

**LOS ANGELES TO PASADENA  
METRO BLUE LINE  
CONSTRUCTION AUTHORITY**

**METRO BLUE LINE  
LIGHT RAIL PROJECT**

**PROJECT IMPLEMENTATION PLAN**

**March 12, 1999**

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## **PROJECT IMPLEMENTATION PLAN**

### **EXECUTIVE SUMMARY**

The Los Angeles to Pasadena Metro Blue Line project has been in the planning and design stages for more than ten years. With only a small amount of construction work complete, the project was suspended by the Metropolitan Transportation Authority (MTA) in 1998 as part of its fiscal restructuring. The Legislature approved SB-1847 later that year to provide for the creation of the Metro Blue Line Construction Authority to complete the project. This Project Implementation Plan (PIP) is one of the first policy actions by the Board of Directors of the new Authority. The PIP recommends a Design-Build framework documents that will require within which the project will be completed.

In terms of project delivery, the Authority is primarily concerned with the quality of the system, the cost, and the schedule. Sufficient planning, design and community dialogue have taken place, and the environmental clearance approved for the system. Therefore, with design partially complete, a method to take advantage of this work effort while not exposing the Authority to substantial risks and liability was sought. Continuing the MTA's conventional approach of Design-Bid-Build was determined to be more expensive (\$60+ million) and to take longer (as much as 15 months) than the Design-Build approach that is recommended.

Design-Build experience in the transportation industry is gaining support due primarily to the cost savings and schedule acceleration that are being realized. A major benefit to the Authority of this approach is that a single entity, the Design-Build contractor, will provide the design and construction services, reducing significantly the legal complications inherent in the transfer of contracts from MTA and the changing of work scopes for their consultants.

The Authority can proceed to complete the Metro Blue Line project with a budget of \$683.7 million and a Revenue Operations Date (ROD) of July 2003. A relatively small professional staff of 25-30 will be required to manage the project under the direction of the Board and the CEO.

Staff recruitment will be a major focus of activity for the immediate future, in parallel with a number of programs designed to restart the project. Retaining Value Engineering consultants, and noise and vibration testing are two such parallel activities that must begin immediately. Also, real estate and utility relocations are critical path items and should be pursued in this time frame.

The plan is the basis for the Authority to begin the remobilization of the Project. It sets the direction for organization structure and budget levels, and is the foundation upon which the other documents (i.e. the Financial Plan, Project Management Plan, and Safety Plan) are based.

## **1.0 INTRODUCTION**

### **1.1 PURPOSE OF THE PLAN**

The Project Implementation Plan (PIP) is intended to define the overall construction contracting strategy that will be utilized by the Los Angeles to Pasadena Metro Blue Line Construction Authority for the initial 13.7 mile project. The PIP will define the procurement and project management strategy with respect to the final design and construction of the guideway, tracks and stations, systems, and related facilities that are part of the project.

There are three underlying goals of the PIP and the other project documents that are required by SB1847. They are to:

- Complete construction and place the system in revenue operation at the earliest possible date;
- Reduce project costs; and
- Exercise Board oversight while maintaining an active community relations program throughout the project.

This PIP is a guide to the recommended project execution structure for the initial phase of the Project (i.e. from Union Station to Sierra Madre Villa). See the conceptual alignment map in Figure 1.1 on the following page. The extension of the Project, described in the legislation, will be the subject of a subsequent Project Implementation Plan.

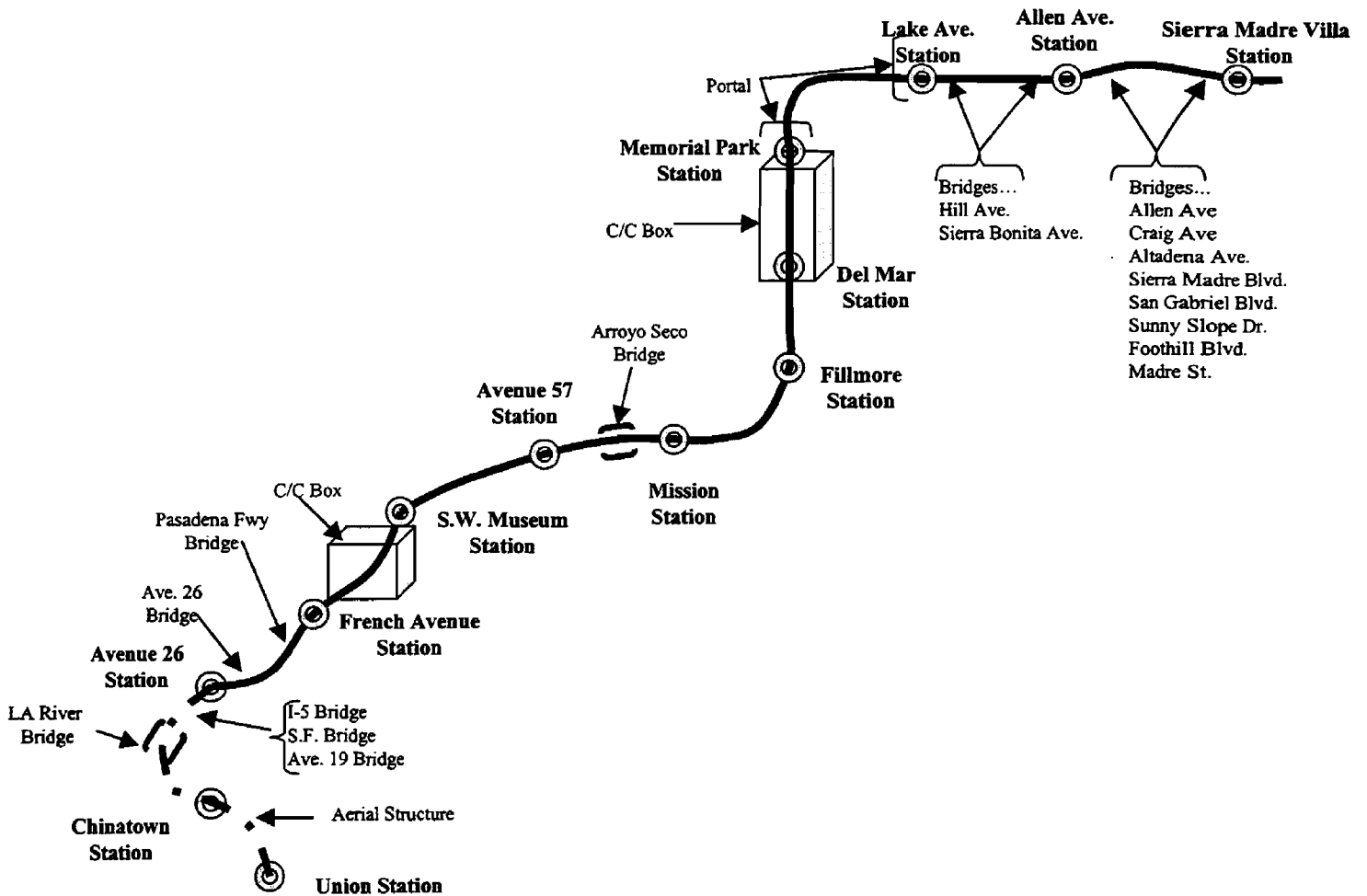
### **1.2 MTA TRANSITION**

With the passage of SB 1847, the responsibility for completion of the Metro Blue Line Project was transferred from the Los Angeles County Metropolitan Transportation Authority (LACMTA) to the Pasadena Metro Blue Line Construction Authority. The transition officially took place on January 1, 1999 when the Construction Authority legislation became effective.

In 1998 when MTA suspended work on the Pasadena Blue Line project, the approved project budget was \$804 million. The approximate, project status was as follows:

- Fixed facility design: 46% complete;
- Line segment design: 65% complete;
- Systems design: 45% complete; and
- Construction: 11-15% complete

**Figure 1.1  
Route Map of the LA to Pasadena Blue Line**



The construction activities were focused on the bridge retrofit and construction program that is substantially complete. The following Figure 1-2 illustrates the general status of the project segments when suspension was ordered by the MTA Board.

The legislation requires MTA to transfer real property, documents and budget balances to the Authority effective January 1,1999. In order to manage the transfer of responsibility, funding, and documents, the Construction Authority and the MTA have entered into five agreements with each other and one jointly with the California Transportation Commission (CTC). These agreements generally cover the following areas:

- (1) Interim Funding: to provide a total of \$350,000.00 for the initial start-up activities of the Authority. These funds will be deducted from the transfer of dedicated local funds. (See item # 4);
- (2) Transfer of Documents: to provide for the transfer of all documents pertaining to the Project;
- (3) Memorandum of Understanding: the transfer of all assets, in trust, and allocated to the Project will be the subject of this agreement.
- (4) The transfer of local memorandum funds from the MTA to the Authority;
- (5) Master Cooperative Agreement defining the review process (by MTA) of Any significant changes in the design or construction of the Project will be covered in this agreement; and
- (6) The CTC, MTA and Authority Agreement: to transfer the unencumbered state funds to the Authority.

At the time that the initial project (from Union Station to Sierra Madre Villa) is complete and ready for revenue service, the Authority will transfer the project back to MTA which will be responsible for operations and maintenance. An additional Memorandum of Understanding will deal with this second transfer. — all assets of the project that will be transferred from the Authority to the MTA.

### **1.3 REQUIREMENTS OF SB 1847**

SB 1847 was introduced on February 19, 1998 in the Senate by Senator Schiff. Principal Co-authors of the Bill were Assembly Members Margett and Scott, and Senator Polanco. The Bill passed the Assembly on August 20, 1998 and the Senate on August 27, 1998. SB-1847 was signed by the Governor on September 30, 1998.

The purpose of the SB 1847 was to create the Pasadena Metro Blue Line Construction Authority to assume responsibility for the completion of the light rail project from Union Station to Sierra Madre Villa Blvd. and any rapid transit guideway project that may be planned east of Sierra Madre Villa Blvd. to the City of Claremont.

The bill requires the Authority to complete within 60 days after formation and Administrative Code and within 90 days after its establishment a number of documents that will guide the agency in carrying out its mandate. These documents include the following:

- Project Management Plan;
- Project Implementation Plan;
- Project Safety Plan; and
- Project Financial Plan.

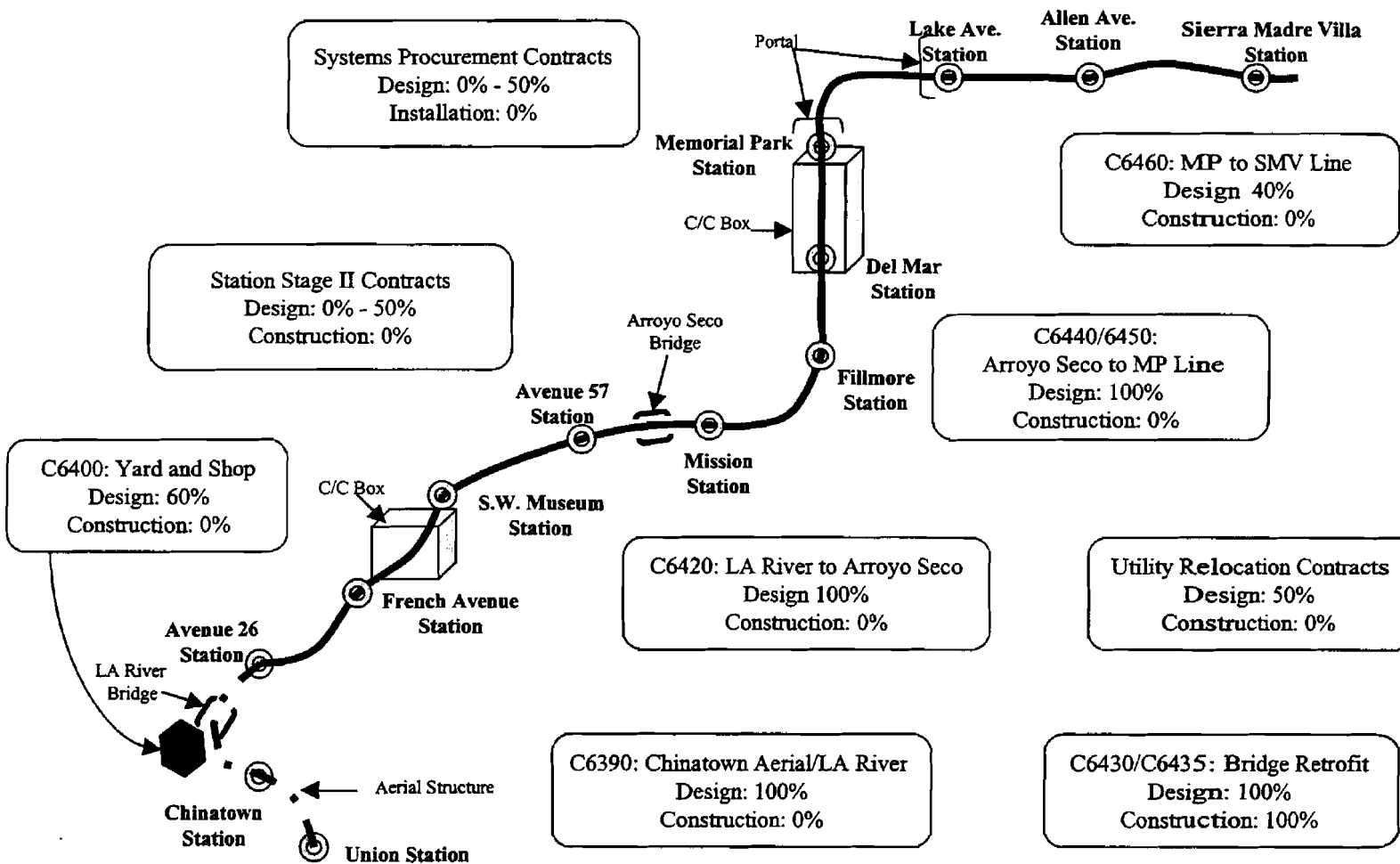
The latter four documents must be completed and submitted to the Governor, the legislative, and the CTC within 90 days after the Authority is established. The Administrative Code has a shorter time frame of 60 days attached to it. The Board of Directors approved the Administrative Code on February 24, 1999.

Agreements with LACMTA are required for the transfer of assets and unencumbered local funds programmed for the project, and for the participation of LACMTA in the review of any significant changes in project scope.

Upon completion of the submissions, and the Caltrans financial and program management review, and certification, known as the "580 Review," the Authority will have the necessary authorization to proceed with remobilizing the project using of the Project Implementation Plan as a guide to build the project.



**Figure 1.2  
Los Angeles to Pasadena Blue Line  
Alignment and Stations Design and Construction Status**



## **2.0 SYSTEM DESCRIPTION**

### **2.1 OVERVIEW**

SB-1847 specifies that the Metro Blue Line Construction Authority is responsible for design and construction of a rapid transit line of approximately 34-35 miles connecting the San Gabriel Valley in the North East part of the County to Downtown Los Angeles. The alignment, following railway rights-of-way and the 210 Freeway, defines a full operating system that links the San Gabriel Valley communities from Claremont to Pasadena and the City of Los Angeles and the Downtown City core. Figure 2-1 below illustrates the extent and location of the overall project.

Construction of the full system will be phased. The first phase, known as the Pasadena Blue Line (PBL), has been an active rail project in the region since 1989. Beginning at Union Station where it connects to the Red Line and Metrolink trains, the PBL phase extends through the Cities of Los Angeles, South Pasadena and Pasadena to Sierra Madre Villa Blvd., at the 210 Freeway. A double tracked conventional light rail line, PBL is planned to have 13 new stations to provide access to passengers arriving by bus, car or on foot.

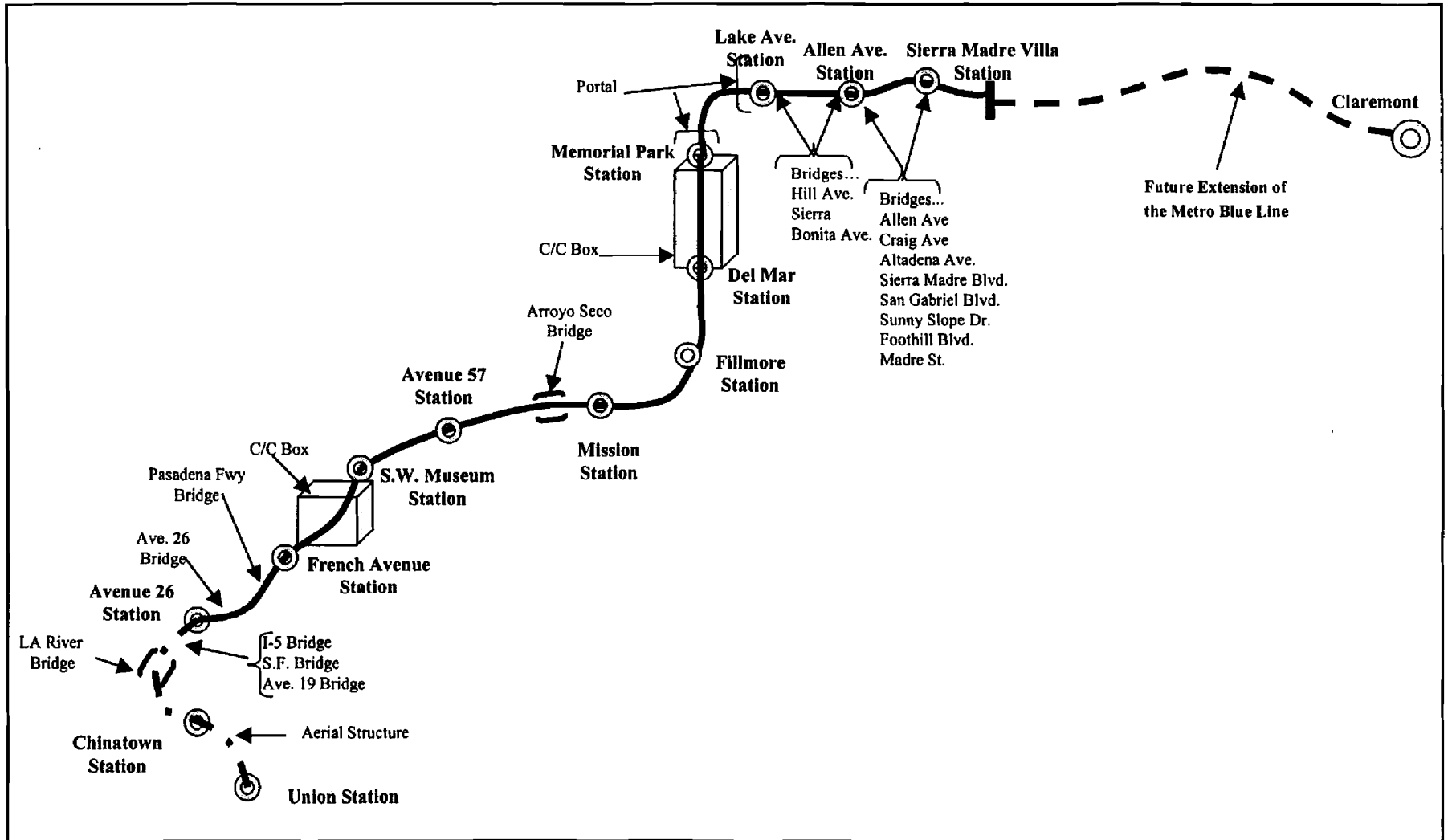
The second phase of the full system has been studied to determine the feasibility of rapid transit service in the 210 corridor (using right of way acquired from the railroad) as far east as the City of Claremont. Although further analysis and design are required in this section of the project, the overall feasibility of rapid transit service in this corridor has been confirmed.

The first phase of the Metro Blue Line (MBL) system is the focus of the strategies and documents described in the following paragraphs. Additional work to define the second phase of the overall project will follow the initiation of construction of the PBL segment.

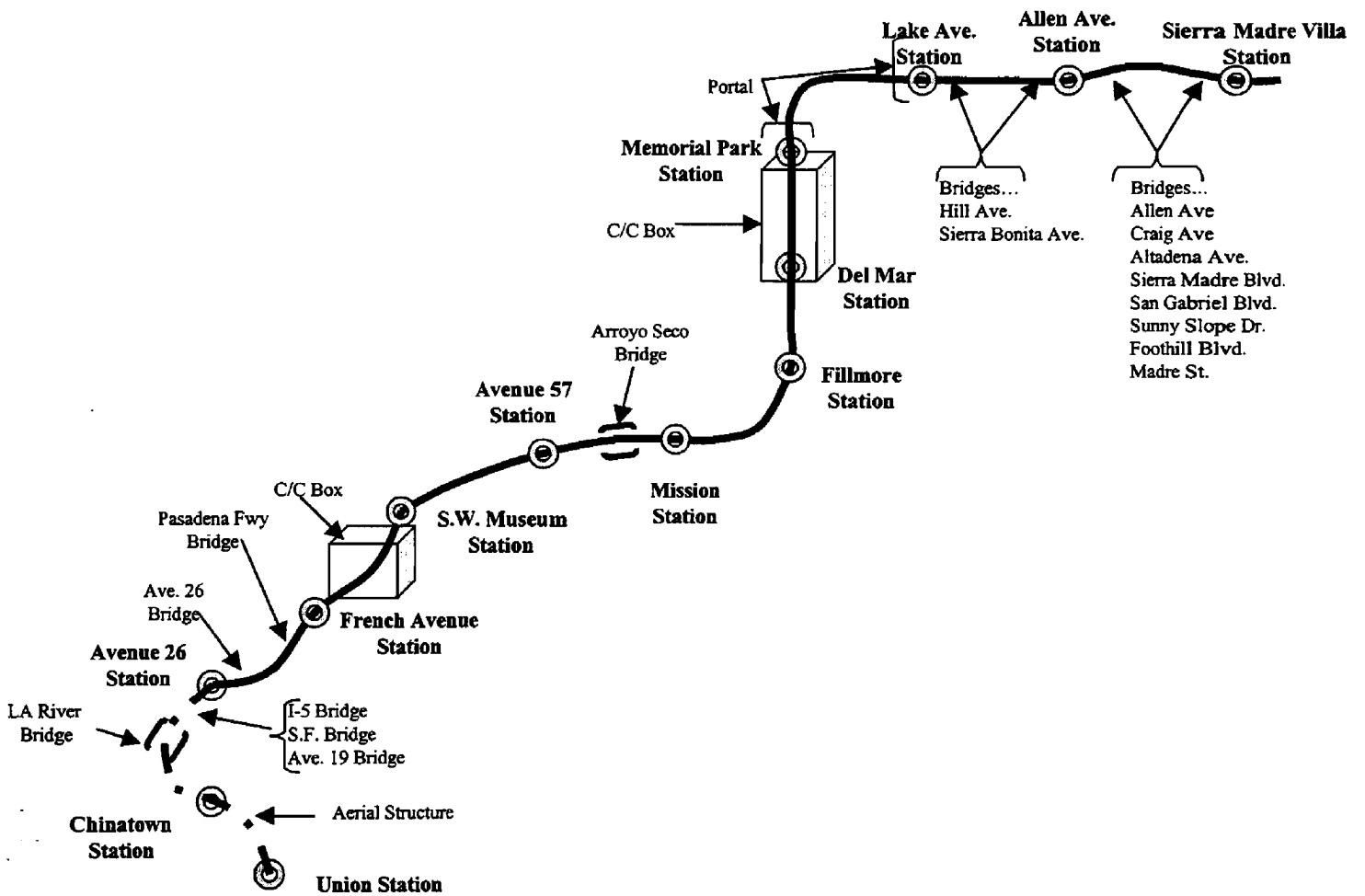
### **2.2 ALIGNMENT**

The MBL segment is a 13.7 mile light rail line extending from Union Station to the eastern parts of Pasadena at Sierra Madre Villa Blvd. The alignment follows the rail right of way purchased from the Atchison, Topeka and Santa Fe Railroad through the Cities of Los Angeles, South Pasadena and Pasadena. Figure 2-2 below, illustrates the alignment and station locations. The transit service will connect the residential neighborhoods in Pasadena, South Pasadena and Los Angeles with the Downtown Los Angeles business district and serve many destinations in Los Angeles and Pasadena on the route. In the eastern part of Pasadena, the alignment follows the 210 Freeway to an interim terminus at Sierra Madre Villa Blvd. At this point the system will intercept 210 commuters bound for Pasadena and Los Angeles business districts.

**Figure 2.1**  
**Future Extension of**  
**the Los Angeles to Pasadena Blue Line**



**Figure 2.2  
Route Map of the LA to Pasadena Blue Line**



## **2.3 STATIONS**

There are thirteen new stations planned along this alignment including an addition to the existing Union Station facility where MBL passengers may connect with Metrolink and Metro Red Line trains. Of the thirteen new stations, the majority are simple high platform structures with shelters to provide access to the light rail trains. These stations include the following:

**City of Los Angeles:**

- Avenue 26 Station;
- French Avenue Station;
- S.W. Museum Station; and
- Avenue 57 Station.

**City of South Pasadena:**

- Mission Station.

**City of Pasadena:**

- Fillmore Station.

In Chinatown, near the Union Station terminus, an aerial station is planned. This station will be the focus of a joint development project adjacent to the station. Two stations in Pasadena are also planned as part of an urban development project. The Memorial Park Station was designed as part of a residential complex, the Holly Street Apartments, and the shell of the station was built with the apartment building. The second station is at the Del Mar transportation center, the site of the historic passenger rail station. The lands adjacent to this station are planned for joint development and an integrated bus transit and commuter parking facility. The last three stations are situated in the median of the 210 Freeway. They are:

- The Lake Avenue Station;
- The Allen Avenue Station; and
- The Sierra Madre Villa Station.

The last station is the interim terminus of the first phase line. The Sierra Madre Villa Station is planned to have a major park and ride facility on lands adjoining the freeway. Access to all three stations will be from the bridges that are over the freeway at this point.

Generally, the stations are planned to be simple structures, in compliance with Americans with Disabilities Act (ADA) provisions, and with the highest levels of safety and security designed into the facilities. Integrated with local and in some cases regional bus services the stations all have clearly defined pedestrian environments.

## **2.4 TRACK AND STRUCTURES**

The MBL alignment is essentially an at-grade line with two grade separations and one aerial structure. The majority of the line will be built on ballast with concrete ties that MTA purchased some time ago.

The grade separations at Marmion Way in Los Angeles and Colorado Blvd. in Pasadena are designed for safety purposes at both locations. At these locations the track will be fixed to a concrete slab that forms the fixed guideway for the system. Similarly, in Chinatown where an aerial alignment is necessary to improve access between Chinatown and the station, the rail will be affixed directly to the structures.

## **2.5 BRIDGES**

There are 15 bridges that are part of, or intersect, the PBL alignment. Construction of a new bridge at the LA River and the reconstruction of the Arroyo Seco Bridge were two major construction projects that have been completed.

The other bridges, at I-5 and along the 210 Freeway for example, have also been completed. This work involved seismic upgrades, widening of decks and general rehabilitation.

## **2.6 YARDS AND SHOPS**

A maintenance facility for the fleet of vehicles to be operated on the PBL line is planned for a site in Los Angeles near Chinatown. This facility is planned for light servicing and daily inspection of the revenue fleet, and as the operations center for the line. Major repairs would be carried out in other MTA facilities with vehicles either trucked or towed to those sites.

In the extension program for the line a new site for a major maintenance and facility will be sited and built to accommodate the full project requirements.

## **2.7 OPERATIONS**

SB-1847 provides for MTA to operate the MBL system once the Authority has completed construction. Each train set, of up to three 90-foot long vehicles, will provide service for up to 640 passengers. Operating daily from 4:30 – 5:00 am in the morning to 12:30 – 1:00 am at night, the system is planned to carry 38,000 riders daily in the first year of operation.

MTA will be an active participant in the final design and construction of the project to ensure that the operating requirements are maintained. MTA has an approved Fleet Management Plan that reflects the assignment of 32 refurbished LA to Long Beach

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vehicles to the MBL line, and will prepare a detailed Revenue Operations Plan to guide service delivery. The latter document will specifically address service standards, fleet requirements, organization staffing, operating policy and procedures, and annual costs / revenues.

**3.0 PROJECT STATUS**

**3.1 BUDGET**

The MTA approved budget for the MBL project is \$803,868.00 This budget was based on the initial estimates of the project's cost elements (e.g. construction, engineering, insurance, etc.) completed by the MTA's consultants, and then reduced by the MTA's cost containment process. The \$803.8 million budget is contained in the CTC approved STIP.

At the time the project was suspended by MTA, approximately \$274.3 million of this budget had been committed. The construction of the bridges, the lengthy design process, and the real estate acquisitions account for most of these commitments.

Figure 3-1 below highlights the approved budget and levels of commitment/expenditure recorded by MTA.

FIGURE 3-1		
MTA BUDGET		
PASADENA BLUE LINE		
(\$000)		
CONSTRUCTION	\$431,365	76,531
PROFESSIONAL SERVICE	258,887	157,829
REAL ESTATE	55,500	32,701
UTILITY/AGENCY FORCE ACCOUNTS	12,400	7,028
SPECIAL PROGRAMS	2,201	395
PROJECT CONTINGENCY	43,554	0
PROJECT REVENUE	(39)	(198)
<b>TOTAL</b>	<b>\$803,868</b>	<b>\$274,287</b>



## **3.2 PROGRESS**

Under MTA management, the PBL project was divided into 16 construction contract packages. Design was initiated in all of these work packages and in some cases (bridges) the construction activities completed. The suspension of work on the project has resulted in many design contracts, real estate negotiations and acquisitions, and program control updates left unfinished. Contracts with design firms and other service suppliers are still being closed out by MTA. Figure 3-2 below summarizes MTA's status of the project by contract package.

There are many conflicting views of the overall project status. Although there are at least two line section packages where designers have completed their work, there are a number of outstanding comments by City staff that have not been addressed. Therefore, additional design activity is required.

In the following subsections, the status of the various components of the PBL project is described. The background information that was used to create this status report has been taken from the "Suspension Papers" prepared by MTA's general engineering consultant.

### **3.2.1 FIXED FACILITIES CONTRACTS**

Construction of the Pasadena Blue Line Project was broken into 16 separate main contracts. They include **five** line segment construction contracts (viz. C6390, C6420, C6440, C6450, and C6460); and **seven** station finishing contracts (viz. C6391, C6470, C6475, C6480, C6500, C6520, C6510), and one Design-Build contract for the Union and Sierra Madre Villa stations (C6490). Design/Build packaging of these two contracts resulted from the MTA Board decision to minimize schedule and cost impacts from the consideration to redesign Union Station to achieve construction cost savings. The Union Station bid document was advertised to solicit bids for construction. The MTA Board rejected the lowest bid, as it exceeded the engineer's estimate. Union Station was one of the several cost reduction items in the June 1996 MTA Board Report.

In addition to five Line segments, and seven station finish contracts; there were two system contracts (viz. H0060 and H0070), one Midway Yard and Maintenance Shop contract (C6400) and other miscellaneous contracts for procurement and installation of system and rail elements, landscaping and fencing, and signage and graphics.

## FIGURE 3.2 Los Angeles to Pasadena Metro Blue Line Summary of Contract Status

Pkg	CWO	Contract	Description	Design	Const.	General Comments	Const. \$ Est.	B/E
1	41	C6390	Chinatown Aerial Structure	100%	0%	Construction of double track aerial structure, direct fixation, and trackwork installation.	\$21,852	T1
23	41	C6391	Chinatown Station Stage II Finishes.	5%	0%	Construction of canopies, mechanical, electrical, architectural, and station plaza. (recommended as part of D-B contract.)	\$5,409	T1
2	41	C6400	Yard and Shop	60%	0%	Construction of buildings and site improvement for a satellite maintenance facility located in the existing Midway Yard - (recommend as part of a D-B contract.)	\$35,792	T2
19	99	C6410	LA River Bridge	100%	100%	Construction is Completed.	\$13,439	T1
3	40	C6420	LA River to Arroyo Seco Line and Ave. 26, French Ave, Ave. 57 and SW Museum Station.	100%	0%	Construction of line segment, stations, station Stage II finishes, and OCS foundations, grade crossing, trackwork installation, ballast, direct fixation, and concrete work.	\$47,920	T1
20	99	C6430	Arroyo Seco Bridge Reconst	100%	100%	Construction is Completed.	\$11,574	T1
21	99	C6435	Reconst/retrofit 13 Bridges	100%	100%	Construction is Completed.	\$12,676	T1
4	40	C6440	Arroyo Seco to Del Mar Line and Mission and Fillmore Stations.	100%	0%	Construction of line segment, stations, station Stage II finishes, and OCS foundations, grade crossing, trackwork installation, ballast, direct fixation, and concrete work.	\$18,070	T1
5	40	C6450	Del Mar to Memorial Park Line and Del Mar and Memorial Station.	100%	0%	Construction of line segment, stations, station Stage II finishes, and OCS foundations, grade crossing, trackwork installation, ballast, direct fixation, and concrete work.	\$33,809	T1

**FIGURE 3.2**  
**Los Angeles to Pasadena Metro Blue Line**  
**Summary of Contract Status**  
**(continued)**

Pkg	CWO	Contract	Description	Design	Const.	General Comments	Const. \$ Est.	B/E
6	41	C6460	Memorial Park to SM Villa Line and Lake and Allen Ave. Stations.	40%	0%	Construction of line segment, stations, station Stage II finishes, and OCS foundations, grade crossing, trackwork installation, ballast, direct fixation, and concrete work, (recommended as part of a D-B contract.)	\$11,095	T1
3	40	C6470	SW Museum and Avenue 57 Stations Stage II Finishes.	50%	0%	Included in C6420 contract.	\$0	T1
7	41	C6475	Mission and Fillmore Stations Stage II Finishes.	50%	0%	Construction of canopies, mechanical, electrical, architectural, and station plaza. (recommended as part of a D-B contract.)	\$3,335	T1
7	41	C6480	Avenue 26 and French Stations Stage II Finishes.	50%	0%	Construction of canopies, mechanical, electrical, architectural, and station plaza. (recommended as part of a D-B contract.)	\$2,544	T1
8	42	C6490	Union Station and SM Villa Stations Stage II Finishes.	0%	0%	Construction of canopies, mechanical, electrical, architectural, and station plaza for two terminal stations, including C6491 Contract, (recommend as part of D-B contract.)	\$12,094	T1
8	99	C6491	Union Station and SM Villa Station	0%	0%	Construction of two terminal at-grade stations, OCS foundations, grade crossing, trackwork installation, ballast, direct fixation, and concrete work, included in Contract C6490. (recommended as part of D-B contract.)	\$0	T1
9	41	C6500	Del Mar Station Stage II Finishes.	50%	0%	Construction of canopies, mechanical, electrical, architectural, and station plaza finishes, (recommend as part of D-B contract.)	\$2,711	T1
9	41	C6510	Lake and Allen Avenue Stations Stage II Finishes.	50%	0%	Construction of canopies, mechanical, electrical, architectural, and station plaza, (recommend as part of D-B contract.)	\$4,616	T1

**FIGURE 3.2**  
**Los Angeles to Pasadena Metro Blue Line**  
**Summary of Contract Status**  
**(continued)**

Pkg	CWO	Contract	Description	Design	Const.	General Comments	Const. \$ Est.	B/E
11	43	C6660	LA River to Glenarm Landscap	0%	0%	Finish and install automatic timer controlled irrigation, supply and place top soil, trees, ground cover/schrub, maintenance of new planting.	\$2,899	T1
11	43	C6670	Glenarm to SM Villa Landscap	0%	0%	Included in C6620.	\$0	T1
12	43	H0010	Telephone System	0%	0%	MTA Operations to furnish and install an EPABX telephone system including ETEL, Yard/Shop facilities, and trunk line connections to accommodate PBL analog telephone requirements.	\$0	T7
12	43	H0030	Radio System	0%	0%	Trunked radio system/900 Mhz system by MTA Option Contract in H0889.	\$2,123	T7
12	43	H0040	Fare Collection	0%	0%	MTA Fare/Ticket Vending Machine Option Contract in H0840.	\$2,924	T7
99	99	H0050	Safety/Security	0%	0%	Deleted.	\$0	T7
99	99	H0055	SCADA	0%	0%	Cost incurred prior to cancellation of the design. All SCADA removed.	\$40	T7
13	40	H0060	Train Control	50%	0%	Design, furnish, fab, install, and test a bi-directional train control system, including grade crossing and pedestrain, pre-fab building for communication and signaling and C6530, C6535, and C6540.	\$35,271	T7
10	40	H0070	Traction Power System/OCS	50%	0%	Design, furnish, fab, install, and test traction power stations and required demolltion, site preparation, and interface with line segments/OCS, TPSS foundation-C6530, C6535, C6540.	\$26,850	T6
11	43	H0080	Signage	0%	0%	Included in C6620.	\$2,891	T1
10	40	H0090	Overhead Contact System (OCS)	50%	0%	Included in H0070.	\$0	T6

**FIGURE 3.2**  
**Los Angeles to Pasadena Metro Blue Line**  
**Summary of Contract Status**  
**(continued)**

Pkg	CWO	Contract	Description	Design	Const.	General Comments	Const. \$ Est.	B/E
18	43	H0100	Rail Maintenance Equipment	0%	0%	Provide assistance to MTA with id, investigation, and specification of shop equipment, machinery powr tools handtools, and portable shop equipment, and other misc. maintenance equipment.	\$632	T2
14	43	H0110	Elevators	0%	0%	For 4 stations, Allen, Lake, Chinatown Aerial and SMV Stations.	\$2,076	T1
11	99	P0210	Maintenance Way Equipment	0%	0%	Included in P2120, for shop tools and other misc. maintenance equipment.	\$0	T2
99	99	P0822	Precast Concrete Ties	100%	0%	Inventory and Material Management Required from Long Beach Line	\$2,533	T8
15	43	P2070	Special Trackwork	0%	0%	Design has not started for long lead items. Furnish special trackwork, including timber switch ties for turnout and crossovers.	\$5,153	T8
16	99	P2090	Running Rail Procurement	100%	100%	Included in B611 Metro Red Line option.	\$4,426	T8
22	99	P2100	Precast Concrete Ties	100%	100%	Inventory and Material Management Required.	\$2,554	T8
17	43	P2110	Direct Fixation Fasteners	100%	100%	Inventory and Material Mangement Required.	\$1,782	T8
18	43	P2120	Hi-Rail Maintenance Vehicles	0%	0%	Assistance to LACMTA with ID, investigation, and specification of hi-rail vehicles, equipment, and spare parts, Including P0210 contract.	\$1,420	T2
24	99	Testing	Integration Test	0%	0%	Pre-revenue and Start-Up Test.	\$9,634	T9

**3.2.2 DESIGN STATION CONTRACTS**

The station design activities have been conducted in parallel with the line sections engineering. However, the station designs are not as advanced as the time section civil work. MTA experienced delays in developing neighborhood consensus with set of design criteria. Therefore, the state of design for each station is noted below.

Figure 3-3  
Status of Station Designs

<b>Contract Package</b>	<b>Station Name</b>	<b>Current Level of Design/Documents</b>
C6490	Union	PE Drawings Are Complete
C6391	Chinatown	PE for Aerial Station Are Complete
C6480	Avenue 26	PE Drawings Are Complete
C6480	French Ave.	PE Drawings Are Complete
C6470	S.W. Museum	Design Drawings Are Complete
C6470	Avenue 57	Design Drawings Substantially Complete
C6475	Mission	Design Drawings To Be Revised
C6475	Fillmore	Design Drawings Substantially Complete
C6500	Del Mar	Design Drawings To Be Revised
C6520	Memorial Park	Design Drawings To Be Completed
C6510	Lake Avenue	Design Drawings To Be Completed
C6510	Allen Avenue	Design Drawings To Be Completed
C6490	Sierra Madre Villa	Design Drawings To Be Completed

**3.2.3 STATUS OF CONSTRUCTION**

The MTA has completed construction on three Pasadena Blue Line contracts:-

- 1.3 C6410 - Los Angeles River Bridge,
- 1.4 C6430 - Arroyo Seco Bridge, and

- 1.5 C6435 - Retrofit of 12 steel and concrete bridges. Coordination of As-build conditions into affected contracts for the fire/life systems and a number of other construction elements are identified as open items by MTA.

### **3.2.4 STATUS OF MATERIAL PROCUREMENT**

The project has completed contract P2100, and has purchased all required concrete ties for track work. The concrete ties and Type I Rail Fasteners are stockpiled at the Johnson and Johnson property/future Sierra Madre Villa Station park-and-ride site.

### **3.2.5 STATUS OF RAIL PROCUREMENT**

Procurement of about one half of the running rail for the 13.7-mile project has been completed. Thirty percent of the total anticipated rail stock need was provided by spare rails from the construction of the Long Beach Blue Line and Green Line. The rails are stockpiled at the PA-018 site along Alameda Street and in the median of I-210 Freeway.

### **3.2.6 REAL ESTATE**

There are 147 real estate parcels that must be acquired for right-of-way, stations, construction access/staging, and ancillary uses. Of these, only 26 have been completed and 6 parcels are no longer needed. Although this would appear to be substantial roadblock to progress, the remaining parcels are partial takings, city owned lands, and easements.

The completion of the acquisitions of these parcels is of the highest priority in terms of critical path items for the project schedule.

## **3.3 ENVIRONMENTAL MITIGATION**

### **3.3.1 METRO BLUE LINE ENVIRONMENTAL COMPLIANCE**

The PBL Light Rail Line project is required to comply with the laws and regulations set forth in the California Environmental Quality Act (Public Resources Code §§ 21000-21178.1) (CEQA), as amended. This section addresses the environmental compliance completed to date for the PBL, the measures recommended to mitigate significant impacts, and the processes necessary to bring the environmental compliance of the project up to date.

### **3.3.2 ENVIRONMENTAL COMPLIANCE HISTORY**

Numerous environmental documents have been prepared for the PBL project. All previous environmental documents were prepared according to CEQA and the State CEQA Guidelines. These documents include:

- (1) **Revised Draft Environmental Impact Report-Pasadena-Los Angeles Light Rail Transit Project (State Clearinghouse Number SCH# 88642713) and Final Environmental Impact Report-Pasadena-Los Angeles Light Rail Transit Project (SCH# 89082327) (Los Angeles County Transportation Commission, 1989, 1990).**

The Revised Draft Environmental Impact Report (EIR) for the entire Pasadena Blue Line was prepared and circulated in 1989 after public review of a Draft EIR in 1988 resulted in the expansion of the scope of the project. The Revised Draft EIR evaluated the environmental impacts associated with construction and operation of two alternatives (Highland Park and North Main Street Alignments, various segment options, alternative rail yards, and other facilities. The Final EIR was certified in 1990 and the Highland Park, Union Station "No Subway" was selected as the preferred alternative. Implementation of mitigation measures (see detail below) would reduce any potentially significant impacts of the proposed PBL to a less than significant level.

- (2) **Chinatown Mitigated Negative Declaration (SCH# 91071040) (Los Angeles County Transportation Commission, 1991).**

An Initial Study was prepared in 1991 to analyze the redesign and relocation of the Chinatown Station as an aerial station located across the intersection of College and Alameda Streets in the City of Los Angeles. A Mitigated Negative Declaration was certified for this change in 1992. Preparation of the MND indicated that no significant impacts would result from construction and operation of the proposed Chinatown Station.

- (3) **Supplemental EIR for the Pasadena-Los Angeles Light Rail Transit Project (Supplement EIR #1) (SCH# 92071005) (Los Angeles County Transportation Commission, 1992, 1993).**

Supplemental EIR #1 was prepared in 1992 to analyze several proposed design changes, including: three alternative locations for maintenance facilities (Taylor Yard, Cornfield, West Bank Option); three new station locations (Allen Street-replacing Hill Street and Altadena Avenue stations, Fillmore Street replacing Glenarm and California Streets stations, and Southwest Museum station; Fair Oaks and Los Robles Avenues stations were dropped from consideration); and two grade separations (Colorado Boulevard in Pasadena, and Figueroa Street and Marmion Way in Los Angeles). None of the maintenance facility sites were chosen to replace the Midway Yard, which was selected in the original EIR. The station and grade separation changes were approved. The Supplemental EIR #1 was certified in 1993. Implementation of the recommended



mitigation measures would reduce the potential environmental impacts to a less than significant level.

**(4) Supplemental EIR for the Pasadena-Los Angeles Light Rail Transit Project (Supplemental EIR #2) (SCH# 9321099) (Los Angeles County Metropolitan Transportation Authority, 1994a, 1994b).**

Supplemental EIR #2 was initiated in 1993 to analyze the effects of eight planning and design modifications to the PBL. These proposed modifications included a change from street-running to semi-exclusive train operation along Marmion Way in Mount Washington and Highland Park; five additional street closures in Highland Park; additional property acquisition to provide adequate emergency vehicle access to streets along Marmion Way between Avenues 51 and 59; additional property acquisition in Elysian Park for construction of an access road to the Midway Yard; sound barrier wall modifications along Marmion Way in Mount Washington and Highland Park, and in South Pasadena; a below-grade separation option in the vicinity of Marmion Way and Figueroa Street in Mount Washington; and a change in alternative locations for a park-and-ride facility located at Madre Street/Sierra Madre Villa and the Foothill (210) Freeway in Pasadena.

The Supplemental EIR #2 was certified in 1994. Implementation of mitigation measures reduced all but the vibration impacts to a less than significant level. A Statement of Overriding Considerations was adopted by the MTA for vibration impacts associated with the proposed action for this EIR.

**(5) Addendum #1 to the Final EIR and two Supplemental EIRs (No SCH#) (Los Angeles County Metropolitan Transportation Authority, 1995).**

This Addendum was prepared in 1994 to analyze the environmental effects of the acquisition of 17 additional parcels for the PBL alignment, facilities, station clearances, emergency access, and easements. Addendum #1 was certified in 1995. No significant environmental impacts were found and no new mitigation measures were required. Previously identified mitigation for new locations of noise impacts were included.

**(6) Addendum #2 to the Final EIR and two Supplemental EIRs (No SCH#) (Los Angeles County Metropolitan Transportation Authority, 1996a).**

This Addendum was prepared to analyze the environmental effects associated with changes proposed for the Del Mar Transportation Center (which includes the PBL Del Mar Station). Proposed changes included the redesign of the 600-space at-grade parking facility to a four-level subterranean parking structure to be located on MTA property and on a portion of the Public Storage Facility and the MTA property entitlement to the City of Pasadena to construct the subterranean parking structure. Addendum #2 was certified in 1996. No significant environmental impacts were found.

**3.3.3 PROPOSED MITIGATION MEASURES**

A report entitled, Mitigation Measure Consolidation for the Pasadena Blue Line, was prepared (June 1998) to consolidate the mitigation measures proposed in the eight environmental documents prepared to date for the proposed project. The report documents both the measures that are still applicable and those that are no longer applicable (i.e., some new measures may have been proposed in subsequent environmental documents that superseded a previous measure or a new design element may have eliminated the need for a previously recommended mitigation measure).

The report groups the measures by impact category and identifies in which CEQA document the measure was proposed. A generalized listing of the applicable measures, as identified in the Mitigation Measure Consolidation report, appears in Figure 3-2 below. A detailed list of mitigation measures can be found in the Mitigation Measure Consolidation report.

<b>FIGURE 3-4 SUMMARY OF PBL PROJECT MITIGATION MEASURES</b>	
<b>Impact Category</b>	<b>Generalized Mitigation Measures</b>
Land Use	Compensate property owners and tenants for property acquired.
	Implement parking permit programs around stations, if warranted by parking analysis findings.
	Work cooperatively with Cities and Agencies in all areas of impact.
Traffic and Circulation	Implement roadway improvements (widening, restriping, reconfiguration of turn lanes, signing, signal timing, on-street parking restrictions), ramp metering, detour and other construction plans, roadway closures, maintenance of street capacities.
Geology	Stabilize subsurface materials for below-grade construction.
	Design all facilities and structures to conform with City of LA Seismic Safety Plan and emergency evacuation plans, Uniform Bldg. Code and seismic design parameters of Structural Engineers Association of California.
	Prepare emergency preparedness and evacuation plans.
	Conduct on-site, specific engineering studies to

**FIGURE 3-4  
SUMMARY OF PBL PROJECT MITIGATION MEASURES**

<b>Impact Category</b>	<b>Generalized Mitigation Measures</b>
	identify increased potential for seismic risk.
	Conduct frequent in-grading inspections during construction.
<b>Air Quality</b>	Maintain all construction equipment to reduce emissions from heavy equipment.
	Halt all grading operations during first- and second-stage smog alerts.
	Implement other measures (twice daily watering, suppression of activities during high winds, wheelwashing, revegetation of graded areas) to reduce short-term construction emissions.
	Demonstrate compliance with SCAQMD regulations, including Regulation XIII, New Source Review, and Rule 403, fugitive dust emissions.
	Evaluate options to reduce amount of energy required for PBL operation.
	Perform asbestos inspection prior to building demolition.
<b>Biology</b>	Request permit for removal of oak trees and replace oaks removed.
	Develop and implement new landscaping plan to conform to surrounding environment.
<b>Noise and Vibration</b>	Construct sound wall barriers adjacent to sensitive land uses.
	Minimize construction noise in sensitive areas and comply with local ordinances (limit construction hours, use portable sound barriers, use properly muffled equipment and trucks).
	Place rail subgrade structure so as not to be in direct contact with building structure or foundation.
	Use continuous welded rail, soft direct fixation fasteners, wheel truing, and rail grinding as standard maintenance.
<b>Light and Glare</b>	Incorporate directional shielding of lighting fixtures, as well as safety lighting and construction equipment, and shield traction power from adjacent sensitive uses.
<b>Risk of Upset</b>	Conduct detailed geotechnical and hazardous materials investigations and comply with regulations from OSHA, SCAQMD, LAFD, and other agencies for

**FIGURE 3-4  
SUMMARY OF PBL PROJECT MITIGATION MEASURES**

<b>Impact Category</b>	<b>Generalized Mitigation Measures</b>
	handling encounter of these materials.
	Design all underground structures to include adequate ventilation to reduce potential for methane gas accumulation, and use relief wells, where necessary, to remove gas.
Population and Housing	Compensate tenants and owners fairly and adequately for relocation.
Public Services: Police	Incorporate security of LRT into design to enhance perceived and actual security of system. Should include: two-way communication, CCTV, alarm system, elimination of dark or obscured areas, protection of right-of-way, access for emergency vehicles, maximization of visibility at parking lots, installation of silent alarm.
	Incorporate "vandal-resistant" interior finishes in vehicles.
	Limit access to power substation to authorized personnel only.
Fire	Design all facilities in accordance with applicable fire codes.
	Implement fire safety measures: sufficient emergency access, smoke detectors as required by law, use of fire retardant materials, availability of fire extinguishers.
	Provide on-board communication devices to report emergencies.
Schools	Implement safety measures to ensure safety during construction and operation in vicinity of schools: separation of rail line and pedestrian rights-of-way, secure overhead power sources and power stations from unauthorized access, install "No Trespassing" signs on overhead bridges and grade separations, secure construction sites, post warning signs, phase construction to minimize conflicts with school activities, provide education program.
	Examine special requirements around Marmion/Figueroa grade separation to determine if additional lighting and/or CCTV is appropriate for security.
Electrical Consumption	Reduce consumption as part of final design with features such as: chopper rail vehicle motor speed

**FIGURE 3-4  
SUMMARY OF PBL PROJECT MITIGATION MEASURES**

<b>Impact Category</b>	<b>Generalized Mitigation Measures</b>
	controls, regenerative braking, coordination of traffic and rail signal systems, separate electrical meters at major facilities, integration of stations with adjacent land uses, use of solar power where practical, consolidation of yard vehicle movements.
<b>Utilities</b>	Coordinate relocation and in-place support of utilities.
	Prevent loss of service by notifying potentially affected consumers of construction activities.
	Obtain necessary relocation approvals.
<b>Aesthetics</b>	Design stations to be attractive and non-intrusive on surrounding areas. Use station design and building materials to emphasize low maintenance and graffiti resistance.
	Perform workshops to provide input to community.
	Commit 0.5 percent of construction budget toward arts program.
	Provide special landscaping treatments, sidewalk and street improvements, pedestrian plazas, and building materials to be consistent with Chinatown community.
<b>Recreation</b>	None required.
<b>Cultural Resources: Archaeological</b>	Follow CEQA law and guidelines if sites and/or artifacts are discovered during excavation to insure proper protection of resources. Cease earthmoving and/or grading activities if resources are unearthed.
	Use portion of granite pavers as onsite historic element as gateway to Chinatown community, donate remaining to Heritage Square Project (recommended).
	Consult with Cultural Heritage Commission to ensure consistency of design of Southwest Museum Station with existing structures.
	Conduct engineering studies to determine if structures in Old Pasadena National Register Historic District can withstand vibration from construction and operation of rail system.
	Consult with SHPO to determine data needs for undertaking of NRHP review.
	Consult with Native American Groups and other interested parties.
	Have archaeological personnel present where

**FIGURE 3-4  
SUMMARY OF PBL PROJECT MITIGATION MEASURES**

Impact Category	Generalized Mitigation Measures
	appropriate to monitor construction activities and all excavation associated with below-grade separation, Midway Yard access road, and Arroyo Seco Bridge support foundation excavation.
Historical	Prepare mitigation plan prior to any demolition at Johnson and Johnson/Merck site.
	Monitor excavation greater than 3 feet in depth at Capitol Milling Company to assure no potential resources are damaged.
	Review with and obtain approval from City of Pasadena Design and Historic Preservation Department prior to demolition or reconstruction in Old Pasadena Historic District and in Memorial Park.

**3.3.4 FUTURE ENVIRONMENTAL COMPLIANCE**

The need for any additional future environmental compliance documents and mimeos is governed by CEQA regulations. If there is a change in the conditions analyzed in the Final EIR, after the EIR has been certified but before all discretionary actions have been taken, then a subsequent EIR, a supplemental EIR or an addenda are required. The differences in the documentation are as follows:

- A subsequent EIR is prepared if the previous EIR requires *major* revisions resulting in significant impacts;
- A supplemental EIR is prepared if the previous EIR requires *minor* changes resulting in significant impacts; and
- An addendum should be prepared for minor technical changes with no significant impacts.

Both the subsequent and supplemental EIRs must be recalculated for public review, following the requirements of the original EIR. Addenda need not be circulated for public review.

The triggers for a subsequent or supplemental EIR are more specifically defined as the following, as identified in CEQA Guidelines Sec. 15162(a)(1)-(3):

- Substantial changes are proposed in the project that will require major revisions of the previous EIR due to the involvement of new significant environmental effects or a substantial increase in the severity of previously identified significant effects;
- Substantial changes occur with respect to the circumstances under which the project is undertaken, which will require major revisions of the previous EIR due to the involvement of new significant environmental effects or a substantial increase in the severity of previously identified significant effects; or
- New information of substantial importance which was not know and could not have been know with the exercise of reasonable diligence at the time the previous EIR was certified as complete shows any of the following:

Since the alignment and criteria have been “frozen” and significant changes to the project are not contemplated by the Authority, the need for supplemental EIR analysis is not foreseen..

The impact of noise and vibration, however, has been identified as an unresolved matter. Specifically at issue is the process by which noise and vibration were tested and whether the testing conducted represents a realistic operating scenario.

Noise and vibration studies were first evaluated in the environmental documentation for the proposed Pasadena Blue Line (Revised Draft EIR-Pasadena-Los Angeles Light Rail Transit Project (State Clearinghouse Number [SCH#] 88642713) and Final EIR-Pasadena-Los Angeles Light Rail Transit Project (SCH# 89082327) (LACTC, 1989, 1990). Implementation of mitigation measures (sound walls at noise sensitive areas and compliance of construction contractors with local noise ordinances) were found to reduce noise impacts to less than significant levels.

Subsequent to the preparation of the above documents, an Administrative Draft Addendum to the project’s EIR and SEIRs was initiated but not completed. To be completed for this Addendum was the noise and vibration section.

MTA commissioned a Noise and Vibration Technical Report to update impacts and mitigation measures for the entire project, based on actual field measurements of the Long Beach Blue Line. Previous analyses had used the Portland Light Rail vehicle in the modeling of noise and vibration. The initial studies conducted on the Long Beach Blue Line produced higher vibration levels than anticipated and above those used from the Portland Light Rail data. As a result of the preliminary findings, it was determined that additional sound walls, floating slab, and other track isolation may be required to mitigate these impacts. These additional measures were not included in the current Camera Ready design packages. Incorporating these measures into the project design would add an estimated \$8 to \$12 million in coats to the project. This would be a scope change.

The previous field testing of the Long Beach Blue Line may not represent an accurate and realistic train operating scenario by which to measure the potential for noise and vibration impacts. The portion of the line used in the testing is one of the oldest segments in the system and is a non-revenue line. The equipment used in the testing was not representative of the vehicles that would operate on the Pasadena Blue Line (i.e., refurbished P865's). The combination of these two factors greatly contributed to the finding of an unavoidable significant adverse vibration impact. The use of more refined noise and vibration criteria, and the application of the criteria to more realistic scenarios will potentially reduce the significance of the noise and vibration impacts. The expected results will be similar to the initial measures used for evaluation. The updated testing will be a priority action in the restart of the project.



## **4.0 CONSTRUCTION STRATEGY ALTERNATIVES**

### **4.1 OVERVIEW**

In reviewing the cost elements and revenue sources for the MBL segment, it is important that the impact of the project delivery strategy be incorporated. Project delivery and procurement options will have a direct impact on the duration of the construction activity and the organizational needs of the Authority. There are many lessons that can be learned from delivery programs of rapid transit projects throughout the country, and applied to the MBL project. In addition, the most recent experience of the Transportation Corridor Agency in Orange County has some relevant management successes that may be applied to this project.

Rapid transit projects have three basic characteristics that have an impact on the procurement strategy. First, each project has a finite life that means that the organization is temporary in nature, lasting only as long as the project construction schedule. The second characteristic is the focus on quality and the management of the project to ensure that the product meets the public's expectations. Finally, cost management is a critical function that, regardless of the project's unique and complex elements, is the responsibility of all project staff and contractors. Under the right circumstances, these characteristics help build and unify the team that delivers the project.

There has been much discussion centered on which project delivery method would best achieve the goals of the Authority. To date, the project has progressed under the conventional (Design/Bid/Build) approach that MTA has used for all rail projects. Recent discussion has centered on the Design/Build method as an alternative. These approaches to project delivery are summarized in the following sections. The advantages and disadvantages of each are noted for evaluation purposes.

### **4.2 CONVENTIONAL (DESIGN-BID-BUILD) APPROACH**

- (1) The traditional project delivery system for U.S. transit projects typically involves the following steps:
- (2) The agency contracts with a design firm or series of design firms to provide "complete" engineering drawings;
- (3) The agency then solicits bids from construction contractors and equipment suppliers to carry out the project; and

The agency then awards construction contracts to the best qualified, lowest price bidder and through a contract with a construction management firm oversees the work.

This approach is used by MTA and was underway in the MBL project when work was suspended. In this approach, the agency (in this project MTA) is directly responsible for all design and construction decisions. The MTA's project plan for MBL itemized more than 16 construction contracts and multiple equipment supply contracts to deliver the project that had been designed by multiple section designers. Management of these contracts is the responsibility of the agency.

There are various opinions in the transit industry concerning the advantages and disadvantages of this approach. The Federal Transit Administration (FTA) now requires each transit project (that is federally funded) have a project oversight consultant (PMOC) monitoring the progress and reporting to the FTA regional office. The complex nature of these projects requires considerable management expertise on the part of the agency and a sizeable staff to manage the volume of contracts. There are number of advantages in this approach; however, that are highlighted below.

#### **4.2.1 Advantages:**

- **Familiarity:** This process is well known and understood by all parties (designers, contractors, suppliers). The local industry is organized to respond to the continuation of work on the project.
- **Early Construction Start:** MTA indicates that a number of contract packages (specifically the line sections in Los Angeles and Pasadena) are 100% complete and bid packages could be issued immediately for this work.
- **Multiple Contracts:** The large number of contracts for construction and the completion of design will ensure that a large number of firms will be involved in the project.
- **Agency Control:** The Board of Directors would have direct control over the every aspect of the project on a day-to-day basis. This ranges from contract award to resolution of community construction issues.

In addition to these advantages of the conventional approach, there are some disadvantages to be considered. They are discussed in the following section.

#### **4.2.2 Disadvantages:**

- **Schedule:** Based on current estimates, the Revenue Operations Date (ROD) for the project will slip from July 2001 to July 2004. This new date assumes that the remobilization of the designers' teams can be accomplished by assuming the contracts

that MTA has with these firms. This schedule re-alignment will have cost impacts due to inflation and restart.

- **Multiple Contracts:** Notwithstanding any advantages gained by having multiple contracts, the agency will have to have the staff to manage these contracts, monitor contractors for compliance and pay contractors invoices. A larger administrative burden would be assumed by the Authority.
- **Cost Risk:** It is difficult to predict how much time and cost are involved in the restart of the design process. Some firms do not exist any more and others will have reassigned key personnel. On the construction side, the interface between contractors is always an area where cost risk is increased. Although the number of contractors could be reduced from 16 to 7, this risk and the Authority's liability for claims is significant.
- **Assumption of MTA's liabilities:** A broad interpretation of SB-1847 may permit the Authority to assume the MTA's place in the contracts with design teams. However, there are a number of significant claims from these designers that MTA is dealing with. The uncoupling of the MTA's responsibilities from further work by these teams and the protection of the Authority from costs that MTA may bear have been defined as potential schedule and cost risks.

#### **4.3 DESIGN-BUILD APPROACH**

In recent years, an effort has been made in the transit industry to find ways to reduce project costs and to deliver the project in less time. The examination of construction practices in other industry groups pointed to a Design-Build as an option to be considered. The Federal Transit Administration (FTA) has initiated a study and demonstration program to further explore these benefits. A number of transit agencies have responded to FTA's interest in the benefits of the Design-Build approach.

Design-Build is a project delivery system where a single contractor (or teams) performs both design and construction activities under a competitively procured contract with the agency. The procurement process in the D/B projects, to date, has been very thorough and deliberate. Qualified firms and teams are evaluated both on their proposed fixed price and on their experience in project delivery.

The agency then has one point of responsibility for all work for the complete job. It is designed to allocate project risks and controls in new ways, in order to utilize private sector efficiencies and expedite the project's delivery. Throughout the project the agency exercises approval authority at major milestones for the contractor's design and construction plans. In many cases the agency also assumes responsibility for some project functions real estate acquisitions and community relations, for example.

There are many cases now throughout the transit industry where this approach has been applied to successfully deliver a project. For example, the Baltimore Central Light Rail Extension is a project similar to MBL, where the project was completed in 3 years and within the budget.

Our review of the project history shows that the extension project was delivered faster and at a lower cost than the first phase (built using a conventional approach). The second interesting finding was that claims under the D/B project were significantly smaller in number and value than the previous project. New projects in New Jersey Transit, BART, San Juan Puerto Rico, and New York's JFK Access Project all utilize this approach for construction. Similarly, the Transportation Corridor Agency (TCA) in Orange County has employed this project delivery strategy to successfully complete their toll road projects.

The experience of these transit projects has identified some distinct advantages of this approach. Summarized below are some of the more important advantages.

#### 4.3.1 Advantages:

- **Schedule and Cost:** The inherent cost and schedule advantages are due to elimination of design effort redundancies which typically exist between designer and contractor. Lead times were reduced by allowing construction to begin in stages of the project prior to completion of the entire design. Significant schedule savings of a minimum of one (1) year have been documented.
- **Small Agency Staff:** The assumption of the major administrative functions by the D/B contractor results in a smaller agency staff that manages the contract and the relationship with the contractor.
- **Risk Allocation:** The contractor, in bidding a fixed price for the D/B work, assumes a certain amount of cost risk based on their assessment of the project including the state of the current design drawings. The management of costs is placed squarely at the point where the largest risk exposure exists – between designer and construction contractor.

There are disadvantages of the D/B approach that are related to the transfer of design and construction authority to a private contractor. These disadvantages can be summarized in the following sections:

#### 4.3.2 Disadvantages:

- **Agency Control:** In selecting a single contractor, the Authority would be transferring many responsibilities to the private firm. This reduces the direct day-to-day role the Authority plays in the project. Changes in scope or

schedule, that are initiated by the Authority, after the contract is signed translates into change orders and additional cost.

- **Start-up Preparations:** An assessment of current work level and the preparation of contract documents that will form the basis of the bid package will take some time. This predatory work is critical to the success of the D/B approach from the Authority's point of view. This start-up time delays the initial construction activity.
- **Agency Staff:** The relationship between the agency and the contractor is very different than a traditional construction project. Therefore, the staff of the agency must be familiar with and able to manage in this environment. Recruiting this staff and consultant teams may be more difficult than in another approach.

#### **4.4 HYBRID APPROACH**

A combination of both methods produces a Hybrid project delivery approach. In this case, the agency evaluates the contract packages and develops a strategy that utilizes the most effective contract bundling and contracting strategy. The issues to consider in the repackaging and contracting evaluation include the scope of each package, the expected cost, the schedule implications, and the status of the design.

The MTA Board had directed the staff to utilize such an approach just prior to suspension. The plan was to have two stations, and the Yards and Shops delivered through Design-Build contracts. The major part of the project was still utilizing a conventional project delivery approach.

There are obvious advantages in continuing the two approaches, particularly with a project that has progressed through the design phase. These advantages are summarized below.

##### **4.4.1 Advantages:**

- **Early Start:** The completed design packages could be advertised immediately and work could begin on these parts of the project.
- **Schedule and Budget:** Some of the potential schedule and cost savings that are attributed to the D/B process may be realized.
- **MTA Design Teams:** This approach would not reactivate the design teams that were under contract to MTA. The design packages that are complete may have "design during construction" issues that may be handled by the Construction Manager. The packages that are now D/B will utilize existing drawings for reference purposes.

The disadvantages of this approach are limited but are significantly impacted by the state of the "completed" design packages. These disadvantages include the following factors.

**4.4.2 Disadvantages:**

- **State of Design:** Although MTA's designers have submitted 100% complete design drawings, there is no consensus with the Cities that they are complete. Therefore, additional design may be necessary. This would involve reactivating the design teams.
- **Design During Construction:** If construction was to be awarded based on the completed packages, the liability of original designers and the Construction Manager may be in dispute. The transfer of this responsibility without altering liability levels for each party would need to be clarified.
- **Agency Staff:** In this approach, the Authority would have to maintain a larger staff to manage more contracts and the legal interface between MTA and the design firms that are completing the work.

**4.5 SUMMARY**

The study of the alternatives that could be considered by the Board for completion of the project indicates that there are multiple solutions. The transit industry has been attempting to find ways to improve the performance of its capital improvement programs both in terms of schedule and cost management.

## **5.0 RECOMMENDED PROCUREMENT STRATEGY**

### **5.1 IMPLEMENTATION**

In the analysis of the procurement options available to the Authority, there were four significant factors that were identified. These are:

- Status of design packages;
- Development of the Authority;
- Schedule Implications; and
- Cost Savings.

The combination of these factors has dramatically altered the assessment of the viable alternatives and lead to the recommendation that the Authority proceed with a Design-Build (D/B) strategy for project delivery. This will be the most cost-effective means to build the MBL project within the proposed budget.

In summary, the specific factors that had a significant impact in the analysis include the following:

- **Status of design packages:** notwithstanding the completion of drawings by MTA's consultants, the Cities report that there are major issues to be additional in the packages. A review of one (of the four) 100% complete packages indicates that it may be no more than 85% complete based on the outstanding issues raised in the City comments.

It would not be possible to put these drawings into a bid package for a conventional procurement without substantial work by the original design team. This would mean assumption of the MTA contracts and the resolution of the legal liability issues for the drawings. The Authority could then become a party to the outstanding claims between MTA and its contractors.

- **Development of the Authority:** As a new agency, the Authority does not have an established organization structure and staffing to support large project. The transit market is very active throughout the country and, therefore, the recruitment of sufficient staff may take longer than desired. On the other hand, the TCA in Orange County has been very successful with a small highly qualified technical management team that directs a D/B contractor.
- **Schedule Implications:** The Metro Blue Line project is included in the State's Implementation Plan for air quality for the South Coast Air Basin. The strategies in this plan are commitments made by the region and the State to reduce regional emission levels and improve air quality. This commitment

(for the Pasadena Blue Line) is to be in operation by 2003. This is a two edged around MTA and the Bus riders will stay put on move bases It's less/costly.

The analysis of the project delivery options indicates that only the Design-Build alternative can maintain this schedule. Figure 5-1 illustrates the schedule for the MBL project utilizing the D/B strategy.

- **Cost Savings:** In order to develop a reasonable project budget, it is necessary to maximize the cost savings that can be achieved through the D/B process. The consolidation of the design and construction activities reduces overlapping assignments (and costs), and eliminates the mobilization efforts of multiple firms that were involved previously. Baltimore reduced costs by approximately 12% per route mile by using this approach.

The Design-Build procurement strategy will be successful if the Authority recruits professional staff that are knowledgeable and familiar with the approach and then maintains an active partnership with the contractor. The Authority's role in addition to the competitive procurement of the D/B contractor and the approval of final plans will be to maintain a presence in the field for construction management, focused on safety, quality, and community relations. Figure 5-2 below illustrates these relationships.

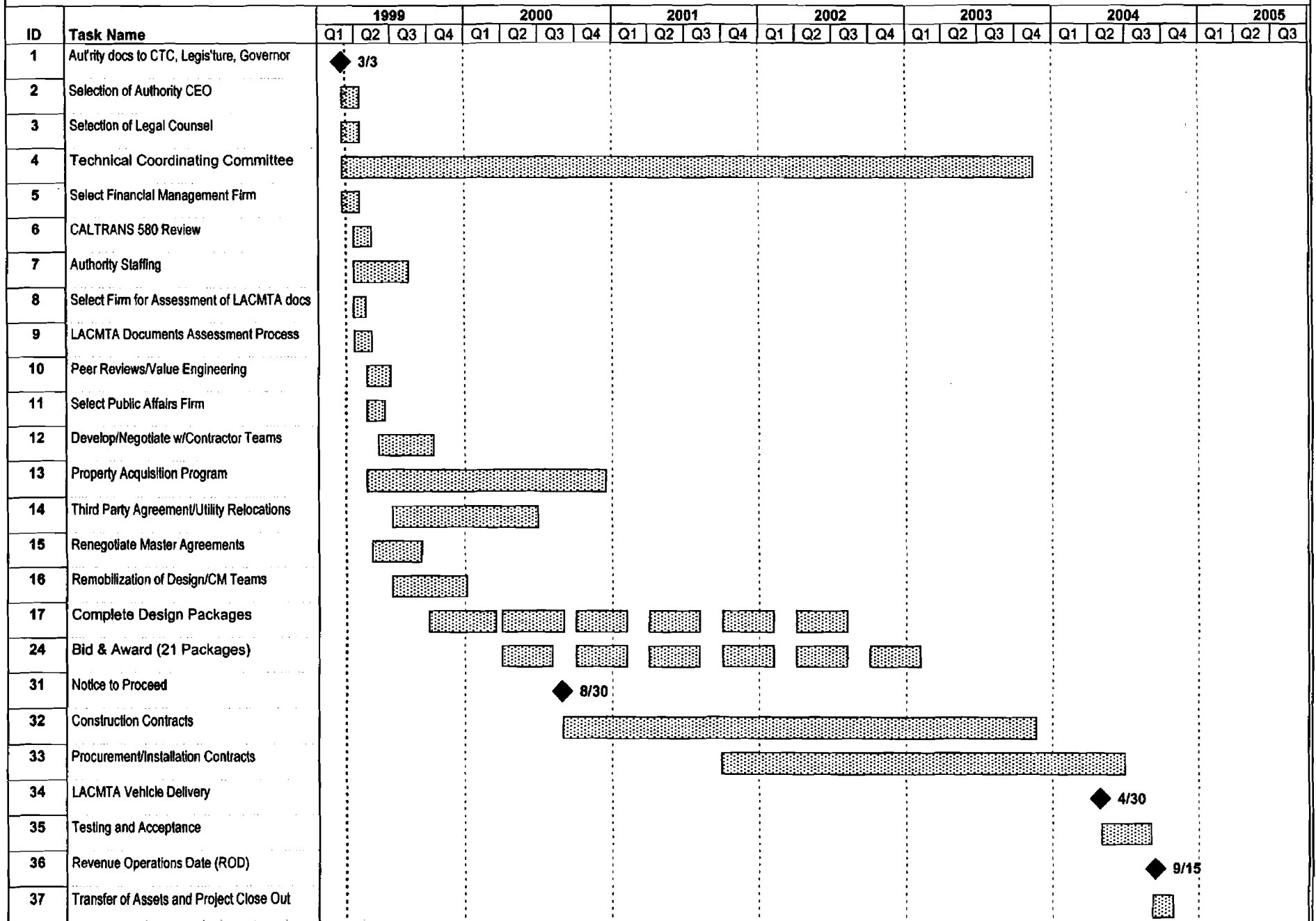
## **5.2 ADVANTAGES OF DESIGN/BUILD CONTRACTING**

The design/build method has been widely used in the U.S. over recent decades, and is gaining acceptance in the transit community. In contrast to the traditional procurement method, design/build contracting places significantly more responsibility on a prime contractor. The consolidation of responsibilities under a design/build contract brings a number of benefits to projects suited to this approach.

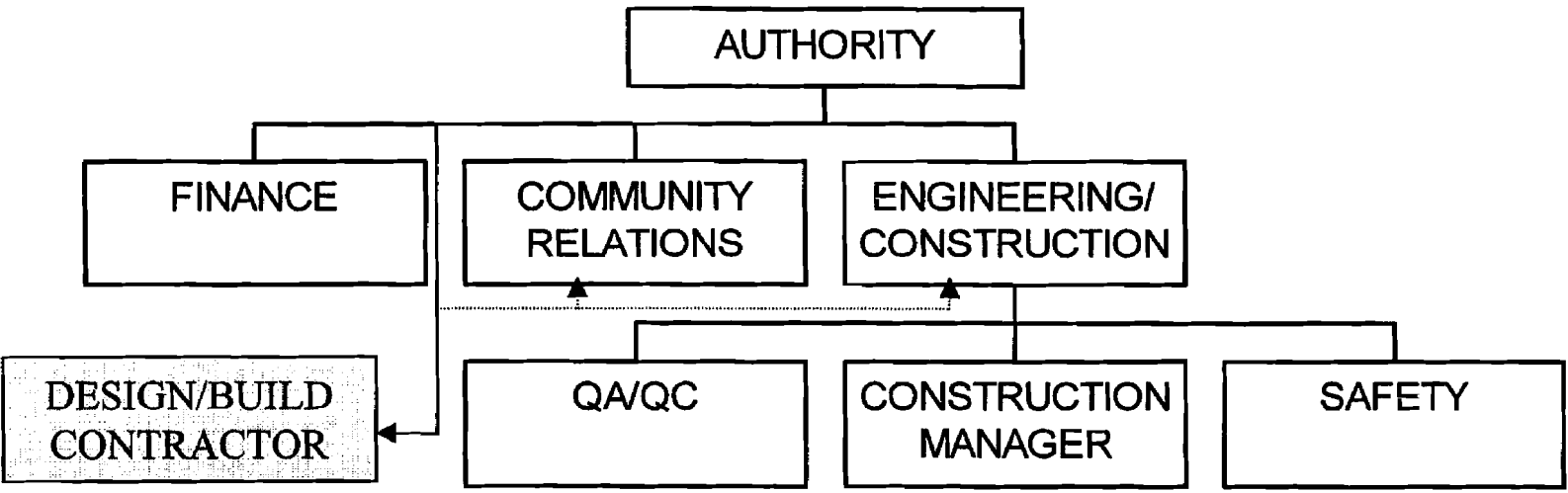
Consolidation of responsibility for design and construction allows activities which would be performed sequentially under a traditional contracting approach to be performed instead in parallel. The primary compression arises from the contractor's ability to progress the design in the same sequence that the work will be constructed (Exhibit 3-3). This allows construction work to proceed as soon as each design package is completed. Maximum schedule compression is possible if the design always stays ahead of the construction, or if the contractor is able to work around any instances where design is delayed.



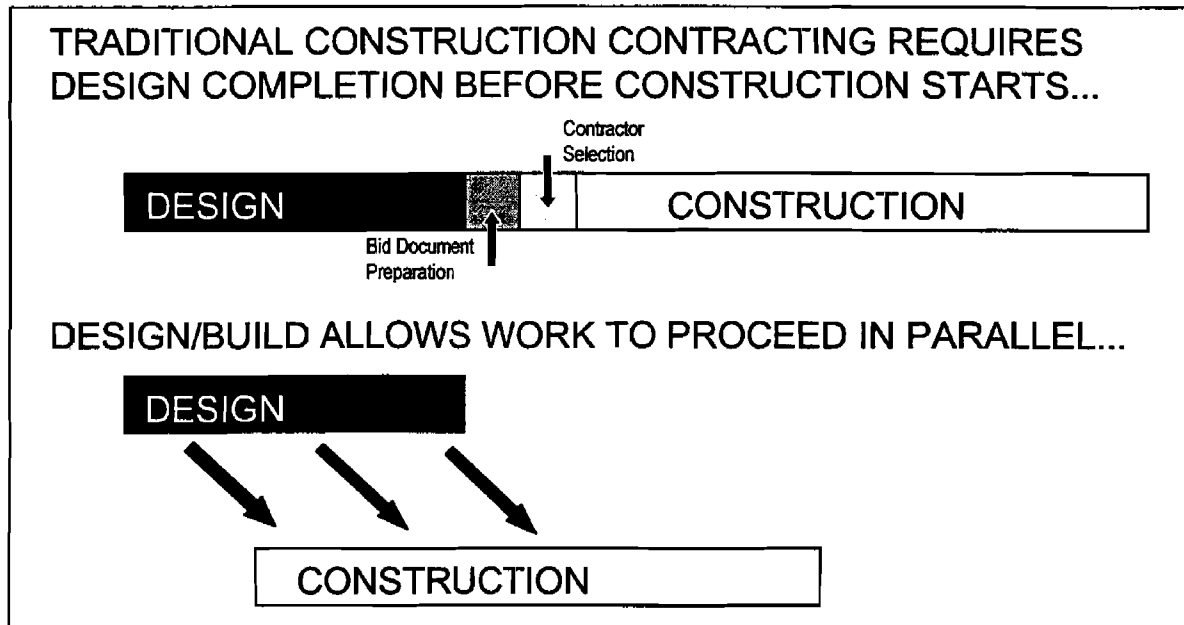
**FIGURE 5-1  
Conventional Design/Bid/Build Method  
Los Angeles to Pasadena Metro Blue Line Implementation Schedule**



**FIGURE 5.2  
ORGANIZATIONAL ARRANGEMENTS  
DURING CONSTRUCTION**



**FIGURE 5-3  
Design/Build Schedule Compression**



In addition to sequencing final design work to lead construction, further schedule compression can occur in two ways using the design/build method. First, it may be possible for preliminary construction work to proceed on the basis of a partially completed design, as long as there is sufficient certainty that key information will not be changed in the final design. Second, the procurement of long lead items can follow the same pattern, and can be based on partially completed designs. For example, the Yards and Shops building's final architectural details do not need to be completed to purchase the structural steel. Advancement of procurement also advances the date the related construction sequence can begin, resulting in further schedule compression.

The schedule savings can be dramatic. For the New Jersey Transit Hudson-Bergen project, the calculated schedule savings achieved by switching to the Design/Build DBOM approach for design and construction of the initial 9.5 mile segment range from over three years to over seven years. In either event, the resulting cost savings were substantial.

The primary cost saving from schedule compression is the reduction in daily costs. These costs are generically called overhead costs such as the owner's and contractor's administrative and management efforts, office and trailer rentals, insurance, etc. There are also indirect cost benefits, such as reduced escalation costs and diminished inflation effects.

**METRO BLUE LINE  
LIGHT RAIL PROGRAM**

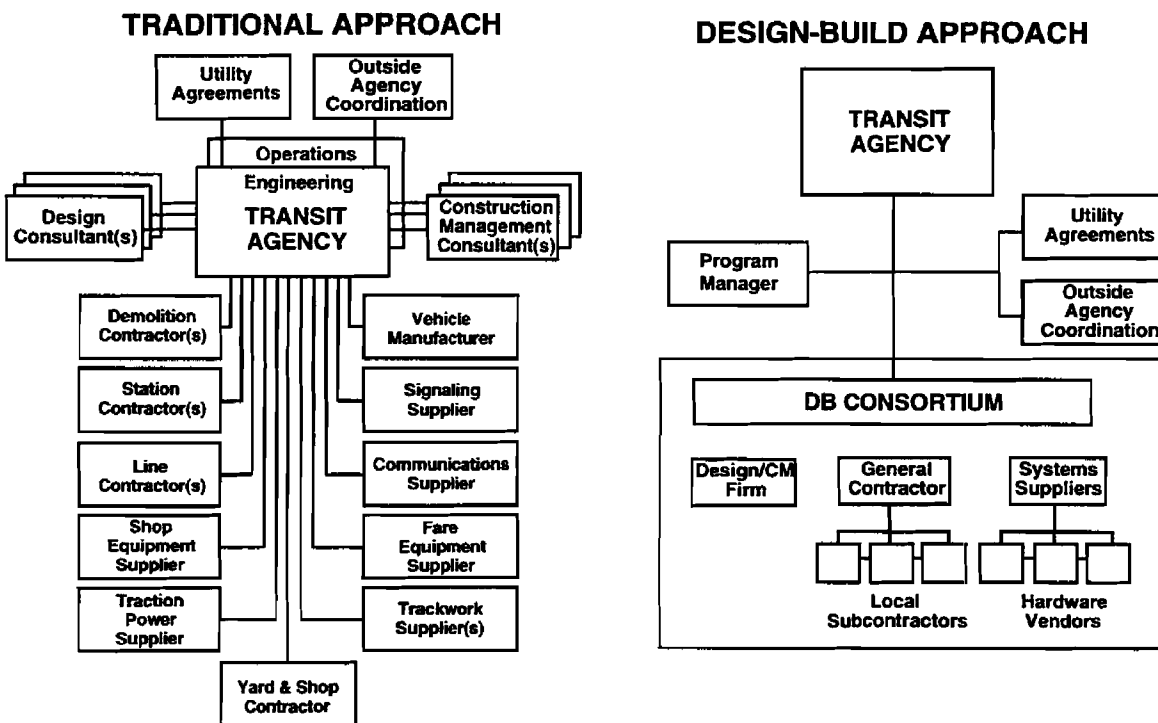
**PROJECT  
IMPLEMENTATION PLAN**

Under the design/build method, the Authority will contract with one entity which takes responsibility for all work necessary to design and construct the project, by a set date, for a lump sum bid price. The engineering and design work that has been done to define the project, and to develop mandatory requirements will be used by the contractor which must be delivered as specified. Other design and engineering work will be provided as 'reference' material, available for use, but not binding on the contractor. The Authority's liability is limited in this way.

This structure packages a number of responsibilities which would otherwise have been distributed among some 16 separate contracts. In addition, the design/build contractor will be required to accept certain risks which correspond to the overall responsibility they have taken.

From the Authority's perspective, the consolidation of responsibility creates a single point of contact for all matters concerning the design and construction as shown in Figure 5-4 below. The number of interfaces and contacts needed to manage the project is greatly reduced, as a number of functions which would have been performed by separate contractors are performed by subcontractors to the design/build contractor, and do not require any direct input from the Authority.

**FIGURE 5.4  
Comparison of Traditional and DB Organization**



The consolidation of functions within the design/build contractor moves many of the Authority's management and coordination responsibilities into the contractor's role. In addition, when the design/build contract utilizes the mandatory/reference documents and performance specification methods described below, the Authority's approvals will be confined to areas of work that are considered critical. However, inspection of the work and management oversight of the contractor must still be performed.

The consolidation of responsibilities reduces conflict in a number of ways, especially from the perspective of the Authority. With one entity responsible for both design and construction, closer working integration is possible, and discrepancies and errors can be worked through informally to get the desired results. The design/build contractor has ultimate responsibility for ensuring that the project performs as required, and therefore for integrating all areas of design work. There may still be conflict as this process proceeds, but as all involved are working toward the same goal, they have an incentive to bring the matter to resolution internally.

The incentive for the contractor's team to resolve matters internally is reinforced by the greatly reduced opportunities for recourse against the Authority. Placing the designer and constructors on the same team eliminates a common area of problems in traditional projects: claims arising out of disputes between the designer and contractor(s). Unlike a traditional contract, no claims can be made for problems with the design because the contractor's team includes the design firm.

The consolidation of responsibilities under the design/build method can reduce the number of change order requests submitted by the contractor, especially if the design/build contract uses the mandatory/reference documents and performance specification methods. In general, every contractor-initiated change order request is premised on a foundational assertion that something they are not responsible for controlling has had a negative impact on their performance. Generally, a design/build contract places more 'ultimate' responsibility on the contractor, and thus reduces the categories under which they would be entitled to change orders.

In addition, the structure places the contractor in a better position to manage certain areas of risk traditionally borne by the Authority. As discussed above, design integration is a risk appropriate for the design/build contractor. It is also appropriate for the design/build contractor to be responsible for the coordination of all subcontractors, and of all utility relocation, subsurface condition and hazardous materials redemption work. The security of the site, and responsibility for overall construction safety should also be the responsibility of the design/build contractor.

In addition to the risks the contractor can manage directly, the design/build structure also allows some risk areas to be simplified by addressing them on a project-wide basis, instead of incident by incident, as would likely be the case on a traditional project with a number of separate contractors

The level of contractor requested change orders has been low in the design/build rail projects implemented to date. The \$106M Baltimore extension project is on budget, with six change orders. The \$480M New Jersey Transit Hudson-Bergen project is more than 50% complete, and the contractor has presented nine change order requests, mostly for small amounts. The two major change order requests (in the \$200,000 to \$300,000 range) have been rejected under the contract terms.

Under a design/build contract, the contractor is typically given some degree of design latitude. The design work that has been done defines the project. This design work is then provided to the contractor as a basis for the development of final design. The design work ranges from 30% level designs to work at a 90%-100% complete level.

The design work should be provided on a 'reference' basis. The reference materials are available for the contractor's benefit, but are not binding. This is done in part to encourage value engineering during the bidding process. It also allows the contractor to use its choice of means and methods to accomplish the work, which may reduce bid prices. However, the requirements of the environmental mitigation actions will be mandatory in the contractual documents.

Experience has shown that the Authority will benefit from providing further definition of critical project elements, such as the environmental mitigation measures. Incomplete definition of these elements may increase the risk premium in the bid prices. It is important to recognize that the design, which was "frozen" by MTA many months ago, must remain in that status as the contractor completes design efforts.

The project will require a reintroduction to the communities through which it will run. A series of neighborhood meetings will be part of an overall Communications Plan managed by the Authority, that will guide a proactive public awareness program. This outreach program will not be designed to revisit the "frozen" design of the project, that resulted from MTA's outreach and environmental documentation programs. At this time, the purpose of the outreach effort will be to clarify the project scope, neighborhood integration, station development and access plans, and construction schedules. The Communications Plan will describe the techniques that will be used to protect the neighborhood from noise, for example, both during construction and operations

### **5.3 BUDGET AND SCHEDULE**

Based on a number of studies of the budget and schedule there are several cost savings measures that have been identified. These range in size from in excess of \$40 million in engineering and management costs to \$200,000 in pre-revenue testing. All potential savings will be confirmed in a Value Engineering exercise planned as the first task following approval of the Financial Plan.

**METRO BLUE LINE  
LIGHT RAIL PROGRAM**

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In summary, the budget for the project has been set at \$683.7 million. Figure 5-5 summarizes the major elements of project budget. This budget represents a reduction of \$120 million from MTA's approved project budget, and can only be achieved through the contracting approach outlined above.

To test the reasonableness of this revised estimate, the light rail projects currently underway in Sacramento and San Jose were reviewed. These two projects, employ similar technology and have conditions that are similar to those in the MBL project. Primarily, at grade construction with some grade separation, these projects are being built for \$22-\$40 million per line mile. The new budget for the MBL project equates to \$49 million per mile. Less than half of this value is committed through real estate acquisition, bridge construction and design fees. Examining other light rail projects indicates that the MBL budget will be the most expensive project per mile, significantly above the average cost per mile of \$17 million.

**Figure 5-5**

<b>METRO BLUE LINE BUDGET</b>	
<b>(0.00)</b>	
CONSTRUCTION	\$355,922
PROFESSIONAL SERVICES	214,166
REAL ESTATE	47,395
UTILITIES	15,400
SPECIAL PROGRAMS	2,201
CONTINGENCY	48,457
PROJECT REVENUE	<u>- 198</u>
TOTAL	\$683,739

The schedule for the project has been revised to reflect the lengthy delays caused by MTA's suspension actions and the expected recovery actions afforded by the D/B strategy. Figure 5-6 below displays the Project Schedule, with a Revenue Operations Date (ROD) in mid 2003.





#### **5.4 ORGANIZATION**

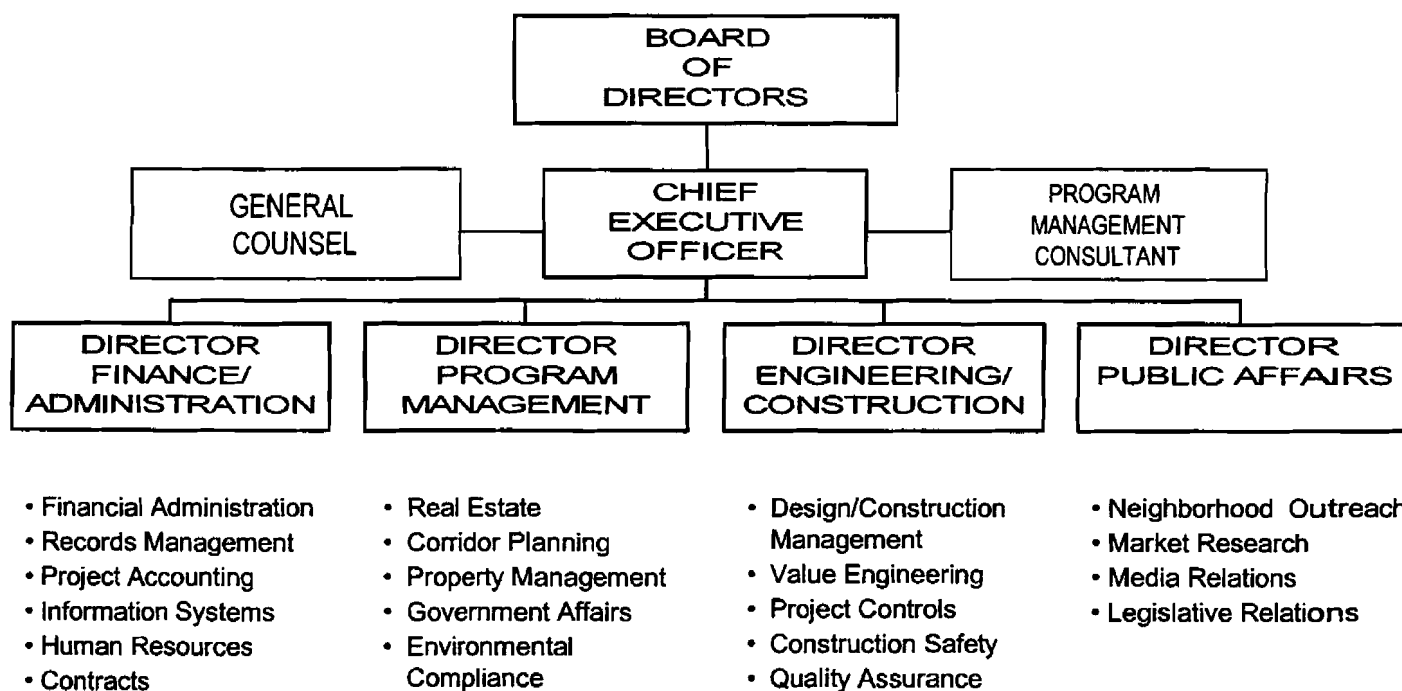
The Authority should have a small highly experienced staff that manages the Design-Build contractor and conducts the studies of the extension to Claremont. Under the direction of the Board and the Chief Executive Officer (CEO), there are four primary functional areas headed by a senior manager. Figure 5-7 shows these functional areas and the General Counsel for the Authority. The primary functions of the staff will be:

- Finance and Administration;
- Program Management;
- Engineering and Construction; and
- Public Affairs.

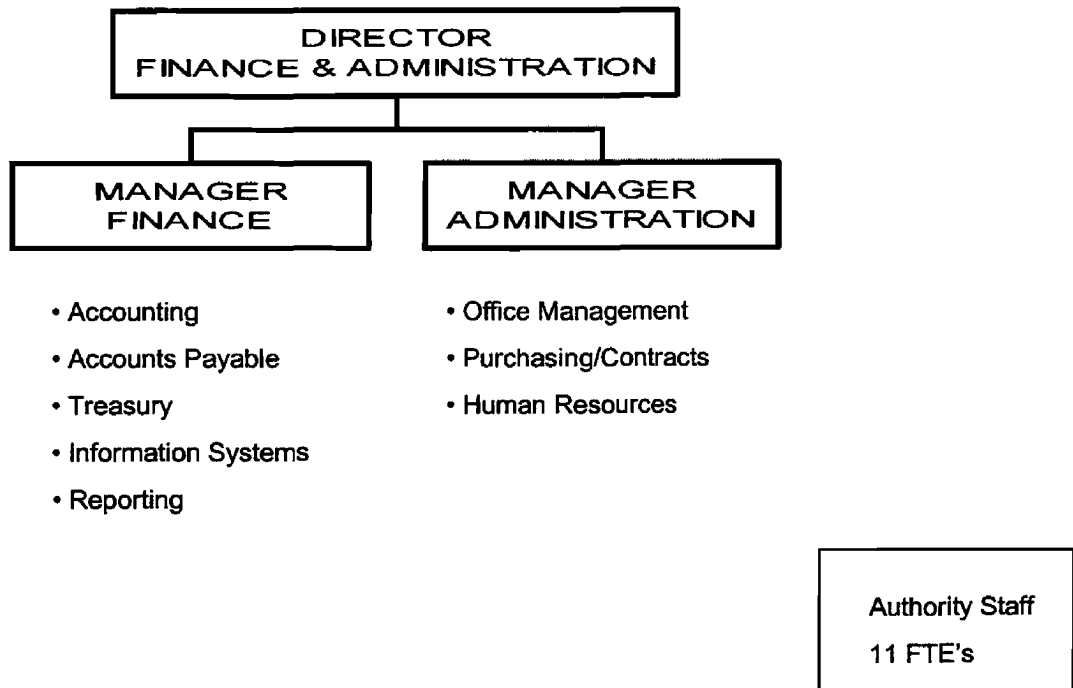
The staff in each functional area should be small in number (approximately 26) since the agency has such a discrete term of service. The staff services will be augmented with consultants to provide specialty functions on an as needed basis. Figures 5-8-5-11 below show the organization structure of each Division within the Authority

In the short term, as the CEO becomes familiar with the project and recruits management staff, the Authority will utilize the services of a Program Management Consultant (PMC) to staff the functional areas of responsibility. The PMC will provide the necessary staff in all areas to allow the Authority to move forward aggressively with its program.

**FIGURE 5-7  
ORGANIZATION CHART**



**FIGURE 5-8  
ORGANIZATION CHART  
FINANCE AND ADMINISTRATION DIVISION**



**FIGURE 5-9  
ORGANIZATION CHART  
PROGRAM MANAGEMENT DIVISION**

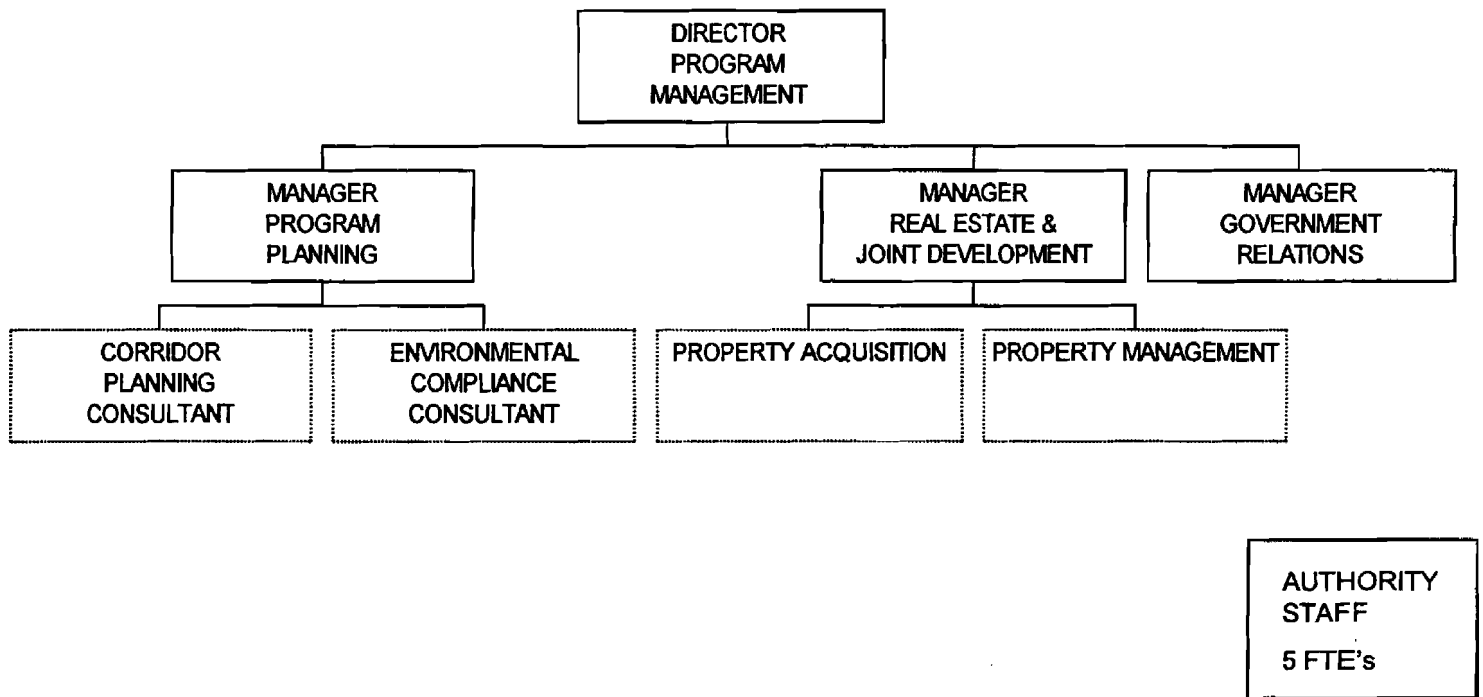
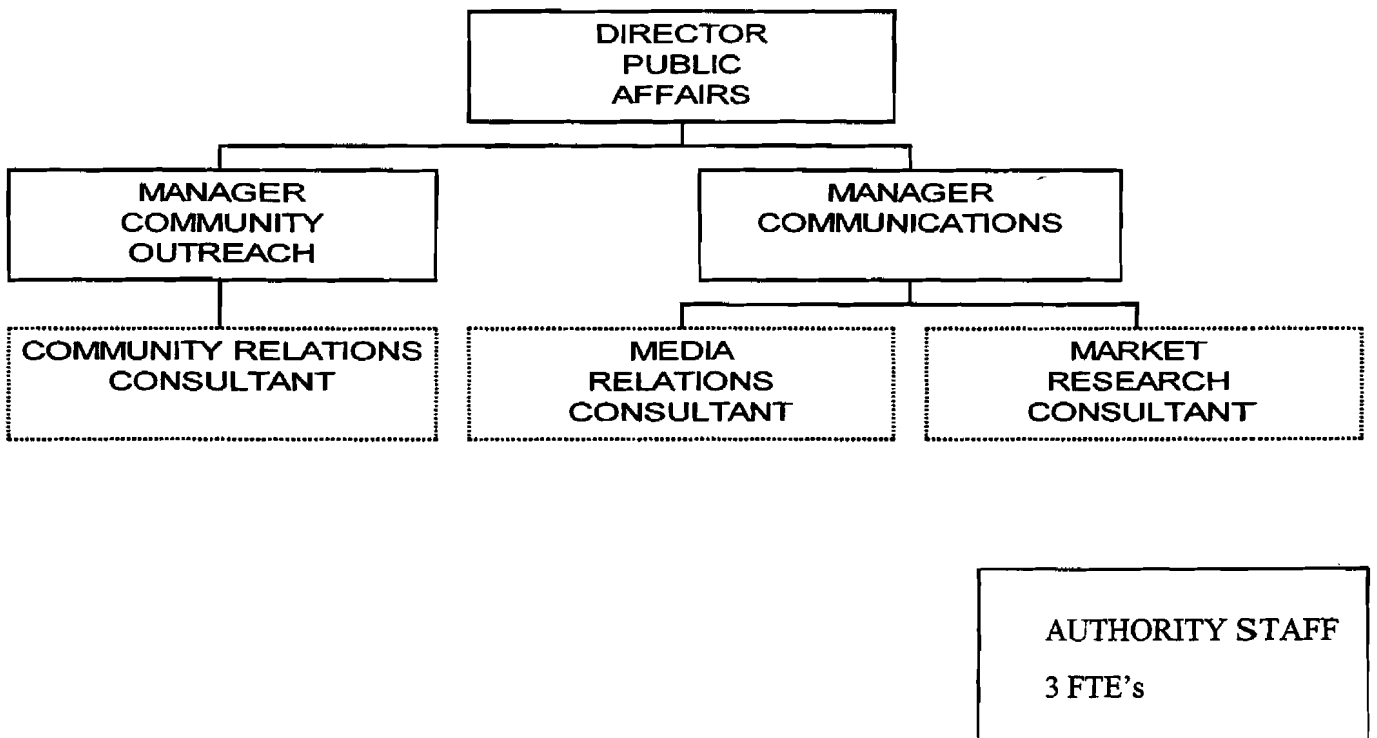
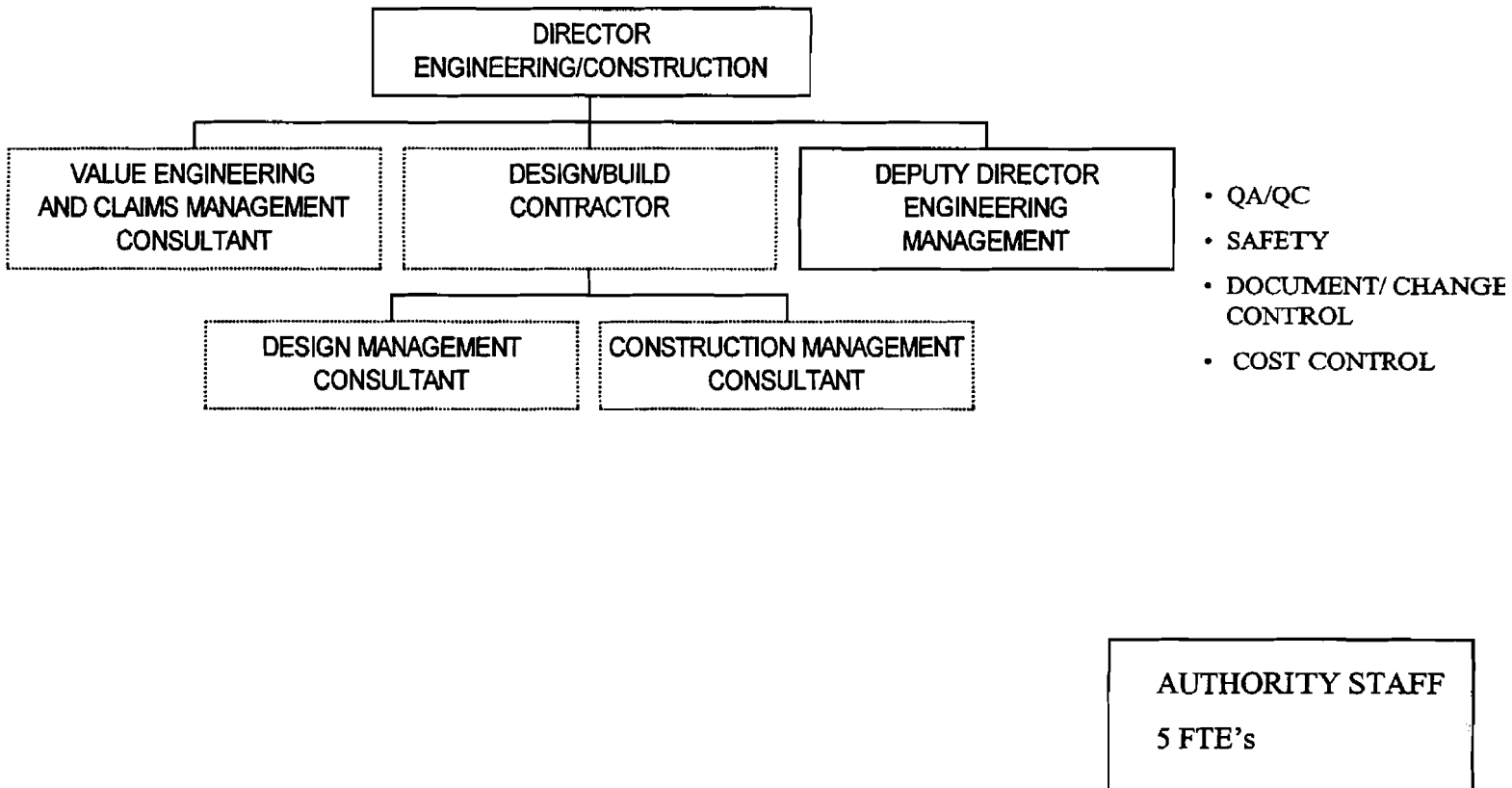


FIGURE 5-10  
ORGANIZATION CHART  
PUBLIC AFFAIRS DIVISION



**FIGURE 5-11  
ORGANIZATION CHART  
ENGINEERING & CONSTRUCTION DIVISION**



**6.0 IMPLEMENTATION**

**6.1 POLICY DIRECTION**

The Board's approval of the Project Implementation Plan (PIP) and the approval of the Financial Plan, the PMP and the PIP by the CTC will put in motion a number of actions that restart the project. These actions range from staffing the Authority to preparing the Design-Build procurement documents. Inherent in this PIP are policy directions to move forward on all fronts simultaneously. Figure 6-1 below highlights the specific policies that are being authorized in the PIP.

Using a Design-Build construction procurement strategy, the project can be delivered faster and more economically than under the traditional methods used by MTA. The new contracting method (Design-Build) will result in significant changes in scope to most consultant contracts that MTA has suspended. Changing the scope of work of these contracts will be in conflict with the Authority's procurement procedures due to the significant change in direction. Therefore, the design and engineering contracts, for example, will not be assumed by the Authority. Only those contracts where the MTA's scope of services can reasonably be applied to the Authority's requirement will the contract responsibility be transferred. The environmental compliance contract and the artists contracts are two such examples.

**Figure 6-1  
POLICY DIRECTIONS FROM PIP**

<u>POLICY</u>	<u>DIRECTION</u>
1. ORGANIZATION	Agency will have small staff (25±FTE's), Highly qualified and experienced professionals.
2. CONSTRUCTION STRATEGY	Design-Build approach will be used
3. BUDGET	In accordance with the Financial Plan, a new budget of \$683.7 million is set for the project, pending outcome of VE studies.
4. SCHEDULE	A revised schedule is approved pending a D/B contract delivery starting, with a revenue operations date mid 2003.
5. MTA CONTRACTS	With the exception of those contracts that have virtually the same scope of work, the MTA contracts will not be assumed by the Authority.

The board should revisit the PIP and the policy directions that flow from it on a regular basis. A quarterly review of progress and budget is recommended as the appropriate interval to evaluate the project's direction and to take steps necessary to remain on course.

**6.2 NEXT STEPS**

In order to bring the project from its suspended state to active status, a series of specific actions are proposed. These actions are summarized in Figure 6-2 as the Next Steps. Essentially, they include staffing the Authority, developing an administrative budget, conducting a Value Engineering study, and initiating the D/B contract documents. First, however, it is critical that the Authority get through the SB-580 review process by CALTRANS.

The SB-580 review will involve a financial and program management assessment of the Authority's plans for carrying out the project. To this end, a significant part of the review includes the financial accounting, initial control, and project controls functions that are specified in the PMP. To assist in the implementation of these systems, a Financial Management Consultant has been included in the Project Development Budget.

**Figure 6-2  
NEXT STEPS FROM P.I.P.**

Functional Area	Action	Timing
PERSONNEL	Recruit CEO	2 <sup>nd</sup> Qtr '99
	Begin to Recruit Staff	2 <sup>nd</sup> Qtr '99
ENGINEERING/ CONSTRUCTION	Conduct Value Engineering	2 <sup>nd</sup> Qtr '99
	Renegotiate Master Agreements	2 <sup>nd</sup> Qtr '99
	Utility Relocations	2 <sup>nd</sup> Qtr '99
PROGRAM MANAGEMENT	Select Program Management Consultant	2 <sup>nd</sup> Qtr '99
	Property Acquisition Program	2 <sup>nd</sup> Qtr '99
	Property Management Program	2 <sup>nd</sup> Qtr '99
FINANCCE/ ADMINISTRATION	Select Firm to develop financial report for SB-580	1 <sup>st</sup> Qtr '99
	Review	2 <sup>nd</sup> Qtr '99
	Document Assessment Process with MTA Prepare Budget-Authority Administration	1 <sup>st</sup> Qtr '99
LEGAL	Select General Counsel	2 <sup>nd</sup> Qtr '99
	Select Counsel to Assist in D/B Documents	2 <sup>nd</sup> Qtr '99



Once on-board, the CEO will want to discuss the budget (and the other plans) with the Board. In the interim, this will be the operating plan for the remainder of the fiscal year. Once approved, the budget will guide expenditures for Value Engineering, for example, and other immediate project activities.

The immediate action plan listed in Figure 6-2 is intended to jump start the project activities and raise the public awareness of the planned transit improvements in this corridor.