Internal Audit Report

Construction Inspection Program

TxDOT Internal Audit Division
Objective
To determine if an adequate process exists to ensure sufficient coverage and qualifications to inspect construction work.

Opinion
Based on the audit scope areas reviewed, control mechanisms require improvement and only partially address risk factors and exposures considered significant relative to impacting reporting reliability, operational execution, and compliance. The organization's system of internal controls requires improvement in order to provide reasonable assurance that key goals and objectives will be achieved. Significant improvements are required to correct control gaps and mitigate residual risk that may result in potentially significant negative impacts to the organization including the achievement of the organization's business/control objectives.

Overall Engagement Assessment
Needs Improvement

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<th>Findings</th>
<th>Control Design</th>
<th>Operating Effectiveness</th>
<th>Rating</th>
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<td>Finding 1: Construction Inspector Training</td>
<td>X</td>
<td>X</td>
<td>Needs Improvement</td>
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<tr>
<td>Finding 2: Construction Engineering and Inspection Contractor Evaluation</td>
<td>X</td>
<td>X</td>
<td>Unsatisfactory</td>
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Management concurs with the above findings and prepared management action plans to address deficiencies.

Control Environment
The Construction Inspection Program is directed operationally by each TxDOT district and is overseen organizationally by Construction Division (CST). The districts are responsible for determining inspection staffing coverage and training needs.

In order to supplement internal inspector resources, Construction Engineering Inspection (CEI) contractors are utilized. CEI resources are procured through collaboration between the Professional Engineering Procurement Services Division (PEPS) and the districts. District Project Managers are responsible for monitoring and providing evaluations of each CEI contractor’s performance.

Inspections are to be completed in accordance with Federal Highway Administration guidelines and TxDOT Standard Specification for Construction and Maintenance of Highways, Streets, and Bridges. Performance of inspections is documented by means of Daily Work Reports (DWRs) within SiteManager for both internal and CEI hired inspectors.
Summary Results
Audit testing completed requiring management action.

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<th>Finding</th>
<th>Scope Area</th>
<th>Evidence</th>
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| 1       | Construction Inspector Resource Qualifications | Thirty-nine internal inspectors were randomly sampled from the 968 total inspectors statewide and were reviewed to determine whether they met training requirements: 
- 32 of 39 (82%) inspectors selected had not completed either one or more of the following required training courses in Fiscal Year (FY) 2016  
  - Nuclear Gauge Transportation Overview  
  - Basic Nuclear Safety  
  - Hot Mix Level 1-B HMA Roadway Specialist  
  - Soils and Flexbase Field Specialist  
  - 11 different Storm Water Pollution Protection Plan (SW3P) environmental courses  
  A sample of twelve Daily Work Reports (DWR) was reviewed for completeness:  
  - 4 of 12 (33%) DWRs tested did not include required information/data to meet TxDOT standards |
| 2       | Construction Inspector Resource Qualifications | A random sample of CEI contracts from all districts with active CEI contracts during FY 2016 was reviewed and the following was noted:  
- 23 of 23 (100%) districts were not able to provide a documented process for monitoring CEI inspection work  
- 115 of 120 (96%) CEI FY 2016 contracts did not have provider evaluations completed by the district Project Manager to provide an assessment of their performance |

Audit Scope
The audit was performed by Alberto Calderon, Charlita Freeman, Timothy Owen, Monica Washington, and Casey Kopcho (Engagement Lead). The audit was conducted during the audit period from September 1, 2016 to November 30, 2016. Inspection results were reviewed for FY 2016, as well as, inspection observations during the first quarter of FY 2017.

Construction inspection staffing was evaluated to determine whether an adequate process existed to provide sufficient staffing coverage statewide. Additionally, qualifications of construction inspection resources were reviewed to determine if inspectors had adequate
experience and training to perform their work. Inquiry and documentation review was performed at all twenty-five TxDOT districts. A sample of TxDOT inspectors was selected from 968 TxDOT employees identified as conducting construction inspections during FY 2016 for adequacy of training and certifications. Inspector qualifications were also tested through observations at six districts of both CEI and TxDOT staff performing and documenting inspections.

Methodology
The methodology used to complete the objectives of this audit included:

- Reviewed TxDOT internal documents, including Construction Division (CST) policy and procedure manuals, organization charts, and Daily Work Reports (DWRs).
- Reviewed Texas Transportation Codes and Title 23 Code of Federal Regulations (CFR) – Highways to identify applicable state and federal laws and regulations.
- Reviewed prior audit reports from TxDOT’s Internal Audit Division, Texas State Auditor’s Office, and the following state transportation agencies: Arizona, Connecticut, Florida, and Kentucky.
- Evaluated control design and operating effectiveness of the Construction Inspection Program.
- Conducted interviews with key personnel in TxDOT Construction Division and within the 25 districts to understand the processes for assigning, performing, and reviewing construction inspections.
  - Performed data analysis of statewide inspector coverage on active contracts.
- Judgmentally selected 6 districts to visit based on construction project spending and CEI contract utilization.

Background
This report is prepared for the Texas Transportation Commission and for the Administration and Management of TxDOT. The report presents the results of the Construction Inspection Program audit which was conducted as part of the Fiscal Year (FY) 2017 Audit Plan.

The Construction Inspection Program was established by the Construction Division (CST) to maintain the quality of projects within TxDOT and Federal Highway Administration guidelines by means of on-site inspection staff. These inspections are performed by either TxDOT employees or a third-party contractor. Inspections consist of reviewing construction work to assure work meets minimum quality standards as established in the 2004 and 2014 Standard Specifications for Construction and Maintenance of Highways, Streets, and Bridges and notifying the contractor of any deficiencies to be addressed. Inspections also consist of testing materials according to timeframes established within the Guide Schedule of Sampling and Testing to assure quality of the materials used for construction work.

At the end of FY 2016, TxDOT had 968 employees assigned to perform inspection duties covering a total of $15 billion in construction projects across the state. CST and the districts, to supplement the inspector workforce, have increased usage of Construction Engineering Inspection (CEI) contracts to provide additional inspection support. CEI contracts add resources by outsourcing the inspection of construction contracts, thus allowing TxDOT to manage more projects in a given period of time. In FY 2014, TxDOT executed 15 CEI contracts.
contracts valued at approximately $75 million. By FY 2016, that number had grown to 114 CEI contracts valued at approximately $515 million.

We conducted this performance audit in accordance with Generally Accepted Government Auditing Standards and in conformance with the International Standards for the Professional Practice of Internal Auditing. 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. Recommendations to mitigate risks identified were provided to management during the engagement to assist in the formulation of the management action plans included in this report. The Internal Audit Division uses the Committee of Sponsoring Organizations of the Treadway Commission (COSO) Internal Control – Integrated Framework version 2013.

A defined set of control objectives was utilized to focus on operational and compliance goals for the identified scope areas. Our audit opinion is an assessment of the health of the overall control environment based on (1) the effectiveness of the enterprise risk management activities throughout the audit period and (2) the degree to which the defined control objectives were being met. Our audit opinion is not a guarantee against operational sub-optimization, or non-compliance, particularly in areas not included in the scope of this audit.
Detailed Findings and Management Action Plans (MAP)

Finding No. 1: Construction Inspector Training

Condition
Districts were not monitoring to ensure construction inspectors had completed the required training courses prior to performing inspections.

Some inspectors performed inspections for which they did not have the proper training or did not complete required Daily Work Report (DWR) information.

Effect/Potential Impact
Without completion of inspector training, proper asset quality checks may not be completed which would put those construction assets at uncertain risk. If project work is not inspected per federal and state guidelines, poor asset quality may result which would increase the risk of failure and potential harm to the traveling public, thus, increasing the agency liability and costs.

Criteria
The TxDOT Inspector Development Program (IDP) was established to provide recommended and required trainings to assist inspectors in learning specific topics necessary to inspect projects and maintain expected standards of quality. Title 23 Code of Federal Regulations (CFR) part 637 requires TxDOT maintain a construction inspection program to identify items that may reflect the quality of the finished product.

In addition, the TxDOT Guide Schedule of Sampling and Testing also provides quality assurance procedures for certification requirements.

Cause
Eight districts report they do not utilize the Inspector Development Program. All twenty-five districts had no written or sustainable policies and procedures in place to establish how they monitor and document inspector training and qualifications. In addition, the TxDOT Inspector Development Program Handbook was reviewed and determined not to have been updated since 2011.

Evidence
A random sample of 39 inspectors from the 968 total inspectors statewide was reviewed to determine whether those inspectors had completed the required IDP training courses as listed below. The following was identified:

- 32 of 39 (82%) inspectors selected had not completed either one or more of the training courses noted below:
  - Nuclear Gauge Transportation Overview
  - Basic Nuclear Safety
  - Hot Mix Level 1-B Roadway Specialist
  - Soils and Flexbase Field Specialist
  - 11 different Storm Water Pollution Protection Plan (SW3P) environmental courses
From the above random sample of 39 inspectors, an additional random sample of 10 inspectors were selected to determine if they had completed the training and certifications required for inspections they performed during the month of August 2016. It was noted that:

- 1 of 10 (10%) inspectors performed inspections for which they did not have the required certification during the month of August 2016

To determine the adequacy of training of inspectors, a judgmental sample of 12 inspectors were observed performing inspections and their Daily Work Reports (DWR) were reviewed for completeness of required fields. The following was noted:

- 4 of 12 (34%) DWRs tested did not correctly include required information to meet TxDOT standards such as weather conditions, instructions given to contractor, contractor work hours, contractor’s equipment and utilization, safety concerns and SW3P information

Management Action Plan (MAP):

**MAP Owner:**
Joe S. Graff, P.E., Construction Section Director, Construction Division

**MAP 1.1:**
Construction Division (CST) will work to update IDP training materials to reflect the requirements of the 2014 specifications and will submit proposed updates to subject matter experts for review. The updated trainings materials will be then published to the Inspector Development Program website.

**Completion Date:** September 15, 2017

**MAP Owner:**
Brett T. Haggerty, P.E., Materials and Pavements Section Director, Construction Division

**MAP 1.2:**
Construction Division will modify SiteManager to capture inspector training and certifications and will create a system control to disallow inspectors to upload results without having the required certifications in place. CST will communicate the updated process to the districts and will verify during District Laboratory accreditation reviews to ensure the system is working as designed.

**Completion Date:** August 15, 2017
Finding No. 2: Construction Engineering and Inspection Contractor Evaluation

Condition
Evaluations of Construction Engineering and Inspection (CEI) contractors were not completed to assess the quality of the contractor and the performance of its inspectors.

Effect/Potential Impact
Not completing CEI evaluations exposes TxDOT to asset quality risk because potential inadequacies in CEI contractors’ performance may not be identified timely. Poor asset quality increases the risk of potential harm to the traveling public and increases the agency’s liability and costs.

Criteria
Professional Engineering Procurement Services’ (PEPS) manual Contracting: Contract Management for the Project Manager states CEI evaluations should be completed at least annually.

Cause
PEPS has developed a design recommending evaluations of CEI contractors, however, that design does not include a process to monitor or require the completion of performance evaluations. In addition, there were no formal plans at the districts to monitor CEI contractors or provide the performance evaluations as required by the PEPS Contracting manual.

Evidence
Twenty-three districts were queried to determine their processes for monitoring and evaluating CEI performance, the following was noted:

- 23 of 23 (100%) of districts were not able to provide a documented process to indicate performance was monitored on CEI contracts
- 115 of 120 (96%) CEI Fiscal Year (FY) 2016 contracts did not have provider evaluations completed by the district Project Manager to provide an assessment of their performance

Management Action Plan (MAP):

MAP Owner:
Lucio Vasquez, Deputy Director, PEPS

MAP 2.1:
- PEPS will modify the existing provider evaluation template to improve on its usability and effectiveness. There are two major tasks to accomplish:
  - Revised template based on survey input from end-users. In addition, PEPS will revise the scoring for each criteria, and
  - Remove the existing consultant contract evaluation system from mainframe (CCIS) and place it on an independent system (PS-CAMS).
- PEPS will draft a memo to go out from the Chief Engineer to the District Engineers on completing the Prime Provider Evaluations. The memo will enforce the TxDOT Project Managers to adhere with the existing PEPS procedure of completing an evaluation for
the consultant contract's Project Manager and the firm, along with performing evaluations annually, at a minimum, and more frequently if there are issues with the work performed.

- PEPS to provide electronic notification to TxDOT Project Managers to alert them of the Prime Provider Evaluation due dates.
  - Evaluations should at least be conducted annually, at a minimum, and more frequently if problems exist. If the work authorization (WA) duration is less than a year, the provider evaluation should be conducted at the completion of the WA.

**Completion Date:** September 15, 2017
Observation and Recommendation

Audit Observation (a): Construction Inspector Coverage
Not all districts have a documented method or approach in determining their inspection coverage for construction projects. Additionally, TxDOT has not identified sustainable tool(s) or technique(s) that could be used by all districts in the determination of inspection coverage prior to the utilization of Construction Engineering Inspection (CEI) contracts.

Effect/Potential Impact
Without a documented, sustainable, and/or transparent tool or technique to assist in the determination of inspection coverage for construction projects in the districts, full project completion in areas needing inspection work may be called in to question based on adequacy and/or timeliness of that work per the contract. Failure to effectively analyze the inspector capacity needs for construction projects could also lead to over utilization of CEI contracts at higher contracted rates which may have not been considered during preliminary project cost estimation.

Audit Recommendation
Construction Division (CST) should continue to work with districts to identify or develop tools and procedural techniques to effectively identify adequate inspector coverage for construction projects throughout the state. Once a tool or technique is determined for all districts, it should be documented and shared with Professional Engineering Procurement Services Division to incorporate this inspector capacity analysis into the CEI statewide tool currently in development.
### Summary Results Based on Enterprise Risk Management Framework

#### Audit Results Dashboard
**Construction Inspection Program**

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#### Closing Comments

The results of this audit were discussed with/provided to the Construction Division Director and District Engineers on March 14, 2017. The Internal Audit Division appreciates the cooperation and assistance received from the Construction Division and all districts during this audit.