STATUS OF ENVIRONMENTAL MITIGATION MEASURES FOR LOS ANGELES METRO RAIL PROJECT

MINIMUM OPERABLE SEGMENT (MOS-1)

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for the
Urban Mass Transportation Administration
U.S. Department of Transportation

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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.

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 there were insufficient Federal funds to construct either the full 18.6 or 8.8 mile rail alternatives evaluated in the FEIS. SCRTD subsequently 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) was prepared to analyze the effects of terminating the line at Wilshire/Alvarado. The EA, along with the Comments and Responses Addendum, contained additional mitigation measures.

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 certain project mitigation measures and the rationale for selecting the Locally Preferred Alternative. In March 1985, an explosion and fire occurred near Third Street and Fairfax Avenue as a result of methane gas seeping from underground sources. This incident was investigated by a task force of the City of Los Angeles. The incident raised issues about the safety of the Metro Rail Project

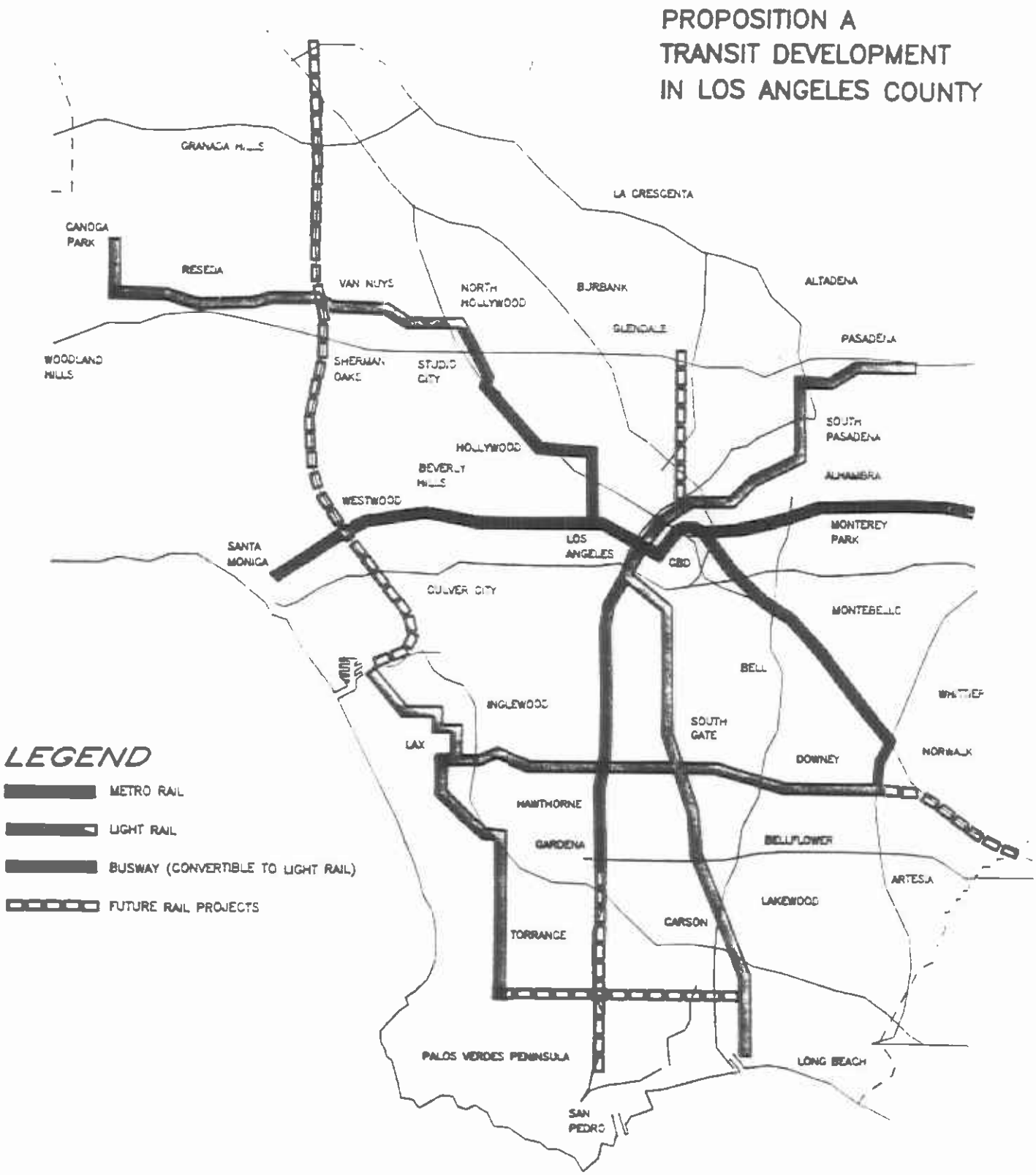
PROPOSITION A
TRANSIT DEVELOPMENT
IN LOS ANGELES COUNTY
GRANADA HILLS
LA CRESCENTA
CANOGA PARK
RESEDA
VAN NUYS
NORTH HOLLYWOOD
BURBANK
ALTADENA
GLENDALE
PASADENA
WOODLAND HILLS
SHERMAN OAKS
STUDIO CITY
SOUTH PASADENA
HOLLYWOOD
BEVERLY HILLS
ALHAMBRA
WESTWOOD
MONTEREY PARK
SANTA MONICA
LOS ANGELES
CBD
CULVER CITY
MONTEBELLO
BELL
INGLEWOOD
SOUTH GATE
LAX
DOWNEY
NORWALK
HAWTHORNE
GARDENA
BELLFLOWER
ARTESIA
LAKEWOOD
CARSON
TORRANCE
PALOS VERDES PENINSULA
LONG BEACH
SAN PEDRO
LEGEND
METRO RAIL
LIGHT RAIL
BUSWAY (CONVERTIBLE TO LIGHT RAIL)
FUTURE RAIL PROJECTS

FIGURE 1

SOUTHERN CALIFORNIA RAPID TRANSIT DISTRICT

JULY 1986

RTD

MINIMUM OPERABLE SEGMENT-1

ROUTE MAP

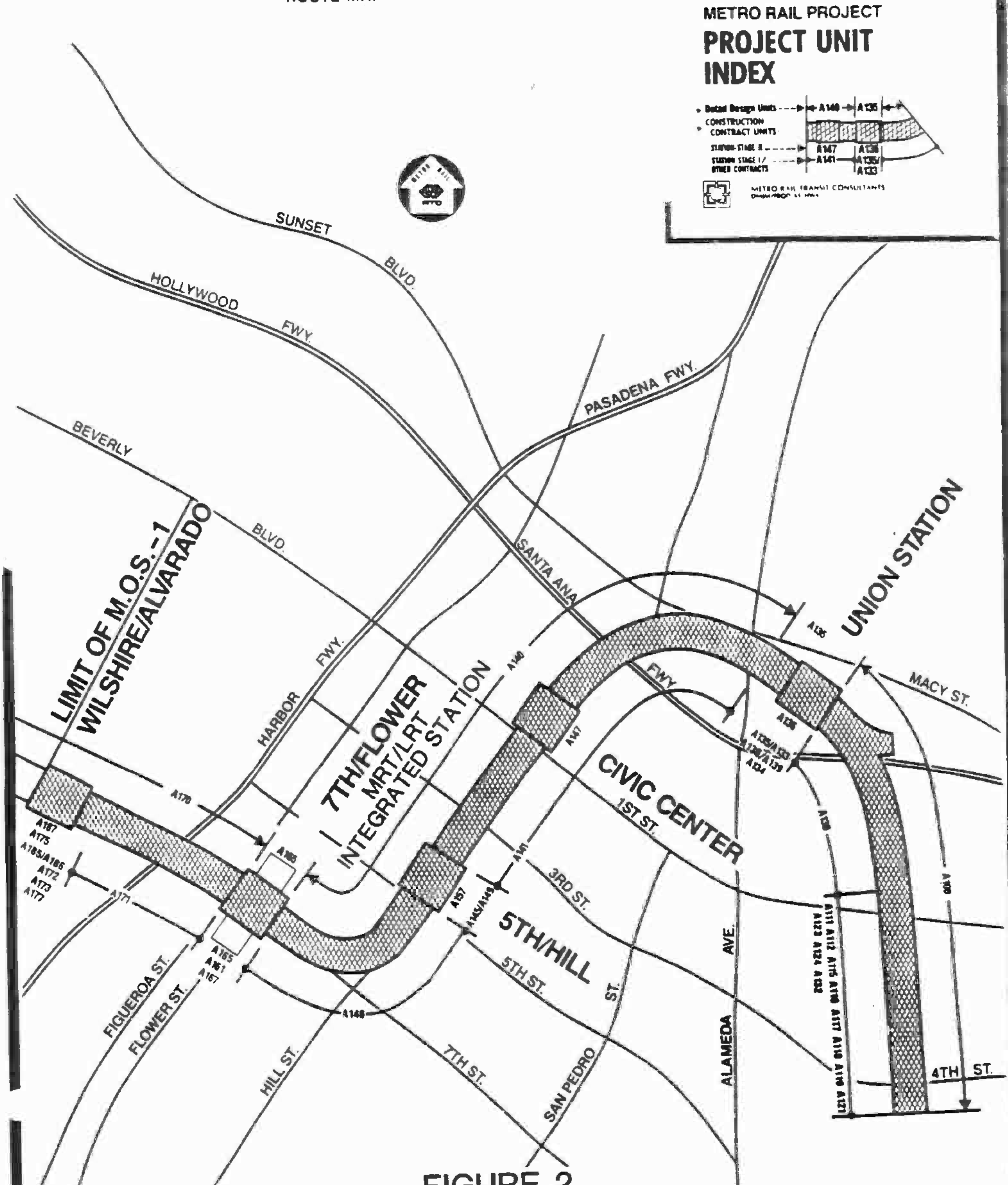

FIGURE 2

which were explored by an SCRTD in-house board of review and an Independent Review Board appointed by the District.

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 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, with specific references to geology, methane gas, seismic, safety equipment and construction methods. In a January 1986 report, the Committee proposed recommendations to improve the safety of design and construction for the Metro Rail Project. These 14 recommendations were adopted by the Board of Directors of the District on February 13, 1986.

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 Addendum dated October 1984; and the Reevaluation of Environmental Record, dated August 1986. The FFC requires the mitigation measures to be implemented as part of the Metro Rail Project. The FFC also provides that where options are still being considered, the District and UMTA will mutually decide on the measures. The District and UMTA will use the scheduled quarterly review meetings to review the progress in implementing adopted mitigation measures and to reach decisions among options. The District may not withdraw or substantively change any of the adopted mitigation measures without the express written approval of UMTA.

MITIGATION MEASURES STATUS REPORT

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

U.S. Urban Mass Transportation Administration and Southern California Rapid Transit District, 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.

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.

_____, Independent Board of Review, Design, Construction and Operation in Gaseous Areas, October 31, 1985.

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

ORGANIZATION AND FORMAT OF THE REPORT

The report will be updated periodically. The base document will list all measures finalized up to the date of publication. Subsequent editions will indicate measures recently finalized and other areas where decisions are pending. The report will reflect the changes that have taken place as design and construction details have been refined and will indicate where the record of final compliance may be found. Some examples of compliance documents are contract specifications, permits, agency agreements, procedure manuals, policy statements, and actions of the Board of Directors.

Including the complete history of all measures will make the report easy to follow for readers who are new to the project and will reduce the disruption in case of future staff changes.

When a mitigation measure has been implemented and no further action is needed the text describing this measure will be printed in bold-face type. The report will be updated quarterly through FY 1988 and may be updated less frequently when fewer issues remain to be resolved.

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.

Category	Abbreviation
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 and Hydrology	GE
Construction	C
Cultural Resources	CR

Where appropriate each category will be divided into a construction and an operations section. Each adopted mitigation measure is assigned a number within the major categories. Each numbered Mitigation Measure is followed by a reference to the document(s) in which the measure is required, the document which implements the measure, the status of implementing the measure, and future actions needed.

The Reference section indicates in which of the above environmental documents, the mitigation measures are found.

The Implementation section shows what contract, permit, correspondence, procedure manual, or agreement will implement the mitigation measure. MOS-1 is divided into thirty-five Construction Contract Units and is supported by the Project Archaeologist Contract. Most of the mitigation measures apply to the Construction Contract Units, shown in Figure 2. The contract units are also described in detail in the Contract Unit Descriptions Report dated January 1987.

The Status section shows the status of the implementation of the mitigation measure. This section will reflect the history of the mitigation measure including correspondence, meetings, agreements and the date of final compliance. It will indicate the document in which final compliance is documented. These include contract drawings, specifications, design criteria, plans and programs.

The Future Action section indicates what action is pending, if known, or what action must be accomplished before the mitigation measure can be implemented.

A summary table is provided at the beginning of the report, which lists the mitigation measures and indicates if they are completed, nearing completion or will be completed in the long term. It will be changed as mitigation measures evolve and are finalized.

Mitigation Measures	Complete	Nearing Completion	Long Term
TP1	Dec. 83		
TP2	Jan. 85		
TP3	Dec. 85		
TP4	Dec. 85		
TP5	Jan. 87		
TP6	Dec. 85		
TP7	Dec. 85		
TP8	Dec. 85		
TP9	Dec. 85		
TP10	Nov. 86		
TP11	Nov. 86		
TP12	Feb. 87		
TP13			X
TP14	Nov. 86		
TP15	Nov. 84		
TP16			X
TP17			X
TP18			X
TP19		X	
TP20		X	
TP21	Oct. 84		
TP22	Oct. 84		
TP23	Oct. 84		
TP24	Oct. 84		
TP25	Oct. 84		
TP26			X
TP27			X
TP28	Apr. 86		
TP29		X	
FB1			X
FB2	Mar. 85		
FB3	Mar. 85		
FB4			X
FB5			X
LU1			X
LU2			X
LU3			X
LU4		X	
LU5a			X
LU5b	Dec. 83		
LU5c			X
LU5d			X
LU5e			X
LU5f			X
LU5g			X
LU5h			X
LU5i			X
LU5j			X
LU6	Dec. 83		
LU7			X
			X

Mitigation Measures	Complete	Nearing Completion	Long Term
SS1	Dec. 86		
SS2	Dec. 85		
SS3	Dec. 83		
SS4	Aug. 85		
SS5	Dec. 86		
SS6	Dec. 86		
SS7		X	
SC1	Sep. 86		
SC2	Dec. 86		
SC3	Sep. 86		
SC4	Sep. 86		
SC5	Mar. 87		
SC6	Apr. 87		
SC7			X
SC8	Aug. 86		
SC9		X	
SC10		X	
SC11		X	
SC12	Feb. 86		
SC13	Feb. 87		
SC14	Jul. 86		
SC15	May 86		
SC16	Dec. 86		
SC17	May. 86		
SC18			X
SC19	Sep. 86		
SC20	Sep. 86		
SC21	Dec. 86		
SC22	Apr. 87		
SC23			X
SC24	Aug. 85		
SC25	Dec. 86		
SC26	Dec. 86		
SC27	Dec. 86		
SC28	Sep. 86		
SC29	Sep. 86		
SC30	Sep. 86		
SC31	Dec. 86		
SC32	Dec. 86		
SC33	Dec. 86		
SC34	Dec. 86		
SC35	Dec. 86		
SC36	Dec. 86		
SC37	Dec. 86		
SC38	Sep. 86		
SC39	Dec. 86		
SC40			X
SC41	Sep. 86		
A1			X
A2	Aug. 85		

Mitigation Measures	Complete	Nearing Completion	Long Term
NV1	Sep. 86		
NV2	Sep. 86		
NV3	Sep. 86		
NV4	Sep. 86		
NV5	Sep. 86		
NV6	Sep. 86		
NV7	Sep. 86		
NV8	Nov. 84		
NV9	Sep. 86		
NV10	Nov. 84		
NV11	Nov. 84		
NV12			X
NV13	Feb. 87		
AQ1	Feb. 85		
AQ2			X
AQ3			X
AQ4	Sep. 86		
AQ5	Sep. 86		
AQ6	Sep. 86		
AQ7	Sep. 86		
AQ8	Sep. 86		
AQ9	Sep. 86		
AQ10	Sep. 86		
AQ11	Sep. 86		
E1	Dec. 86		
E2	Dec. 86		
E3	Dec. 86		
E4	Dec. 85		
E5	Dec. 86		
E6	Dec. 85		
E7	Dec. 86		
E8	Dec. 86		
E9			X
E10	Dec. 84		
E11	Dec. 86		
E12	Dec. 86		
E13	Dec. 84		
E14	Feb. 87		
GE1	Mar. 87		
GE2	Aug. 84		
GE3			X
GE4	Nov. 84		
C1	Jul. 85		
C2	Dec. 85		
C3	Jul. 85		
C4			X
CR1		X	
CR2		X	
CR3	Feb. 84		
CR4	Feb. 84		
CR5	Aug. 84		
CR6			X

Mitigation Measures	Complete	Nearing Completion	Long Term
CR7			X
CR8	May 85		
CR9	Mar. 87		
CR10	Mar. 87		
CR11	May. 85		
CR12	Mar. 87		
CR13	Mar. 87		
CR14	Mar. 87		
CR15	Mar. 87		

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. Implementation: All cut-and-cover segments

C. Status: The Metro Rail Project will use cut-and-cover only at stations, crossovers, Tunnel Boring Machine launch shafts, and the yard leads.

D. Future Action: None needed

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. Implementation: 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.

D. Future Action: The District will monitor the activities of the contractors during construction.

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. Implementation: A-130, A-141, A-145, A-165

C. Status: The District has determined that the use of integrated panel decking would increase the

cost of construction unnecessarily and is therefore not feasible. 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.

D. Future Action: The District will monitor the activities of the contractors during construction.

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).

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

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

B. Implementation: 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.

D. Future Action: The District will monitor the activities of the contractors during construction.

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. Implementation: 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.

D. Future Action: The District will monitor and coordinate with involved agencies during construction.

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. Implementation: 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.

D. Future Action: None Needed

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. Implementation: 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.

D. Future Action: The District will monitor the activities of the contractors during construction and coordinate with involved agencies.

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. Implementation: 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.

D. Future Action: The District will monitor the activities of the contractors and coordinate with agencies during construction.

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. Implementation: 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.

D. Future Action: The District will monitor the activities of contractors and coordinate with agencies during construction.

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

A. Reference: FEIS, Page 3-174

B. Implementation: 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.

D. Future Action: The District will monitor the activities of contractors and coordinate with agencies during construction.

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. Implementation: 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.

D. Future Action: The District will monitor the activities of contractors and coordinate with agencies during construction.

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. Implementation: 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.

D. Future Action: The District will monitor the activities of contractors and coordinate with agencies during construction.

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:

- Increasing approach capacity through installation of a parking restriction;

- o Restriping approach to the intersection 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. Implementation: 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.

D. Future Action: The District will monitor the activities of the contractors during construction and will dedicate the easement when appropriate.

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. Implementation: A-130

C. Status: The design of this intersection, including traffic signalization, was approved by Caltrans in Permit No. 785-7MC 2656, dated September 30, 1986. The City of Los Angeles Department of Transportation approved the contract drawings in November 1986.

D. Future Action: None Needed

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. Implementation: A-138

C. Status: Three outbound and three inbound lanes are included in Contract A-136, Drawing No. C-004F, Sheet No. 7.

D. Future Action: These mitigation measures will be transferred to Contract A-138, which will be created later in 1987.

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. Implementation: A-130

C. Status: Included in Contract, Sheet No. 65B, Drawing No. C074. Also see Sheet No. 46, Drawing Nos. C049.

D. Future Action: The District will monitor the activities of contractors and coordinate with agencies during construction.

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. Implementation: A-130 .

C. Status: Same as TP16C above.

D. Future Action: The District will monitor the activities of contractors and coordinate with agencies during construction.

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. Implementation: A-130

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

D. Future Action: None Needed

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. Implementation: A-138

C. Status: Presently included in Contract A-136, Drawing No. C-010F, Sheet No. 15. These measures will be transferred to Contract A-138, which will be created later in 1987.

D. Future Action: The District will monitor preparation of Contract A-138 and transfer requirements from Contract A-136.

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. Implementation: A-138

C. Status: Presently included in Contract A-136, Drawing No. C-010F, Sheet No. 15. These measures will be transferred to Contract A-138, which will be created later in 1987.

D. Future Action: Same as TP19D above.

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. Implementation: 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.

D. Future Action: None Needed

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. Implementation: 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.

D. Future Action: None Needed

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

A. Reference: FEIS, Page 3-23

B. Implementation: A-138

C. Status: As agreed with the City, will be done by LADOT during street restoration

D. Future Action: The District will monitor the activities of contractors and coordinate with agencies during construction.

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. Implementation: A-136

C. Status: Same as TP22C above

D. Future Action: None Needed

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. Implementation: A-136

C. Status: Same as TP22C above

D. Future Action: None Needed

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. Implementation: Coordination with other agencies and private firms.

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 as construction nears completion and start of operations approaches.

D. Future Action: The District will coordinate development of programs with the City of Los Angeles and the CRA as operations near.

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. Implementation: Coordination with other agencies.

C. Status: Same as TP26C above

D. Future Action: Same as TP26D 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. Implementation: 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.

D. Future Action: The District will monitor the start of operations and evaluate Kiss and Ride demand. Arrange for additional spaces if needed.

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

A. Reference: FEIS, Page 3-32

B. Implementation: A-138

C. Status: Included in Contract A-136, Drawing Nos. A-007 and A-008. They will be moved to Contract A-138 which will be created later in 1987.

D. Future Action: Monitor preparation of Contract A-138. Transfer requirements from Contract A-136.

FEEDER BUS OPERATION (FB)

Mitigation Measure FB1. Coordinate with SCRTD Bus 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. Implementation: 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. Contract A-175, drawings Nos. C-037, C-039, C-040, and C-072 show concrete pavement on Westlake Ave.

D. Future Action: The District will monitor construction and execute bus line changes as the start of rail operations approaches.

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. Implementation: 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.

D. Future Action: None Needed

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

A. Reference: Same as FB2A above

B. Implementation: 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.

D. Future Action: None Needed

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. Implementation: Applies to traffic operations

C. Status: Will be coordinated with LADOT in time for beginning of rail service.

D. Future Action: The District will coordinate with internal departments and LADOT as the start of operations nears.

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. Implementation: Applies to traffic operations.

C. Status: These measures will be coordinated with LADOT in time for the beginning of rail service. Removal of approximately 32 one-hour spaces from Alvarado Street and 27 one-hour spaces from Westlake Avenue as proposed would be an inconvenience to the users. An October 1986 SCRTD parking survey recorded over 1800 curb side parking spaces within one quarter mile of the Wilshire/Alvarado Station with a usage rate of only 69%. A total of 6470 on-street and off-street spaces with a usage rate of 64%, available within one-quarter mile of the station, indicated that the removal of spaces from Alvarado Street and Westlake Avenue would not be a significant impact.

D. Future Action: The District will coordinate with LADOT as the start of operations nears.

LAND USE, SOCIAL AND ECONOMIC (LU)

Mitigation Measure LU1. 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. Implementation: This measure is accomplished outside of the construction contracts through coordination with other agencies.

C. Status: The Community Redevelopment Agency is undertaking a housing project on surplus industrial land leased from the Santa Fe Railroad. The project is a 130 bed temporary homeless shelter on a site east of Union Station, immediately north of the Metro Rail Yard. It was funded by a combination of public and private funds in December 1986.

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, under construction), scheduled for completion by the end of 1987 and TC Apartments (20 units), completed in 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.

The Community Redevelopment Agency is in the planning stages for the South Park Project which is planned as a housing community, ultimately including several thousand units. This project is located within close walking distance of the 7th/Flower Station.

At three of the five MOS-1 stations located in-street the District only purchased enough land or easements for entrances, thus eliminating opportunities for joint development above stations. While Wilshire/Alvarado and Union Stations are located off-street and have substantial joint development potential, the District owned land at Wilshire/Alvarado is not available for joint development until after the station is built. The District owned land at Union Station also will be unavailable during construction, however, the Los Angeles Union Passenger Terminal Corporation has assembled a large vacant parcel on the Union Station site. The Community Redevelopment Agency is negotiating the terms of a new master land use plan for this site, and with the District's cooperation, may include housing on-site or en lieu payments to the downtown housing fund as part of the negotiation.

The District will continue to work with the Community Redevelopment Agency to insure that housing is built within walking distance of MOS-1, and anticipates continued substantial near term progress in the vicinities of Union Station and 7th/Flower Stations. In the longer term, after the disruptions of construction are over, the District expects the elements of the Draft Station Area Development Plan prepared by the City of Los Angeles which allows Transfers of Development Rights, Residential Financial Assistance, and development bonuses for provision of amenities and improvements in the station area to yield additional new housing in the Wilshire/Alvarado Station area.

D. Future Action: The District will continue to coordinate with the CRA and Los Angeles Department of Planning to insure residential development is included in station areas.

Mitigation Measure LU2. The District and the Community Redevelopment Agency will identify historic and cultural properties that could be affected by the indirect effects of increased developmental pressures resulting from the subway project. They will consider these properties in the planning process for the Station Area Specific Plans for MOS-1.

They will examine areas where indirect effects on historic and cultural properties are expected in consultation with the SHPO, the Los Angeles Cultural Heritage Board and interested local groups.

They will include mechanisms for the preservation of significant historic and cultural properties in the MOS-1 Station Area Specific Plans. These mechanisms may include :

Transfer of Development Rights,

Down-zoning,

Grants or low-interest loans for rehabilitation,

Establishing a revolving loan fund for rehabilitation,

Conditioning of bargain sale or joint development with the preservation/rehabilitation of an historic or cultural property,

Property tax abatement or discount,

Advocacy of the tax incentives of Section 212 of the Economic Recovery Tax Act, and

Donation/acceptance of a facade easement.

The SCRTD and private developers will cooperate with the CRA's preservation program.

A. Reference: FEIS, Pages 3-66, 67

FEIS, Pg 4-29, 30 (Section V, Memorandum of Agreement)

EA, Pages 49 and 50

COF, October 25, 1984, Page 21

B. Implementation: This measure is accomplished outside of the construction contracts.

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 Central Business District (CBD), with a detailed list of the mitigation measures to 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.

D. Future Action: The District will follow-up with the CRA to ensure that at least some measures in the Memorandum Of Agreement with the Advisory Council on Historic Preservation are incorporated in final station area plans.

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

A. Reference: FEIS, Page 3-104

B. Implementation: Coordination with other agencies

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 CBD, one City prepared Station Area Development Plan at the Wilshire/Alvarado Station and a CBD Master Plan, covering four CBD stations, developed by the Community Redevelopment Agency.

The City prepared and circulated an EIR for the Transit Corridor Specific Plan and public hearings have been held. Adoption of the plan is awaiting completion to the CORE Study to fix the middle portion of the Metro Rail alignment.

Revisions to the Station Area Development Plan are delayed until the City Planning Department and City Planning Commission resolve their response to Initiative Ordinance U, passed by the voters of the City of Los Angeles in November 1986. Initiative U, reduces the allowable Floor Area Ratio (FAR) in Height District One from FAR 3 to FAR 1.5. This results in downzoning substantial amounts of land in the Wilshire/Alvarado Station Area but would not affect the land owned by the District.

Since neither the Metro Rail Transit Corridor Specific Plan nor the Station Area Development Plan has been adopted, some or all of this land conceivably could be rezoned upward, but some questions exist as to the legal and political acceptability of such an action.

The Draft CBD Master Plan, written by the Community Redevelopment Agency, has been completed and reviewed by the District. On November 12, 1986 the agency notified the District that they would finalize the CBD Master Plan when results are available from the rezoning of all of downtown in compliance with California laws, the Development Framework Plan and the adoption of a Transportation Implementing Ordinance for downtown. They expect these events will require 18 months, but, until then they will use the draft Master Plan as a guideline for discussions with developers.

D. Future Action: The District will continue to coordinate with the City and CRA until Specific Plans are complete.

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. Implementation: Coordination with other agencies

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. The units are families or businesses relocated.

	CCU A100	CCU A130	CCU A145	CCU A165	CCU A171	CCU A175	TOTAL
Total Relocation	4	5	0	0	5	42	56
Relocations Completed	4	3	0	0	5	42	54
Relocations Remaining	0	2	0	0	0	0	2
Residential	0	0	0	0	0	25	25
Commercial	4	5	0	0	5	16	30

RESIDENTIAL RELOCATIONS

The 25 residential relocations displaced in Construction Contract Unit (CCU) A175 consisted 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

Twenty nine commercial tenants have been relocated with the assistance of a Real Estate Specialist. The commercial tenants consisted of two transport companies, a wholesale grocery distributor, a sheet metal processor, a corn processor, a medical clinic including individual medical practices, four fast food restaurants, a grocery market, a bar, several retail clothing operations, and several other small businesses.

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

SUMMARY

A total of $603,000 has been paid to date in relocation expenses. The acquisition and relocation program will continue to be implemented with the remaining occupants.

D. Future Action: The District will continue real estate acquisitions until all right of way has been purchased.

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. Implementation: Coordination with other agencies for Civic Center, 5th/Hill, and 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).

D. Future Action: The District will continue to monitor the progress of developers and other agencies.

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

A. Reference: Same as LU5a(A) above

B. Implementation: Existing policies at all station areas

C. Status: The City of Los Angeles adopted a Rent Stabilization Ordinance (Chapter XV) of the Los Angeles Municipal Code), operative from May 1, 1979. This ordinance includes rent controls in currently occupied apartments, protects tenants from the use of evictions to raise rents, provides for annually adjusted fair rent increases based on historic costs (now 5%), safety regulations, and administrative recourse for both landlords and tenants in the event of disputes. The Rent Control Ordinance does not cover single family dwellings but does include residential hotel rooms rented for more than 50 days. It requires all rental units to be registered with the Rent Stabilization Board. The ordinance is in effect in the entire City of Los Angeles, including all of the MOS-1 alignment and station areas.

D. Future Action: None Needed

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(A) above

B. Implementation: Coordination with other agencies and tenants in 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 may 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 and County, but is much in demand and there are restrictions on the disbursement of the limited funds. See also status of LU5b above.

D. Future Action: The District will continue to monitor increases in rental rates in station areas.

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

A. Reference: Same as LU5a(A) above

B. Implementation: Coordination with agencies and residents in 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 preferential parking district can be 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. The fastest that a parking district has been established is five and one half months but a more representative time would be 12 to 18 months.

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.

D. Future Action: The District will monitor and coordinate with neighborhood groups and LADOT when operations begin.

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(A) above

B. Implementation: Coordination with agencies and neighborhood businesses

C. Status: The Draft Metro Rail Station Area Development Plan (Page VIII-3) includes 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.

A City Planning Department representative estimates that the DART will be operational one year after the adoption of the Metro Rail Transit Corridor Specific Plan. See LU3C above for a discussion of implementation.

Specific responsibilities of DART might include:
o Receive and review development project applications.
o Establish preliminary negotiating positions and recommendations
o Coordinate with the Economic Development Office and Community Development Department on financial incentives and economic development programs.
o Recommend use of density bonuses and other incentives to the Planning Commission.
o Recommend related public improvements to the Planning Commission.
o Coordinate with the SCRTD Operations, Planning, Engineering, Real Estate and Architecture (OPERA) committee, the District's equivalent of DART, in processing development applications

D. Future Action: The District will continue to monitor and coordinate with L. A. City Planning through implementation and operation of DART.

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

A. Reference: Same as LU5a(A) above

B. Implementation: Coordination with agencies and firms in the station areas

C. Status: The District encourages tenancy and investment in joint development by displaced firms. The District's first joint development agreement in construction, the Home Savings Tower, is an investment in the site by the firm originally occupying the site needed for the Metro Rail Portal.

At the Wilshire/Alvarado Station the District has successfully relocated firms displaced by the MOS-1 construction. As construction progresses and the climate for joint development improves, the District will notify the displaced firms when Requests for Proposals for Joint Development projects are issued and will invite their participation. In the case of smaller firms the District will suggest participation as part of a consortium or joint venture. See also the status of LU5h below.

D. Future Action: The District will continue to coordinate its efforts in joint development with L. A. City Planning and CRA.

g) Provide relocation assistance to social services or facilities displaced by new development.

A. Reference: Same as LU5a(A) above

B. Implementation: Coordination with agencies in the station areas.

C. Status: No social services or facilities are to be displaced by initial construction of MOS-1.

D. Future Actions: None Needed

h) Establish special zoning or development review procedures to preserve existing and accommodate new social services and facilities in the station area.

A. Reference: Same as LU5a(A) above

B. Implementation: Coordination with agencies in the station areas.

C. Status: The Draft Station Area Development Plans include a Development Area Review Team (DART) which will determine density bonuses to developments for the inclusion of community services. The DART would act as a liaison between the project applicant and the City, interpreting City plans and regulations. This new Committee would be chaired by the Director of Planning and would recommend project actions to the City Planning Commission and City Council.

The DART probably will be composed of the following departments: City Planning, Transportation, Public Works (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 land use items on the DART agenda at SCRTD's request, with tasks arising from these meetings to be completed by each agency.

The City Planning Department anticipates that the DART will be established and active within a year of the passage of the Metro Rail Transit Corridor Specific Plan. The current edition of the Metro Rail Transit Corridor Specific Plan calls for the establishment of a a single DART to serve the entire Metro Rail Corridor including the Alvarado Station Area and the Los Angeles CBD.

If a development application utilizes density bonuses, DART would determine, based on program criteria, the degree of consistency of the project with the Station Area Development Plan. DART would then determine the magnitude of bonuses to be granted. Criteria would include those in the Station Area Development Plan, when adopted, and:

- How much the bonusable feature will increase the ridership of Metro Rail,
- Do the bonusable features provide a use which will fulfill the goals of the Centers Concept,
- Will the bonusable feature provide an amenity that is not in the Plan area,
- Will the bonusable feature provide an amenity that meets a need,
- Will the bonusable feature fulfill the intent of the Transit Corridor Specific Plan and other elements of the General Plan,
- How appropriate the bonusable feature is to the site or the overall project,
- The accessibility of the bonusable feature to the intended users.

The District is negotiating with appropriate agencies to ensure that the Wilshire/Alvarado Station Area Development Plan will accomplish the project mitigation measures. The District will be represented on DART and will have the opportunity to work for the project mitigation measures.

D. Future Action: The District will continue to coordinate with the CRA and L. A. Department of Planning.

i) Encourage the inclusion of displaced and new social services and facilities in joint development projects for the stations.

A. Reference: Same as LU5a(A) above

B. Implementation: Coordination with other agencies in the station areas.

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.

In MOS-1 station areas, the SCRTD will use its representation on the DART at the Wilshire/-Alvarado station and its contacts with the Community Redevelopment Agency to negotiate for the inclusion of social agencies either in the new development on the existing site or at a new site in the station area.

D. Future Action: The District will continue to coordinate with the CRA.

j) Require 15% of all new housing constructed in the CBD to be low-moderate income housing.

A. Reference: Same as LU5a(A) above

B. Implementation: Existing policies for 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, Central Business District Redevelopment Project, and Little Tokyo Redevelopment Project plans. See also the response in LU1C above .

D. Future Actions The District will monitor the activities of contractors and coordinate with agencies during construction.

Mitigation Measure LU6. The City of Los Angeles has a zoning roll-back program to align the city's zoning ordinances with the general plan, that specifies lower density levels in the Wilshire/Alvarado area. This will create additional protections for the existing low income housing stock.

A. Reference: EA, Page 50

B. Implementation: Proposed zoning ordinances for the Wilshire/Alvarado Station Area.

C. Status: The proposed zoning rollbacks are part of the City effort to bring existing zoning into conformity with the existing City Plan and are in addition to the efforts to encourage housing preservation and the construction of new housing which will be required in the Station Area Development Plan. Preliminary zoning rollbacks for the Westlake Community Plan, which will protect the existing housing stock for low income individuals were scheduled to go to the City Planning Commission on February 2, 1987 for review and public comment. The Planning Commission has continued consideration of the proposed changes several times and scheduled another review for April 27, 1987. The Westlake Community Plan revisions do not include any changes in the immediate vicinity of the Wilshire/Alvarado Station because such changes will be accomplished in the Transit Corridor Specific Plan. Development of the Specific Plan by the Los Angeles Planning Department is pending.

D. Future Action: The District will continue to coordinate with the City Department of Planning on zoning changes and conformity efforts.

Mitigation Measure LU7. 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 residual development potential for the parcel and seek to have housing development incorporated into station area development.

A. Reference: FEIS, Page 3-80

B. Implementation: Coordinate with agencies affected by property takes at all station areas

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.

D. Future Action: The District will monitor development during construction and operation of Metro Rail.

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. Implementation: All Contracts

C. Status: These measures are required by the Fire/Life Safety Criteria for the Project. The District Fire/Life Safety Committee (FLSC) has reviewed all plans and specifications for conformance with Fire and Life Safety Criteria. Final plans were approved by the FLSC prior to the end of 1986 after all criteria provisions were incorporated. Any changes to final design require resubmittal to and approval by the FLSC.

D. Future Action: Staff will monitor any changes for compliance.

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

A. Reference: FEIS, Pages 3-187, 188, 189

B. Implementation: 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.

D. Future Action: None Needed

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. Implementation: 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.

D. Future Action: None Needed

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. Implementation: 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.

D. Future Action: None Needed

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

A. Reference: FEIS, Page 3-109

B. Implementation: All Station Contracts

C. Status: Same as SS1C above

D. Future Action: None Needed

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

A. Reference: FEIS, Page 3-111

B. Implementation: 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.

D. Future Action: None Needed

Mitigation Measure SS7. Provide art works in stations to give them a more human and personalized character.

A. Reference: FEIS, Page 3-111

B. Implementation: 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.

D. Future Action: The District will continue to monitor the progress of the Art in Transit Program.

SUB-SURFACE CONDITIONS (SC)

In March 1985, an explosion and fire occurred near Third Street and Fairfax Avenue as a result of methane gas seeping from underground sources. This incident was investigated by a task force of the City of Los Angeles. The incident raised issues about the safety of the Metro Rail Project which were explored by an SCRTD in-house board of review, an Independent Review Board appointed by the District, and by an Independent Technical Review Committee (ITRC) appointed by the Los Angeles City Council. The incident also became the subject of Congressional concerns and prompted legislation which prohibited the District from tunneling through any ground designated as a "High Potential Risk Zone" or "Potential Risk Zone" in the June 10, 1985 City Task Force Report.

Technical reports issued by the ITRC and by the District's Independent Review Board contained recommendations to improve the overall safety of the Project. The District's Board of Directors adopted the recommendations of the ITRC on February 13, 1986. Mitigation measures SC1 through SC14 incorporate these recommendations. UMTA included the recommendations of the Independent Review Board in their August 5, 1986 "Reevaluation of the Environmental Record for the Los Angeles Metro Rail Project, Minimum Operable Segment (MOS-1)" and concurrently incorporated them by reference into the Full Funding Contract. Mitigation Measures SC15 through SC25 incorporate these recommendations.

Before these review boards had completed their reviews the Board of Directors adopted a position regarding Metro Rail safety, entitled "Policy Statement on the Safety of the Metro Rail Project", dated September 12, 1985 . Safety measures considered necessary to ensure the safe construction and operation of the Project were included and are listed in Mitigation Measures SC26 through SC34.

These 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 of 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.

This section is an exception to the general organization of the report, where construction measures are discussed at the beginning of each category followed by operations measures. In this section the measures are discussed in the order shown in the source document.

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: Recommendations of the City of Los Angeles, Independent Technical Review Committee, adopted by the District Board of Directors on February 13, 1986.

EA, Comment 5 and Response, Pages 11 and 12

B. Implementation: A-141, A-146, and A-171

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.A2, 1.6.I, 1.6.J, and 3.1 of Contract A-141 and A-171 implement this mitigation measure. Contract A-146 has similar material in different parts of Specification Section 02311.

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.

D. Future Action: The District will minitor construction and will comply with the mitigation measures as appropriate to conditions.

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: Recommendations of the City of Los Angeles, Independent Technical Review Committee, adopted by the District Board of Directors on February.

B. Implementation: Contracts A-141, A-146, and A-171

C. Status: The requirements for audible and visual warning devices are incorporated in Section 2.8.1 of a draft SCRTD Construction Safety and Security Manual, dated December 15, 1986 which refers to Sections 7984 and 7985 of Title 8 of the California Administrative Code. This draft should be finalized by February 1, 1987. 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.

D. Future Action: 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 station 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 SC2A above

Report of the Independent Review Board, entitled "Design, Construction, and Operation in Gaseous Areas," dated October 31, 1985.

B. Implementation: Contracts A-141, A-146, and A-171

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.

D. Future Action: The District will monitor construction and training for emergency drills.

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 SC2A above

Report of the Independent Review Board, entitled "Design, Construction, and Operation in Gaseous Areas," dated October 31, 1985.

B. Implementation: Contracts A-141, A-146, and A-171

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.

D. Future Action: The District will monitor construction and will spot check for compliance.

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.

A. Reference: Same as SC2A above

B. Implementation: Not applicable to the construction contract segments. Included in the contract with Engineering-Science for subsurface conditions investigation.

C. Status: The SCRTD has completed its investigation of gas and water conditions along the alignment before 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 included 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 were evaluated.

The District's geotechnical consultants, Engineering Science, produced the CORE Study "Subsurface Conditions Report" in May 1986. The report concluded that sub-surface facilities could be constructed safely using standard precautions and gas mitigation measures.

During construction the Construction Manager's Environmental Monitoring Section will monitor gas probes. They will reduce the data and interpret it to provide advance information on the location and extent of gas build-up in front of tunneling.

See also SC11C, SC15C, SC17C, and GE1C below.

D. Future Action: The District will monitor construction and insure compliance.

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 SC2A above

B. Implementation: A-640 (Communications)

C. Status: SCRTD has completed its review of the Metro Rail emergency operations when gas is detected and has determined that the communications controller will need a short time to ascertain that the prescribed emergency fan activation regimen is correct considering all events that may be taking place.

Accordingly, 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.

D. Future Action: None Needed

Mitigation Measure SC7. The SCRTD will 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 SC2A above

B. Implementation: This measure does not apply to the construction contracts. It is handled in operations planning.

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. Most of the design features that address emergency exiting benefit both the able bodied and handicapped patrons. Examples are:

- o The vehicle floor is designed to give one hour fire separation to allow additional time to evacuate handicapped patrons in a fire emergency.
- o Tunnels and stations are of Class I construction which means they contain almost no combustible materials.
- o All stations will have elevator access from street level to mezzanine and mezzanine to train platform. The elevators are designed for exclusive use by handicapped patrons.
- o Emergency ventilation will bring fresh air into the tunnels from the direction that evacuees should walk to reach safety. Fumes and smoke will be exhausted in the opposite direction.

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.

D. Future Action: The District will continue to monitor project development and construction.

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 SC2A above

B. Implementation: A-640 (Communications)

C. Status: Initially gas probes were to be located in the exhaust ducts. This meant that gas intruding into the tunnel at any point would not be detected until it reached the ventilation exhaust ducts. It did not allow for reasonably accurate location of the source of gas intrusion. SCRTD has revised Section TP11 and 18 of the contract drawings to increase the number of gas probes from 30 to 76 with 41 placed in the tunnel, midway between stations. Others are in exhaust shafts, equipment rooms, and in other isolated locations. The number of central gas analyzers was increased from five to twelve. These figures include sensors installed in the Light Rail System structures at 7th and Flower.

Probes were placed to reduce the transmission time of the samples to the analyzers and to sample air from the perimeter of the structures where gas intrusions would occur. The increased number of probes provides more detail and allows greater accuracy in indicating the source of the gas intrusion. The response time for a sensor to detect and register a change in gas concentration is 17 minutes maximum and 11 minutes average.

To supplement the coverage of the automatic gas monitoring system the District will provide for manual gas measurement as required. As the beginning of revenue operations approaches, the District will prepare a plan for training personnel and operating the system. This plan will specify that when the automatic gas monitoring system detects gas at a steady or rising level, even though the level is below the action limit, monitoring personnel will use hand held gas detectors to check the areas near the probes.

D. Future Action: The District will test the gas sampling system before accepting it for operations and will prepare and implement the training and operating plan.

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 SC2A above

B. Implementation: Contracts A-141, A-146, and A-171

C. Status: A draft report entitled "Procedures for Mapping Faults and Modifying Mined Tunnel Linings in MOS-1," dated October 1, 1986, requires that engineering and geotechnical personnel be assigned to the jobsites to accurately document geologic conditions and to ensure that proper construction procedures are followed.

D. Future Action: The report will be finalized and implemented by May 1987. The District will monitor construction and insure compliance.

Mitigation Measure SC10. The SCRTD will develop a contingency plan that will establish the criteria against which (geologic) 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 SC2A above

B. Implementation: Contracts A-141, A-146, and A-171

C. Status: SCRTD has developed a design for potentially active fault crossings. The District developed a draft contingency plan, entitled "Procedures for Mapping Faults and Modifying Mined Tunnel Linings in MOS-1," dated October 1, 1986, for any unknown faults that may be encountered within MOS-1. This contingency plan includes criteria and a range of construction options which include specially reinforced cast-in-place concrete tunnel liner or an inner liner of welded 3/4 inch steel plates for tunnels where pre-cast concrete liner segments were planned.

The draft plan is under review with completion of a final plan expected in May 1987. Prior to active tunnel construction the District will implement the plan and assign appropriate personnel to deal with the situation.

D. Future Action: The District will complete and implement the plan, then will monitor construction to insure compliance.

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 SC2A above

B. Implementation: Contracts A-141, A-146, and A-171

C. Status: Groundwater conditions along MOS-1 had been studied in detail during the design process and 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 address the groundwater environment is as follows:

- 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).

- November, 1986 : Report on Union Station Area Aquifer Pump Tests for the Metro Rail Project.

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 have been made to determine the quantity and quality of the groundwater. The findings indicate that no design modifications are required to successfully operate the system. For construction however, the permit from the Regional Water Quality Control Board required an extensive plan of monitoring and treatment of the water that will be discharged from the dewatering activities of the excavations for the Project. The District has prepared the

necessary plans and specifications to comply with the permit. See also SC5C above and GE1C below.

D. Future Action: Implement the plans and specifications for all construction areas that require dewatering.

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 SC2A above

B. Implementation: Contracts A-141, A-146, and A-171

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.

See also SC10C above.

D. Future Action: The District will monitor construction for evidence of (geologic) fault crossing.

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 SC2A above

Report of the Independent Review Board, entitled "Design, Construction, and Operation in Gaseous Areas," dated October 31, 1985.

B. Implementation: A-630 (Sub-Station Equipment) and A-631 (Traction Power Installation)

C. Status: SCRTD has completed a review of the need for additional back-up power. The review consid-

ered various system requirements arising from a severe earthquake which could cause damage ranging from area-wide blackouts to street blockage and tunnel ruptures.

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. The District considered a mobile generator but rejected this option.

The design re-work of the system was completed in February 1987. The system selected did not involve the Department of Water and Power. Contracts A-630 (Substation Equipment) and A-631 (Traction Power Installation) provide switching equipment and a fixed generator for back-up power for ventilation fans and dewatering pumps. Specification Section 16622 (Stand-by Engine-Generator Set) of Contract A-631 provides for the purchase and installation of a 1,000 KW fixed emergency generator.

D. Future Action: None Needed

Mitigation Measure SC14. Re-examine the use of membrane clamps, 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 SC2A above

B. Implementation: Contracts A-141, A-146, and A-171

C. Status: 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 A-146 shows typical details of membrane installation and grout pipes.

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

D. Future Action: None Needed

THIS CONCLUDES THE MITIGATION MEASURES RECOMMENDED BY THE ITRC

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Mitigation measures recommended by the District's Independent Board of Review in their October 31, 1985 Report on" Design, Construction, and Operation in Gaseous Areas" are shown below in SC15 through SC25.

Mitigation Measure SC15. The District will have petroleum geologists and engineers make a further study of existing subsurface gas data.

A. Reference: Report of the Independent Review Board, entitled "Design, Construction, and Operation in Gaseous Areas," dated October 31, 1985.

B. Contract Segment: All Contracts

C. Implementation: District contracted with the firm of Engineering-Science to evaluate existing gas data and to collect and analyze data from existing and from additionally installed gas probes. Their analysis team included petroleum geologists, petroleum engineers, and risk assessors. It produced the CORE Study "Subsurface Conditions Report," dated May 1986, which evaluated subsurface gas conditions along Metro Rail alignments.

D. Future Action: None Needed

Mitigation Measure SC16. The District will monitor existing gas probes and the ventilation air in the tunnel for gas both before and during construction.

A. Reference: Same as SC15A above

B. Implementation: All Contracts

C. Status: Section 2.8.1 of the District Construction Safety and Security Manual requires automatic and manual gas monitoring for the heading and the return air in the tunnel.

D. Future Action: The District will continue to monitor the construction and insure compliance.

Mitigation Measure SC17. A separate group, responsible to the construction manager, will collect, reduce, and interpret gas data.

A. Reference: Same as SC15A above

B. Implementation: All Contracts

C. Status: Section 3.1.2.K(7) of the May 1986 Scope of Work of the Construction Manager's contract requires the Environmental Monitoring Section to collect, reduce, and interpret gas data.

D. Future Action: Monitor the organization of the Environmental Monitoring Section.

Mitigation Measure SC18. Continue and ensure ongoing coordination with the local fire departments. Invite key personnel underground during construction to familiarize them with the tunnel.

A. Reference: Same as SC15A above

B. Implementation: All Contracts

C. Status: Section 2.6 of Volume 1 of the System Design Criteria and Standards establishes system fire/life safety procedures. Section 2.6.3 sets up an Emergency Preparedness Plan which requires coordination with local fire departments listed in Section 2.6.4. Section 2.6.9 requires training, exercises, drills, and critiques to prepare the District and participating agencies for emergencies.

D. Future Action: The District will monitor and coordinate with the (internal) Fire /Life Safety Committee to insure local fire departments visit construction sites.

Mitigation Measure SC19. Drill horizontal probe holes in advance of the tunnel to drain gas-bearing zones ahead of the working face.

A. Reference: Same as SC15A above

B. Implementation: Contracts A-141, A-146, and A-171

C. Status: Technical Specification Section 02311 (Shield Driven Tunnels), Part 3.1.A and E require drilling exploratory holes ahead of the tunnel face, monitoring for gas at the collar of the holes during drilling, and testing the holes for gas. The Districts Construction Manager and Cal OSHA will oversee the work.

D. Future Action: The District will monitor the work during construction.

Mitigation Measure SC20. Implement a detailed ventilation plan similar to that required by MSHA.

A. Reference: Same as SC15A above

B. Implementation: All Contracts

C. Status: Technical Specifications Section 01518 (Temporary Ventilation) establishes a plan for ventilation during construction of the Project. See also Mitigation Measures SC6, SC13, SC24, SC25, SC26, SC27, SC35, SC37, and SC38.

D. Future Action: Monitor construction to determine how well the ventilation system works.

Mitigation Measure SC21. Analyze the applicability of using underground coal mine electrical equipment as outlined in Parts 18 and 75 of Title 30, Code of Federal Regulations.

A. Reference: Same as SC15A above

B. Implementation: All Contracts

C. Status: The District determined that there was no essential difference between the electrical equipment outlined in Parts 18 and 75 of Title 30, Code of Federal Regulations and that required in CAl OSHA Regulations. The equipment required in Cal OSHA Regulations will be used.

D. Future Action: The District will monitor construction to insure that installed equipment meets the Cal OSHA standards.

Mitigation Measure SC22. Contact the Washington Metro Area Transit Authority (WMATA) and ascertain what success they had with gas monitoring during operations.

A. Reference: Same as SC15A above

B. Implementation: All Contracts

C. Status: According to a conversation with the Manager of WMATA's Office of Safety and Fire Protection, they monitor continuously for combustible vapors in their underground structures. In the ten years of operations, they have never detected any such vapors in their underground structures.

D. Future Action None Needed

Mitigation Measure SC23. Locate all the gas probes and abandon them in a safe manner.

A. Reference: Same as SC15A above

B. Implementation: 1986 Contract with Engineering-Science for the evaluation of Subsurface Conditions along Candidate Alignments of the Metro Rail Project.

C. Status: The contractor, Engineering-Science, that installed the probes, is responsible for backfilling the borings with sand and cement slurry according to permit Number A-86-51-0172 issued by the L.A. Department of Public Works, Bureau of Engineering on February 18, 1986. The probe bores will be filled in after there is no further need to monitor the probes for gas.

D. Future Action: The District will monitor construction to insure all probes are properly abandoned.

Mitigation Measure SC24. Ensure that the underplatform exhaust (UPE) system is turned on if a train becomes stalled in a tunnel.

A. Reference: Same as SC15A above

B. Implementation: This measure would be implemented through operational procedures, not the construction contracts.

C. Status: The Final Report on the Environmental Control System, dated August 23, 1985 governs the operation of the ventilation system for the Project. The primary purpose of the underplatform exhaust system is to control the temperature of the station. In warm weather the fans will exhaust the hot air from under the train when the train comes into the station. If the station temperature exceeds a set limit, the fans will operate to exhaust the hot air. In cooler weather the fans are turned off and the heat from train operations is allowed to warm the station. The UPE fans are used as part of the emergency ventilation system to provide needed ventilation during non-revenue hours and to exhaust smoke and gases as needed. In the case of a stalled train there would be no reason to operate the UPE unless the train was on fire.

D. Future Action: None Needed

Mitigation Measure SC25. Ensure that high and low points in the tunnel alignment are either monitored for accumulation of gas or are adequately ventilated.

A. Reference: Same as SC15A above

B. Implementation: All Contracts

C. Status: The District has determined that gas layering and collection occur at air flow rates of two feet per minute or less. Revenue train operations or operation of the ventilation system during non-revenue hours (typically 1:00 to 5:00 AM) will provide airflow of over 20 times this level to dissipate intruding gases from either high or low points in the tunnels and move them to probe locations where they can be analyzed. See also the status of SC8 above.

D. Future Action: None Needed

THIS CONCLUDES THE MITIGATION MEASURES RECOMMENDED BY THE INDEPENDENT REVIEW BOARD

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Safety measures adopted by the District's Board of Directors in a September 12, 1985 "Policy Statement on the Safety of the Metro Rail Project" are shown below in SC26 through SC38.

Mitigation Measure SC26. Provide natural ventilation, ventilation created by train movements and under-platform exhaust systems that will operate continuously during revenue service.

A. Reference: District's Policy Statement on the Safety of the Metro Rail

B. Implementation Contracts A-141, A-146, and A-171

C. Status: The Metro Rail Project has an extensive ventilation system consisting of natural ventilation, air exchange created by train movements and under-platform exhaust systems.

D. Future Action: None Needed

Mitigation Measure SC27. Provide an emergency ventilation system of fans and controls that can bring in fresh air and exhaust gases when required.

A. Reference: Same as SC26A above.

B. Implementation: Contracts A-141, A-146, and A-171

C. Status: The standard ventilation system is augmented by an emergency ventilation system capable of exhausting gas, smoke and fumes from any conceivable emergency.

D. Future Action: None Needed

Mitigation Measure SC28. Install steel tunnel liners to prevent gas infiltration in areas identified as having the potential for high gas concentrations and pressure.

A. Reference: Same as SC26A above

B. Implementation: Contracts A-141, A-146, and A-171

C. Status: Technical Specification Sections 02311 (Shield Driven Tunnels) and 02324 (Fabricated Steel Segmented Tunnel Liners) establish procedures for providing and installing steel tunnel liners in cases where high gas concentrations and pressures are encountered. Based on subsurface explorations to date, the District does not expect to encounter areas of high gas concentration or pressure that would warrant use of steel tunnel liners. Nevertheless, the procedures are available if needed.

D. Future Action: Monitor during construction for high gas pressures. Install steel tunnel liners if needed.

Mitigation Measure SC29. Install gas barrier membranes in all concrete tunnel sections and in the stations.

A. Reference: Same as SC26A above

B. Implementation: Contracts A-141, A-146, and A-171

C. Status: Technical Specification Section 07101 (Hydrocarbon-Resistant Membrane for Cast-In-Place Concrete) describes installation of High Density Polyethylene (HDPE) membrane in stations and on cast-in-place concrete tunnel liners. Section 07121 (Hydrocarbon-Resistant Coating) describes installation of HDPE on prefabricated steel or precast concrete segments to be used as tunnel liners. These barriers will be used on all tunnel segments and stations in MOS-1 to prevent the inflow of gas into the system.

D. Future Action: None Needed

Mitigation Measure SC30. 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: District September 12, 1985 "Policy Statement on the Safety of the Metro Rail Project"

B. Implementation: Contracts A-141, A-146, and A-171

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.

D. Future Action: None Needed

Mitigation Measure SC31. Smoking and other sources of ignition will be prohibited.

A. Reference: Same as SC30A above

B. Implementation: 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.

D. Future Action: The District will monitor construction to insure compliance.

Mitigation Measure SC32. 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 SC30A above

B. Implementation: All Contracts

C. Status: Section 2.8.1 of Metro Rail "Construction Safety and Security Manual" covers this measure

D. Future Action: The District will monitor construction to insure compliance.

Mitigation Measure SC33. 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 SC30A above

B. Implementation: All tunnel segments

C. Status: Same as SC32C above. See also Status of SC2 above.

D. Future Action: The District will monitor construction to insure compliance.

Mitigation Measure SC34. Records of gas tests and air flow measurements shall be available at the surface and to the California Division of Industrial Safety.

A. Reference: Same as SC30A above

B. Implementation:

C. Status: Same as SC32C above.

D. Future Action: None Needed

Mitigation Measure SC35. Ventilation systems shall exhaust gas or vapors, shall have explosion relief mechanisms, and shall be fireproof.

A. Reference: Same as SC30A above

B. Implementation: All tunnel segments

C. Status: Same as SC32C above

D. Future Action: None Needed

Mitigation Measure SC36. Refuge chambers or alternate escape routes shall be provided and equipped with equipment acceptable to the California Division of Industrial Safety. Workers shall be provided with emergency rescue equipment and trained in its use.

A. Reference: Same as SC30A above

B. Implementation: Contracts A-141, A-146, and A-171

C. Status: Same as SC32C above

D. Future Action: None Needed

Mitigation Measure SC37. The main ventilation flow shall be reversible.

A. Reference: Same as SC30A above

B. Implementation: Contracts A-141, A-146, and A-171

C. Status: Contract 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. requires the main ventilation flow to be reversible.

D. Future Action: The District will monitor the installation of the ventilation system during construction to insure it is reversible.

Mitigation Measure SC38. 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 SC30A above

B. Implementation: Contracts A-141, A-146, and A-171

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.

D. Future Action: The District will monitor construction to insure compliance.

THIS CONCLUDES THE SAFETY MEASURES LISTED IN THE POLICY STATEMENT ON THE SAFETY OF THE METRO RAIL PROJECT

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Mitigation Measure SC39. The District will coordinate final design and construction with the California OSHA, who have responsibility for compliance with state orders on safety of subsurface tunneling through hazardous material.

A. Reference: FEIS, Page 3-189

B. Implementation: All tunnel segments

C. Status: The District has coordinated with the California Division of Occupational Safety and Health, Mining and Tunneling Unit, for several years. All issues of tunneling safety have been approved by Cal OSHA including the District's Construction Safety and Security Manual.

D. Future Action: The District will continue coordination witn Cal OSHA during construction.

Mitigation Measure SC40. Where needed, collection wells will be sunk ahead of the tunnel excavation machines so gas can be pumped out.

A. Reference: FEIS, Page 3-188

EA, Comment 5 and Response, Pages 11 and 12

B. Implementation: Contracts A-141, A-146, and A-171

C. Status: If ventilation, as required in Technical Specification Section 01518, is not adequate to dilute and remove the influx of gas, arrangements can be made on short notice to sink collection wells ahead of the tunnels.

D. Future Action: The District will monitor gas reports during construction to decide if collection wells are needed.

Mitigation Measure SC41. Install conduit seals, collars on any penetrations, and waterstops in joints.

A. Reference: EA, Comment 5 and Response, Pages 11 and 12

B. Implementation: All contracts

C. Status: Technical Specification Sections 02311 (Shield Driven Tunnels), 02322 (Precast Concrete Tunnel Liners) and 02324 (Fabricated Steel Segmented Tunnel Liners) include provisions for installing and sealing tunnel liners to produce a water and gas tight liner. The District determined that water stops would not be

necessary in structures protected by HDPE membrane. Conduit seals are included in Standard Drawings SS-020B (Waterproofing Details) and MS-002C (Pipe Hanger & Support Details).

D. Future Action: None Needed

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. Implementation: A-118

C. Status: Drawings L-002, L-003, L-004, and L-005 of an early version of Contract A-112 show plantings of camphor trees, red iron bark, Mexican fan palm, and brisbane box trees along Santa Fe Avenue. These drawings will be repackaged in Contract A-118 at a later date.

D. Future Action: Prepare Contract A-118

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

A. Reference: FEIS, Page 3-123

B. Implementation: A-141

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.

D. Future Action: None Needed

NOISE AND VIBRATION (NV)

The District has developed a comprehensive set of noise and vibration design criteria, based on a review of federal and American Public Transit Association guidelines, local guidelines, and industry practice. The "Technical Report on Noise and Vibration" (1983), prepared for the FEIS, contains detailed descriptions and explanations of specific noise and vibration standards.

Construction Measures.

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. Contractors must meet these noise criteria and may do so by using the measures identified below for mitigating construction noise and impacts.

Mitigation Measure NV1. 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. Implementation: All segments

C. Status: General Technical Specifications Section 01566 (Pollution Controls), Parts 3.1.E.1a & b incorporate these measures.

D. Future Action: The District will monitor during construction to insure compliance.

Mitigation Measure NV2. 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. Implementation: All segments

C. Status: General Technical Specifications Section 01566 (Pollution Controls), Parts 3.1.E.1a; and c incorporate these measures. During Final Design, the District decided to specifically prohibit blasting during the construction of MOS-1.

D. Future Action: The District will monitor construction to insure compliance.

Mitigation Measure NV3. 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. Implementation: All segments

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

D. Future Action: The District will monitor construction to insure compliance.

Mitigation Measure NV4. 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. Implementation: All segments

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

D. Future Action: The District will monitor construction and insure compliance.

Operations Measures

Mitigation Measure NV5. Use 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. Implementation: A-610 (Trackwork)

C. Status: Technical Specifications Section 02450, (General Track Construction), Part 3.3 requires the installation of Continuous Welded Rail (CWR) throughout the system.

D. Future Action: None Needed

Mitigation Measure NV6. Specify rail vehicles with light weight trucks 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. Implementation: A-610 (Passenger Vehicles)

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.

D. Future Action: None Needed

Mitigation Measure NV7. 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. Implementation: A-610 (Trackwork)

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.

D. Future Action: The District will monitor construction and system testing to insure that criteria are met.

Mitigation Measure NV8. 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,

B. Implementation: A-610 (Trackwork)

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.

D. Future Action: None Needed

Mitigation Measure NV9. 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. Implementation: A-610 (Trackwork)

C. Status: RRF will be used for all underground track. This measure is not needed or used for outdoor tracks in the rail yard.

D. Future Action: None Needed

Mitigation Measure NV10. Use Resiliently Supported Ties (RST) where Resilient Rail Fasteners are inadequate to satisfy applicable noise standards and criteria.

A. Reference: Same as NV9A above

B. Implementation: A-610 (Trackwork)

C. Status: The District's noise and vibration consultant determined in a letter dated November 2, 1984, 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.

D. Future Action: None Needed

Mitigation Measure NV11. Provide more effective noise mitigation with Floating Slab Trackbed (FST) construction where necessary to meet applicable noise standards and criteria.

A. Reference: Same as NV9A above

B. Implementation: A-610 (Trackwork)

C. Status: Floating Slab Trackbed is planned for tracks from Station 235+00 to Station 258+84. This includes a massive, poured-in-place FST at the 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. An additional elastomeric pad insulation will be applied on the outside of the crossover box at the point of closest approach to a nearby apartment building.

D. Future Action: The District will monitor construction and insure compliance.

Mitigation Measure NV12. 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 NV9A above

B. Implementation: All Station Finish Contracts

C. Status: a) District staff and consultants are still studying the necessity and feasibility of applying cellular glass and mineral fiber to the walls and ceilings of shafts. This issue will be resolved during the preparation of contracts for station finish.

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.

D. Future Action: The District will complete the study of the feasibility of applying insulation to the walls and ceilings of shafts and modify the Project design as appropriate. Contract drawings and technical specifications will reflect the decision.

Mitigation Measure NV13. 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 NV9A above

B. Implementation: 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 has been completed and is contained in Technical Specification Section 16622 of Contract A-630. These auxiliary, emergency generators are located outdoors. One is in the rail yard, an industrial area away from any sensitive noise receptors. Another, near the Rail Control Center, is enclosed by a noise barrier wall.

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 yard and Rail Control Center is complete. Because the generators are located outdoors in an industrial area special mufflers were not needed.

D. Future Action: None Needed

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. Implementation: 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.

D. Future Action: None Needed

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. Implementation: Will apply to riding public near station areas

C. Status: SCRTD Planning will arrange to change the feeder bus routes to coincide with the start of rail operations. Proposed revisions are defined in the 1983 Milestone 9 (Supporting Services Plan) and in Section 3.1.1.4 of the EA.

D. Future Action: The District will coordinate and implement the revised feeder bus service as the start of rail operations nears.

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. Implementation: 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.

D. Future Action: The District will coordinate with its internal departments to promote the use of feeder buses when the beginning of rail operations is near.

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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. Implementation: All Demolition, Grading, Excavation, and Tunneling Contracts.

C. Status: Technical Specifications Section 01566, Part 3.3A.1 contains this measure

D. Future Action: The District will monitor construction and insure compliance.

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. Implementation: Same as AQ4B above.

C. Status: Technical Specifications Section 01566, Part 3.3.A.2 contains this measure.

D. Future Action: The District will monitor construction and insure compliance.

Mitigation Measure AQ6. A person shall not cause or allow particulate matter to exceed 100 mg/m3 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. Implementation: Same as AQ4B above

C. Status: Technical Specifications Section 01566, Part 3.3.A.3 contains this measure.

D. Future Action: The District will monitor construction and insure compliance.

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. Implementation: Same as AQ4B above.

C. Status: Technical Specifications Section 01566, Part 3.3.A.4 contains this measure.

D. Future Action: The District will monitor construction and insure compliance.

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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. Implementation: Same as AQ4B above.

C. Status: Technical Specifications Section 01566, Part 3.3.B.3 contains this measure.

D. Future Action: The District will monitor construction and insure compliance.

Mitigation Measure AQ9. Tarp loads of debris leaving sites.

A. Reference: FEIS, Pages 3-182, 183

B. Implementation: Same as AQ4B above.

C. Status: Technical Specifications Section 01566, Part 3.3.B.1 contains this measure.

D. Future Action: The District will monitor construction and insure compliance.

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. Implementation: Same as AQ4B above.

C. Status: Technical Specifications Section 01566, Parts 3.3.B.2 & 4 include these measures.

D. Future Action: The District will monitor construction and insure compliance.

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. Implementation: Same as AQ4B above.

C. Status: Technical Specifications Section 01566, Parts 3.3.B.3 and 3.3.E include these measures.

D. Future Action: The District will monitor construction and insure compliance.

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. Implementation: All Contract Segments

C. Status: Consolidation of deliveries does not appear feasible. Delivery of materials during non-rush hours will be required by the Work Site Traffic Control Plans for each contract. The contractors must maintain a fixed number of traffic lanes during rush hours. No on-street parking is allowed during rush hours, therefore deliveries must be made during non-rush hours.

D. Future Action: None Needed

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. Implementation: All Contract Segments

C. Status: The limited area provided to the Contractor as "Temporary Construction Easements" will necessitate direct delivery

D. Future Action: None Needed

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

A. Reference: FEIS, Page 3-184

B. Implementation: A-111, A-124, A-138, A-147, A-157, A-167, A-185

C. Status: The City of Los Angeles does not allow emulsified asphalts when repaving streets.

D. Future Action: None Needed

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. Implementation: 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

D. Future Action: None Needed

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

A. Reference: FEIS, Page 3-184

B. Implementation: All Contract Segments

C. Status: Contractors are expected to monitor delivery, disbursing and accounting of petroleum products. The overall efficiency of contract performance is subject to audit.

D. Future Action: The District will monitor construction and insure compliance.

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. Implementation: All Contract Segments

C. Status: Specification Section 01566, Part 3.3.E requires maintenance records of gasoline and diesel powered equipment.

D. Future Action: The District will monitor construction and insure compliance.

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. Implementation: All Station Design and Construction Contracts

C. Status: Station designs have been reviewed to minimize lighting, heating, ventilating, and air conditioning loads.

D. Future Action: None Needed

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

A. Reference: FEIS, Page 3-153

B. Implementation: A-115, A-610 (Trackwork)

C. Status: Track layout at the Yard & Shops has been designed to minimize non-revenue vehicle movements

D. Future Action: None Needed

Mitigation Measure E9. Use cold water for vehicle washing.

A. Reference: FEIS, Page 3-153

B. Implementation: 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.

D. Future Action: Contract A-130 is being changed. It will be updated and reissued at a later date. The car wash equipment will be the same as the present version but the location will be different.

Mitigation Measure E10. Use solar hot water preheating for hot water and steam needs in the maintenance yard.

A. Reference: FEIS, Page 3-153

B. Implementation: A-110, A-112

C. Status: District's consultants conducted a study and concluded that solar hot water pre-heating was not cost effective

D. Future Action: None Needed

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. Implementation: 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

D. Future Action: None Needed

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

A. Reference: FEIS, Page 3-153

B. Implementation: All Station Contracts

A-135, A-147, A-157, A-165, A-170

C. Status: This measure was included in the FEIS as a potential mitigation. Opportunities exist in nearby new construction to interconnect their heating and cooling with the station electrical system to capture regenerative braking energy. Private developers are not, however, obligated to cooperate with the District in this area.

D. Future Action: The District will continue to monitor nearby developments and coordinate with developers.

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

A. Reference: FEIS, Page 3-153

B. Implementation: A-135, A-147, A-157, A-165, A-170

C. Status: Same as E10C above

D. Future Action: None Needed

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

A. Reference: FEIS, Page 3-153

B. Implementation: A-630 (Traction Power)

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 all train propulsion energy at each station. There are individual meters for each utility service feeder. Technical Specification Section 3.5.2 contains this information.

D. Future Action: None Needed

GEOLOGY AND HYDROLOGY (GE)

Construction Measures

Mitigation Measure GE1. 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. Implementation: All excavations below the water table, both cut-and-cover at stations and tunnels along the line segments

C. Status:

Permit Requirements

The RWQCB, in their transmittals to the District dated December 28 and 29, 1986, specified the tentative waste discharge requirements. These include levels of permissible pollutants, treatment of water, monitoring, and sampling at various locations during the dewatering and construction operations. The District generally agreed with these requirements, but in a letter of January 8, 1987, asked for certain modifications and clarifications. This request was resolved and the RWQCB issued NPDES Permit No. CA 0059714 to the District in January 1987.

This permit includes requirements on effluent limitations, receiving water limitations, standard provisions and general monitoring and reporting requirements. Although the District will comply with all requirements of the permit, only the effluent limitations and monitoring requirements are listed here, to give an indication of the technical level of the mitigation measures.

I. Effluent Limitations

a. Wastes discharged shall be limited to those described herein, as proposed.

b. The discharge of effluent containing constituents in excess of the following limits is prohibited:

		Discharge Limitations	
Constituent	Units	30-Day Average	Daily Maximum
Suspended Solids	mg/L	50	150
	lbs/day(1)	16,847	50,540
Settleable Solids	ml/L	0.1	0.3
BOD_5 (20°C)	mg/L	20	60
	lbs/day(1)	6,739	20,216
Oil and Grease	mg/L	10	15
	lbs/day(1)	3,369	5,054
Sulfides	mg/L	1.0	2.5
Phenols	mg/L	---	1.0
	lbs/day(1)	337	337
Pentachlorophenol	ug/L	---	30

(1) Based on a maximum flow of 40.4 mgd.

c. The toxicity of the effluent shall be such that the average survival in undiluted effluent for any three consecutive 96-hour static or continuous flow bioassay tests shall be at least 90%, with no single test producing less than 70% survival.

d. The wastes discharged shall not contain odor-producing constituents in concentrations that will cause nuisance.

II. Receiving Water Limitations

a. The waste discharged shall not cause the pH of the receiving water to be less than 6.5 nor more than 8.5.

b. The waste discharge shall not cause the dissolved oxygen of the receiving waters to be less than 5.0 mg/L.

c. The waste discharge shall not cause the concentration of the total dissolved solids in the Los Angeles River at at representative point downstream to exceed the water quality objective (1,500 mg/L) contained in the Basin Plan.

III. Effluent Monitoring

The District will establish water sampling stations for each point of discharge at the Los Angeles River, Ballona Creek and the sulfide treatment plant.

The sampling stations will measure the rate of flow, the temperature, and the pH and will test the effluent for Sulfides, Oil and Grease, BOD_5, Suspended Solids, Settleable Solids, Phenols, Chlorinated Phenols, Pentachlorophenols, Dioxin, Turbidity, Total Dissolved Solids, Phthalates, and Toxicity. Criteria for each of these constituents are contained in the permit.

IV. Receiving Water Monitoring and Sampling

The District has forwarded to the RWQCB an "Effluent and Receiving Water Monitoring and Sampling Plan" dated March 1987. This plan gives the locations of the sampling stations on

the Los Angeles River and Ballona Creek. The plan sets out the procedures and criteria for sampling the receiving water, measuring the flow, and testing it for pH, Total Dissolved Solids, Sulfides, Phenols, Pentachlorophenols, and Phthalates.

WATER POLLUTION CONTROLS

Pollution Control Specifications 01566, Section 3.4 are included under all contract segments and contain the following directives for the construction contractor:

1. 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.

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

3. 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.

4. 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.

5. 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.

More specific instructions are contained in the Technical Specifications for contracts where dewatering must be done. For example, in Contract A141, Specification Section 02140 (Dewatering), dated March 20, 1987, requires the contractor to design, furnish, locate, install, maintain, operate, and remove dewatering systems and water treatment plants as necessary.

Hydrogen Sulfide. During final design additional geotechnical tests revealed that the water that would have to be removed from the excavations was contaminated with hydrogen sulfide, a toxic, noxious gas. Estimates of the quantity of water to be discharged ran into the millions of gallons daily. The RWQCB required the District to remove the hydrogen sulfide before discharging the water into the storm sewer system. The water treatment plants mentioned above will remove hydrogen sulfide from the water by treating it with hydrogen peroxide to oxidize the sulfides to sulfates. This process will effectively eliminate the odor of the hydrogen sulfide.

D. Future Action: The District will monitor construction and insure compliance.

Mitigation Measure GE2. Before construction, more detailed geotechnical work will be completed in the CBD to define fully the horizontal and vertical extent of loose granular soils above and below the water table. If soils subject to liquefaction or densification are found, more conservative site preparation and foundation design measures will be used.

A. Reference: FEIS, Page 3-165

B. Implementation: All segments

C. Status: Converse Consultants completed specific geotechnical studies for each station in MOS-1. TAMS Consultants prepared a report on "Liquefaction Potential at Union Station", dated August 7, 1984. These studies did not reveal any loose granular soils that are subject to liquifaction or densification.

D. Future Action: None Needed

Mitigation Measure GE3. The disposal of wastewater containing oil and gas will require a National Pollutant Discharge Elimination System (NPDES) permit. The permit will be issued by the Regional Water Quality Control Board (RWQCB) and is 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 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. Implementation: 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. The required water quality monitoring reports will be prepared.

D. Future Action: The District will coordinate with the RWQCB to get NPDES permits.

Mitigation Measure GE4. Design and build internal structural elements that are "life critical" (stations and tunnels) to resist strong ground motions approximating the maximum credible earthquake.

A. Reference: FEIS, Page 3-165

B. Implementation: All contracts

C. Status: The District has adopted "Supplemental Criteria for Seismic Design of Underground Structures" by Metro Rail Transit Consultants dated June 1984 and Part II, Appendix A "Seismological Investigation and Design Criteria" by Converse Consultants dated May 1983. These criteria insure that the Metro Rail Project will be designed and built to withstand the Maximum Credible Earthquake, also known as the Maximum Design Earthquake. For an example of detailed seismic design see "Union Station Structural Calculations, Volumes I & II", for Construction Contract Segment A-135, by TAMS Consultants, November 28, 1984. See also mitigation measures SC10 and SC12.

D. Future Action: None Needed

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. Implementation: 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. For example, 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.

D. Future Action: The District will monitor construction and insure compliance.

Mitigation Measure C2. In some areas 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. Implementation: Same as C1B above

C. Status: Temporary shoring and bracing will be used in station excavations along with pumping out groundwater.

D. Future Action: The District will monitor construction and insure compliance.

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. Implementation: A-141, A-146

C. Status: All contract segments were evaluated by the section designers to determine where underpinning would be necessary. For example, Segment A-140 was examined in the report referenced in Mitigation Measure C1C above and underpinning 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. The same report 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.

D. Future Action: The District will monitor construction and insure compliance.

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. Implementation: All tunnel and excavation contracts

C. Status: Specification Section 01566 (Pollution Controls), Part 3.5 outlines the procedures to be followed for control of solid and hazardous waste. Disposal of hazardous material is governed by CFR 40, 190-399 and Section 25100 et. seq.,Chapter 6.5, Division 20 of the California Health and Safety Code (Hazardous Waste Control). The handling and transportation of hazardous materials is governed by Section 66000 et. seq., Division 4, Title 22 of the California Administrative Code. The District has coordinated with the Toxic Substances Control Division (TSCD) of the State Health Department and established preliminary procedures to be followed if the Project encounters questionable materials. The District will provide samples of the materials encountered to the TSCD, which will assess the level of contamination and will

classify the material for disposal purposes. The TSCD will consider alternative methods of disposal such as hauling to Class I dumps, land farming, or incineration, and will make a final determination of the method of disposal of the spoil material. The District will assist contractors in having haul routes for hazardous materials approved by the City of Los Angeles.

D. Future Action: The District will monitor construction and contact the appropriate agencies if any contaminated or hazardous material is encountered during excavation.

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 State Historic Preservation Officer (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

FEIS, Page 4-27, (Memorandum Of Agreement, Section I.A.)

B. Implementation: A-136

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.

D. Future Action: The District will monitor any changes during construction and will insure the Memorandum of Agreement is complied with.

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: Amended Memorandum of Agreement, Section I.A.2

B. Implementation: 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 Advisory Council on Historic Preservation (ACHP) on March 23, 1984 and subsequently ratified by the signatories. This change is included in contract.

D. Future Action: The District will monitor construction and insure compliance with the amended MOA.

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 (Sections I.A.3 and IV.A, Memorandum of Agreement)

B. Implementation: 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.

D. Future Action: None Needed

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 (Section I.A.4, Memorandum of Agreement)

B. Implementation: 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.

D. Future Action: None Needed

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 (Section I.A.5, Memorandum of Agreement)

B. Implementation: 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.

D. Future Action: None Needed

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 (Section I.B, Memorandum of Agreement)

B. Implementation: 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.

D. Future Action: The District will monitor construction and implement the plans for the Title Guarantee building entrance if necessary.

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 (Sections I.A.4, I.B, II.B, IV.A, and IV.C, Memorandum of Agreement)

B. Implementation: All Station Contracts

C. Status: The Cultural Heritage Board has been provided with correspondence and plans about design changes to Union Station and the Title Guarantee Building.

D. Future Action: The District will continue to provide the Cultural Heritage Board with correspondence and plans about any design changes to historic buildings along MOS-1.

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 (Section II.A, Memorandum of Agreement)

B. Implementation: 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, distributed to interested organizations, and was made available to proposers for Project Archaeologist services.

D. Future Action: None Needed

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

A. Reference: FEIS, Page 4-42

B. Implementation: 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. Therefore the District has determined that an early construction start for archaeological testing is not necessary. Proposals for services of a Project Archaeologist, sought under RFP 86-27, were received October 27, 1986. The District signed the contract in March 1987.

D. Future Action: The District will administer the Project Archaeologist contract as necessary during construction.

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 36 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 Advisory 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 (Section II.B, Memorandum of Agreement)

B. Implementation: A-135, A-141, A-145, A-165, A-175, and Project Archaeologist

C. Status: A Treatment Plan has been prepared and approved by SHPO. Procedures for implementing the plan are in Contract 4344 for the services of a Project Archaeologist and in Contract Specifications 01170. The District will determine the significance of any resources found in coordination with the SHPO and the Department of the Interior. The contract for services of a Project Archaeologist was executed in March 1987.

D. Future Action: The District will monitor construction and insure compliance.

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

A. Reference: FEIS, Page 4-42

Identification Study, Page 38

B. Implementation: A-141

C. Status: The May 1985 Identification Study found monitoring is no longer needed at the Civic Center Station because about 30 feet of the hill was removed during the construction of the Hollywood Freeway in the 50's.

D. Future Action: None Needed

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. Implementation: A-145, Project Archaeologist

C. Status: Same as CR10C above

D. Future Action: The District will monitor construction and insure compliance.

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. Implementation: A-141, Project Archaeologist

C. Status: Contract 4344 for the services of a Project Archaeologist calls for monitoring for and recovery of any significant paleontological resources encountered. The contract was executed in March 1987.

D. Future Action: The District will monitor construction and insure compliance.

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. Implementation: A-145, A-165, Project Archaeologist

C. Status: Same as CR13C above

D. Future Action: The District will monitor construction and insure compliance.

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. Implementation: A-175, Project Archaeologist

C. Status: Same as CR13C above

D. Future Action: The District will monitor construction and insure compliance.