New Jersey State Legislature
Office of Legislative Services
Office of the State Auditor

Department of Transportation
Bridge Maintenance Activities

July 1, 2008 to August 31, 2010

Stephen M. Eells
State Auditor
The Honorable Chris Christie  
Governor of New Jersey

The Honorable Stephen M. Sweeney  
President of the Senate

The Honorable Sheila Y. Oliver  
Speaker of the General Assembly

Mr. Albert Porrini  
Executive Director  
Office of Legislative Services

Enclosed is our report on the audit of the Department of Transportation, Bridge Maintenance Activities for the period of July 1, 2008 to August 31, 2010. If you would like a personal briefing, please call me at (609) 292-3700.

Stephen M. Eells  
State Auditor  
November 10, 2010
# Table of Contents

<table>
<thead>
<tr>
<th>Section</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>Scope</td>
<td>1</td>
</tr>
<tr>
<td>Objectives</td>
<td>1</td>
</tr>
<tr>
<td>Methodology</td>
<td>2</td>
</tr>
<tr>
<td>Conclusions</td>
<td>2</td>
</tr>
<tr>
<td>Findings and Recommendations</td>
<td></td>
</tr>
<tr>
<td>Consultant Bridge Inspections</td>
<td>3</td>
</tr>
<tr>
<td>Priority Repairs</td>
<td>5</td>
</tr>
<tr>
<td>Construction Orders</td>
<td>7</td>
</tr>
<tr>
<td>Auditee Response</td>
<td>9</td>
</tr>
</tbody>
</table>
Department of Transportation  
Bridge Maintenance Activities  

Scope  
We have completed an audit of the Department of Transportation's bridge maintenance activities for the period July 1, 2008 to August 31, 2010. Our audit included the bridge inspection contracting process, field verifications, repairs, and monitoring of construction orders for bridge maintenance projects funded by the Special Transportation Fund. The primary responsibility of the department's bridge maintenance function is to maintain bridges to ensure the safe and efficient movement of traffic.

On May 26, 2010 the department's Office of Internal Audit issued a report entitled Contract Estimating Process. The objective of that audit was to determine whether the process was effectively and efficiently meeting the needs of the department. The audit concluded that estimators are performing their job responsibilities and recommended that the department work toward meeting their goal of awarding 50 percent of the contracts to the lowest bidder and to be within 10 percent of the engineer's estimate. A second recommendation was made that the department determine why pre-qualified vendors are not bidding on certain contracts. Since the department's Office of Internal Audit recently issued the above noted audit report, we excluded the contract estimating process from the scope of our review.

Objectives  
The objectives of our audit were to determine that consultants contracted to perform inspections of bridges, which fall within the National Bridge Inspection Standards (NBIS) inventory, were being selected in accordance with established policies and procedures, that field verifications of inspected bridges are being conducted as required, and that emergency and priority repairs identified during inspections were addressed within the specified time frames. We also tested for resolution of the significant condition involving the Construction Order Tracking System (COTS) noted in our report issued April 27, 2006.
This audit was conducted pursuant to the State Auditor's responsibilities as set forth in Article VII, Section I, Paragraph 6 of the State Constitution and Title 52 of the New Jersey Statutes.

Methodology

Our audit was conducted in accordance with Government Auditing Standards, issued by the Comptroller General of the United States.

In preparation for our testing, we studied legislation, administrative code, circular letters promulgated by the Department of the Treasury, and policies of the agency. Provisions that we considered significant were documented and compliance with those requirements was verified by interview, observation, and through our audit tests. We also read the budget messages, reviewed financial trends, and interviewed agency personnel to obtain an understanding of the programs and the internal controls.

Random and judgmental sampling approaches were used to select items for testing. Our samples were designed to provide conclusions about internal control and compliance attributes.

To ascertain the status of the finding included in our prior report, we identified corrective action, if any, taken by the agency and walked through the system to determine if the corrective action was effective.

Conclusions

We found that consultants were being selected in accordance with established policies; field verifications were being performed as required; and although repairs were being addressed, they were often not started within the specified time frames. In making these determinations, we identified areas where improvements can be made in the current processes which should be considered by management. We also found that the department has not resolved the issue related to COTS noted in our prior report. This issue has been updated in our current report.
Consultant Bridge Inspections

The National Bridge Inspection Standards (NBIS) require that all bridges greater than twenty feet in length be inspected biannually. The department is required to ensure the inspection of state-owned bridges. After a failed county inspection pilot program in fiscal year 2008, the department reacquired the responsibility to oversee the inspections of county-owned bridges. Results of all NBIS bridge inspections are reported to the Federal Highway Administration (FHWA).

During fiscal year 2009, the department’s Bureau of Structural Engineering oversaw 3,767 bridge inspections required by NBIS. Less than 13 percent of these inspections were conducted by the department’s seven in-house inspection teams. In order to complete the bridge inspections for fiscal year 2009, the department contracted with 38 consultant inspection teams. Selection of consultant bridge inspectors is made by the department’s Consultant Selection Committee and is based on qualifications alone. The department’s Professional Services Procurement unit maintains a complex rating system that ranks qualified consultants, which is used to make responsible recommendations to the selection committee.

The FHWA requires that five percent of each bridge inspection teams’ projects be independently field verified subsequent to the final inspection report. This is done to determine the validity of the inspection results. The department voluntarily increased this requirement to ten percent. Adjustments and corrections identified during field verifications are expected to impact the consultant’s ratings in a subsequent procurement cycle.

In calendar year 2009 the department met its self-imposed requirement to field verify ten percent of the inspections performed in calendar year 2008. We reviewed all of the field verification reports and the results indicate that in-house inspections
are more accurate and more successful at identifying priority repairs.

<table>
<thead>
<tr>
<th>2009 Field Verifications of Inspections</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total Verified</td>
</tr>
<tr>
<td>Priorities Missed</td>
</tr>
<tr>
<td>Technical Report Changes</td>
</tr>
</tbody>
</table>

* One priority missed was an emergency that caused immediate closure of the bridge
** A Priority 1 was missed due to heavy vegetation at the time of inspection

We found that the results of the field verifications do not have a timely effect on the consultants' ratings. We reviewed the ratings of the consultants before and after field verifications that identified missed priority repairs. We found two of six of the consultants' ratings were not adjusted for the procurement cycle subsequent to the identified missed priority repair. One of these consultants was selected again in the procurement cycle following an identified missed priority. As of August 31, 2010, the next procurement cycle ratings were not yet available to determine if these consultants' ratings were adjusted.

The FHWA requires the department to submit an annual review each December. This report includes field verification data. We found that the department is conducting the field verifications just in time for the annual report. There is no policy indicating a deadline for field verifications to be performed. Seventy percent of the department's field verifications were performed in November. Although it is reasonable to expect that some field verifications would be performed close to the report date, field verifications should be spread throughout the year to provide more timely results.

In 2003 the department's Division of Budget completed a study comparing the cost effectiveness of conducting bridge inspections using in-house staff versus consultants. The division updated this study in 2007 and concluded that on average it is 37 percent more cost effective to perform bridge inspections using
in-house staff. The report also stated that there was a 25 percent decline in staff from 1994 to 2006. We found an additional decrease in staff of three engineers, or eight percent, from 2008 to 2009. Because of the workload on the Bureau of Structural Engineering, reduction in staff, and the ongoing state hiring freeze, an increase in the percentage of bridges inspected by in-house staff is currently not reasonable.

**Recommendation**

We recommend the department implement a policy requiring field verifications be performed within a reasonable time period after the completion of a bridge inspection. Adjustments and corrections to the inspection report identified during field verifications should have an immediate and punitive effect on the consultant’s rating. The ratings should be adjusted prior to the next procurement cycle so that management can make a more informed decision. Selection of field verifications, beyond the five percent required by the FHWA, should give consideration to prior field verification results and those bridges that have not had field verifications. Finally, the department should seek approval to increase the staff in the Bureau of Structural Engineering so that the number of consultant inspections can be reduced and an overall savings can be realized.

---

**Priority Repairs**

Department procedures require that emergency and priority repairs be started within the specified time frames after notification of the needed repair as follows:

<table>
<thead>
<tr>
<th>Time Frames for Repairs</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Type</strong></td>
</tr>
<tr>
<td>Emergency</td>
</tr>
<tr>
<td>Priority 1</td>
</tr>
<tr>
<td>Priority 2</td>
</tr>
</tbody>
</table>

The department should perform priority repairs timely and the implementation of the shared repairs database should be expedited.
The department’s Bureau of Structural Engineering (Structural Engineering) maintains a log for all types of bridge repairs reported. The means by which repairs are reported vary, but they come primarily from the annual or biannual inspection report. The department’s Bureau of Maintenance and Operations (Maintenance and Operations) is responsible for ensuring repairs are made; however, they do not have access to the repair log used by Structural Engineering. Instead, Maintenance and Operations relies on memos sent via email from Structural Engineering when a repair need arises. These memos are used to update a separate repair log maintained by Maintenance and Operations. When the repairs are completed, Maintenance and Operations will update their repair log and notify Structural Engineering. However, a start date is not included with the information forwarded to Structural Engineering. Therefore, management is unable to assess compliance with the established time frames.

The use of two separate systems to track the status of repairs has resulted in inaccurate and incomplete records, and has been documented by the department’s Office of Internal Audit and FHWA as inefficient. The department’s Applications Development and Systems Support Bureau approved a project in April 2008 to implement an intranet based application to allow for a shared tracking of emergency and priority repairs. The system had not been put into operation as of August 31, 2010.

We obtained the Structural Engineering cumulative emergency and priority repair log from May 2008 to February 2010. The log identified 64 Emergency, 365 Priority 1 and 401 Priority 2 type repairs. We sampled each type of repair from this log. We found 47 percent of Priority 1 and 50 percent of Priority 2 repairs exceeded the specified time frame to begin corrective measures. We also found 13 percent of Priority 1 and 10 percent of Priority 2 repairs that did not have start dates recorded. We identified
inaccuracies in the priority repair log, which diminishes its effectiveness as a management tool. Six percent of emergency, thirty percent of Priority 1, and twenty percent of Priority 2 repairs had incomplete or inaccurate data in the repair log. These inaccuracies are the result of a breakdown in or lack of communication between the two bureaus.

**Recommendation**

We recommend the department expedite the implementation of the shared repairs database and ensure emergency and priority repairs are addressed within the established time frames.

**Construction Orders**

The department developed the Construction Order Tracking System (COTS). COTS was expected to produce exception and status reports relating to construction orders; identify potential problems; track trends that could have an impact on the program’s cash flow position; and allow management to identify areas for which work improvements or procedural changes could be implemented to reduce the number of changes required on future projects.

Our report dated April 27, 2006 noted that management was not fully utilizing COTS and a backlog in data entry existed. Management responded that the system was outdated and that they intended to replace it with SiteManager in the Fall of 2007.

Data entry into COTS remains a required step in the department’s procedural manual. However, we observed that the department stopped using the system entirely around the time that SiteManager was expected to go on-line. Implementation of SiteManager has been continually delayed because of a request to conduct a data cleanup, additional partnerships created that were expected to provide enhancements to SiteManager, required
customizations, lack of staff dedicated to the project, licensing issues, and retirement of key personnel who were deeply involved in the project.

Management has not provided any guidance for its three regions to track construction orders. As a result, each region has developed their own method of tracking and reviewing construction orders. We retrieved and reviewed the logs from the North, Central and South regions and found a lack of consistency, and the logs presently used do not provide the level of information that would have been collected in COTS. The regions are tracking the information primarily to ensure that their construction order requests are processed and authorized timely.

**Recommendation**

We recommend that the department update their procedures manual. We also recommend that management work with the regions to develop a single methodology of tracking construction orders that will provide usable information that can be uploaded to SiteManager once it is implemented.
November 1, 2010

Stephen M. Eells, State Auditor
Office of the State Auditor
P.O. Box 67
Trenton, NJ 08625-0067

Subject: New Jersey Department of Transportation
Bridge Maintenance Activities – OLS Audit (July 1, 2008 to August 31, 2010)
Auditee Response to Audit Recommendations

Dear Mr. Eells:

Staff in the Capital Program Management unit has completed a review of two of the three “findings and recommendations” identified in the report. Those findings and recommendations are “Consultant Bridge Inspections” and, “Construction Orders.” Staff in the Maintenance and Operations unit has completed a review of the finding and recommendation called “Priority Repairs.” Analyses have been conducted and the New Jersey Department of Transportation offers the following responses to these specific recommendations.

Consultant Bridge Inspections: NJDOT’s current policy is that the inspection team responsible for reviewing the inspection reports for an assigned Consultant Project must field verify approximately 10 percent of the bridges in the project. The verification is accomplished by taking the inspection report to the bridge site and checking Structural Inventory & Appraisal (SI&A) data as well as PONTIS (element level) data with field conditions.

The Team will also check field notes and photos to ensure that all defects were properly identified and all Priority letters written in the specified time required by our current policy. The Team is required to document any inconsistencies and provide a memo for the FHWA Annual Review file. The Consultant is also copied on these findings and a meeting is held if it was found that a significant defect was overlooked. These findings are then considered when performing the annual Consultant Evaluation System (CES) ratings in October of each year.

One of the comments made in the report is that most of the field monitoring done in 2009 was not done until November which is one month after the CES ratings are done. It should be noted that only one CES rating is done per Agreement or Addendum (second cycle) and will only be done if the Consultant has submitted his final invoice for the Project. Therefore a Consultant may or may not receive a CES score depending on the status of the project. The reason for the
delayed field monitoring is mostly due to the significant existing work load in the unit, new responsibilities added over the past two years, and loss of staff.

The Department agrees with this recommendation and will immediately set forth a policy in Structural Evaluation to perform field monitoring of Consultant and In-House bridges throughout the year as close to the inspection date as possible. Please note that the monitoring cannot take place until the inspection report is submitted. We will incorporate this new policy into our Quality Assurance/Quality Control policy in our Structural Evaluation Procedures Manual.

**Priority Repairs:** Operations & Maintenance is in agreement with all findings. The client application referred to in the report is operational. It will be used by the Structural Evaluation unit to enter priority bridge repair data and eliminate the need for paper memos. This will result in greater consistency since all units will use the same database to enter bridge data.

The application is on the Intranet and went live in July 2010. The Structural Evaluation unit can now enter a priority work order and then Operations will get an alert that it is in the system. Operations can then assign it to a Resident Engineer and track type of repair, duration, cost, etc. With the advent of the new application individual units will no longer have to keep separate records.

**Construction Orders:** Several issues were raised in the report related to tracking change orders in the Construction Order Tracking System (COTS). Although data entry into COTS is a required step in the Department’s procedural manual, auditors observed that the Department stopped using the system around the time that SiteManager was expected to go online.

The Division of Construction will update the Construction Procedures to eliminate the requirement for data entry into COTS, and will work to develop a single change order tracking system that can be integrated into SiteManager and can be applied in each of NJDOT’s three operating regions. SiteManager is scheduled to become operational in spring 2011.

Respectfully submitted by:

Richard T. Hammer
Assistant Commissioner
Capital Program Management