

CITY OF ALBANY

# Office of Audit and Control

## **Performance Audit** of the City's **Street Paving and Maintenance** **Programs**

**Audit Report**  
**May 2012**

Leif Engstrom  
Chief City Auditor



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## PREFACE

The Office of Audit and Control exists to provide oversight, transparency and public accountability as a means to improve City services. This performance audit is a part of that function.

When the Office of Audit and Control takes on an audit client and, absent evidence of misconduct, that client addresses the audit's findings; it is our commitment to support and encourage their use of the audit process to improve their operations.

This audit was conducted with the full cooperation of the Department of General Services and the Commissioner has committed to addressing its findings.

The proper use of the audit findings in these circumstances is to provide for oversight of the resulting changes and as the basis for informed public policy discussions.

Given that the Department of General Services has given their full cooperation, it would be unfair and damaging to the audit process for this audit's findings to be used for political gain. As such, the Office of Audit and Control will view the political use of this audit's findings as detrimental to our mission.

We thank the Department of General Services for their cooperation and commitment.

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## Executive Summary

*DGS is committed to improving its street maintenance programs on an ongoing basis. They actively look for and implement better technologies, methods, and information management to improve their operations.*

*However, DGS needs to improve its street condition assessment process and start tracking operational performance.*

Each year the City spends well over \$5,500,000 on rebuilding, repaving, and maintaining its streets. While this is a major investment, it does not come close to addressing the City's street condition needs. This reality makes it all the more important that these limited resources be utilized as effectively as possible. To that end, this audit examined the Department of General Services' (DGS) process for the selection and scheduling of streets for paving, maintenance and repair.

DGS is committed to improving their street maintenance programs on an ongoing basis. They actively look for and implement better technologies, methods, and information management to improve their operations. However, DGS is not currently tracking street conditions effectively or monitoring the programs' operational performance.

The following is a summary of each of the three audited functions: street paving, street maintenance, and pothole repair.

### **Street Paving**

DGS repaves streets every year. Some of the streets are repaved by DGS staff through the in-house paving program that was initiated in 2008 while streets requiring more extensive reconstruction are repaved by private contractors.

DGS selects streets for repaving through an annual process. They reported an extensive list of criteria used to make those selections, which are similar to the criteria used by other municipalities.

As a part of the selection process, DGS has contracted with the Capital District Transportation Committee (CDTC) to conduct a street conditions survey every two years. This provides an unbiased evaluation of overall street conditions as well as information on over 4,000 street segments in the City.

The streets that have been selected for repaving in recent years appear to be reasonable based on their CDTC scores. Additionally, the audit team found no indication that the decisions were based on anything other than the listed criteria. However, there was little evidence that the listed criteria were being tracked and used in a centralized, systematic way. That finding combined with the fact that DGS staff described the street selection process as painful and difficult indicates that improved coordination and organization of the

*A key principle of effective street maintenance is “keeping good streets good.”*

*Studies have shown that preventing recently paved streets from falling into disrepair improves road conditions and significantly reduces costs.*

selection criteria would result in better decisions and a more efficient process.

Another factor in effective decision-making is program cost. While DGS does know the material and equipment costs for the in-house paving program, they do not track the staff time used to pave the streets. Without this information it is impossible to do most cost benefit analyses for the streets programs.

### **Street Maintenance**

A key principle of effective street maintenance is “keeping good streets good.” Studies have shown that preventing recently paved streets from falling into disrepair improves road conditions and significantly reduces costs.

DGS recognizes this and has recently upgraded its in-house street crack-sealing program with new machinery and sealing material. Unfortunately, DGS has not developed a system for tracking streets that are in good condition but in need of preventive maintenance. They also do not have a system that would inform them of the most effective allocation of resources between paving, maintenance and repair. This is very similar to the findings for the street-paving program. A centralized street condition tracking system, bought or developed in-house, would enable DGS to better track, plan, and allocate their limited resources.

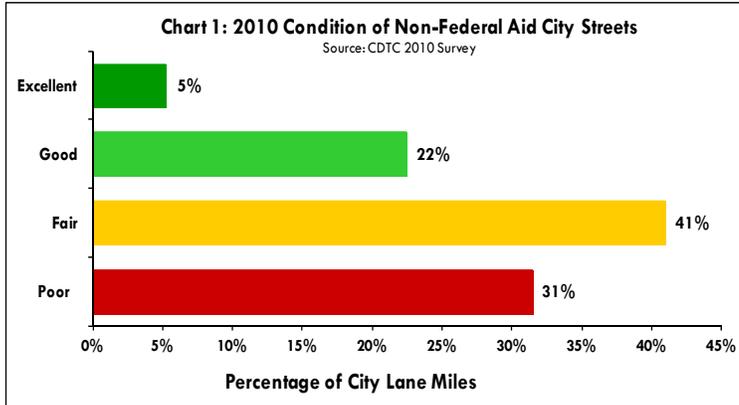
### **Pothole Repair**

Pothole repair is an ongoing aspect of the City of Albany’s street maintenance program. Repairs include the patching of potholes, larger areas of disturbed pavement, depressions, bumps and pavement edge defects. Pothole locations may be reported to the Department of General Services at 434-CITY.

We reviewed pothole complaint records for 2011 for timeliness of pothole repair. Fifty percent of pothole complaints were resolved in two or less days. DGS uses the system to organize complaint response, but the database is not used to generate management reports or track program performance.

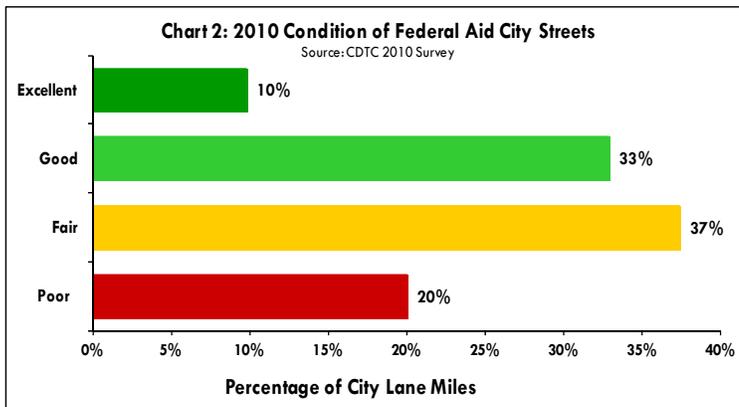
## Background

This audit of the City's street maintenance efforts came about as the result of the Office of Audit and Control's (OAC) citywide risk assessment program. The City's street maintenance program was selected for audit because of the expenses involved, the large value of the assets, the effect streets have on the City's image, the impact streets have on quality of life, and the potential streets have to damage personal property.



There are six hundred and seventy streets (two hundred and fifty miles) in the City and the Department of General Services (DGS) spends well over \$5,500,000 annually on rebuilding, repaving, and maintaining them. The condition of these streets is the primary measure of DGS's success in its streets program and since 2006, the Capital District Transportation Committee (CDTC) has conducted a biennial survey of the City's street conditions.

CDTC is the designated Metropolitan Planning Organization (MPO) for the Albany-Schenectady-Troy metropolitan area. MPOs function as the regional planning organization that coordinates federally and state-funded transportation projects. Under a contract with the City, CDTC evaluates the City streets and roads every two years.



Streets are scored on a scale of one to ten, poor to excellent. DGS has also contracted with Fountains Spatial to incorporate the CDTC data into an Esri mapping program.

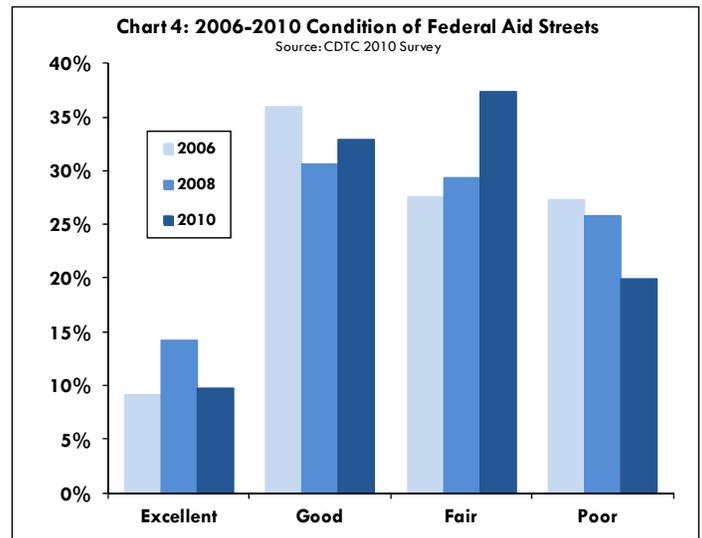
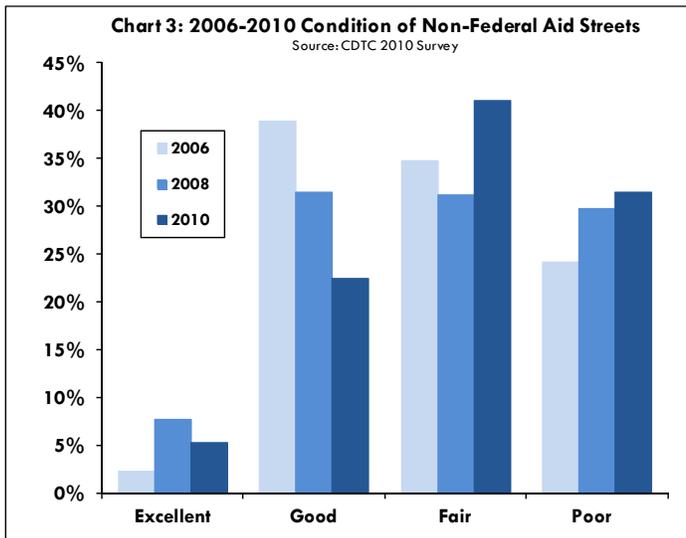
The streets under DGS care fall into two self explanatory funding categories: federal aid streets and non-federal aid streets. The federal aid streets are primarily the main thoroughfares and make up only half the lane mileage of the City's other streets.

While the City makes a significant annual investment in its roads, **Charts 1 and 2** help to demonstrate that it does not come close to addressing the City's street condition needs. In 2010, CDTC rated 31% of the City's non-federal aid streets as in Poor condition. Chart 2 shows that only 20% of the City's streets that qualify for federal aid are in poor condition.

*As a result of recent DGS initiatives, CDTC's analysis may not reflect the current trajectory of the City's street conditions.*

It is no surprise that streets qualifying for federal aid are in better condition than those that do not. In fact it is important to point out that cities in New York State, including Albany, are at a distinct disadvantage as the State maintains all state routes that are outside of cities. As a result, Albany is responsible for the maintenance of all State Routes in the City. The one exception is interstate highways, which are maintained by the State.

**Charts 3 and 4** show that while the federal-aid street-miles rated as Poor has decreased from 27% to 20% between 2006 and 2010, the opposite is true for streets that do not qualify for federal aid. Those streets saw Poor conditions increase from 24% to 31% over the same period.



As discussed in the following sections, DGS has initiated significant changes in recent years. As a result, CDTC's 2006-2010 analysis may not reflect the current trajectory of the City's street conditions.

This audit focuses on three areas of the program: street paving, street maintenance, and pothole repair.

### **Street Paving**

DGS repaves streets every year. DGS staff repaves some of the streets through an in-house paving program that was initiated in 2008. Other streets, that require more extensive reconstruction, are repaved by private contractors.

A team of DGS employees selects streets for repaving through an ongoing annual process. DGS reported that the decision-making process uses the following criteria, which are similar to those used by other municipalities.



***Crack sealing is a best practice. “The benefits (of crack sealing) are realized in three to five years when it becomes obvious that the pavement has not deteriorated.”***

***“Cracking is one of the two main concerns considered in the pavement design process...”***

*Nevada T2 Center, Univ. of Nevada Reno*



- Capital District Transportation Commission’s (CDTC) biennial windshield survey of street conditions
- Requests from the public and staff, and other entities
- Coordination with utilities and other entities
- On site engineering inspections and evaluations
- Evaluations of cost effectiveness
- Physical inspections by DGS road crews
- Available funding

Additional considerations include geographic distribution, bicycle and pedestrian enhancement, public safety and liability, community support, transit, regional and local planning studies, and economic development.

DGS reported that it has a list of about two hundred streets in need of work that is compiled from employee sightings, public complaints and requests from residents. The DGS team decides on approximately seventy streets and engineering visually inspects and evaluates them to determine which can be paved in-house and which would need to be contracted out.

## **Street Maintenance**

DGS uses crack-sealing as its primary method of preventing streets from deteriorating. Crack sealing is a best practice for pavement maintenance. Nevada T2 Center (Univ. of Nevada, Reno) studies have shown that “The benefits are realized in three to five years when it becomes obvious that the pavement has not deteriorated. In fact, roads that have been crack sealed have better rideability five years later than other surface treatments, such as chip seals, micropaving, thin overlays and slurry seals. In five years these other treatments have come to the end of their life cycle.”

“Cracks need to be treated promptly because they create openings for moisture to penetrate the pavement layers. Moisture or water can cause severe damage when trapped in the crack. Neglecting pavement cracking usually leads to accelerated deterioration of the pavement, resulting in significant problems such as potholes or base failures, which cause the serviceability of the pavement to decline.”

Three years ago DGS significantly increased the use of crack sealant in response to the City Engineer’s recommendation that newly paved roads be inspected and crack sealed. The Commissioner said that prior to this initiative, one pallet of crack sealant was used in a three-week period; after the preventative maintenance program began one pallet of crack sealant is used

weekly. Additionally, in 2010 DGS purchased a new \$33,000 self-contained Crack Sealing machine to expedite the process.

DGS reported that a crew visually inspects the recently paved streets and evaluates whether the pavement needs crack sealant. According to the DGS, each street wears differently due to use and location so visual inspection is more dependable than maintenance based on the amount of time since a street was last paved.

**Potholes:**

*DGS noted that complaints with longer resolution times (twenty days or more to resolve) are areas that need more work than just filling a pothole.*

*DGS does not currently track initial response times.*

**Pothole Repair**

Pothole repair is an ongoing aspect of the City of Albany’s street maintenance program. Repairs include the patching of potholes, depressions, bumps and pavement edge defects.

Potholes complaints are tracked in a Filemaker Pro database, but potholes identified by road crews are not tracked. DGS reported that there is no standard time for pothole complaint responses, but depending on staffing level and weather, simple potholes are generally filled with in 24 to 36 hours of receipt of complaint.

DGS also noted that complaints in the database with a longer resolution time (twenty days or more to resolve) are areas that need more than just a pothole filled. Cold patch is applied to most potholes as soon as possible, but the resolution date is the date the road is repaired. Extensive repairs have to be scheduled and are dependent on weather and manpower. DGS also explained that there are pothole complaints with resolution dates earlier than the complaint date. These were complaints that were received and entered into the database after the pothole had been repaired. When the outliers (over twenty days or less than zero days) are removed from consideration, the average time to repair potholes is 46hours.

| <b>Days to Final Repair- 2011 Potholes</b> |                          |                          |
|--|--------------------------|--------------------------|
| Days                                       | # of complaints resolved | % of complaints resolved |
| (12) to 0                                  | 23                       | 2%                       |
| 0  | 127                      | 12%                      |
| 1  | 205                      | 19%                      |
| 2  | 187                      | 17%                      |
| 3  | 79                       | 7%                       |
| 4  | 87                       | 8%                       |
| 5  | 58                       | 5%                       |
| 6  | 59                       | 5%                       |
| 7  | 47                       | 4%                       |
| 8  | 39                       | 4%                       |
| 9  | 21                       | 2%                       |
| 10 to 19                                   | 92                       | 8%                       |
| 20 to 29                                   | 41                       | 4%                       |
| 30 to 39                                   | 13                       | 1%                       |
| Over 39                                    | 13                       | 1%                       |
|  | 1091                     | 100%                     |

## Scope, Objectives and Methodology

### Objectives

The objectives of this audit were as follows:

1. Evaluate the efficacy of the decision making processes for selecting which streets are repaved and repaired
2. Evaluate the efficiency of the coordination processes used in the paving and maintenance of the City Streets
3. Evaluate the timeliness of pothole repair.

### Scope

The scope of this audit encompassed street maintenance and repairs for 2008 through October of 2011. The scope included street maintenance and paving, and pothole response. It did not include sidewalks, street sweeping and snow plowing. Our audit was conducted between September 2011 and May 2012 in accordance with Government Auditing Standards.

### Methodology

This audit was conducted in compliance with generally accepted government auditing standards issued by the U.S. Government Accountability Office (GAO.)

*The overall audit methodology consisted of the following:*

- Collecting, reviewing, and evaluating DGS data and documentation.
- Conducting meetings and interviews with personnel from the DGS and other experts in the field of street and road maintenance.

#### **1. In order to evaluate the efficacy of the decision making process for selecting which streets are repaired,**

The audit team reviewed the Capital District Transportation Committee's (CDTC) biennial evaluations of the City's streets.

In order to evaluate the street paving selection process, the audit team requested documentation for twenty-two streets that had been recently repaved or that had very low CDTC conditions scores.

We selected streets from the CDTC report with fair scores that were not paved. One of those streets is on the master list of streets

#### **Scope:**

*The scope of this audit encompassed street maintenance and repairs for 2008 through October of 2011.*

#### **Including:**

- *Street paving,*
- *Street maintenance and*
- *pothole response*

#### **Not including:**

- *sidewalks,*
- *street sweeping and*
- *snow plowing*

being reviewed for repair currently. The other street is not a City street and belongs to and is maintained by the Port Authority.

**2. In order to evaluate the efficiency of the coordination processes used in the paving and maintenance of the City Streets,**

The audit team reviewed correspondence to and from National Grid, Time Warner, telecommunication companies, other City departments and public agencies operating within the City.

**3. In order to evaluate the timeliness of pothole repair Maintenance,**

The audit team reviewed and evaluated the 2011 Filemaker Pro pothole data with date of complaint and date of resolution. There were sixty seven records with resolution times of 20 days or more along with 23 records with resolution dates earlier than the complaint date. The audit team followed up with inquiries about both occurrences. The explanation given was complaints with a longer resolution time (twenty days or more to resolve) are areas that need more than just a pothole filled. Cold patch is applied to potholes as soon as possible, but the resolution date is the date the road repair is finally completed. Extensive repairs have to be scheduled and are dependent on weather and manpower. They also explained that the pothole complaints with resolution dates earlier than the complaint date were complaints called in on potholes that had already been repaired.

## Audit Results

### Findings:

#### **Street Condition Evaluations:**

**DGS staff put an extensive amount of work into assessing street conditions. The resulting information should be:**

- **Standardized to provide for better comparisons.**
- **Centrally stored for easy access and comparison.**
- **Well documented to reduce duplicate trips and evaluations.**

#### **Program Costs:**

**In order to assess or project the success of DGS's new initiatives, accurate costs should be identified for each major program. In order to do this staff time needs to be recorded by major program area.**

### **1. The selection process of streets for repaving or maintenance is cumbersome and road condition data is not centrally maintained.**

The process for selecting streets for paving or repair should be well organized and analytical. The evaluations of conditions should be recorded on standard forms and centrally maintained in order for the evaluation process to be efficient and effective.

The critical records for this process are not centrally maintained and standardized forms are not used by DGS staff when they evaluate street conditions. With information being stored in various locations, it is quite possible that some of the needed information is not being considered while the information that is considered is being gathered through an unnecessarily laborious process.

**Recommendation:** Procure a road surface management software system (RSMS)\* or develop a centralized internal system using existing ESRI and/or other spreadsheets or databases. Uniform road condition reporting sheets should be developed along with procedures for storing pictures of the conditions. This information needs to be loaded (with dates) into whatever system is developed. The information in the system should be maintained on a timely basis and readily available to all relevant staff.

\*PWS RSMS Software (UNH) is ESRI compatible and provides tools for efficient road condition tracking ADA compliance, and cost of repairs and maintenance. Cornell is developing an updated version of their RSMS program that could be competitive with the UNH program.

### **2. The cost of the pothole repair, crack sealing, and street paving programs are unknown.**

Staff hours and other significant costs for every major activity should be tracked. The costs associated with time, equipment, and materials are information that should be used in planning work, budgeting, cost benefit analysis, and performance analysis.

The staff time applied to the in-house paving program, crack-sealing, and pothole repair programs is not currently being tracked. The staff who perform these duties divide their time between these other activities. It is very difficult to assess the success of a program without knowing the amount of labor involved.

Overall material costs are known for street paving, crack-sealing, and pothole repairs. However other than pothole complaints, DGS does not track the number of potholes repaired, the labor, material, or equipment cost in relationship to the amount of work done.

*Recommendation:* Work with Engineering to determine labor, machinery and material costs for each of these programs for improved planning and performance measurement.

**Coordination with Utilities:**

**Correspondence documenting coordination with utilities and other entities should be centrally stored and available to relevant staff. This would provide for:**

- **Better coordination with external organizations**
- **Better continuity in the event of unexpected changes in personnel**

**3. Some records of correspondence related to the coordination of repair and maintenance of streets were not available for review.**

Records that document the coordination and selection process of street repair and maintenance are important to the Department's planning process. This information should be readily available for review by all affected staff. A lack of continuity for this information can result in duplicate work.

Due to changes in personnel and a lack of central recordkeeping, some records were unavailable for review by the audit staff.

*Recommendation:* Correspondence relating to street selection for paving, and coordination of repair and maintenance of streets between City Departments, Utilities, and Public Agencies should be stored in a central shared file.

**4. Documentation of street condition evaluations was not available for review.**

DGS staff conducts extensive and ongoing evaluations of the City's streets. This work is extensive and at the core of the street planning process. Street condition evaluations should be documented on standardized forms (paper or digital) and stored in a central shared file for reference and analysis by all affected staff.

DGS staff was unable to produce documentation of the evaluations done for the streets requested by the audit team.

*Recommendation:* Document street condition evaluations and meetings to work on the selection process of streets for repair and repaving or reconstruction.

## APPENDIX 1-A

### Management Response



CITY OF ALBANY  
DEPARTMENT OF GENERAL SERVICES

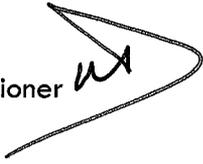
GERALD D. JENNINGS  
MAYOR

NICHOLAS D'ANTONIO  
COMMISSIONER

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**MEMORANDUM:**

TO: Leif Engstrom, City Auditor

FROM: Nick D'Antonio, DGS Commissioner 

DATE: May 22, 2012

RE: Response to Performance Audit dated May 2012

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RECEIVED  
MAY 21 2012  
OFFICE OF THE COMMISSIONER

DGS is pleased to respond to the Performance Audit of the City's Street Paving and Maintenance Program. We appreciate the independent review and thoroughness of the work of the Office of Audit and Control. The audit makes four recommendations for improvements, which DGS supports. We offer the following responses to the specific recommendations.

*Recommendation No. 1: Procure a road surface management software system (RSMS) or develop a centralized internal system using existing ESRI and/or other spreadsheets or databases. Uniform road condition reporting sheets should be developed along with procedures for storing pictures of the conditions. This information needs to be loaded (with dates) into whatever system is developed. The information in the system should be maintained on a timely basis and readily available to all relevant staff.*

*Response: As noted in the audit, DGS is committed to improving its street maintenance programs on an ongoing basis. DGS actively looks for and implements better technologies, methods, and information management to improve our operations. DGS has an existing ESRI system that we developed to assist in optimizing the street selection process. This system is being updated and improved on an on-going basis. We continue to investigate software options. We will develop a standardized road condition reporting form and we will document our existing procedures for storing pictures.*

*Recommendation No. 2: Work with Engineering to determine labor, machinery and material costs for each of these programs for improved planning and performance measurement.*

*Response: The Department of General Services intended to expand its data collection for each in-house paving project in 2012. These items labor, machinery and material cost will be collected as well as some other key components to help analyze the paving program.*

*Recommendation No. 3:* Correspondence relating to street selection for paving, and coordination of repair and maintenance of streets between City Departments, Utilities, and Public Agencies should be stored in a central shared file.

*Response:* In the past this correspondence was stored in the project manager's files. Documentation between City Departments, Utilities, and Public Agencies is now stored in a central file at DGS.

*Recommendation No. 4:* Document street condition evaluations and meetings to work on the selection process of streets for repair and repaving or reconstruction.

*Response:* Street condition evaluations and meetings will be documented on standardized forms and kept in the central file.

Again, thank you for the opportunity to respond to the Performance Audit. If you should have any questions or need any additional information, please contact me.