Austin City Council

Mayor
Will Wynn

Mayor Pro Tem
Brewster McCracken

Council Members
Sheryl Cole
Lee Leffingwell
Mike Martinez
Laura Morrison
Randi Shade

City Auditor
Stephen L. Morgan

Deputy City Auditor
Taylor Dudley

Audit Report

STREET REPAIR AND PREVENTIVE MAINTENANCE

November 18, 2008

Office of the City Auditor
Austin, Texas

Audit Team
Doug Whitworth, CGAP, Auditor-In-Charge
Naomi Marmell
Maisha Jones, audit intern

Assistant City Auditor
Russ Needler, CPA, CGAP

A full copy of this report is available for download at our website: http://www.ci.austin.tx.us/auditor/reports. You may also contact our office by email at oca_auditor@ci.austin.tx.us.
Please request Audit No. AU08112.

OCA maintains an inventory of past audit report copies and we encourage you to return any unwanted hardcopy reports to our office to help us save on printing costs. Please mail to: P. O. Box 1088, Austin, Texas 78767-8808.

Alternative formats are available upon request.
Please call (512) 974-2805 or Relay Texas #711.

Printed on recycled paper

City of Austin

Office of the City Auditor

301 W. 2nd Street, Suite 2130
P.O. Box 1088
Austin, Texas 78767-8808
(512) 974-2805, Fax: (512) 974-2078
email: oca_auditor@ci.austin.tx.us
website: http://www.ci.austin.tx.us/auditor

Date: November 18, 2008

To: Mayor and Council

From: Stephen L. Morgan, City Auditor

Subject: Street Repair and Preventive Maintenance

I am pleased to present this audit report on street repair and preventive maintenance practices within the Street and Bridge Division of the Public Works Department.

We found that street quality remains below the stated goal because funding issues and a backlog of work have prevented Street and Bridge from meeting intermediate goals. The public perception of Austin's street condition is also relatively low.

While Street and Bridge has incorporated best practices and information technology in the planning and measurement process, improvements can be made in the management information system that contains planning and performance data. Despite making informed decisions, Street and Bridge remains vulnerable to changes in market conditions for their supply of critical materials. Also, Street and Bridge has not formalized and updated some procedures to align them with business practices.

We have made seven recommendations designed to help Street and Bridge improve the effectiveness of street repair and maintenance programs. Management has agreed with all seven of the recommendations.

We appreciate the cooperation and assistance we received from staff in the Street and Bridge Division of the Public Works Department during this audit.

Stephen L. Morgan, CIA, CGAP, CFE, CGFM
City Auditor

[This page intentionally left blank]

COUNCIL SUMMARY

Street quality remains below the stated goal because funding issues and a backlog of work have prevented Street and Bridge from meeting intermediate goals. Street and Bridge's performance goal is for eighty percent of City streets to be rated satisfactory as determined by an independent, objective assessment. At the current funding level, Street and Bridge has projected that they will reach their performance goal of having eighty percent of streets in satisfactory condition in 2016. Street and Bridge was unable to meet its intermediate goals for repair and maintenance in 2003-2007 in part due to a lack of available funding. There is a significant backlog of streets requiring maintenance which also affects the division's ability to meet the goal.

In addition, the public perception of Austin's street condition is relatively low. While the public has a generally poor opinion of the quality of Austin roadways, there is a system in place to determine customer satisfaction that is being used to make changes in operations.

Street and Bridge has incorporated best practices and information technology in the planning and measurement process, but improvements can be made in the management information system that contains planning and performance data. Street and Bridge regularly compares its practices to determine if they are in line with best practices. Their annual service plan is developed to maximize road quality with limited resources. The performance measures used by Street and Bridge are relevant for judging performance and making planning decisions.

Management creates performance measurement reports and uses the information in the decision making process. Furthermore, the overall performance management system contains measures that are reliable and adequately controlled. However, the Pavement Management Information System (PMIS) has not had new data uploaded about street conditions since 2005. Also, not all users of the PMIS have an adequate understanding of the system. Information on maintenance and repair backlogs are maintained in a separate database that is not incorporated into the PMIS.

Street and Bridge is vulnerable to changes in market conditions for their supply of critical materials. Despite increased volatility in the materials market, Public Works has not adjusted its procedures, leaving it vulnerable to sharp and unexpected cost increases. In addition, Street and Bridge has not developed contingency plans for dealing with interruptions in the supply of critical materials.

Street and Bridge has not formalized and updated some procedures to align them with business practices. For instance, they do not perform the independent quality control process described in their policy manual. Also, there are no formal procedures for compiling and calculating performance measures, environmental controls for street repair field crews are not formalized and distinct, and work log documentation lacks completeness and standardization.

[This page intentionally left blank]

ACTION SUMMARY
STREET REPAIR AND PREVENTIVE MAINTENANCE

Recommendation Text	Management Concurrence	Proposed Implementation Date
01. To ensure that the backlog of projects that must be postponed from the service plan are completed, the Managing Engineer of Street and Bridge should formalize the process for monitoring the status of backlogged projects.	CONCUR	December 2009
02. To make the department less vulnerable to the loss of key personnel, the Managing Engineer of Street and Bridge should increase cross training and improve the documentation of work procedures.	CONCUR	October 2009
03. To update the data used for annual service planning, the Managing Engineer of Street and Bridge should contract with a consultant to perform an assessment of Austin's road conditions.	CONCUR	October 2010
04. To ensure that information from the PMIS is reliable and personnel understand its use, the Managing Engineer of Street & Bridge should oversee the creation of system training and a PMIS user and administrators' manual.	CONCUR	October 2009
05. To ensure that performance measures are accurate and complete, the Managing Engineer of Street and Bridge should update the policy manual and provide training to the personnel who are responsible for the measures.	CONCUR	October 2010

The Audit and Finance Committee voted to not accept recommendation number three.

For more details, see the minutes from the November 18th Audit and Finance Committee.

06. To identify possible strategies for contingency planning, the Director of Public Works should work with the City Purchasing Department and Street and Bridge staff to explore arrangements to manage costs and supply interruptions for critical materials, including the possibility of partnering with entities outside the City.	CONCUR	October 2009
07. To ensure the completeness and reliability of performance data, the Managing Engineer of Street and Bridge should direct staff to provide more standardized and detailed information in daily work logs.	CONCUR	October 2009

TABLE OF CONTENTS

Exhibits

`

[This page intentionally left blank]

BACKGROUND

Street repair and maintenance work in the City of Austin is managed and performed by personnel in the Street and Bridge Division of Public Works. Funding for repair and maintenance work comes from two primary sources: the transportation user fee and the general fund. Council approved $29.25 million for street preventive maintenance activities in fiscal year 2009 (see Exhibit 1).

Exhibit 1
Budgeted Dollars for Street Repair and Preventive Maintenance Activities

Program/Activity	FY 09 Budget ($ in millions)
Preventive Maintenance	**19.45**
Asphalt Overlay	7.13
Crack Seal Resurfacing	0.72
Engineering Support Services	2.21
Seal Coat	9.40
Street Repair	**9.80**
Routine Roadways and Alley Maintenance	6.57
Utility Excavation Repair	3.23
TOTAL	**29.25**

Source: Approved COA budget for fiscal year 2009

Street repair and maintenance work activities include crack sealing, slurry sealing, microsurfacing, sealcoat, and overlay. This work is intended to prolong the useful life of Austin's street network.

Crack sealing is done when streets are in fairly good shape and involves the application of a three-inch ribbon of tar over all the cracks in a street. Crack sealing is done in the winter months using the same crews that perform sealcoat work during the spring, summer and fall.

Slurry sealing and microsurfacing are also done when streets are in fairly good shape. The work is completed by contractors since specialized equipment is required. Slurry sealing is done only on cul-de-sacs and involves the spreading of an oil, water, and aggregate compound. Microsurfacing is similar to a thick slurry seal and is typically performed when the existing pavement is rougher than a typical sealcoat or slurry seal candidate street, but does not warrant an overlay.

Sealcoat work involves applying a petroleum-based emulsion (similar to tar) to the surface of a roadway and then covering the emulsion with gravel. The main purpose of sealcoat work is to keep moisture out of the road subsurface. This application is made to streets with moderate distress. Sealcoat work can only be done in the warm, dry months of summer, late spring, and early fall.

Overlay work involves the removal and replacement of the top two inches of asphalt along a street. It is the most expensive type of street maintenance work and is used for the streets that are in the worst condition. Overlay work is done by City crews year-round, but it is the type of work where a backlog of uncompleted projects has occurred.

When a street is categorized as in unsatisfactory condition by the consultant who assesses City streets, Street and Bridge removes it from the list of candidates for repair. The street is then scheduled for reconstruction by the CIP Division of Public Works. Reconstruction projects are paid for using bond money.

OBJECTIVES, SCOPE, AND METHODOLOGY

Objectives

Our objectives for this audit were to:

- Identify the current quality levels for City streets and analyze the adequacy of the actions of Street and Bridge to address contributing factors.
- Analyze whether the strategies Street and Bridge has undertaken to manage rising costs of materials provide reasonable protection against increased costs and interruption of supplies.
- Verify that stated procedures are followed and asserted controls are in place.
    - Confirm that environmental procedures are adhered to
    - Assess fraud, waste, and abuse controls
    - Verify operational procedures and requirements such as performance measure collection, service plan completion, etc.

Scope

The scope for this project included the street repair and preventive maintenance activities performed by the Street & Bridge Division of Public Works. We assessed performance measures, citizen feedback, work records, and service plans for the past seven years as well as work sites begun in FY07 and FY08.

Methodology

In order to perform our audit work, we used various methods:

- Analyzing quantitative and qualitative data, to confirm preliminary findings and to verify management assertions.
- Conducting interviews with management and staff.
- Reviewing internally-produced documents.
- Observing work crews at job sites to verify that work was completed as planned.
- Verifying completed repairs and maintenance through direct observation of streets for a selected group of projects.
- Collecting limited cost data from the International City Manager's Association for comparison to the City of Austin.

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.

AUDIT RESULTS

Street quality remains below the stated goal because funding issues and a backlog of work have prevented Street and Bridge from meeting intermediate goals. This has contributed to a public perception of Austin's street condition that is relatively low. Street and Bridge has incorporated best practices and information technology in the planning and measurement process, but improvements are needed in the management information system that contains planning and performance data. Street and Bridge is vulnerable to changes in market conditions for their supply of critical materials. Finally, Street and Bridge has not formalized and updated some procedures to align them with business practices.

Street quality remains below the stated goal because funding issues and a backlog of work have prevented Street and Bridge from meeting intermediate goals.

Currently, seventy-four percent of the streets in Austin's road network are in satisfactory condition. Street and Bridge has set a goal of achieving an average of eighty percent of roads in satisfactory condition. At the current level of funding, Street and Bridge estimates that it will achieve this goal by 2016. Street and Bridge was unable to meet its intermediate goals for repair and maintenance in 2003-2007 in part due to a lack of available funding. There is a significant backlog of streets requiring maintenance, which also affects the division's ability to meet the goal.

Currently, seventy-four percent of the streets in Austin's road network are in satisfactory condition. Street and Bridge estimates that at the end of fiscal year 2008 25.5 percent of the 7,445 lane miles in the Austin street network were considered to be in unsatisfactory condition (see Exhibit 2 on the next page, 2008 Estimated). Most of these unsatisfactory roads are considered to be in poor condition with 1,137 miles of roadway and 756 miles are failing. Of the roads that are considered to be in satisfactory condition, some 1,735 miles are considered to be excellent, 1,937 are good, and 1,880 are fair.

Street and Bridge's performance goal is for eighty percent of City streets to be rated satisfactory as determined by an independent assessment done in accordance with objective measures. The standards were developed by the American Society for Testing and Materials (ASTM). These metrics are performed by measuring the roughness of streets and determining the degree of distress shown by the roadway. Management believes that this measure most clearly reflects the experience felt by Austin drivers. This same street assessment that is used to determine the percentage of roadways that are in satisfactory condition is used to prioritize street repair work.

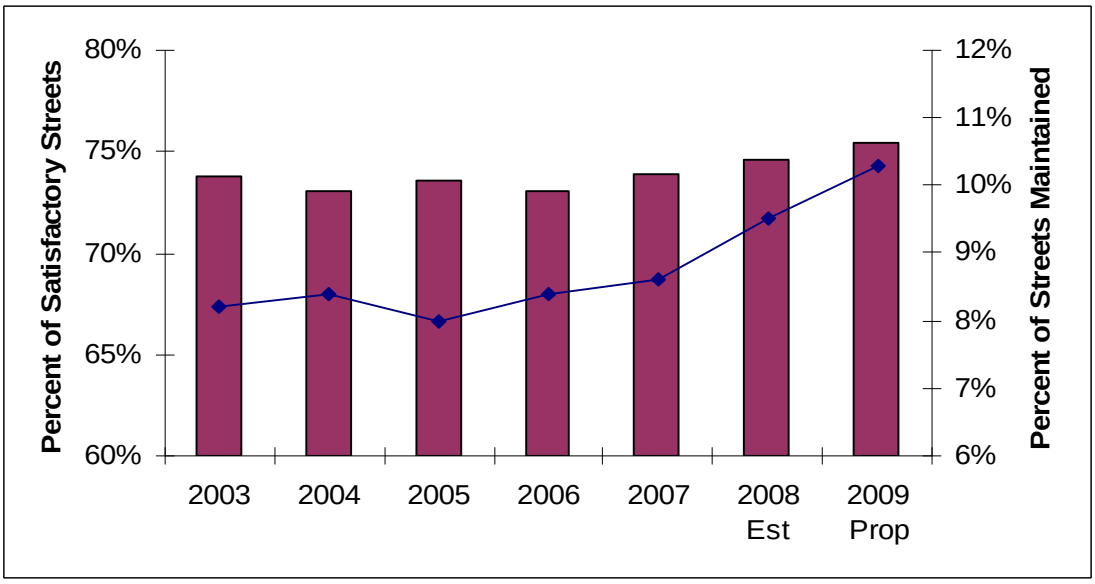
Many studies have shown that preventive maintenance activities extend the useful life of a road network. Investment in the maintenance of infrastructure is much less than the cost for replacing failed infrastructure. Street and Bridge personnel expect Austin roads to have a 20 year lifespan before needing replacement. They report that maintenance work adds another 10 to 15 years to a street's useful life.

At the current funding level Street and Bridge has projected that they will reach their performance goal of having eighty percent of streets in satisfactory condition in 2016. Street and Bridge arrived at this performance goal by using data from the International City Manager's Association that showed an average street satisfaction level of 80 percent for cities the size of Austin. While every city is different and faces unique challenges, this benchmark satisfaction level of 80 percent drives the operational budget for Street and Bridge.

Street and Bridge was unable to meet its intermediate goals for repair and maintenance in 2003-2007 primarily due to a lack of available funding. The average percentage of the street network receiving maintenance work for fiscal years 2003 through 2007 was 8.4 percent. Street and Bridge has created an intermediate goal of maintaining ten percent of the streets in Austin per year in order to reach their target of eighty percent of streets at an acceptable level of quality.

However, as shown in Exhibit 2 below, the level of funding for fiscal years 2003-07 was not adequate to meet the ten percent goal or to increase the percentage of streets that were rated satisfactory. The percentage of roads rated as satisfactory for that period remained steady at seventy-three to seventy-four percent. With an increased level of funding for fiscal years 2008 and 2009, Street and Bridge estimates it will be able to increase the percent of roads rated satisfactory to seventy-five percent.

Exhibit 2
Street and Bridge Was Unable to Make Progress towards Meeting Its Goal of Eighty Percent of Streets in Satisfactory Condition during FY 2003-2007
Street and Bridge Estimates that the Percent of Roads in Satisfactory Condition Will Increase as the Percent of Streets Maintained Increases for FY 08 and FY 09



Source: 2008-2009 COA Proposed Budget Executive Summary

Projections made by Street and Bridge staff indicate that providing maintenance to ten percent of the street network per year will allow the department to increase the number of roads in satisfactory condition. Providing maintenance to nine percent of streets will sustain the percentage of satisfactory roads at current levels while providing maintenance to eight percent of the streets would make the percentage of satisfactory roads decrease.

The amount of maintenance work done on City streets each year is mainly a function of the funding available. Exhibit 3 below shows a comparison of Austin per capita expenditures versus several cities of comparable size for fiscal year 2006. Austin is towards the lower end of this list.

Exhibit 3
City of Austin Per Capita Paved Road Rehabilitation Expenditures in Comparison to Cities of Similar Size

City	Per Capita Expenditures (FY 06)
San Antonio	$36.73
Oklahoma City	$28.02
Portland	$26.19
Austin	**$20.86**
Las Vegas	$17.89
Phoenix	$15.93

Source: International City Manager's Association (ICMA) Data

There is a significant backlog of streets requiring maintenance, which also affects the division's ability to meet the goal. Backlogs can be caused by a lack of funding or by the need to delay projects to coordinate with other entities. Both have an impact upon the department's ability to achieve their target of 80 percent of the roadways in satisfactory condition.

The main cause for a backlog of projects is lack of funding. Streets may require maintenance work, but will not be included in the annual service plan until funding is approved. However, the streets still require work, and so they become part of a future year's service plan when the funding is available to complete them.

Backlogs can also occur when Street and Bridge must delay work in areas where other utilities also have projects planned. According to Street and Bridge personnel, backlogs are mainly the result of poor communication with the Utility Coordinating Board. The Board is responsible for coordinating the schedule of work to be done by utilities with rights-of-way when the work requires cuts to streets or sidewalks.

The result of these causes is that the backlog of streets requiring an asphalt overlay is significant. More than fifty percent of the lane miles identified as needing overlay for fiscal year 2007 were not scheduled for treatment. In addition, twenty-seven percent of lane miles identified as needing overlay in the fiscal year 2008 budget were not scheduled for treatment.

Street and Bridge maintains a list of the projects delayed for coordination with other utilities, but the information is not incorporated into the division's management information system. While management team members indicated that incomplete work is moved to the next year's service plan, the process for doing so is not formalized or reported.

Not accurately tracking the backlogged projects could result in necessary work going undone and streets falling into further disrepair. In addition, future service plans could be affected because there would be streets in need of repair that Street and Bridge believed had already been completed.

Recommendation:

01. To ensure that the backlog of projects postponed from the service plan is completed, the Managing Engineer of Street and Bridge should formalize the process for monitoring the status of these projects.

MANAGEMENT RESPONSE: CONCUR. Subject to funding availability, Street and Bridge will secure software or develop a routine for linking a database of backlogged projects with the PMIS to ensure tracking of backlogged projects are updated, shared with impacted agencies and tracked accordingly.

The public perception of Austin's street condition is relatively low.

Despite the work done by Street and Bridge, the public has a generally poor opinion of the quality of Austin roadways. There is a system in place to record the customers' concerns and feelings towards sealcoat maintenance that is being used to make changes in operations.

The public has a generally poor opinion of the quality of Austin roadways. Only 40.3 percent of the population was satisfied with the maintenance and repair of City streets in 2006. The 2007 City of Austin Citizen Survey revealed that only 41 percent of respondents were satisfied with city streets with 24.5 percent expressing a very low opinion and 35.2 saying that they has a somewhat low opinions of maintenance and repair of City streets.

There is a system in place to record customer feedback on projects and use the information to make changes in operations. Before sealcoat work is performed in a given area, Street and Bridge personnel distribute flyers with a detachable customer care card that allows citizens to provide feedback. Currently, Street and Bridge only collects customer comment cards from customers after sealcoat operations are performed but they plan to expand the practice to include the collection of comments about overlay, slurry seal, and crack sealing work in the near future.

Comment cards have allowed Street and Bridge staff to follow up with unhappy customers to try to resolve their issues. They also allow management to make operational changes accordingly. For example, to help reduce the number of complaints about loose rocks hitting windshields, they hooked "skirts" to the trucks to help catch loose rocks. Street and Bridge are unable to determine the amount of operational changes that need to be made for any other maintenance type besides sealcoat work because there are currently no customer comment data collected for those specific maintenance types.

Street and Bridge has incorporated best practices and information technology in the planning and measurement process, but improvements can be made in planning and performance data and supporting procedures.

Street and Bridge has incorporated best practices from other entities in its planning and measurement processes. For example, the annual service plan is developed to achieve the goal of maximizing road quality within the constraint of available funding, and the plan takes into account available personnel and the conditions necessary to complete work. Street and Bridge personnel use relevant performance measures for judging performance and making planning decisions. In addition, management creates performance measurement reports and uses the information in the decision making process.

Street and Bridge has also developed a management information system and uses it to make informed planning decisions**.** However, information on street conditions has not been updated in the management information system since 2005, and information on backlogged projects is maintained in a separate database. In addition, not all users of the management information system have an adequate understanding of the inputs and outputs. Finally, Street and Bridge does not have formal procedures for compiling and calculating performance measures.

Street and Bridge regularly compares its practices to those of other local governments and industry experts to determine if they are in line with best practices. Street and Bridge follows guidelines published by the Project Management Institute, the Asphalt Institute, Texas Department of Transportation, and the US Department of Transportation. In addition, management has been meeting with other local governmental street maintenance experts to share experiences and lessons learned with a goal of finding solutions to common problems.

Street and Bridge maintains benchmark comparisons for reporting of overall levels of quality and costs per mile. The policies and procedures developed by Street and Bridge link directly to their performance measures.

The annual service plan is developed to achieve the goal of maximizing road quality within the constraint of available funding. The service plan is developed using two essential inputs: the road condition and the amount of funding that is available. The Street and Bridge management team uses its Pavement Management Information System (PMIS, discussed later in this report) to derive the mix of work to be done that maximizes road condition. Using data from the PMIS, they perform a multivariate analysis using several constraints such as the cost of performing the work in-house versus using contractors, the number of City crews and equipment that are available, and the time required for each type of maintenance work. The goal of this analysis is to achieve the goal of having 80 percent of roads in satisfactory condition.

In analyzing Street and Bridge's planning methodologies, we noted that most of the planning, financial analysis, and performance measurement work is dependent upon source data provided by one person. While no significant errors in this data were noted during the course of our work, there should still be cross training to allow more individuals within the division to gain a

full understanding of the planning and measurement processes related to repair and maintenance.

02. To make the department less vulnerable to the loss of key personnel, the Managing Engineer of Street and Bridge should increase cross training and improve the documentation of work procedures.

MANAGEMENT RESPONSE: CONCUR. Street and Bridge will develop a succession plan of key positions within the division. The plan will include a training curriculum of each key position identified and include parties interested from other divisions within the Public Works department.

The annual service plan takes into account available personnel and the conditions necessary to complete work. As a part of planning, Street and Bridge assembles appropriate teams to perform the road maintenance work at the best times of the year for that particular application. This plan is made based upon data collected about the condition of the roads and prioritizes those roads based upon need within the constraints of available funding levels.

By taking personnel and weather information into account, Street and Bridge is able to maximize the outputs of its operational staff. Operational staff includes one overlay team and two sealcoat teams. Overlay work is performed year round, while the sealcoat teams perform sealcoat during the summer months and switch to crack sealing during the winter.

The performance measures used by Street and Bridge are relevant for judging performance and making planning decisions. The measures are in line with industry best practices. Street and Bridge maintains data to monitor multiple aspects of the department and provide information on both the effectiveness and efficiency of operations. The division measures direct and indirect cost drivers, worker performance, outputs in the form of lane miles completed and outcomes in the form of road quality and customer satisfaction.

Management creates performance measurement reports and uses the information in the decision making process. Street and Bridge uses performance measurement to manage the planning and execution of projects as well as to monitor the progress towards meeting their goals. The performance measures are checked quarterly to see if they are within a certain tolerance level before being reported to upper management. If the information being measured is outside of the tolerance level, they use this information to make decisions to change their operations.

The performance measurement system is reliable and has adequate controls. As part of our work, we verified the accuracy of the calculation of Street and Bridge's performance measures for 2002-2007 and found no significant errors. In addition, we tested the reliability of the reporting procedures for lane miles completed through direct observations of street maintenance work. We selected a judgmental sample of 45 projects from the 2007 service plan where Street and Bridge reported that work was done. We found no major discrepancies that were not explained by project engineers.

Data are submitted by field superintendents and entered by the Administrative Manager and Financial Consultant. The Supervising Engineer and Accountant Senior construct spreadsheets from the data. The Financial Consultant and Acting Financial Manager review this data, which is given to management for monthly meetings with superintendents.

Street and Bridge has developed a management information system and uses it to make informed planning decisions. The software system in place for planning and assigning responsibility for road maintenance operations is called the Pavement Management Information System (PMIS). This software is used to plan work and develop a service plan which is assigned to operational teams.

PMIS is a relational database developed from the Pavement Management Administration database and incorporates almost all of the elements of the decision tree used by engineers to select the most appropriate roads for street maintenance. Street and Bridge relies heavily upon PMIS to give them a list of recommended roads that will be discussed by the management team for inclusion in their annual service plan.

PMIS is used by Street and Bridge to apply the Pavement Quality Index consistently to all City streets. The Pavement Quality Index is comprised of the Riding Comfort Index and the Surface Distress Index. Applying a consistent standard to all City streets allows Street and Bridge to plan and prioritize repair and maintenance projects for maximum benefit.

Data on street conditions has not been updated in PMIS since 2005 and information on backlogged projects is maintained in a separate database. This is important because data from PMIS is used in planning and assigning work. The last street assessment done by an independent consultant was completed in 2005. However, an outside consultant is supposed to assess half the streets each year to provide updated information on street conditions. In addition, a status report was supposed to be presented to Council in 2008 but was not.

In addition to not having a timely street assessment, Street and Bridge has not incorporated the tracking of projects backlogged due to coordination with other entities into the PMIS. Instead, this information is maintained in a separate database that is not tied to the PMIS. This data must be incorporated into the planning process manually. We addressed this situation in Recommendation 1 to this report.

The assessment of road conditions has been done by an experienced independent consultant in order to have a complete and timely set of data describing the conditions of Austin's roadways. Planning and prioritization of efforts towards maintaining the streets that need it most is very difficult to do without this inventory of the condition of Austin's streets. According to Street and Bridge personnel, street conditions do not deteriorate dramatically from year to year so the impact of this delayed assessment may not be great. However, until a new assessment is performed, Street and Bridge does not have a clear and current picture of the true condition of Austin's streets to make their planning decisions.

Recommendation:

03. To update the data used for annual service planning, the Managing Engineer of Street and Bridge should contract with a consultant to perform an assessment of Austin's road conditions.

MANAGEMENT RESPONSE: CONCUR. Subject to funding availability, Street and Bridge will secure services for collecting road condition data on half of the street inventory every other year.

Few users of the Pavement Management Information System have an adequate understanding of the system. Currently, only one person in Street and Bridge has a complete understanding of the PMIS. That person is responsible both for inputting data in the system and manipulating the data to produce the outputs. There is not a second person who is trained to input data on the system or create the outputs. In addition, there is no training for users on how the information is used for planning or performance measurement.

Street & Bridge should have adequate and up-to-date manuals documenting procedures for using PMIS. The best manuals divide the instructions between that which is useful for people who work with the inputs and outputs from the system and those who serve as system analysts or administrators. Currently, there is no accessible documentation for working with PMIS other than a data dictionary.

Recommendations

04. To ensure that information from the PMIS is reliable and personnel understand its use, the Managing Engineer of Street & Bridge should oversee the creation of system training and a PMIS users' and administrators' manual.

MANAGEMENT RESPONSE: CONCUR. Based on the current application, Street and Bridge will develop a Pavement Management Information System (PMIS) User's Guide. The guide will include how the system is used to generate a candidate list of streets and how the list is used to generate a recommended strategy for maintenance. Upon completion of the guide, Street and Bridge will train employees on its use.

There are no formal procedures for compiling and calculating performance measures. As a result, performance measure spreadsheets contained calculation and data entry errors. While these errors were not significant, Street and Bridge should have adequate and up-to-date procedures for collecting and calculating performance measures.

The policy manual has not been updated since 2003. Consequently, many of the policies are out-of-date. Multiple staff members have worked on performance measures in the past and are able to step in if the financial manager in charge of performance measurement is unavailable. However, Street and Bridge does not have sufficient cross-training or backup for key positions to ensure consistent performance in case of sudden personnel changes or unavailability.

Recommendation:

05. To ensure that performance measures are accurate and complete, the Managing Engineer of Street and Bridge should update the policy manual and provide training to the personnel who are responsible for the measures.

MANAGEMENT RESPONSE: CONCUR. Street and Bridge will develop a manual that identifies what performance measures are captured and how they are calculated. The manual will include forms used by employees. Upon completion of the manual, update the policy and train employees on capturing data for generating performance measures.

Street and Bridge is vulnerable to changes in market conditions for their supply of critical materials.

Public Works has not adjusted its procedures to match the changes in the market, leaving it vulnerable to sharp and unexpected cost increases. In addition, Street and Bridge has not developed contingency plans that include procedures for dealing with interruptions in the supply of critical materials.

Public Works has not adjusted its procedures to match the changes in the market, leaving it vulnerable to sharp and unexpected cost increases. Management recognizes that rising material costs are one of the most significant obstacles facing the department. However, thus far they have only responded to cost increases by submitting budget requests for additional funding to cover expenses. Public Works should be developing strategies for both procurement and operations to reduce the impact of rising materials costs. Street and Bridge identified rising petroleum prices as an organizational threat in 2007 but did not create a backup plan for acquiring materials.

The increased volatility in the materials market is new and relatively unprecedented, so there are no administrative structures in place to respond to the current situation. Continuing price increases at current rates will result in either a reduction in service or a need to find additional or alternative funding sources, such as increasing the Transportation User Fee beyond what was approved in the FY 2009 budget.

Street and Bridge has not developed contingency plans that include procedures for dealing with interruptions in the supply of critical materials. Public Works has no plans for supply disruptions beyond the standard procedures for emergency procurements. The bankruptcy of a key supplier in 2008 resulted in a cost that was 235 percent and $504,000 higher than the price which Street and Bridge normally paid for the materials. It also resulted in more than a week without sealcoat work. Cost per lane mile rose, because the emergency contract was more expensive and transport costs were higher. Any future supply disruptions will likely have similar effects.

Given the new volatility in construction commodities markets, the small number of suppliers for many crucial materials, and the bankruptcy of firms and their consequent effects on operations, Public Works should develop a contingency plan to mitigate the effects of future supply disruptions.

Recommendation:

06. To identify possible strategies for contingency planning, the Director of Public Works should work with the City Purchasing Department and Street and Bridge staff to explore arrangements to manage costs and supply interruptions for critical materials, including the possibility of partnering with entities outside the City.

MANAGEMENT RESPONSE: CONCUR. Street and Bridge will meet with other agencies (i.e. TxDOT, Travis and Williamson County) to discuss the possibility of areas to be impacted and to consider developing and/or updating an Interlocal Agreement for labor, material and equipment.

Street and Bridge has not formalized and updated some procedures to align them with business practices.

While Street and Bridge has adopted strong policies and procedures, the implementation of these controls could be strengthened. Street and Bridge does not perform the independent quality control process described in their policy manual. In addition, there are no formal procedures for compiling and calculating performance measures. Environmental controls for street repair field crews are not formalized and distinct. Finally, work log documentation lacks completeness and standardization.

Street and Bridge does not perform the independent quality control process described in their policy manual. Street and Bridge does not appear to be following its own polices that outline an internal quality assessment process. According to the policy, various teams within the division are responsible for quality review. Instead, all quality control is done by onsite supervisors who are able to make corrections on the spot and have the most experience doing the work to ensure its quality. However, the segregation of duties for reviewing and performing work would help to improve operational controls.

Environmental controls for street repair field crews are not formalized and distinct. There are no documented procedures for addressing environmental issues as part of completing maintenance and repair projects. However, environmental risk is mitigated in several ways. Street and Bridge field personnel are made aware of environmental risks and the procedures for reducing risk through annual training, instruction from field supervisors, and compliance language contained in the General Work Permit.

Environmental risks are further mitigated through inspections completed by the Watershed Protection and Development Review inspectors, although the inspections may not be complete or formal due to the short amount of time that it takes to complete a maintenance project.

The largest environmental threats caused by street maintenance activities are the pollution of waterways that comes from vacuuming the streets after seal coating. A secondary problem comes from not installing dikes that would prevent debris and sediment from going into wastewater storm drains. Environmental issues can range from noise to dust to rocks that come as a result of normal street maintenance work activities, but these have been identified as lower risk activities.

Work log documentation lacks completeness and standardization. Data from the work logs reviewed was often general and lacked important information such as the name of the street where work was occurring. This data is the basis for many of the performance measures. Therefore, it must be accurate and complete to ensure that the measures are reliable. To ensure that information is accurate, project managers should train employees on filling out the logs and monitor the logs to make sure they are completed properly.

Recommendation:

07. To ensure the completeness and reliability of performance data, the Managing Engineer of Street and Bridge should direct staff to provide more standardized and detailed information in daily work logs.

MANAGEMENT RESPONSE: CONCUR. Street and Bridge will update existing daily work logs, including developing a written procedure for filling out forms and transferring data to a database for generating reports and/or performance measures. A select group of employees from each program (i.e. repairs, preventive maintenance, etc.) will help update the existing forms by which a revised methodology will be developed for capturing data and generating performance measures.

APPENDIX A

MANAGEMENT RESPONSE

[This page intentionally left blank]

MEMORANDUM

TO: Doug Whitworth, CGAP
Office of the City Auditor

FROM: Howard S. Lazarus, PE, Director
Public Works Department

DATE: November 12, 2008

SUBJECT: Action Plan - Street Repair and Preventive Maintenance Audit

---

As per the audit of Street and Bridge, attached is the Action Plan with the seven recommendations for the Street Repair and Preventive Maintenance Audit in which four are already underway. The spreadsheet outlines recommendations, proposed strategies for implementation and proposed dates. Should you have additional questions, please contact David Magana at 974-7042.

cc: Robert Goode, PE, Assistant City Manager
Bill Gardner, PE, Chief Engineer, Public Works
David Magana, PE, Street and Bridge Division Manager, Public Works

ACTION PLAN
Street Repair and Preventive Maintenance Audit

Rec #	RECOMMENDATION TEXT	Concurrence	Proposed Strategies for Implementation	Status of Strategies	Responsible Person/ Phone Number	Proposed Implementation Date
01	To ensure that backlog of projects that must be postponed from the service plan are completed, the Managing Engineer of Street and Bridge should formalize the process for monitoring the status of backlogged projects.	Yes	Subject to funding availability, secure software or develop a routine for linking a database of backlogged projects with the PMIS to ensure tracking of backlogged projects are updated, shared with impacted agencies and tracked accordingly.	Underway	David Magaña 974-7042	December 2009
02	To make the department less vulnerable to the loss of key personnel, the Managing Engineer of Street and Bridge should increase cross training and improve the documentation of work procedures.	Yes	Develop a succession plan of key positions within the division. The plan will include a training curriculum of each key position identified and include parties interested from other divisions within the Public Works department.	Underway	David Magaña 974-7042	October 2009
03	To update the data used for annual service planning, the Managing Engineer of Street and Bridge should contract with a consultant to perform an assessment of Austin's road conditions.	Yes	Subject to funding availability, secure services for collecting road condition data on half of the street inventory every other year.	Planned	David Magaña 974-7042	October 2010

Rec #	RECOMMENDATION TEXT	Concurrence	Proposed Strategies for Implementation	Status of Strategies	Responsible Person/ Phone Number	Proposed Implementation Date
04	To ensure that information from the PMIS is reliable and personnel understand its use, the Managing Engineer of Street & Bridge should oversee the creation of system training and a PMIS users' and administrators' manual.	Yes	Based on the current application, develop a Pavement Management Information System (PMIS) User's Guide. The guide will include how the system is used to generate a candidate list of streets and how the list is used to generate a recommended strategy for maintenance. Upon completion of the guide, train employees on its use.	Underway	David Magaña 974-7042	October 2009
05	To ensure that performance measures are accurate and complete, the Managing Engineer of Street and Bridge should update the policy manual and provide training to the personnel who are responsible for the measures.	Yes	Develop a manual that identifies what performance measures are captured and how they are calculated. The manual will include forms used by employees. Upon completion of the manual, update the policy and train employees on capturing data for generating performance measures.	Planned	David Magaña 974-7042	October 2009

Rec #	RECOMMENDATION TEXT	Concurrence	Proposed Strategies for Implementation	Status of Strategies	Responsible Person/ Phone Number	Proposed Implementation Date
06	To identify possible strategies for contingency planning, the Director of Public Works should work with the City Purchasing Department and Street and Bridge staff to explore arrangements to manage costs and supply interruptions for critical materials, including the possibility of partnering with entities outside the City.	Yes	Meet with other agencies (i.e. TxDOT, Travis and Williamson County) to discuss the possibility of areas to be impacted and to consider developing and/or updating an Interlocal Agreement for labor, material and equipment.	Planned	David Magaña 974-7042	October 2009
07	To ensure the completeness and reliability of performance data, the Managing Engineer of Street and Bridge should direct staff to provide more standardized and detailed information in daily work logs.	Yes	Update existing daily work logs, including developing a written procedure for filling out forms and transferring data to a database for generating reports and/or performance measures. A select group of employees from each program (i.e. repairs, preventive maintenance, etc.) will help update the existing forms by which a revised methodology will be developed for capturing data and generating performance measures.	Underway	David Magaña 974-7042	October 2009

Concurrence: concur, partially concur, or disagree.
Status of strategies: planned, underway, or implemented.

Department Director

11/12/08
Date