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September 12, 1996

TO: BOARD OF DIRECTORS

FROM: JAMES L. de la LOZA
STANLEY G. PHERNAMBUCO

SUBJECT: METRO RED LINE MID-CITY EXTENSION: RESULTS OF
WILTON/ARLINGTON ENGINEERING FEASIBILITY
STUDY

ISSUE

In April, 1996 the Board authorized staff to proceed with an engineering feasibility study of a possible Wilton/Arlington deep bore tunnel alignment for the Red Line Mid-City Segment. The completed study (Attachment 1) has determined the alignment is safe to construct and operate. The tunnel alignment can be constructed using a tunneling boring machine, until just east of the Pico/San Vicente site, where some cut-and-cover construction in the street right-of-way will be required.

Staff has initiated the procurement for professional services necessary to analyze the environmental impacts of a Wilton/Arlington alignment and prepare a revised Mid-City Segment SEIS/SEIR. A procurement recommendation will be presented for Board authorization in November, 1996. Once the environmental process is re-initiated, the attached schedule is anticipated (Attachment 2).

BACKGROUND

In April 1996, the Board approved an engineering feasibility study for a potential Wilton/Arlington alignment. The Draft SEIS/SEIR that was underway for the two alternatives along Crenshaw Boulevard was put on hold while a potential Wilton/Arlington alternative was explored. In May 1996, MTA's Engineering Management Consultant (EMC) initiated the feasibility study, which included analysis and refinement of the subsurface data and development of conceptual engineering profiles. EMC reconvened its Tunnel Review Board (TRB) to review the information and assess the safety of constructing and operating in a deep bore tunnel along this alignment. The TRB was originally created for the Mid-City Reassessment Study process and consists of a national panel of experts in the fields of subsurface design, construction and environmental conditions, including geology and subsurface gases. MTA's Tunnel Advisory Panel also participated in the review process.

The attached EMC report, entitled "*Engineering Feasibility Study: Mid-City Extension, Metro Red Line, Segment 3 - Wilton/Arlington Alignments,*" completed

in August 1996, documents the analysis and conclusions concerning the feasibility of a deep bore tunnel along the proposed Wilton/Arlington alignment. MTA's Construction Division is currently developing preliminary project schedules and cost estimates for the alignment alternatives. These cost estimates will be available shortly.

The key conclusions resulting from the TRB and Tunnel Advisory Panel review are as follows:

- Deep bore tunneling is feasible along the proposed Wilton/Arlington alignment.

Some special construction techniques were identified, including use of a closed face tunnel boring machine (similar to the type that is being considered for the Eastside extension) and pre-treatment of the ground and/or treatment of excavated materials, if necessary.

- The station at Pico/San Vicente must be shallow to avoid a high concentration of hydrogen sulfide. Depending on the orientation of the station, it could be shallow underground, shallow open-cut, at-grade or above ground.

The TRB developed the criteria that a tunnel or station should be placed at least 10 feet above the San Pedro Formation layer, in areas where the San Pedro formation contains high H₂S gas concentrations. The station design alternatives for this site accommodate this criteria.

Additional key conclusions developed by the EMC as part of the conceptual engineering process are as follows:

The Wilton/Arlington Alignment:

- The northern curve, from Wilshire to Wilton Place, requires a 1200-foot radius to return to the street right-of-way as soon as possible and avoid going under an elementary school. MTA's design criteria calls for a desirable minimum curve of 1400 feet. However, a 1200-foot curve is possible and has been applied in other parts of the system. This northern curve is relatively shallow and will need to be further evaluated with regard to any special mitigation measures required to minimize settlement impacts.
- A standard station is feasible under Arlington Avenue, south of Olympic Boulevard, and could be built within the street right-of-way.
- A Venice Boulevard approach to the Pico/San Vicente Station is feasible, although it will require about 800 feet of cut-and-cover along Venice just east of the station. There are several advantages to the Venice approach as follows:
 - ◊ The topography allows a lower height for an above-ground station than for an above-ground station along Pico Boulevard.
 - ◊ The Venice approach does not necessitate acquiring and relocating the L.A. City Municipal Pool as required by the Pico Boulevard approach.

- The station configurations along Venice Boulevard are likely to be less costly than those along Pico Boulevard.
- The Venice approach facilitates commercial development along the Pico Boulevard side of the site, which is consistent with the current land use patterns.
- The Venice approach provides a convenient transfer from a Red Line station to a future Censhaw line station.

Extending West Beyond Pico/San Vicente:

- An underground alignment extending west of the Pico/San Vicente station is feasible if the extension utilizes the Pico Boulevard right-of-way, although a major storm drain would need to be relocated. The line could continue west under Pico Boulevard or, possibly, curve north from Pico and merge with San Vicente, after La Brea Boulevard. This would require further analysis to determine where the alignment could return to San Vicente.
- An extension northwest from the Pico/San Vicente Station along San Vicente would be restricted to an aerial configuration until the line crossed over La Brea Boulevard because of a high concentration of H₂s and a conflict with a major storm drain. Just beyond La Brea Boulevard, the line could submerge into a deep bore configuration.

Compatibility with a Future Crenshaw Rail Line:

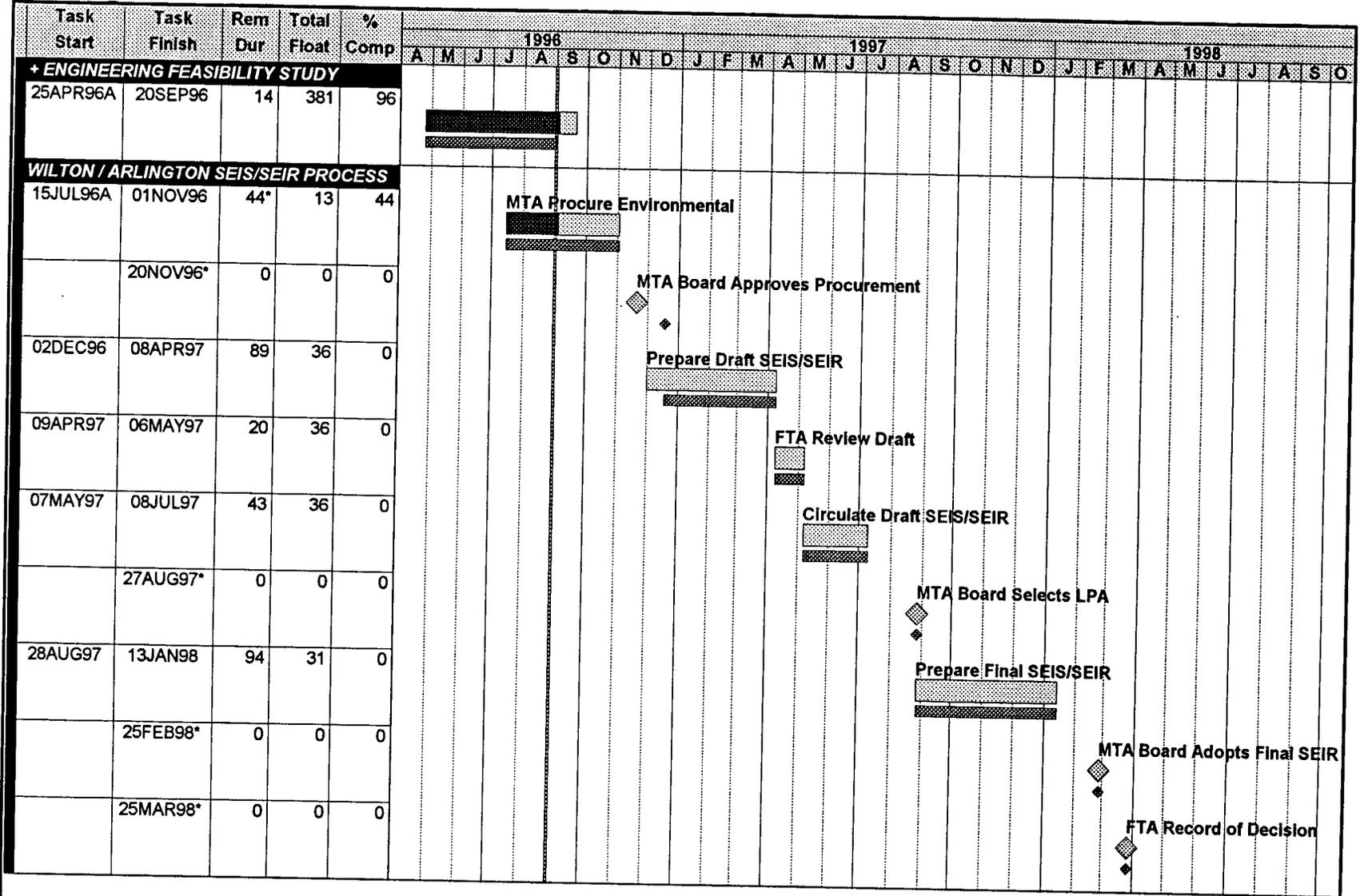
- A Red Line Mid-City approach along Venice Boulevard would not preclude a future Crenshaw Line from also approaching the Pico/San Vicente site from Venice. There is sufficient space on the Pico/San Vicente site for both stations.
- However, if the future Crenshaw line is to be underground along Venice, special considerations to accommodate both lines may be required in order to avoid impacting the Red Line after it begins operating. One option that EMC proposed is for the Mid-City project to overbuild a cut-and-cover box along Venice Boulevard, as the line approaches the Pico/San Vicente Station, so that it is wide enough to accommodate an eventual Crenshaw line. This would require more extensive cut-and-cover construction along Venice Boulevard, as well as additional cost. Other engineering solutions can also be explored.

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Attachment 1

Under Separate Cover:

ENGINEERING FEASIBILITY STUDY
Mid-City Extension
Metro Red Line Segment 3
Wilton/Arlington Alignments



Project Start 24APR96
 Project Finish 25MAR98
 Data Date 21AUG96
 Plot Date 16SEP96

WILSON
 Wilton Place / Arlington Avenue
 Feasibility Study & SEIS/SEIR
 August Schedule Update

Engineering Management Consultant			
Date	Revision	Checked	Approved