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December 5, 2008

Mr. H. Dale Hemmerdinger  
Chairman  
Metropolitan Transportation Authority  
347 Madison Avenue  
New York, NY 10017

Re: Report 2008-F-27

Dear Mr. Hemmerdinger:

Pursuant to the State Comptroller's authority as set forth in Article X, Section 5 of the State Constitution, we have followed up on the actions taken by officials of the Metropolitan Transportation Authority Bridges and Tunnels (B&T) to implement the recommendations contained in our audit report, *Capital Project Planning and Cost Estimation* (Report 2003-S-58).

**Background, Scope and Objective**

Metropolitan Transportation Authority (MTA) Bridges and Tunnels (B&T) operates seven bridges and two traffic tunnels in New York City. Vehicles using these facilities are charged tolls that support B&T's operating expenses and capital program. The capital program is implemented through five-year capital plans and the capital plan for 2005 - 2009 is budgeted at \$1.209 billion. B&T's engineers identify individual projects for possible inclusion in the Capital Plans and try to develop general work plans, including cost estimates, for each proposed project.

Once the Capital Plan is approved by the MTA Board of Directors, design consultants help B&T to finalize work plans and cost estimates for each project on the plan and to prepare bid specifications. After a contract has been awarded for a project and work on the project has begun, the contract may be amended to address the need to perform unplanned work or to purchase additional quantities of an item. In such instances, a change order is issued for the additional work and/or additional purchases, and the contractor is usually paid an additional amount.

Our initial audit report, which was issued on October 18, 2005, examined whether B&T (1) accurately estimated the final cost of individual capital projects, (2) could have reduced the number of change orders through better planning practices, and (3) complied with the cost estimation procedures contained in the Engineering and Construction Manual. We found that B&T both underestimated and overestimated the cost of many of the projects by 10 percent or more. We examined the documentation relating to change orders and found that some could have been avoided if better planning practices had been used by B&T. For example, numerous change orders resulted from deficiencies in defining the scope of the project or surveying the work site. We noted that

B&T usually follows the final cost estimation procedures contained in its Engineering and Construction Manual, however we found that the cost estimating practices of B&T's design consultants are not always reviewed for appropriateness, as is required by these procedures.

The objective of our follow-up was to assess the extent of implementation as of August 7, 2008 of the eight recommendations included in our initial report.

### **Summary Conclusions and Status of Audit Recommendations**

We found that B&T officials have made some progress in correcting some of the problems we identified. However, additional improvements are needed. Of the eight prior audit recommendations, four recommendations have been implemented, one recommendation has been partially implemented, and three recommendations have not been implemented.

### **Follow-up Observations**

#### **Recommendation 1**

*Develop a comprehensive action plan for improving the accuracy of the cost estimation process, and monitor progress in improving the accuracy of the estimates.*

Status - Implemented

Agency Action - The Engineering and Construction Department has included specific steps to be followed in their standard requests for proposals (RFP) effective February 2008. These steps complement the Department's established procedures (ECP-201) that were effective September 2004. These RFP requirements provide extensive detail on the cost estimation process such as which forms to use and the organization and development of estimates; which labor rate sources to use; and how to handle cost escalations. During the cost estimation process, the engineers compare line items to historical bid information from NYSDOT data as well as prior B&T data via various web accessed databases. Monitoring of the accuracy of the estimates is accomplished by determining an acceptable range of no less than 90 percent of the lowest responsible bid and no more than 110 percent of the average bid for the project. If the final engineer's estimate (FEE) was outside of this range, it is reviewed to determine why the FEE was different by more than 10 percent.

We reviewed the supporting documentation for three projects and found that this process was followed. We also reviewed the bid versus estimate summary for capital projects in 2007 and the first half of 2008 and found that six of the ten projects reviewed fell within the acceptable range. Both of the projects started in 2008 fell within the acceptable range.

#### **Recommendation 2**

*Establish a quality assurance process for the survey and design phases of capital projects. As part of this process, review individual project plans to determine whether the work site was thoroughly surveyed, cost estimates are appropriate, and all factors that could reasonably be expected to affect*

*project completion have been properly taken into account. Also review the bid specifications to determine whether they are consistent with the project plan.*

Status - Implemented

Agency Action - The Engineering and Construction Department's Design-Build Contractor Quality Management System (Section 1460 D-B) delineates what is required during projects that have been established. Quality Assurance (QA) performs internal audits and quality reviews throughout capital projects. Internal audits are performed on a random sample basis and cover a range of topics, such as compliance with B&T procedures. Quality reviews of design submittals are performed during the design phase of the project, specifically at 70 percent for all projects. We reviewed QA's "Capital & Operating Quality Data Analysis" Report for the first quarter of 2008 as well as various Program Operations documentation for six capital projects. Our review indicated they were in compliance with the procedures.

### **Recommendation 3**

*Hold the design consultant accountable when change orders are issued because of deficiencies in the consultant's work. If the deficiencies are severe enough to question the quality of the consultant's performance, do not accept uncompensated services in lieu of financial penalties.*

Status - Partially Implemented

Agency Action - Each capital contract contains a liquidated damages clause. ECP-217 requires that change orders resulting in more than \$10,000 in excess costs be evaluated to determine the source of the change. If the design consultant is found to be culpable, they are assessed damages. During the period January 1, 2004 through July 18, 2008, six potential Errors/Omissions analyses were completed with two resulting in settlements. While B&T has not used uncompensated services in lieu of financial penalties since the audit report was issued, they have not eliminated its use as an alternative.

### **Recommendation 4**

*Take action to improve the accuracy of "as-built" drawings.*

Status - Implemented

Agency Action - B&T hired a consultant to update the drawings to reflect "as-built" conditions. The technical services group maintains a database of all facility drawings with "red-line" corrections. These drawings are also maintained in a searchable database. When changes are made at the facility, both the filed drawings and the database are corrected to reflect actual conditions. This process is ongoing at this time.

### **Recommendation 5**

*Ensure that the design consultant's estimating practices are reviewed by the Manager of Cost Estimating, and the reviews are documented.*

Status - Implemented

Agency Action - The design consultant who will prepare the estimate and B&Ts cost estimation representative attend the design kick-off meeting (where the design contract is officially awarded). The estimating procedures required by the manual are supplied to the consultant and discussed at that meeting. This is documented in the meeting minutes and signed off by the meeting participants. We reviewed the minutes for five of these meetings and found that the procedures were being followed.

### **Recommendation 6**

*Ensure that the interval between the bid opening and the submission of the Engineer's Final Estimate complies with the Manual. If necessary, modify the Manual to allow a shorter interval in certain specified circumstances. If a shorter interval is to be allowed in certain circumstances, require that these circumstances be documented.*

Status - Not Implemented

Agency Action - B&T eliminated the five day requirement but did not replace it with another time frame for submission of the engineer's final estimate. They advised us that the five days was an arbitrary length of time chosen when the procedure was established and has since been determined to be unnecessarily long. They added that if the reviews cannot be completed at least by the day of the opening, the opening can be postponed.

Eliminating the interval between the bid opening and submission of the engineer's does not address the recommendation because it allows for the final estimate to be submitted as late as the day of the bid opening, thus allowing no time for the review. The position that the bid opening can be postponed if the review is not completed by the bid opening may not be a reasonable alternative because it can impact the progress of the award process. We urge B&T officials to establish a specific interval to ensure there is time for final review of estimates before the bids are opened.

### **Recommendation 7**

*Revise the Manual to specify the circumstances in which a project may be fast-tracked, and to describe the alternative procedures that are to be followed to ensure such projects are subject to sufficient review.*

Status - Not Implemented

Agency Action - The Manual was not revised to specify circumstances when a project may be fast-tracked. The Engineering and Construction Department Procedures (ECP-301) were updated to address review meetings, but this does not address the recommendation. Since the initial audit was issued, only one project has been placed in the fast-track category.

### **Recommendation 8**

*Ensure that the design consultant's cost estimates are reviewed by the Engineering and Construction Department at the points specified in the Manual.*

Status - Not Implemented

Agency Action - B&T does not review design consultants' cost estimates at the points (10%, 40%, 70%, 95% and 100%) which are specified in the manual for each project. B&T officials stated that these are only recommended review points and their use is dependent on circumstances. Procedure 5.1 of number 301, revision 5 dated June 22, 2007 only requires that there be a minimum of one design review and that it is up to the engineer or project manager to determine if additional design reviews are necessary for a project. Furthermore, procedure 5.5 of number 201, revision 3 dated September 30, 2004 indicates that this is a "low priority task" and is not a constraint on proceeding to the further stages of the design process. However, if meetings are not held, the reasons therefore should be documented.

We reviewed three projects to determine if B&T officials reviewed the projects at the points specified. We found that they were not. No project was reviewed at 10%, 40% or 95%, one was reviewed at 70% and three were reviewed at 100%. There was no documentation of the reasons for not reviewing these projects at any other recommended points, as required.

Major contributors to this report were Robert Mehrhoff, Erica Zawrotniak, Peter Schmidt, Altagracia Rodriguez, and David Schaeffer.

We would appreciate your response to this report within 30 days, indicating any actions planned to address the unresolved issues discussed in this report. We also thank the management and staff of Bridges and Tunnels and the Metropolitan Transportation Authority for the courtesies and cooperation extended to our auditors during this review.

Very truly yours,

Carmen Maldonado  
Audit Director

cc. Elliot Sander, Executive Director, MTA  
Michael Fucilli, Auditor General, MTA  
Thomas Lukacs, Division of the Budget