TO: BOARD OF DIRECTORS

THROUGH: ARTHUR T. LEAHY
CHIEF EXECUTIVE OFFICER

FROM: RUTHIE HOLDEN
CHIEF AUDITOR, MANAGEMENT AUDIT SERVICES

SUBJECT: AUDIT OF PHASE 1 EXPO CONSTRUCTION PROJECT

May 13, 2013

Issue
Macias Consulting Group performed a performance audit of Expo Construction Project, Phase 1. The purpose of the audit was to determine (a) causes for cost overruns in the Expo Construction Project, Phase 1; (b) lessons learned; and (c) whether Exposition Construction Authority applied lessons learned to Phase 2 of the project.

Scope
The scope of this audit was limited to contracting and project management activities for Expo Construction Project, Phase 1 and controls for mitigating project risks in Phase 2.

Findings
The cost of Expo Phase 1 increased by $292 million over the life of project. Multiple factors contributed to the cost growth including expansion in the project scope, project design changes, delays in third party utility relocations, contractor claims, unreimbursed soft costs for betterments, use of negotiated design-build contracting strategy, insufficient project contingency budgeting, and higher than normal escalation cost.

The lessons learned included limiting changes to the project scope to the extent possible, completing the design to a greater degree prior to establishing a Life of Project budget, considering project complexity and industry standards when establishing contingencies, budgeting for unanticipated third party requests and requirements, enhancing MTA’s oversight and more consistency in project staff and documentation, establishing better controls to effectively managed the project, more involvement by stakeholders at the early stages of the design process, and enhance communication between MTA and the Expo Construction Authority.

Management agreed to the findings. Both Expo and MTA have applied lessons learned from Phase 1 of the project to mitigate risks for Phase 2.

Next Steps
Management Audit will follow-up to verify that the recommendations were implemented.

Attachment: Audit of Phase 1 Expo Construction Project Report No. 13-EXP-P01.
FINAL REPORT

Audit of the Phase 1 Expo Construction Project

Los Angeles County Metropolitan Transportation Authority
April 9, 2013
April 9, 2013

Ms. Ruthe Holden,
Chief Auditor – Management Audit Services
Los Angeles Metropolitan Transportation Authority
One Gateway Plaza
Los Angeles, CA  90012-2952

Dear Ms. Holden,

Enclosed is our Final Performance Audit Report of the Exposition Metro Line Construction Authority’s Lessons Learned. Within the attached report, we provide our results and offer recommendations for both Expo and Los Angeles County Metropolitan Transit Authority (MTA). Expo and MTA officials reviewed this report and their comments have been incorporated where appropriate. Official agency comments from Expo and MTA are included in Appendix 3 of this report. This report summarizes information collected by Macias Consulting Group, Inc. between October 2012 and December 2012.

Sincerely,

Macias Consulting Group, Inc.
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Executive Summary

Why the Review was Conducted

To date, the cost for Expo Phase 1 has exceeded the original Life-of-Project (LOP) budget of $640M by approximately 31 percent, or about $292M, for a total cost of about $932M. An additional $8.2M\(^1\) at the time of our review was forecasted for additional cost growth upon close-out of Phase 1. Concerned about the substantial cost overruns experienced in the construction of Phase 1, the Los Angeles County Metropolitan Transportation Authority (MTA) Board directed the Management Audit Services Department (Management Audit Services) to perform an audit to determine:

(1) The causes of cost overruns in Phase 1;
(2) The lessons learned; and
(3) How risks have been mitigated in Phase 2.

What the Review Found

There were multiple factors contributing to the cost growth on the Phase I project. These factors include: expansion of the project, project design changes, utility relocations and contractor claims, unreimbursed soft costs for betterments, use of a negotiated design-build contracting strategy, insufficient project contingency budgeting, and higher than normal escalation. Key activities that led to cost growth to Phase 1 are shown in Figure 1 below.

Figure 1: Cost of Activities That Led to Cost Growth

<table>
<thead>
<tr>
<th>Cost</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>$23.30M</td>
<td>Expanded Scope of Work, including an additional station</td>
</tr>
<tr>
<td>$145.00M</td>
<td>Escalation in costs</td>
</tr>
<tr>
<td>$54.10M</td>
<td>Culver City Aerial Structure and Station Advanced from Phase 2</td>
</tr>
<tr>
<td>$36.56M</td>
<td>Safety enhancements, including additional station Required by CPUC</td>
</tr>
<tr>
<td>$28.50M</td>
<td>Contractor claim settlement</td>
</tr>
<tr>
<td>$4.53M</td>
<td>Betterments requested by stakeholders paid for by stakeholders</td>
</tr>
<tr>
<td>TOTAL:</td>
<td>$292M</td>
</tr>
<tr>
<td></td>
<td>Additions to original budget</td>
</tr>
</tbody>
</table>

The lessons learned as a result of the cost growth include the need for:

- limiting changes to the project scope to the extent possible;
- completing the design, or completing design to a greater degree within the design-build contract prior to establishing a LOP;

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\(^1\) The March 13, 2013 Construction Committee report states that the Phase 1 budget may be impacted by $8.2 million forecast overrun plus any contractor claims or other unknowns. Expo is pursuing additional cost savings which include third-party reimbursable and other cost savings of $3.1 million.
- F I N A L P E R F O R M A N C E A U D I T -

- establishing contingencies in line with project complexity and industry standards and newly established MTA policies;
- consideration of betterments and deviation from standards in establishing contingencies
- budgeting for unanticipated third-party requests and requirements;
- implementing a project management system administered by Expo, which can also integrate with MTA’s system;
- improving consistency among MTA project staff and documenting decisions to ensure the incidence of late changes is minimized. Enhanced MTA oversight, including more involvement with MTA Rail Operations, Maintenance, Systems and Fire Life Safety at early stages of the design process; and better coordination between FLS and Expo to gain consensus on potential design changes prior to construction;
- establishing better controls at both MTA and Expo to effectively manage the project; and
- building on the communication plan in Phase 1, implementing more effective communication activities between MTA and Expo Construction Authority so that decisions and follow up implementation are addressed.

Expo and MTA have applied all of these lessons learned and initiated substantial corrective actions to mitigate potential risks that could occur in Phase 2. These actions include:

- strengthening contract terms that further define and provide increased MTA oversight and involvement in the design and project control areas;
- allocating contingencies by each project component;
- Expo providing formal monthly financial and project status information to MTA and MTA assigning a part-time project manager;
- conducting partnering meetings with third parties (utilities and cities) to better plan for utility relocations and identifying betterments;
- coordinating workshops to ensure safety and security requirements are included in the Phase 2 design and feedback and review is given on design submittals; and
- ensuring MTA review documents for compliance with design criteria.

Our report provides five recommendations to Expo and MTA on ways to enhance communication to ensure that MTA executive management and the Board are kept up-to-date on the status of Phase 2. The recommendations describe a more comprehensive approach to addressing oversight, expanding current MTA and Expo practices that have been successful, and the consideration of meetings at higher levels of MTA Management inclusive of all stakeholder departments.
Background

The Exposition Metro Line Construction Authority (Expo) was created through state legislation (SB 504), in February 2003, for the purpose of awarding and overseeing final design and construction contracts for the completion of the Expo light rail project from the 7th Street/Metro Center to the downtown area of the City of Santa Monica. Planning for the 15.6 mile Expo light rail project began in 2000. The original project budget of $640M was put forth in the 2005 Final Environmental Impact Report (FEIR). In March 2006, the design-build contractor, which was a joint venture between three companies, was awarded the project. In September 2006, the first of two construction phases commenced. In June 2012, the first phase, an 8.6 mile segment from the 7th Street/Metro Center to Culver City opened for service. As of June 2012, the Phase 1 project cost was $932M and by March 2013, additional cost growth of $8.2M was forecasted. Phase 2 extends the rail line corridor 6.6 miles from Culver City to Santa Monica and construction began in September 2012. The current budget for Phase 2 is approximately $1.5B which was presented in the Phase 2 FEIR.

Results

MULTIPLE FACTORS LED TO PHASE 1 COST GROWTH

Expansion of Phase 1

Phase 1 costs exceeded the original budget established by the FEIR due, in part, to additions to the original scope of the project. While the FEIR’s cost estimate for Phase 1 included eight new stations, three stations were added to the project’s scope. Two of these stations – Trousdale and Farmdale – were added through change orders. The Trousdale Station, also known as the USC/Expo Park Station, cost $8.7M at completion. Of these costs, $7M was part of the $23.3M funding request that was approved at the September 2007 MTA Board Meeting. The Farmdale station, including relocating a nearby parking lot (to provide safe interactions between the light rail trains, pedestrians and vehicles) cost $18.7M. This cost was included in the $36.6M Safety Enhancement budget request. The procurement of the two new stations should have been executed through a contract modification rather a change order. Had the budget been adjusted accordingly by contract modification rather than change orders, the perception that Phase 1 had high amounts of change orders would be different. The perception of Phase 1 would have been that it had lower levels of cost growth due to change orders if these items were added to the budget by contract modification due to scope growth. The third station -- Venice/Robertson aerial station -- cost another $54M and was procured under a separate contract. This project was originally planned to be constructed as part of Phase 2. MTA obtained $50M in State Proposition 1B funds and a $4M contribution from the City of Culver City to fund the project. The MTA Board authorized $54M in funding for the aerial station at its May 2008 meeting.

Lesson Learned:

- Expo determined that it needed to provide better project cost tracking by establishing policies on when to utilize change orders versus contract modifications.

Phase 2 Corrective Action:

- Expo now distinguishes between change orders and contract modifications in the Phase 2 design-build contract so that any change to the work that falls outside of the contract is a modification that must be issued in writing and executed by Expo's
Contracting Officer. A change order is a written order that directs a change to the work, which is found to be within the scope of the contracted work, to establish a basis for adjustments in contract price or contract time.

Project Design Changes

Phase 1 included project changes that required design modifications, such as building a smooth interface between the Blue Line and Expo Line at Flower Street, which would allow train movements to operate efficiently and be better tracked and managed remotely through the installation of an electronic switch, and a train control system - at a cost of $11.3M. Another project change included building a turn-back booth at the 7th Street/Metro station. These and other changes were requested as part of safety enhancements driven by the CPUC, MTA, City of Los Angeles, Los Angeles Unified School District, a Safety Peer Review and Expo in 2010. MTA staff determined that these changes were out of the original scope and therefore, required additional funding. By implementing these changes, Expo would then meet the desired operational and safety requirements. In July 2010, the MTA Board approved the funding for an additional $36.6M for these changes. Expo officials explained there was turnover in MTA staff during Phase I which impacted design review and interpretation of criteria. Expo incurred $11.1M of MTA-related costs which included oversight and review of design submittals.

Lessons Learned:

- MTA and Expo determined that processes for the review and approval of design submittals must be developed to ensure that feedback from Operations, Maintenance, and Train Control Systems Departments are properly considered and addressed.

- MTA determined that it needs to ensure that its Fire-Life Safety staff is involved in the design submittal review process and that all safety requirements are included in the design specifications.

Cost for these types of improvements need to be considered in the original design or contingency provided to assure improvements are adequately funded.

Phase 2 Corrective Actions:

- To ensure that the design of the Phase 2 design-build contract met MTA’s latest safety design criteria. MTA Fire-Life-Safety and Los Angeles Fire Department, Santa Monica Fire Department, Los Angeles Police Department, Santa Monica Police Department representatives, in conjunction Expo Project Management and the Phase 2 contractor have been meeting in working groups on a monthly basis since the inception of Phase 2. Fire-Life Safety staff explained the meetings have led to added assurance that their requirements and safety criteria are incorporated into the design of Phase 2 as early in the process as possible.

- Operations and Maintenance and Train Control have become more involved in the design review process. This has created a need to identify whether recommendations by Operations, Maintenance, Systems and MTA FLS are requirements that need to be included in the budget.

Utility Relocations and Contractor Claims

Third parties are entities that have an interest in or can be impacted by capital projects planned for their environment. Third parties can be cities, state agencies or even private utility companies that may require relocation of power or water lines. Utility relocations are traditionally a major issue for transportation projects, and can present significant coordination problems for projects because the utilities, in most cases, are responsible for the design and the construction work. Third-party utility design and relocations are not controlled by Construction Authorities and can cause delays in project schedules that impact cost growth, which occurred in Phase 1. For example, the construction of the aerial station at the intersection of La Cienega and Jefferson
Boulevards was delayed due to Department of Water and Power (DWP) overhead power lines that required relocation underground. DWP was responsible for performing the relocation but under no obligation to conform to the Construction Authority project schedule, delays ensued leading to interruptions to the project. Ultimately, the delay contributed to the prime contractor filing a claim against Expo for $28.5M. The settlement request covered increases in the contractor’s direct costs such as insurance and bonds, additional general conditions costs, interest, settlement of subcontractor claims and construction fees. Third-party utilities that cause delays are not named as part of delay claims against the Construction Authority.

**Lessons Learned:**

- The Expo Construction Authority determined that they needed to establish earlier and better working partnerships with the utility companies.
- Expo assigned dedicated staff to work on third-party issues.
- Communicate with third-party utilities at the executive management level to mitigate roadblocks.
- Contingencies are included to cover potential issues with third parties, including utilities.

**Phase 2 Corrective Actions:**

- Expo is now working with the DWP, Southern California Gas (SCG) and Southern California Edison (SCE) on utility relocations to move forward with power line and facility relocations required on Phase 2. Activities include meeting with utility executive management on a regular basis, coordinating staffing with all utilities on a weekly basis, and holding partnering meetings with the utilities and the design-build contractor. In some cases, the design-build contractor has performed utility work on behalf of DWP to speed up the process.
- Expo continues to contract for construction and engineering claim support services to handle arbitration, mediation and forensic cost assistance.

**Unreimbursed Betterments and Soft Costs for Betterments**

Betterments are requests for changes by MTA and other third parties that may address improving the level of service, capacity, capability, appearance, efficiency or function of a particular project. How betterments are to be funded and accounted for are generally addressed in the Master Cooperative Agreement (MCA) with MTA and in Memorandums of Understanding (MOUs) with other third parties. Examples of other third parties that request betterments are cities and their departments such as Fire and Police Departments. These agreements stipulate how costs will be reimbursed by the requesting party. Currently there is approximately $4.7M of unfunded approved MTA betterments on Phase 1. Additionally, a MCA was in place with the City of Los Angeles and an MOU was in place with Culver City regarding betterments to the project. However, Expo did not have a process for ensuring reimbursement of all costs. While Phase 1 had $4.525M of cost growth due to betterments from just the cities of Los Angeles and Culver, the soft costs, which ran about 10 percent of this amount, were not reimbursed because these costs were not negotiated as part of the betterment. The betterments also did not make provisions for any contingency amounts.

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2 In February 2011, Expo and its contractor entered into a Settlement Agreement covering all project delay costs up to that point in time. The settlement of outstanding contractor claims was approved by the MTA Board in a December 2010 board meeting.
Lesson Learned:

- Expo determined that it needed to engage third parties early in the planning process, include requirements for reimbursement of all costs as part of the negotiated price of the betterment and establish a separate budget line item for betterments.

Phase 2 Corrective Actions:

- Expo and its contractor began working with the cities of Los Angeles and Santa Monica early in the design process and conducted regular meetings with each city.
- Expo has now dedicated sufficient staff to work on third-party activities.
- To ensure that the betterments requested by the City of Los Angeles and City of Santa Monica, which together comprise $23.6M in costs, will be reimbursed by the respective cities, agreements are now in place to include full reimbursements, including allocated contingencies and soft costs.
- Expo created a separate project budget line item to track third-party betterment budgets and related costs. The current betterment budget for Phase 2 is $23.6M. Based on the term sheet of the MCA, the MTA CEO must review and approve third-party agreements with Expo to the extent that the agreements include any financial, operations or real property obligations transferred to MTA upon completion of Phase 2.

Use of a Negotiated Design-Build Contracting Strategy

In July 2005, the Expo Board approved a construction procurement approach called Negotiated Design-Build which was intended to reduce the risk of over paying the contractor for each work package planned for Phase I. Because Expo is a special agency under state law, MTA did not have rights to approve the contracting approach. In a traditional design-build contract, the owner enters into a Lump Sum Fixed Price contract with a single firm or joint-venture that is responsible for carrying out both design and construction of the project upon completion of preliminary engineering. Although the risk is shifted to the contractor to complete the project within budget, Expo explained that the remaining risk is that the initial price bid may be unnecessarily high due to the need to cover unknowns and contingencies because the price is established before significant completion of the design and before risk areas or uncertainties are identified.

Under the Negotiated Design-Build contract, Phase 1 was comprised of work-packages, or phased implementation segments, to allow for complete construction of each segment should funding become unavailable. Expo prepared 19 work-packages to accommodate the Minimum Operating Segments described in the FEIR because funding for the entire Expo project was not certain at the initiation of the project. Expo explained the following:

“In order to minimize cost risk and be able to adjust for a possible project phasing that was contemplated in the FEIR a negotiated design-build project delivery system was developed to address these unique requirements. The main variation from the traditional design-build method to the selected approach was that the final construction price was negotiated after contract award and following the completion of final design, which thereby avoids the inclusion of bid or risk contingencies due to lack of a complete design. At or near design completion (85%), a Lump Sum Fixed Price was negotiated for each specific construction package. All pricing information was provided in an ‘open book’ approach to allow for an objective evaluation and good faith negotiations over the final direct construction price.”

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3 Expo worked closely with the City of Santa Monica to plan for and coordinate the requirements of Phase 2 along Colorado Boulevard. During these discussions, the City expressed an interest in funding a betterment to modify the 26th Street Station from a center platform to a side platform configuration and to add a second patron entrance at the 17th Street Station. Terminus station betterments were also added by the City of Santa Monica.
Leading construction management practices call for designs to be 30 percent complete before establishing the final construction price. When prices are negotiated without completing preliminary engineering at the 30 percent level of design, it leaves the owner (Expo) vulnerable to cost growth. Once Expo had negotiated four of the 19 work packages, Expo began reporting that costs had exceeded the established contracted price because additional design and engineering work was necessary, in addition to the escalation of construction prices. Expo ultimately submitted a revised budget to the MTA Board requesting an additional $145M for Phase 1 in November 2007.

Lesson Learned:

- Expo recognized the need to use a more traditional design-build procurement method for Phase 2.

Phase 2 Corrective Actions:

- Expo utilized a modified design-build Lump Sum Fixed Price contract in Phase 2. Design-build contracts hold the contractor accountable for cost overruns by establishing a fixed price for the project at the time of contract award.
- Expo, rather than MTA, contracted for the preliminary design work for Phase 2, since they were the designated lead agency for the preparation of the FEIR for the line extension\textsuperscript{4}. Expo utilized and paid two firms about $5M each for preliminary design work (up to 30 percent) and selected one firm. Expo's CEO explained this approach allowed the authority to own both designs and utilize the best selected design features developed by both firms.

Recommendation:

1. The MTA Board should include in its MCA with Construction Authorities a requirement for the Construction Authorities to obtain MTA approval for proposed contracting strategies that differ from standard design-bid-build or design-build strategies.

MTA Response: Concur. This language has been incorporated into the MCA with the Construction Authority. Prime contract has already been awarded for the Expo Phase 2 design-build project.

Insufficient Project Contingency

At the time of Phase 1 construction, Federal Transit Administration (FTA) guidance recommended establishing a contingency budget of about 18 to 25 percent of project costs for the purpose of accommodating changes in the planning and design phases of the project based on project factors, such as: type of project, complexity and percentage of design complete. Although Expo at the time was required to adhere to FTA guidance, the original contingency budget was 11 percent ($71.1M), which was below the FTA recommended level. However, the FTA approved the FEIR in its Record of Decision in 2006, with the $71M contingency allocation. Additionally, at the time the contingency was established, MTA cost estimators determined that its level was sufficient based on the fact that the project was designed to be constructed in minimum operating segments, should funding run out. As the Phase I project scope grew substantially the contingency adjustments made by Expo were insufficient to cover costs. For example, by 2007 when $17.4M contingency remained in the project budget, or about 2.7 percent, Expo requested additional project contingency funding of $7.6M\textsuperscript{5}, for a total of $25M, as shown in Figure 2. Although the additional funding increase raised the contingency level to 3.18 percent of the project budget ($785M), this was not enough to cover other additional unforeseen costs that were

\textsuperscript{4} In Phase 1, MTA had conducted all planning elements prior to the establishment of the Expo Construction Authority.

\textsuperscript{5} This additional contingency request was part of the $145M request in November 2007.
to come, such as safety enhancements and other required design changes that needed to be addressed.

**Figure 2: Phase 1 Contingency Amounts and Percentage Values**

<table>
<thead>
<tr>
<th>Element</th>
<th>Project Budget</th>
<th>Contingency Level</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Original Budget</td>
<td>$640,000,000</td>
<td>$71,100,000</td>
<td>11%</td>
</tr>
<tr>
<td>Remaining Contingency (as of Jan 2007)</td>
<td>$640,000,000</td>
<td>$17,400,000</td>
<td>2.7%</td>
</tr>
<tr>
<td>Requested project contingency/reserve</td>
<td></td>
<td>$7,600,000</td>
<td></td>
</tr>
<tr>
<td>Project Value &amp; Contingency</td>
<td>$785,000,000</td>
<td>$25,000,000</td>
<td>3.18%</td>
</tr>
</tbody>
</table>

Although Expo’s contingency was below that recommended by the FTA, MTA’s contingency policy does not require its Construction Authorities to comply with its Contingency Policy. In 2004, MTA’s contingency policy in effect at the time of the Phase I project, did not require a specified percentage for contingencies, but provided directives on how to calculate and monitor contingency throughout the project. Having adequate contingency set aside for Phase I as the project proceeded could have cushioned the need for continued additional funding throughout the project. In September 2011, MTA Project Controls staff acknowledged the failure to include an adequate allowance for contingency in Phase 1.

**Lessons learned:**

- MTA and Expo concluded that the contingency set aside for Phase I was insufficient.
- MTA and Expo identified the need to establish a contingency line item for each project component. This would include the:
  - Comparison of contingency with industry guidelines and MTA policies;
  - Monitoring of contingency levels throughout the progress of the project; and
  - Establishment of a contingency for contract modifications when adding scope (i.e. additional stations, safety enhancements, betterments) per the MTA contingency standards.

**Phase 2 Corrective Actions:**

- Expo took action to ensure that a contingency was set aside for specific project components. Depending on the nature of the project, FTA recommends 10 to 15 percent contingency in the construction phase of capital projects and Expo appropriately set aside 14.62 percent for the project, as shown in Figure 3 below.
Figure 3: Phase 2 Allocated Contingencies by Construction Component

<table>
<thead>
<tr>
<th>Element</th>
<th>Board Approved Budget</th>
<th>Contingency</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Design-Build Corridor (less project revenue)</td>
<td>$606,825,000</td>
<td>$80,095,000</td>
<td>13.2%</td>
</tr>
<tr>
<td>Other Construction Elements</td>
<td>159,475,000</td>
<td>$10,000,000</td>
<td>6%</td>
</tr>
<tr>
<td>Right-of-Way</td>
<td>265,000,000</td>
<td>$0</td>
<td>0%</td>
</tr>
<tr>
<td>Vehicles (fixed costs)</td>
<td>202,100,000</td>
<td>$0</td>
<td>0%</td>
</tr>
<tr>
<td>Professional Services</td>
<td>148,200,000</td>
<td>$19,000,000</td>
<td>13%</td>
</tr>
<tr>
<td>Special Conditions</td>
<td>63,600,000</td>
<td>$9,000,000</td>
<td>14%</td>
</tr>
<tr>
<td>Project Reserve</td>
<td>65,958,000</td>
<td>65,958,000</td>
<td>4% of total budget</td>
</tr>
<tr>
<td>TOTAL BUDGET</td>
<td>$1,511,158,000</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Less fixed costs - MTA Holdback</td>
<td>($252,180,000)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>$1,309,058,000</td>
<td>$184,053,000</td>
<td>14.62%</td>
</tr>
</tbody>
</table>

*This amount includes the contingency of $65,095,000 and $15M in Provisional Sums included in the Design-build contract, Appendix 10, Schedule F. Additional Source: Current Phase 2 LOP Budget as of September 30, 2012.

- In 2012, the MTA Board mandated that all projects have the FTA-recommended contingency used for their project budgets. In addition, the Finance, Budget and Audit Committee proposed revisions requiring that when contingency levels reach three percent of the project value the Board will be notified and get involved. Expo has exceeded this measure for Phase 2 and added an additional Project Reserve of about four percent.

- MTA included a provision in the MCA withholding an additional $252M to pay for their own project costs, coordination and oversight, the purchase of rail cars and for the rail operation center.

- The Phase 2 budget now has a contingency line item for contract modifications.

Recommendation:

2. The MTA Board should require the MCA with Construction Authorities include language requiring Construction Authorities to comply with MTA’s contingency policy.

MTA Response: Concur. MTA contingency policy is included in the Funding Agreement by Attachment.

Higher than Normal Cost Escalation

While budget contingencies are meant to provide for unexpected changes to a project, escalation is built into a construction contract to cover the cost of materials whose prices can increase over the life of a project based on inflation or other changes in market conditions. For example, a

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6 The Institution of Civil Engineering defines “Provisional Sum” as a sum included and so designated in the Contract as a specific contingency for the execution of work or the supply of goods materials or services which may be used in whole or in part or not at all at the direction and discretion of the Engineer.
common commodity subject to cost escalation is iron and steel. In Phase 1, the escalation amount included in the 2004 budget estimates for this material was about $96.2M over the projected five years of the project, or three percent of Phase I’s original budget of $640M, which is consistent with general construction pricing escalation of 3.5 percent for that time period, (based on historical average trends).

However, between the last quarter of 2004 and the first quarter of 2006, construction prices experienced uncommon escalation with rate increases between six percent and 10 percent per year, with some estimates as high as 11 percent. These increases far exceeded previous years, such as in 2000 when a rate of 2.5 percent to 3.5 percent was typical. In 2007, construction pricing escalation was between nine and 12 percent, which was not anticipated by Expo and added an estimated $82M to construction costs. In general, the construction industry during the time of the Phase I project was adversely affected by higher steel and iron prices because of the market demand for these materials overseas. Expo notified the MTA Board about cost escalation increases in November of 2007 and a formal request for additional funding of $145M was subsequently submitted and approved by the Board in the same month.

Lesson Learned:

- All major projects should start with adequate contingency and it should be maintained until costs can be accurately and reasonably forecasted and contingency applied according to leading practices and standards.

Corrective Action: None identified.

Other Issues

MTA Project Management and Expo Management Information Systems were not Robust

The objectives of project management are to execute a project so that deliverables can meet scope requirements on budget and schedule and at acceptable risk, quality, and safety levels. FTA leading practices and best-in-class transportation organizations recommend that the parent agency assign an individual with requisite experience to oversee mega-transportation projects to monitor the status of the project and to identify warning signs of potential project quality and financial risks. There was not a formally designated MTA individual tasked as a project manager that would provide full oversight of the Phase I project, including formally meeting with Expo staff on a regular basis. However, there were bi-monthly and monthly meetings with MTA staff to discuss the project. For example, Expo provided monthly status reports at MTA’s monthly Construction Committee meetings. The absence of a designated project manager to the Phase I project stemmed from the MOU between MTA and Expo lacking project oversight and financial monitoring requirements. Expo did comply with the MOU by providing quarterly reports to MTA Project Controls staff.

Expo’s quarterly reports to MTA contained descriptions of management issues and budget concerns, project planning, budget, resource management, tracking progress and showed project status in diagrams, Gantt charts, and staffing resource graphs. These quarterly reports, to their credit, did raise issues well before they rose to the level of formally requesting additional funds from MTA. For example, in June 2007, Expo reported that after negotiating four of the work packages in excess of the estimates, Expo had assembled a team to work on cost containment and re-design and had developed an estimate of the amount of additional funds needed. Ultimately, Expo went to the Board in November 2007 to make the formal request, which was unanimously approved.

FTA leading practices also call for an integrated project system to assist the manager in project planning, cost estimating, project administration, scheduling, control, and data management. Although Expo had a project management plan for Phase1, a system that could track project
status, budget, contract requirements, and schedule was absent. Contract management, financial management and scheduling were not integrated and according to MTA officials, information was not available to MTA on an on-demand basis to effectively monitor the project until the near completion of Phase 1.

**Lessons Learned:**

- MTA determined that it needed a dedicated transit project delivery project manager to provide oversight for Phase 2.
- Expo and MTA agreed that a fully integrated project management system was needed that was compatible with MTA systems.
- Project challenges should be identified early.
- Corrective action plans should be developed and implemented if project issues are identified.
- Regular meetings should be implemented to coordinate project management, financial, schedule and project issues information between MTA and Expo on an on-going basis.

**Phase 2 Corrective Actions:**

- Expo implemented (in early 2011) the Project Management Information System (PMIS), which is project management software that integrates financial management, contract management and project task management.
- MTA Project Controls staff and a designated project manager now have direct access into Expo’s system and can monitor costs and project status in real time.
- Expo implemented the PMIS to be consistent with MTA for project management and document control as well as budgeting and forecasting Expo Phase 2.
- Regular project management meetings have been implemented for consistent MTA and Expo coordination.

**MOU Remains Unsigned**

The Phase 2 MCA and Funding Agreement between MTA and Expo has not yet been approved by MTA. We compared the Phase 2 agreement to the Phase 1 agreement and found that the new MCA contains sufficient controls to mitigate known project risks. For example, the MCA now requires monthly in-person and quarterly status reports of project progress by Expo to the MTA Transit Project Delivery Project Manager, who is now assigned part-time to oversee Phase 2.

Other key additions include:

- Submitting a monthly summary of all invoices paid in the prior month.
- Requiring Expo to adhere to cost containment policies, wherein any reported cost growth must include a cost recovery proposal.
- MTA approval of any significant changes to Phase 2.
- Specific oversight requirements for MTA’s oversight of design, construction, testing and start up.
- MTA imposed a $1.5B price ceiling on Phase 2.
- MTA withheld an amount of $252M to cover MTA project costs, including vehicles.

Despite the strength of the new MCA, we noted the MCA does not require MTA and Expo to implement a lessons learned activity at project close-out. Lessons learned activities call for a post-project conversation between stakeholders to discuss how the project went and agree on appropriate adjustments for subsequent projects. This helps both parties avoid repeating past mistakes and leads to the development of even better solutions. Lessons learned activities play a vital role in facilitating program improvement and lowering project costs on future capital projects.

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7 This individual is assigned to both Expo 2 and Foothill. The expectation is that he will dedicate half his time to each project, depending on the need.
construction projects. Expo terminates at the project’s completion, so MTA should complete a lessons learned on Phase 2.

While Expo administered its own lesson learned activities at the completion of Phase I, reported the results to the MTA Construction Committee, and self-initiated many corrective actions, MTA could do more to benefit from this type of activity. MTA’s Project Controls staff conduct lessons learned activities on a project-by-project basis, but these activities only include the participation of construction and project controls staff; other departments such as Rail Operations are not involved. Lessons learned activities are meant to include all key stakeholders involved in the project from initiation to completion, including those responsible for the project after its completion. For Phase I, none of MTA’s key stakeholders – Rail Operations, Maintenance, Fire-Life-Safety, and Planning staff – were included in a consolidated and comprehensive lessons learned effort.

Finally, we noted that the MCA remains unsigned and is yet to be fully executed by both parties. The Expo Board has authorized the CEO to execute the agreement. Both Expo and MTA have suggested changes that differ from the Term Sheets, but officials reported the parties were close to an agreement.

Lessons Learned:
None identified.

Phase 2 Corrective Actions:
None identified.

Recommendation:

3. MTA’s CEO should include in the Phase 2 MCA, and on future MTA capital construction projects, a requirement for a formal lessons learned process to ensure that the meetings are independently administered, that all key stakeholders participate, and that suggestions are fully reviewed and acted upon for future capital projects.

MTA Response: Concur. This will need to be added to the MCA, or if not placed in the MCA agreed to by a separate letter with the Construction Authority.

4. To remain in alignment with the spirit of the state law that created the Exposition Construction Authority (SB 504), MTA and Expo should work together to ensure the MCA between MTA and Expo is signed promptly. A formalized executed MCA is needed to ensure proper accountability and governance between each agency to help ensure successful project completion and accountability for Phase 2.

MTA Response: Concur. Final MCA is being prepared and should be signed shortly.

Closer Coordination between MTA Departments is Needed

Effective communication is critical to the success of any project requiring the cooperative effort of multiple stakeholders. Well-planned and ongoing communication helps prepare internal and external stakeholders for change by involving and educating them while also managing their expectations. While MTA officials do not have concerns that cost growth will be similar to Phase 1 due to the new financial and project controls that MTA and Expo has now implemented, they do
have some concerns about the level of their own project management and how Expo project information is shared for review and approval internally within MTA.

The MTA Transit Project Delivery Department DEO of Project Management and the Executive Director of Project Management and Oversight presently have the authority to review and approve the design submittals and solicit input from MTA Rail Operations staff through the use of MTA technical staff review. Because Rail Operations is ultimately responsible for operating and maintaining new rail lines and has the technical expertise to understand how design changes could impact passenger mobility, proper acknowledgement and consideration of Rail Operations’ concerns and issues is absolutely critical. Legislation that created Expo calls for Rail Operations staff to be involved in the review and approval of design activity because of their subsequent responsibility for rail operations upon project completion. Ensuring Rail Operations full review and input in the design phase will prevent changes during construction which result in additional cost impacts and further mitigate the occurrence of problematic operational issues once MTA assumes full responsibility. Currently, there is approximately $4.7M of unfunded approved MTA betterments on Phase 1 as stated previously above. MTA officials concur additional costs are warranted and may want to make changes for which they are willing to pay.

Rail Operations management specifically cited the need for improved coordination and communication when Expo provides design submittal for MTA review. In Phase I, staff reported insufficient time to provide full review of the design submittals, and that MTA staff in other departments do not always fully understand the implications of issues and concerns raised by Rail Operations staff. MTA Rail Operations reported the need for greater representation and authority over potential design changes, but a viable alternative is to ensure close MTA executive management attention on a regular basis, at least during the design phase, to ensure that all parties have reached consensus on all design submittals and that any potential impact that design changes would have on future operations are carefully considered.

Recommendation:

5. The MTA CEO should hold periodic progress and status meetings with top level executive management from Operations, Planning, Project Management and Controls, and other key project internal stakeholders on all major capital projects to ensure decisions are being made to benefit MTA's long-term as well as short-term interests. We also suggest a monthly meeting between the CEO for MTA and Expo to discuss budget impacts and potential issues throughout the remainder of the Phase 2.

**MTA Response:** Concur. Monthly meetings have been scheduled with the MTA CEO, Expo CEO, MTA Executive Management, Project Management and other key stakeholders.
Appendix 1:

Budget Increases by Year

<table>
<thead>
<tr>
<th>Description</th>
<th>Requested By</th>
<th>Year</th>
<th>Activity</th>
<th>Dollar Value</th>
<th>Total Financial Impact on Expo Phase 1</th>
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<tbody>
<tr>
<td>Scope Changes &amp; Enhancements</td>
<td>MTA, CPUC</td>
<td>2007</td>
<td>MTA Blue Line/Expo Interface Enhancements</td>
<td>$11,300,000</td>
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<tr>
<td></td>
<td></td>
<td></td>
<td>CPUC Crossing Modifications</td>
<td>$5,000,000</td>
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<tr>
<td></td>
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<td></td>
<td>Trousdale/Expo Park Station Addition</td>
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<td>Sub-Total</td>
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<td>Escalation &amp; Design Refinement</td>
<td>Expo</td>
<td>2007</td>
<td>Design-Build Contract Revised Estimate (additions)</td>
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<td></td>
<td></td>
<td></td>
<td>Vehicles</td>
<td>($1,500,000)</td>
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<td></td>
<td></td>
<td></td>
<td>Special Conditions (Third Party review and private utility relocation)</td>
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<td></td>
<td>Agency &amp; Professional Services (includes MTA Environmental PE Actual costs and Carter Burgess Construction Management)</td>
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<td>Contingency Additions</td>
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<td>Aerial Station</td>
<td>MTA/ Culver City</td>
<td>2008</td>
<td>Culver City Aerial Station (originally in Phase 2 scope)*$50M funded by Prop 1b funds</td>
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<td></td>
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<td>Sub Total</td>
<td>$54,059,600</td>
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<td>Safety Enhancements</td>
<td>Expo/MTA/U SC</td>
<td>2010</td>
<td>Pico station gates, flashers</td>
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<td></td>
<td>MTA</td>
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<td>Photo Enforcement</td>
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<td></td>
<td>MTA/CPUC</td>
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<td>ROW Fencing</td>
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<td>Expo</td>
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<td>Embedded Pedestrian Light Demo</td>
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<td>CPUC/City of LA/Expo</td>
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<td>MTA</td>
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<td>Center Track Signals</td>
<td>Non-Funded Approved MTA Betterment</td>
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<td>MTA</td>
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<td>Intrusion Detection at Portals requested by MTA</td>
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<td>MTA</td>
<td></td>
<td>Safety Outreach Program w/1 MTA FTE</td>
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³ Year approved by MTA Board.
<table>
<thead>
<tr>
<th>Description</th>
<th>Cost</th>
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<tr>
<td>Expo/LAUSD/CPUC</td>
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<td>Farmdale Station</td>
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<td>includes train control, property</td>
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<tr>
<td>acquisition, replacement parking</td>
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<td>Safety Peer Review</td>
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<td>7th/Metro turn-back</td>
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<td>MTA</td>
<td>$100,000</td>
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<td>Car Barriers</td>
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<tr>
<td>MTA</td>
<td>$100,000</td>
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<tr>
<td>Pavement and Signage Enhancements</td>
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<td>MTA</td>
<td>$3,000,000</td>
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<tr>
<td>Interlock MTA Blue Line</td>
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<td>Maple and Tarleton Crossovers</td>
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<td>Sub Total</td>
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<td>Contractor Claims</td>
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<td>Expo/Contractor 2010</td>
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<td>CCIP Insurance, Professional</td>
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<td>Liability Insurance, Bond</td>
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<td>General Conditions, Interest,</td>
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<tr>
<td>Professional Service costs</td>
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<tr>
<td>associated with Scope Growth,</td>
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<tr>
<td>construction fee</td>
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<tr>
<td>Subcontractor Claims,</td>
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<tr>
<td>Professional Services Costs</td>
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<td>Associated with Delay</td>
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<td>Sub Total</td>
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<td>Betterments</td>
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<td>City of Culver City 2011</td>
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<td>Betterments - City of Culver City</td>
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<tr>
<td>City of Los Angeles</td>
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<td>Betterments - City of Los Angeles</td>
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<td>Sub Total</td>
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<td>Total Cost Growth</td>
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<td>Expo Phase 1 - FEIS/FEIR</td>
<td>$640,000,000</td>
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<tr>
<td>based on LPA - Original Budget</td>
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</tr>
<tr>
<td>Phase 1 TOTAL</td>
<td>$931,975,055</td>
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</table>
Appendix 2:

Scope

The scope of our review evaluated the contracting and project management activities that took place by Expo and MTA in Phase 1. We also evaluated the Expo and MTA Board approved expenditures reported and forecasted for Phase 1 and controls for mitigating project and financial risks in Phase 2. We did not conduct a financial or contract compliance audit, nor did we conduct a contract audit of Expo’s contractor, Flour, Flatiron and Parsons joint venture (FFP), nor did we conduct a contract compliance audit between MTA and Expo for Phase 1.

Methodology

To assess the causes of cost overruns in Phase 1, we analyzed Expo Board reports, MTA Board reports, Expo quarterly project status reports, MTA construction committee reports, contractor invoices for construction, design, professional services and all change orders for Phase 1. Additionally, we interviewed seven Expo staff and seven MTA staff. We did not audit the contractor invoices or financial project reports to ensure the accuracy of the financial data presented. However, we did assess the reliability of the financial data presented in this report by examining the reasonableness of the documentation supporting agency reports.

To determine how Expo and MTA have developed mitigating steps in Phase 2 to prevent the causes of the cost overruns, we interviewed Expo officials, reviewed Phase 2 monthly reports, design change review databases, interviewed MTA officials tasked with oversight over Phase 2, and interviewed three MTA Rail Operations staff. We also reviewed the MOU for Phase 1 and the MCA between MTA and Expo for Phase 2. We compared the information that we collected on contracting and project management activities to construction management leading practices.

We conducted this performance audit in accordance with generally accepted government auditing standards. Those standards require that we plan and perform the audit to obtain sufficient, appropriate evidence to provide a reasonable basis for our findings and conclusions based on our audit objectives. We believe that the evidence obtained provides a reasonable basis for our findings and conclusions based on our audit objectives.
Appendix 3:

Management Comments
MTA Management Comments
Recommendations:

1. The MTA Board should include in its MCA with Construction Authorities a requirement for the construction authorities to receive MTA approval for proposed contracting strategies that differ from standard design-bid-build or design-build.

   MTA Response: Concur. This language has been incorporated into the MCA with the Construction Authority. Prime contract has already been awarded for the Expo Phase 2 design-build project.

2. The MTA Board should require the MCA with Construction Authorities include language requiring Construction Authorities to comply with MTA’s contingency policy.

   MTA Response: Concur. MTA contingency policy is included in the Funding Agreement by Attachment.

3. MTA’s CEO should include in the Phase 2 MCA, and on future MTA capital construction projects, a requirement for a formal lessons learned process to ensure that the meetings are independently administered, that all key stakeholders participate, and that suggestions are fully reviewed and acted upon for future capital projects.

   MTA Response: Concur. This will need to be added to the MCA, or if not placed in the MCA agreed to by separate letter with the Construction Authority.

4. To remain in alignment with the spirit of the state law that created the Exposition Construction Authority (SB 504), MTA and Expo should work together to ensure the MCA between MTA and Expo is signed promptly. A formalized executed MCA is needed to ensure proper accountability and governance between each
agency to help ensure successful project completion and accountability for Phase 2.

MTA Response: Concur. Final MCA is being prepared and should be signed shortly.

5. The MTA CEO should hold periodic progress and status meetings with top level executive management from Operations, Planning, Project Management and Controls, and other key project internal stakeholders on all major capital projects to ensure decisions are being made to benefit MTA's long-term as well as short-term interests. We also suggest a monthly meeting between the CEO for MTA and Expo to discuss budget impacts and potential issues throughout the remainder of the Phase 2.

MTA Response: Concur. Monthly meetings have been scheduled with Metro CEO, Expo CEO, Senior Executive Management, Project Management and other key stakeholders.

cc: Paul Taylor
    K. Murthy
Expo Management Comments
Subject: Macias Consulting Group’s Draft Performance Audit Report of the Exposition Metro Construction Authority’s Lessons Learned

Dear Ms. Holden:

The Exposition Metro Line Construction Authority (Authority) has reviewed the Macias Consulting Group’s Draft Performance Audit Report of the Authority’s Lessons Learned dated March 20, 2013. The draft accurately represents what occurred on Phase 1 and the lessons learned and adopted on Phase 2. However, while it appears that most of the Authority’s comments to the previous draft dated February 27, 2013 have been incorporated, there remain a few exceptions that the Authority feels are material to the accuracy of the report. The exceptions are as follows:

1. Page 5, 4th, 5th and 7th bullet point where it references oversight, communication and in the 7th bulleted point reads, “building on the communication plan in Phase 1, implementing more effective communication activities between MTA and Expo Construction Authority so that decisions and follow up implementation are addressed.” The Authority commented on the previous draft dated February 27, 2013 that Expo Phase 1 spent over $10M for Metro oversight costs. This information was left out of the final draft.

2. Page 7, 1st bullet point under lesson learned Project Design Changes, reads, “MTA and Expo determined that processes for the review and approval of design submittals must be developed to ensure feedback from Operations, Maintenance and Train Control Systems Departments are properly considered and addressed.” The Authority commented on the previous draft that Expo Phase 1 spent over $10M for Metro oversight costs which included costs for MTA to review all design submittals. There is no mention of the cost of this oversight and design review or the impact of continual turnover of Metro staff on Phase 1 with differing opinions and interpretations of Metro’s own design requirements.
3. Page 7, 1st bullet point under Phase 2 Corrective Actions where it reads, "Fire-Life Safety staff explained the meetings have led to added assurance that their requirements and safety criteria are incorporated into the design of Phase 2 as early in the process as possible." The Authority commented on the previous draft to add to the end of that sentence, "not after the construction is completed." Fire Life Safety also needs to clarify their design criteria so there isn't such a big variation of interpretations during the design and construction of a project.

4. Page 10, Footnote 6, reads "Metro staff questioned the cost-effectiveness of this approach given that the nature of the project is a rail line and key features of the Phase 1 project could have been utilized in Phase 2." The Authority commented on the previous draft to omit this comment / footnote because it is not a "corrective actions" rather just an opinion of the MTA.

5. Page 12, Figure 3, last line reads "less fixed cost of vehicles, $1,309,058,000 and 14.06% percentage." The Authority commented on the previous draft to revise to read "less fixed cost of vehicles and MTA holdback" of $252.18M in fixed costs resulting in $1,258.8M of variable costs and a contingency percentage of $14.62%.

6. Page 13, 1st paragraph under MTA Project Management and Expo Management Systems Were Not Robust. The 4th sentence reads, "There was not a formally designated MTA individual tasked as project manager that would provide full oversight on the Phase 1 project, including formally meeting with Expo staff on a regular basis." The Authority commented on the previous draft dated February 27, 2013 to add after this sentence, "However, there were bi-monthly and monthly meetings from the inception of the project with MTA staff to discuss all aspects of the project. The Authority spent over $10M on MTA's oversight and review."

It appears there is a common theme in the exceptions noted above, that there was significant input and oversight from MTA throughout the development of the project. Based on the above, we would appreciate if you would make the noted corrections before the final audit report is published.

If there are any questions regarding this response please contact Eric O'Connor at (213) 243-5618.

Sincerely,

Richard D. Thorpe, P.E.
Chief Executive Officer

RDT/eoc
Cc: Samantha Bricker
    Eric O'Connor
    Eric Olson
    Document Control