applicable. Handled outside construction channels
- C. Status: SCRTD has carried out an extensive review of the emergency exiting requirements of the handicapped. This review has involved the general public and the handicapped. The special needs of the handicapped have been, and

will continue to be given particular attention in the design and operation of Metro Rail. The Fire/Life Safety Committee sets the standards and has the final approval of all safety exiting related issues including the accommodations for the handicapped.

The review of emergency exiting provisions for the Metro Rail System is an ongoing process under the general aegis of the Metro Rail Fire/Life Safety Committee. This Committee will continue to review and approve all designs affecting such provisions. At an appropriate time prior to the start-up of the system, all emergency procedures and provisions will be thoroughly tested for revenue operations readiness.

Mitigation Measure SC8. The SCRTD will re-evaluate its gas probe and monitoring system for train operations so as to ensure that the system will: 1) locate probes in such underground locations as stations, tunnels, cross passages, etc. where methane and hydrogen sulfide gases are likely to collect (in addition to those to be located in the exhaust ducts); 2) locate probes so that reasonably adequate diagnostic data can be generated to help locate the source of a gas intrusion should it occur.

- A. Reference: Same as SC1A above
- B. Contract Segment: A-640
- C. Status: SCRTD has revised Section TP11 and 18 associated contract drawings to nearly double the number of gas probes and to place them in tunnels, rooms and other locations as necessary. The increased number of probes provides more detail and allows greater accuracy in indicating the source of the gas intrusion.

Mitigation Measure SC9. The SCRTD will assign a certified engineering-geologist to be stationed at or near the working face of the tunnel at all times to inspect and log tunnel geology so as to obtain accurate information and interpretation in a timely manner about geologic conditions encountered such as methane pockets, ground water, and changes in geologic conditions exposed during tunnel construction.

- A. Reference: Same as SC1A above
- B. Contract Segment: All tunnel segments

- C. Status: Engineering and geotechnical personnel will be assigned to the jobsites to accurately document geologic conditions and to ensure that proper construction procedures are followed.

The District will have available prior to active tunnel construction appropriate procedures and personnel to deal with the situation.

Mitigation Measure SC10. In addition, the SCRTD, if it has not already done so, will develop a contingency plan that will establish the criteria against which faults encountered during construction will be judged as potentially active or inactive and establish a procedure whereby the concrete tunnel lining will be replaced by specially designed steel lining when a fault classified as active is encountered.

- A. Reference: Same as SC1A above
- B. Contract Segment: All tunnel segments
- C. Status: SCRTD has developed a design for potentially active fault crossings. The District will develop a contingency plan for any heretofore unknown faults that may be encountered within MOS-1. This contingency plan will include criteria and a range of construction options.

The District will have available prior to active tunnel construction appropriate procedures and personnel to deal with the situation.

Mitigation Measure SC11. The SCRTD will better define the ground-water environment which Metro Rail will traverse by preparing a detailed profile along the tunnel alignments illustrating the position of the water levels. Estimates will be made of water inflow rates and these will be compared with the capacities of pumping units to be installed in the tunnels. Excavation plans and tunnel walkway plans will also be examined to ensure that they will remain useful to evacuate patrons and employees should excessive inflow occur.

- A. Reference: Same as SC1A above
- B. Contract Segment: All tunnel segments

- C. Status: Groundwater conditions along MOS-1 had been studied in detail during the design process. However, additional studies are being conducted to better determine the current aquifer characteristics.

Groundwater conditions along the MOS-1 alignment have been recorded in the geological reports prepared by Converse Consultants, U.S. Geological Survey Map MF-866, and gas monitoring reports prepared by Engineering Science in 1983 and 1985. Additional pump tests were initiated in March 1986, to verify previous tests and supplement existing data.

The list of geotechnical reports that addressed the groundwater environment is as follows:

- o Converse Consultants, Inc.:
  - August 29, 1983: Report of Man-Size Auger Boring.
  - September, 1983: Geotechnical Report, Metro Rail Project, Design Unit A-135 (with others).
  - October, 1983 : (a) Geotechnical Report, Metro Rail Project, Design Unit A-170 (with others).
  - October, 1983 : (b) Geotechnical Report, Metro Rail Project, Design Unit A-165 (with others).
  - October, 1983 : (c) Geotechnical Report, Metro Rail Project, Design Unit A-140 (with others).
  - June, 1984 : Supplemental Geotechnical Investigation Metro Rail Project, MacArthur Park Lake (with others).

- February, 1985 : Design Unit A-140 Geotechnical Information, Stations 178 through 199 (letter from MRTC).

- o Geotechnical Investigation Report, Volume I and II; Converse, Ward, Davis, Dixon, November 1981.

Current designs provide for water and gas-resistant membranes or coatings on the exterior of tunnel linings and station walls. Therefore, little or no water is expected to penetrate the stations or tunnels under operating conditions.

If a catastrophic seismic event were to occur, the postulated worst case scenario would involve a tunnel break of one foot wide around the entire tunnel circumference. Under this scenario, emergency evacuation would not be impaired by an inflow of groundwater. At typical flow rates through alluvium, the available tunnel storage capacity below the level of the safety walk would require approximately ten hours to fill.

Pump test and additional groundwater measurements are in process. Should the findings indicate any design modifications are required they will be made. However, results to date indicate no modifications will be required.

Mitigation Measure SC12. The SCRTD and its consultants will obtain a copy of the U.S.G.S. Professional Paper 1365(sic, should be 1360) and verify the adequacy of the MOS-1 structural seismic design. Additional consideration of fault displacement and related damage to the tunnel will also be analyzed.

- A. Reference: Same as SC1A above
- B. Contract Segment: All tunnel segments
- C. Status: SCRTD and its consultants reviewed in detail all available literature including U.S.G.S. Professional Paper 1360, "Evaluating Earthquake Hazards in the Los Angeles Region." Selection of earthquake design values for the Metro Rail project involved consideration of several factors, including:

- o The design values are not the maximum ground acceleration (spike or peak) values, but rather represent the effective values for the design earthquake.
- o Attenuation of peak ground acceleration occurs and must be considered in selecting the design value.
- o There is a very small probability of exceeding the 0.6 g design acceleration during the life of the SCRTD structures.

A comparison of the SCRTD design values with those postulated in U.S.G.S. Professional Paper 1360 results in the following tabulation.

	SCRTD Maximum Design Earthquake MDE	USGS Postulated Earthquake
Richter Magnitude	6.5 - 7.0	6.5
Max. Design Ground Acceleration	0.60 g	0.42 g
Max. Design Ground Velocity	3.2 ft/sec	3.3 ft/sec
Max. Design Ground Displacement	3.3 ft	2.3 ft

The SCRTD design values represent a conservative and appropriate earthquake design approach that addresses all the relevant conditions.

Fault crossings were analyzed in detail, including numerical analysis of flexibility of various tunnel structures and dynamic laboratory tests on models prepared for the District by the California Institute of Technology. From these analyses, it was concluded that fabricated steel linings, because of their ductility, were the appropriate linings for the alignment in the vicinity of identified faults.

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Mitigation Measure SC13. The SCRTD will review its plans for back-up power supplies and utilize fixed or mobile generators to supply emergency power for the ventilation and de-watering pumps in critical areas.

- A. Reference: Same as SC1A above
- B. Contract Segment: A-112
- C. Status: SCRTD has completed a review of the need for additional back-up power. The review considered various system requirements arising from a severe earthquake which could create Los Angeles area-wide blackouts as a minimum, and street blockage and tunnel ruptures as a worst case.

Design decisions were made to: 1) provide a fixed generator in the yard to back-up the DWP power-feed to the tunnel cable and 2) prepare for the addition of a second fixed generator at Wilshire/Alvarado in the event of a fault being found during the Metro Rail tunneling work.

Design decisions have been made. The design re-work of the system (including negotiations with DWP) is planned to be completed by April 1987.

Mitigation Measure SC14. Use impervious liners or barrier membranes for the tunnel. Re-examine the use of membrane clamps, conduit seals, collars, waterstops in joints, grout holes and grout pipes to insure that the membrane surrounding the tunnel lining will be properly sealed and closed off after grouting.

- A. Reference: Same as SC1A above
- B. Contract Segment: All tunnel segments
- C. Status: The contracts require the use of steel tunnel liners or High Density Poly-Ethylene barrier membrane to prevent the intrusion of gas. The construction drawings contain detailed sketches governing the installation and sealing of grout holes through the membrane. The grouting design details have been reexamined by SCRTD and consultants to insure proper constructibility. Drawing SS088B of Contract A146 shows typical details of membrane installation and grout pipes.

The present design details are adequate to provide for the proper seals.

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In addition, specific measures will be required to be instituted by contractors involved in the construction of any portions of the Metro Rail Project that present a gas hazard. These measures are cited below:

Mitigation Measure SC15. Comply with Title 24, Part 3 (Electrical Regulations) and other special orders as may be issued by the Division of Industrial Safety (the Division).

- A. Reference: Same as SC1A above
- B. Contract Segment: All tunnel segments
- C. Status: Technical Specifications Section 01545 (Worksite Safety Requirements) requires contractors to follow provisions of SCRTD's "Construction Safety and Security Manual." This manual, Section 2.8.1 (Operation of Gassy -- Tunnels) covers this measure.

Mitigation Measure SC16. Smoking and other sources of ignition will be prohibited.

- A. Reference: Same as SC1A above
- B. Contract Segment: All Contracts
- C. Status: Included in Contract. Section 2.8.1 of Metro Rail "Construction Safety and Security Manual" prohibits smoking and other sources of ignition.

Mitigation Measure SC17. Welding, cutting, and other spark-producing operations shall only be done in atmospheres containing less than twenty percent LEL (lower explosive limit) and under the direct supervision of qualified persons.

- A. Reference: Same as SC1A above
- B. Contract Segment: All Contracts
- C. Status: Section 2.8.1 of Metro Rail "Construction Safety and Security Manual" covers this measure

Mitigation Measure SC18. Automatic and manual gas monitoring equipment shall be provided for the heading and return air of tunnels using mechanical excavators. The monitor shall shut down the equipment under specific defined conditions.

- A. Reference: Same as SC1A above
- B. Contract Segment: All tunnel segments
- C. Status: Same as SC17C above

Mitigation Measure SC19. Records of gas tests and air flow measurements shall be available at the surface and to the Division.

- A. Reference: Same as SC1A above
- B. Contract Segment: All tunnel segments
- C. Status: Same as SC17C above

Mitigation Measure SC20. Ventilation systems shall exhaust gas or vapors, shall have explosion relief mechanisms, and shall be fireproof.

- A. Reference: Same as SC1A above
- B. Contract Segment: All tunnel segments
- C. Status: Same as SC17C above

Mitigation Measure SC21. Refuge chambers or alternate escape routes shall be provided and equipped with equipment acceptable to the Division. Workers shall be provided with emergency rescue equipment and trained in its use.

- A. Reference: Same as SC1A above
- B. Contract Segment: All tunnel segments
- C. Status: Same as SC17C above

Mitigation Measure SC22. The main ventilation flow shall be reversible.

- A. Reference: Same as SC1A above
- B. Contract Segment: All tunnel segments

- C. Status: Special Condition 4 requires that Cal-OSHA provisions of tunneling in gassy ground be adhered to during construction.

Article 12 of Subchapter 20 (Tunnel Safety Orders) of Title 8 of the C.A.C. includes this measure.

Mitigation Measure SC23. Fresh air shall be delivered in adequate quantities to all underground work areas. The supply shall be adequate to prevent hazardous or harmful accumulations of dust, fumes, vapors or gases, and shall not be less than 200 cubic feet per man per minute of a velocity of 60 feet per minute.

- A. Reference: Same as SC1A above
- B. Contract Segment: All tunnel segments
- C. Status: Technical Specifications Section 01518 (Temporary Ventilation) Part 3.2B specifies the volume of fresh air that must be delivered to a tunnel face during excavation. It requires compliance with C.A.C., Title 8 requirements with respect to minimum air velocity and man count/diesel horsepower. Section 8437, Article 12, Subchapter 20 of Title 8 of the C.A.C. meets the above measure.

AESTHETICS (A)

Mitigation Measure A1. At the main yard south of Union Station, relocate the buildings at the property line or use a landscaped berm with a continuous planting of trees to reach a height of 30 to 40 feet to reinforce the spatial definition of Santa Fe Avenue.

- A. Reference: FEIS, Page 3-123
- B. Contract Segment: A-112, A-141
- C. Status: Drawings L-002, -003, -004, and -005 of Contract A-112 show plantings of camphor trees, red iron bark, Mexican fan palm, and brisbane box trees along Santa Fe Avenue.

Mitigation Measure A2. At the Civic Center Station, replace trees along the south side of the station entrance.

- C. Status: Drawings L-002 of Contract A-141 requires trees to be removed, preserved, and replanted at completion of work at the Civic Center Station.

NOISE AND VIBRATION (NV)

Mitigation Measure NV1. Continuous welded rail instead of jointed rail on the steel wheel/rail interface.

- A. Reference: FEIS, Pages 3-133, 134  
COF, September 13, 1984, Pages 5, 6, 7,  
and 8
- B. Contract Segment: A-610
- C. Status: Technical Specifications Section 02450,  
(General Track Construction), Part 3.3 requires  
the installation of Continuous Welded Rail  
(CWR).

Mitigation Measure NV2. Specify rail vehicles with light weight truck rather than heavy weight trucks in order to provide minimum unsprung weight.

- A. Reference: FEIS, Pages 133, 134  
COF, September 13, 1984, Pages 5, 6, 7,  
and 8
- B. Contract Segment: A-650
- C. Status: Section 11.2.2.G of the Technical Provisions of  
Contract A-650 requires that the unsprung  
weight be minimized. The Technical Provisions  
also require in Section 11.4.1.A that the  
natural frequency of the primary suspension  
shall not exceed 10 Hz.

Mitigation Measure NV3. Use special grinding (truing) equipment to ensure the smoothness of wheel/rail interaction.

- A. Reference: FEIS, Pages 3-133, 134  
COF, September 13, 1984, Pages 5, 6, 7,  
and 8
- B. Contract Segment: A-610
- C. Status: Technical Specifications Section 02450 (General  
Track Construction), Part 3.3.J calls for  
grinding of installed CWR to initial  
smoothness.

The Draft System Maintenance Plan requires periodic grinding of rails and wheels to insure smoothness.

Mitigation Measure NV4. During final design, a building by building analysis will be conducted along the alignment of MOS-1. This will examine actual usage and the sensitive receptor nature of each building. Any one or a combination of mitigation measures will be used as needed to meet the Project noise and vibration criteria.

- A. Reference: EA, Page 73
- B. Contract Segment: A-610
- C. Status: This analysis has been completed. The mitigation measures shown in NV5-NV7 below were selected to meet the noise criteria for the Project.

Mitigation Measure NV5. Use Resilient Rail Fasteners (RRF) instead of Fixed Rail Fasteners as a track fixation method.

- A. Reference: FEIS, Pages 3-133, 134  
COF, September 13, 1984, Pages 5, 6, 7,  
and 8
- B. Contract Segment: A-610
- C. Status: RRF will be used for all underground track. This measure is not needed or used for outdoor tracks in the rail yard.

Mitigation Measure NV6. Use Resiliently Supported Ties (RST) where Resilient Rail Fasteners are inadequate to satisfy applicable noise standards and criteria.

- A. Reference: Same as NV5A above
- B. Contract Segment: A-610
- C. Status: The District's noise and vibration consultant determined that the use of Resilient Rail Fasteners and Floating Slab Trackbed provided an adequate range of noise and vibration mitigation measures. Therefore, Resilient Supported Ties were not necessary.

Mitigation Measure NV7. Provide more effective noise mitigation with Floating Slab Trackbed (FST) construction where necessary to meet applicable noise standards and criteria.

- A. Reference: Same as NV5A above
- B. Contract Segment: A-610
- C. Status: Floating Slab Trackbed is planned for tracks from Station 235+00 to Station 258+84. This includes a crossover adjacent to the Wilshire/Alvarado Station from Station 255+45 to Station 258+84. This measure is shown in drawings T-157 and T-158.

Mitigation Measure NV8. Fan and Vent shafts will be designed to minimize noise intrusion by inclusion of the following mitigation measures.

- a) Cellular glass and mineral fiber applied to the wall and ceiling surfaces of the shafts.
- b) Standard duct attenuators contract specifications requiring certified maximum sound power levels for the fans.

- A. Reference: Same as NV5A above
- B. Contract Segment: All Station Contracts
- C. Status: a) District staff and consultants are still studying the feasibility of applying cellular glass and mineral fiber to the walls and ceilings of shafts.  
b) Technical Specifications Section 15242 (Vibration Isolation Devices) requires installation of vibration isolation devices as indicated.

Technical Specifications Section 15920 (Sound Attenuators) covers furnishing and installing sound attenuators where indicated in the system's duct work.

Mitigation Measure NV8. Ancillary facilities, including power sub-stations and emergency power generation equipment, will be modified to minimize noise and vibration using the following specific mitigation measures:

- a) Below ground location of power transformers.
- b) Total enclosure of noise source.
- c) Absorption material embedded in the facility.

- d) Barrier walls surrounding the source.
- e) Sound attenuators on fans and ducts.
- f) Special mufflers.
  - A. Reference: Same as NV5A above
  - B. Contract Segment: All Station and yard contracts
  - C. Status:
    - a) Power transformers at all stations are located underground in transformer rooms. These underground rooms effectively prevent any significant levels of noise or vibration from reaching surrounding areas. The transformer in the train yard is above ground, but the area is industrial with no sensitive receptors nearby.
    - b) Noise generating mechanical equipment is located in underground equipment rooms at stations. This prevents significant levels of noise or vibration from reaching surrounding areas. Design for auxiliary generators in the shops and Rail Control Center are underway. The intent is to specify "quiet" generators and enclose them in equipment rooms.
    - c) System Design Criteria, Volume III, Section 2 (Acoustics) sets allowable noise levels at and around stations, and specifies use of acoustical treatments to reach these levels.

Technical Specifications Sections 09512 (Acoustical Cellular Glass Panel) and 09513 (Acoustical Aluminum Panels) covers furnishing and installing sound absorptive panels where indicated in designs.

d) Barrier walls surrounding the source have not been needed for mechanical equipment in open areas in the train yard because the noise levels do not exceed the criteria allowed for this industrial area.

e) Same as NV7C above

f) The design of emergency generators for the shop, yard, and Rail Control Center is underway. The intent is to use "silent" generators in enclosed rooms. If special mufflers are needed, they will be included.

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Construction noise and vibration impacts are mitigated by the performance standards and design criteria established for the project. Conformance to these standards (including all applicable local regulations and codes) will be monitored by SCRTD. These performance standards will be made a part of contract requirements for all applicable contractors. Among the measures identified for mitigating construction noise and impacts are the following:

Mitigation Measure NV9. Use of alternative construction procedures such as:

- a) Tunnel Boring Machines instead of blasting for tunnel excavation.
- b) Welding instead of riveting.
- c) Mix concrete off-site instead of on-site.
- d) Prefabricated structures instead of cast-in-place.
  - A. Reference: FEIS, Pages 3-180, 181  
COF, October 25, 1984, Pages 4 and 5
  - B. Contract Segment: All segments
  - C. Status: General Technical Specifications Section 01566 (Pollution Controls), Parts 3.1.E.1a & b incorporate these measures.

Mitigation Measure NV10. Using modified construction equipment to dampen noise such as:

- a) Electric instead of diesel powered equipment.
- b) Hydraulic tools instead of pneumatic impact tools.
- c) Drilled piles or vibratory pile drivers instead of impact pile drivers.
- d) "Time-delay" charges instead of "instantaneous" charges, where drill and blast techniques must be used and TBM is impractical.
  - A. Reference: FEIS, Pages 3-180, 181  
COF, October 25, 1984, Pages 4 and 5

- B. Contract Segment: All segments
- C. Status: General Technical Specifications Section 01566 (Pollution Controls), Parts 3.1.E.1a; and c incorporate these measures.

Mitigation Measure NV11. Maximize the physical separation, to the extent feasible, between noise generators and noise receptors. These include but are not limited to the following:

- a) Selection of truck routes for muck disposal to minimize impact on sensitive land uses.
- b) Providing enclosures for stationary items of equipment and barriers around particularly noisy areas of the site or around the entire site.

- A. Reference: FEIS, Pages 3-180, 181  
COF, October 25, 1984, Pages 4 and 5

B. Contract Segment: All segments

- C. Status: General Technical Specifications Section 01566 (Pollution Controls), Parts 3.1.E.1d and 3.1.E.2, incorporate these measures.

Mitigation Measure NV12. Minimize noise-intrusive impacts during the most noise sensitive hours. Some key techniques that could be used are:

- a) Plan noisier operations during times of heaviest ambient levels.
- b) Avoid peaks and impulse noise.
- c) Turn off idling equipment.

- A. Reference: FEIS, Pages 3-180, 181  
COF, October 25, 1984, Pages 4 and 5

B. Contract Segment: All segments

- C. Status: General Technical Specifications Section 01566 (Pollution controls), Parts 3.1.E.1e, incorporates these measures.

AIR QUALITY (AQ)

Mitigation Measure AQ1. Providing secure facilities at stations for cycle and motorcycle parking.

- A. Reference: FEIS, Page 3-145  
COF, October 25, 1984, Pages 22-24,  
Finding #11
- B. Contract Segment: A-136, A-147, A-157, A-167, A-187
- C. Status: Parking facilities for cycles are shown in the following drawings for the indicated contracts: A008, A-136; A-147; A-157; A-167; A-187. Motorcycles may park in regular automobile spaces.

Mitigation Measure AQ2. Improved feeder bus service to stations.

- A. Reference: FEIS, Page 3-145  
EA, Page 37,38  
COF, October 25, 1984, Pages 22-24, .  
Finding #11
- B. Contract Segment: Not applicable. Will apply to riding public near station areas
- C. Status: Bus Planning will arrange to change the feeder bus routes to coincide with the start of rail operations. Proposed revisions are defined in Milestone 9 and in the Section 3.1.1.4 of the EA.

Mitigation Measure AQ3. Conducting public information programs to promote voluntary trip reductions and publicize feeder bus service.

- A. Reference: FEIS, Page 3-145  
COF, October 25, 1984, Pages 22-24,  
Finding #11
- B. Contract Segment: Not applicable. Will apply to riding public near station areas

- C. Status: The District will develop Community Relations Plans for promoting voluntary trip reductions and using public feeder bus service when construction of MOS-1 is complete and operation is imminent.

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South Coast Air Quality Management District Rules and Regulations apply to the proposed project and will govern construction operations. SCRTD has responsibility for the enforcement of these criteria. Standards for both amount and duration of fugitive dust emissions will be written into all construction contracts. SCRTD will monitor all construction sites for compliance.

The detailed descriptions and explanations of specific impact mitigation measures are contained in the South Coast Air Quality Management District (SCAQMD) Rules and Regulations (Rule #403, "Limitation on Fugitive Dust Emissions"). The key features of the mitigation options described therein are as follows:

Mitigation Measure AQ4. A person shall not cause or allow the emissions of fugitive dust from any transport, handling, construction or storage activity so that the presence of such dust remains visible in the atmosphere beyond the property line of the emission source.

- A. Reference: FEIS, Pages 3-182, 183
- B. Contract Segment: All Contracts
- C. Status: Technical Specifications Section 01566, Part 3.3A.1 contains this measure.

Mitigation Measure AQ5. A person shall take every reasonable precaution to minimize fugitive dust emissions from wrecking, excavation, grading, clearing of land and solid waste disposal operations.

- A. Reference: FEIS, Pages 3-182, 183
- B. Contract Segment: All Contracts
- C. Status: Technical Specifications Section 01566, Part 3.3.A.2 contains this measure.

Mitigation Measure AQ6. A person shall not cause or allow particulate matter to exceed 100 mg/m<sup>3</sup> when determined as the difference between upwind and downwind samples collected on high volume samplers at the property line for a minimum of five hours.

- A. Reference: FEIS, Pages 3-182, 183
- B. Contract Segment: All Segments
- C. Status: Technical Specifications Section 01566, Part 3.3.A.3 contains this measure.

Mitigation Measure AQ7. A person shall take every reasonable precaution to prevent visible particulate matter from being deposited upon public roadways as a direct result of their operations. Reasonable precautions shall include, but are not limited to, the removal of particulate matter from equipment prior to movement to paved streets or the prompt removal of any material from paved streets onto which such material has been deposited.

- A. Reference: FEIS, Pages 3-182, 183
- B. Contract Segment: All Segments
- C. Status: Technical Specifications Section 01566, Part 3.3.A.4 contains this measure.

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To implement these regulations, SCRTD will require contractors to take the following steps regarding trucks used to transport materials and debris to and from construction sites:

Mitigation Measure AQ8. Establish regular cycles and location for washing the trucks.

- A. Reference: FEIS, Pages 3-182, 183
- B. Contract Segment: All Segments
- C. Status: Technical Specifications Section 01566, Part 3.3.B.3 contains this measure.

Mitigation Measure AQ9. Tarp loads of debris leaving sites.

- A. Reference: FEIS, Pages 3-182, 183
- B. Contract Segment: All Segments
- C. Status: Technical Specifications Section 01566, Part 3.3.B.1 contains this measure.

Mitigation Measure AQ10. Water down and sweep the streets which have heavy volumes of construction vehicles carrying debris and excavated materials daily.

Site watering is most commonly used to suppress dust, because it is effective if done frequently and water is generally available at construction sites. Watering will receive particular attention during materials handling associated with waste removal and disposal.

- A. Reference: FEIS, Pages 3-182, 183
- B. Contract Segment: All Contracts
- C. Status: Technical Specifications Section 01566, Parts 3.3.B.2 & 4 include these measures.

Mitigation Measure AQ11. SCRTD will require all contractors to establish and maintain records of a routine maintenance program for all internal combustion engine powered vehicles and equipment. The mitigation measures described in the Traffic section above for reducing traffic congestion will also have a positive impact on air quality.

- A. Reference: FEIS, Pages 3-182, 183
- B. Contract Segment: All Contracts
- C. Status: Technical Specifications Section 01566, Parts 3.3.B.3 and 3.3.E include these measures.

ENERGY (E)

Mitigation Measure E1. Consolidate deliveries of materials where feasible. Schedule deliveries of materials to construction sites during non-rush hours.

- A. Reference: FEIS, Page 3-184
- B. Contract Segment: All Contract Segments
- C. Status: Consolidation of deliveries does not appear feasible

Mitigation Measure E2. Make material deliveries direct to site from vendor, wherever feasible, to avoid stockpiling and double handling.

- A. Reference: FEIS, Page 3-184
- B. Contract Segment: All Contract Segments
- C. Status: The limited area provided to the Contractor as "Temporary Construction Easements" will necessitate direct delivery

Mitigation Measure E3. Use emulsified asphalts instead of cut-back asphalts wherever possible when restoring roads.

- A. Reference: FEIS, Page 3-184
- B. Contract Segment: A-111, A-124, A-138, A-147, A-157, A-167, A-185
- C. Status:

Mitigation Measure E4. Use slip form construction to the extent possible for curbs, gutters, traffic separators, barrier walls and concrete pavements, reducing the need for wood and steel forms.

- A. Reference: FEIS, Page 3-184
- B. Contract Segment: A-111, A-124, A-138, A-147, A-157, A-167, A-185
- C. Status: Specifications Section 02528, Part 1.1 refers to the Standard Specifications for Public Works Construction wherein Section 303-5 provides for slip form construction.

Mitigation Measure E5. Monitor delivery, disbursing and accounting of petroleum products.

- A. Reference: FEIS, Page 3-184
- B. Contract Segment: All Contract Segments
- C. Status:

Mitigation Measure E6. Conduct a routine maintenance program for gasoline and diesel powered equipment. Calibrate pumps and injectors for optimum fuel economy.

- A. Reference: FEIS, Page 3-184
- B. Contract Segment: All Contract Segments
- C. Status: Specification Section 01566, Part 3.3.E requires maintenance records of gasoline and diesel powered equipment.

Mitigation Measure E7. During Final Design, every aspect of station design will be reviewed in order to minimize lighting, heating, ventilating and air conditioning loads.

- A. Reference: Response to Comment 83 of Comments and Responses to the EA.
- B. Contract Segment: All Station Design and Construction Contracts
- C. Status: Station designs have been reviewed to minimize lighting, heating, ventilating, and air conditioning loads.

Mitigation Measure E8. Layout track to minimize non-revenue vehicle movements.

- A. Reference: FEIS, Page 3-153
- B. Contract Segment: A-115, A-610
- C. Status: Track layout at the Yard & Shops has been designed to minimize non-revenue vehicle movements

Mitigation Measure E9. Use cold water for vehicle washing.

- A. Reference: FEIS, Page 3-153
- B. Contract Segment: A-112, A-130

- C. Status: In Contract A-112, Drawing No. P052 contains piping plot for car wash building. Cold water lines are prescribed. Drawing S079, equipment layout, shows no water heaters. For Contract A-130, Specifications Section 11560, Part 1.1.B requires the use of recycled water for washing cars but does not require heated water.

Mitigation Measure E10. Use solar hot water preheating for hot water and steam needs.

- A. Reference: FEIS, Page 3-153
- B. Contract Segment: A-110, A-112
- C. Status: District's consultants conducted a study and concluded that solar hot water pre-heating was not cost effective.

Mitigation Measure E11. Design the stations to use the piston effect of the trains to exchange warm air.

- A. Reference: FEIS, Page 3-153
- B. Contract Segment: All Station Segments  
A-135, A-147, A-157, A-165, A-175
- C. Status: Blast Relief Shafts (BRS) have been provided in all stations to enable the piston action of the trains to evacuate warm air.

Mitigation Measure E12. Interconnect heating and cooling with nearby new construction to help capture regenerative braking energy.

- A. Reference: FEIS, Page 3-153
- B. Contract Segment: All Station Contracts  
A-135, A-147, A-157, A-165, A-170
- C. Status:

Mitigation Measure E13. Use solar preheating for station hot water where feasible.

- A. Reference: FEIS, Page 3-153
- B. Contract Segment: A-135, A-147, A-157, A-165, A-170

C. Status: Same as E10C above

Mitigation Measure E14. Equip major facilities with separate electrical meters.

A. Reference: FEIS, Page 3-153

B. Contract Segment: A-795

C. Status: The Metro Rail Electrical Directive, the basis for design of all stations, provides for metering amperes and voltage on all auxiliary power in addition to metering critical loads in the Uninterruptible Power Supply System. At each station there are individual meters for the dedicated service feeder.

## GEOLOGY (GE)

Mitigation Measure GE1. The disposal of wastewater removed from the areas containing oil and gas will require a National Pollutant Discharge Elimination System (NPDES) permit. The permit will be issued by the RWQCB and would be expected to require wastewater treatment to remove hydrocarbons before discharge. This can be done by an oil/water separator, with the separated oil removed by truck to a Class I or II-I disposal site which are presently available. Wastewater from the maintenance yard cleaning facility will also be treated before disposal. Treated discharge water will be monitored and periodic water quality monitoring reports will be prepared to help ensure the continued effectiveness of wastewater treatment procedures and equipment.

A. Reference: FEIS, Page 3-166

B. Contract Segment: Completed Metro Rail System and Maintenance Yard

C. Status: National Pollution Discharge Elimination System (NPDES) permits have been requested from the RWQCB to allow disposal of hydrocarbon contaminated waste water that may collect in sumps and drains built along the tunnel segments and station areas, and in the maintenance yard and shops. The permits will be issued by the time the Metro Rail System is completed.

As may be required by the permit, waste water may require treatment before discharge. This will be done by using an oil/water separator, with the separated oil hauled to a Class I or Class II-1 disposal site. Required water quality monitoring reports will be prepared.

Mitigation Measure GE2. To avoid the engineering and environmental problems associated with excavating or tunneling in soils below the perched or permanent water table, it will be necessary to remove water (dewatering) from these materials before and possibly during construction. This is generally done by advancing slotted pipes into the saturated soils and then pumping or allowing water to flow from the pipes, thus lowering the water table locally. Alternatively, groundwater may be removed by pumping from shallow ditches or sumps within an excavation.

When any dewatering activities occur, they will be limited to the immediate excavation area by utilizing a variety of methods such as compressed air, chemical grouting, freezing, slurry shields or earth pressure balance shields where local geologic or other constraints dictate, thus avoiding potential ground subsidence or differential settlement of adjacent structures. Moreover, by confining groundwater control activities to the immediate area of excavation, the Metro Rail Project will avoid potential adverse impacts on urban flora (trees, shrubs, etc.) caused by a lowered water table.

Wastewater discharge from excavation water removal will contain suspended solids and, in some areas, hydrocarbons. Related water quality impacts will be avoided by removing the suspended solids in siltation basins and, where necessary, removing hydrocarbons in oil/water separators. The monitoring of treated discharge water and periodic filing of water quality monitoring reports will probably be a requirement of the NPDES permit necessary for dewatering activities. This will help ensure the continued effectiveness of wastewater treatment procedures and equipment.

Surface accumulations of sediment from excavation and muck handling activities should not be allowed to reach significant volumes. As part of their contractual obligation, the Metro Rail construction contractors should be required to immediately clean up any accidentally spilled materials, including not only sediment but also vehicle fuels and lubrication fluids. In addition, the periodic cleaning of streets and sidewalks in the construction area should be required to regularly remove the more nominal, day-to-day operational spills.

- A. Reference: FEIS, Page 3-189
- B. Contract Segment: All excavations below the water table, both cut-and-cover at stations and tunnels along the line segments
- C. Status: An NPDES permit application has been submitted to the RWQCB to allow disposal of groundwater during construction. Pollution Control Specifications 01566, Section 3.4 are included under all contract segments and contain the following directives for the construction contractor:

#### WATER POLLUTION CONTROLS

A. Treat wastewater from dewatering, storm run-off or any other actions of the construction operation to remove suspended particles and hydrocarbons through settling basins or hydrocarbon separators. Criteria for

solids in the water are set by state and local water agencies.

B. Obtain a NPDES permit and other necessary permits from appropriate local agencies for water discharge where required.

C. Monitor wastewater discharge to insure it meets standards set by appropriate laws, codes, regulations, ordinances, and permits. Records of measurements shall be retained for inspection by the District or its designee.

D. Do not discharge pollutants such as chemicals, fuels, lubricants, bitumens, raw sewage, or other harmful wastes into or alongside rivers, streams, and impoundments, nor into channels leading thereto.

E. Control the use of lubricating oils, hydraulic fluids, greases, and other such products. Promptly clean up and properly dispose of materials contaminated by spillage or leakage of these products.

CONSTRUCTION (C)

Mitigation Measure C1. Survey sensitive structures adjacent to tunneling and surface excavations to identify those that require special construction stabilization techniques.

- A. Reference: FEIS, Pages 3-187, 188
- B. Contract Segment: A-130, A-135, A-141, A-145, A-165, A-171, A-175
- C. Status: The scope of work for each design unit required the consultant to evaluate the need to protect adjacent buildings, bridges and other structures which are within the zone of influence and which may be affected by the construction. All buildings so identified are included in reports from the consultants and designated in the contract documents as required. A comprehensive survey and structural analysis of sensitive structures adjacent to the Metro Rail Section A-140 was performed by H. J. Degenkolb, Engineers and documented in their report dated July 30, 1985. Their overall recommendation was that several buildings along the alignment be protected by compaction grouting. These recommendations were adopted by the SCRTD.

During construction, the ground, the support systems and existing structures will be monitored with a variety of geotechnical instruments and optical surveys. If significant movements are detected, the methods of construction will be modified as needed.

Mitigation Measure C2. In some area, it may be feasible to construct temporary shoring systems which, with adequate bracing, limited excavation stages and controlled water removal, would minimize earth movements and allow excavation next to existing structures.

- A. Reference: FEIS, Page 3-187
- B. Contract Segment: Same as C1B above
- C. Status: Temporary shoring and bracing will be used in excavation along with pumping out groundwater. The H. J. Degenkolb report referenced in Mitigation Measure C1C indicates that compaction grouting will be used to support a 9' 3" storm drain at Macy and Alameda Streets, and may be used at several other locations.

Mitigation Measure C3. There will be locations where the risk and consequence of damage from earth movements will be unacceptable, and underpinning may be prudent. These include areas of poor soil conditions, deep excavation close to existing structures, and areas of major structures.

- A. Reference: FEIS, Pages 3-187, 188
- B. Contract Segment: A-141, A-146
- C. Status: Underpinning was examined in the report referenced in Mitigation Measure C1C above and was recommended for one building, the Wilshire Grand Building at 601-605 West 7th Street. Underpinning is also scheduled at the Pershing Square garage, the Court of Flags and the Archive Building.

Mitigation Measure C4. In the event that oil or tar impregnated soil is encountered and determined to be hazardous the District will transport and dispose of it in the manner prescribed by law and appropriate regulations.

- A. Reference: Responses 31 and 85 to the comments on the EA
- B. Contract Segment: All tunnel and excavation contracts
- C. Status: Specification Section 01566(Pollution Controls), Part 3.5 outlines the procedures to be followed for solid and hazardous waste controls.

## CULTURAL RESOURCES (CR)

Mitigation Measure CR1. At Union Station the north retaining wall and north vehicular ramp will be re-constructed to match existing conditions to the maximum extent possible. This will include replication or reuse of existing balusters, parapets, balustrades, wall surface treatment, electroliers and plants on the new wall and ramp. If SCRTD and the California SHPO agree that any original ornamental feature cannot be reused as part of this reconstruction, that feature will be stored safely for reuse elsewhere at Union Station.

- A. Reference: FEIS, Page 4-25, 26, 31
- B. Contract Segment: A-136  
Memorandum Of Agreement, Section I.A.
- C. Status: The District, in a letter dated January 8, 1984, and SHPO, in a response dated February 15, 1984, agreed on the final plans and specifications for the Union Station. These agreed on plans are included in the contract.

Mitigation Measure CR2. At Union Station the portion of the Mail, Baggage and Express Building to be modified for the project will be rebuilt to the first or track level.

- A. Reference: Modified Memorandum of Agreement
- B. Contract Segment: A-136
- C. Status: In a letter to the District, dated February 15, 1984, SHPO agreed with the District that full reconstruction of the REA Building would be infeasible and imprudent. This revision was incorporated in a modified MOA proposed to the ACHP on March 23, 1984 and subsequently ratified by the signatories. This chance is included in contract.

Mitigation Measure CR3. For the Metro Rail Facilities constructed at Union Station design guidelines will be developed and implemented to minimize adverse effects of new construction that may be incompatible with or which may alter the setting of such properties. These guidelines will set forth recommendations regarding height (including height limits), massing, relationship between the building and property lines and other development, building setbacks, fenestration patterns, external colors, textures and materials of the new construction to ensure compatibility with historic properties. These guidelines will be developed in consultation with the California SHPO.

- A. Reference: FEIS, Page 4-29
- B. Contract Segment: A-135, A-136
- C. Status: These measures were coordinated with and approved by SHPO in January and February 1984. They are included in the contracts.

Mitigation Measure CR4. Final plans and specifications for subway project facilities at Union Station including the north retaining wall, the north vehicular ramp and the Mail, Baggage and Express Building, will be developed in consultation with the California SHPO.

- A. Reference: FEIS, Page 4-27
- B. Contract Segment: A-135, A-136
- C. Status: These measures were coordinated with and approved by SHPO in January and February 1984. They are included in the contracts.

Mitigation Measure CR5. All Union Station Buildings or building elements to be substantially altered or demolished will be recorded prior to demolition or alteration so that there will be a permanent record of their present appearance. Historic American Engineering Record/Historic American Buildings Survey (HAER/HABS) will be contacted to determine what documentation is required. All documentation must be accepted by HAER/HABS prior to the demolition or alteration.

- A. Reference: FEIS, Page 4-28
- B. Contract Segment: A-135, A-136
- C. Status: Recording of the Union Station elements to be demolished were accomplished according to the specifications of the National Park Service and were forwarded to them on July 27, 1984. The National Park Service accepted the records prepared on Union Station for the Historic American Buildings Survey on August 14, 1984.

Mitigation Measure CR6. The lobbies of the Title Guarantee and Pershing Square Buildings main office towers will remain intact, without modification for a subway station entrance. Storefronts will be modified to accommodate the new subway. Modifications will be in accordance with the "Secretary of the Interior's Standards for Rehabilitation" and the guidelines for new construction contained therein. Modifications for station entrances will be designed in consultation with the California SHPO, will be subject to review by the SHPO and, if necessary, the ACHP.

- A. Reference: FEIS, Page 4-28
- B. Contract Segment: A-145
- C. Status: Plans for the subway station entrance in the Title Guarantee Building have been approved by the SHPO and incorporated in the Contract. These plans have since been deferred. No entrance is planned now for the Pershing Square Building.

Mitigation Measure CR7. Provide the Los Angeles Cultural Heritage Board with pertinent correspondence, plans and specifications to keep them apprised of these consultations.

- A. Reference: FEIS, PAGE 4-27
- B. Contract Segment: All Station Contracts
- C. Status: The Cultural Heritage Board has been provided with correspondence and plans about design changes to the Title Guarantee Building.

Mitigation Measure CR8. As early as possible in the project design, further work will be undertaken to determine whether intact archaeological deposits exist and the significance of these deposits. This identification work will incorporate existing information and field information derived from remote sensing with ground truthing, subsurface testing or a combination of such techniques. This Identification Study will be carried out by a professional archaeologist meeting the qualifications set forth in the proposed guidelines, 36 CFR Part 66, Appendix C and who is knowledgeable of and experienced in urban historical archaeology, especially of Southern California.

- A. Reference: FEIS, Page 4-28
- B. Contract Segment: Union Station, Civic Center, 5th/Hill, A-130, A-135, A-141, A-145
- C. Status: An Identification Study was prepared in May 1985. It has been reviewed by SHPO and made available to proposers for Project Archaeologist services.

Mitigation Measure CR9. The SCRTD will begin construction at the cut-and-cover location for the crossover north of Union Station track area extending to Macy Street to allow time for archaeological testing, development of data recovery plan, and proper recovery of any resources found.

- A. Reference: FEIS, Page 4-42
- B. Contract Segment: A-135, A-141
- C. Status: The tunnel shaft for A-141 construction will provide large scale examination for potential archaeological resources. Monitoring during construction by the Project Archaeologist and data recovery, if necessary, will protect any cultural resources encountered. Proposals for services of Project Archaeologist, sought under RFP 86-27, were received October 27, 1986 and are under evaluation. Contract should be executed in December 1986.

Mitigation Measure CR10. Should the Identification Study identify deposits deemed to meet the National Criteria (36 CFR Sec. 60.6) in consultation with the California SHPO, a plan for their treatment will be developed based on the findings of the Identification Study and implemented. If there is disagreement regarding whether identified deposits meet the National Register Criteria, a determination of eligibility will be requested in accordance with 35 CFR Part 63. Should such treatment involve data recovery, the Treatment Plan will take into account the principles and recommendations set forth in Part I and III of the Council's "Treatment of Archaeological Properties: A Handbook" and will be in accordance with the proposed guidelines, 36 CFR Part 66. Other such treatment may include in-situ preservation of archaeological deposits and/or development of plans for their interpretation to the public. All work will be carried out by appropriate professionals with qualifications set forth in the proposed guidelines (36 CFR Part 66, Appendix C). The Treatment Plan will be reviewed by the SHPO and if necessary the ACHP. The plan cannot be implemented until completion of this review process.

- A. Reference: FEIS, Page 4-28
- B. Contract Segment: A-135, A-141, A-145, A-165, A-175
- C. Status: A Treatment Plan has been prepared and approved by SHPO. Procedures for implementing the plan are in RFP 86-27 and Contract Specifications 01170. The contract for services of a Project Archaeologist should be executed in December 1986.

Mitigation Measure CR11. A qualified archaeologist will observe the excavation of the Civic Center stations to ensure avoidance of impacts and proper recovery of any finds.

- A. Reference: FEIS, Page 4-42  
Identification Study, Page 38
- B. Contract Segment: A-141
- C. Status: The May 1985 Identification Study found monitoring is no longer needed at the Civic Center Station.

Mitigation Measure CR12. A qualified archaeologist will observe the excavation of the 5th/Hill Station. If significant archaeological resources are encountered, SCRTD will implement the Treatment Plan prepared in accordance with the MOA.

- A. Reference: FEIS, Page 4-42  
Identification Study, Page 38
- B. Contract Segment: A-145, Project Archaeologist
- C. Status: Same as CR10C above

Mitigation Measure CR13. Cut-and-cover construction at the Civic Center Station will be closely monitored by a qualified paleontologist.

- A. Reference: FEIS, Pages 4-47, 48
- B. Contract Segment: A-141, Project Archaeologist
- C. Status: The RFP for the Services of a Project Archaeologist calls for monitoring for and recovery of any significant paleontological resources encountered. The proposals were received October 27, 1986. The contract should be executed in December 1986.

Mitigation Measure CR14. Cut-and-cover excavations at 5th/Hill and 7th/Flower Stations will be spot checked by a qualified paleontologist.

- A. Reference: Same as CR13A above
- B. Contract Segment: A-145, A-165, Project Archaeologist
- C. Status: Same as CR13C above

Mitigation Measure CR15. Cut-and-cover construction at the Wilshire/Alvarado Station will be monitored by a qualified paleontologist.

- A. Reference: Same as CR13A above
- B. Contract Segment: A-175, Project Archaeologist
- C. Status: Same as CR13C above