RON GALPERIN
CONTROLLER

July 31, 2014

Honorable Eric Garcetti, Mayor
Honorable Michael Feuer, City Attorney
Honorable Members of the Los Angeles City Council

Re: Audit of Los Angeles Bureau of Street Services' Resurfacing & Maintenance Activities

The Office of the Controller has completed an audit of the Bureau of Street Services' Resurfacing and Maintenance Activities. Our findings are included in the attached report, "L.A. Streets: The Road to the Future," which we are releasing today.

Our audit sought to gauge the Bureau's management of street resurfacing activities and to evaluate its use of resources.

This audit is vital and timely because the quality of City streets is an issue that affects all Angelenos. What's more, L.A. citizens may be called upon in the near future to vote on a plan to fund street restoration, -- which one estimate says will cost nearly $4 billion for the City's D and F rated streets. When Angelenos vote on such measures, they should have total confidence that, should they choose to approve the funding, the money will be spent wisely and appropriately.

Background

The Bureau of Street Services is responsible for maintaining the City's 6,500 miles of public roadways. Under the City's current Pavement Preservation Plan, the Bureau has been using much of its funding to apply a shiny black slurry seal to B and C rated streets, which can be a cost-effective way to preserve the underlying pavement. Between 2010 and 2013, the Bureau spent $51 million on slurry seals, applying top coats to 1166 miles of roadway--about 93% of its stated goal.

Unfortunately, our D and F streets have been left to deteriorate. They now make up about 40% of the network. And while the stated goal is to maintain streets at a B average, the streets get an overall C- by the Bureau's own assessment.

TRIP, a Washington nonprofit that reports on transportation issues, recently noted that the average L.A.-area driver spends $832—71% more than the average American in large metropolitan areas—on additional vehicle operating costs each year, in part because driving on poor roads uses more gas and damages car parts like wheels, suspensions and tires.

The Bureau also does not always prioritize its repair work within geographic regions based on common-sense criteria like traffic volume, heavy vehicle loads and mass transit loads. We strongly recommend changing this process to ensure that the City's busiest and most important thoroughfares—through which cars, bikes and buses travel regularly—are also maintained in the best condition, so as to smooth the flow of both traffic and commerce.

Lack of Transparency

Piecing together the finances and operations of the Bureau has been a challenge. Our auditors discovered a great deal of information about the Bureau's activities is incomplete or simply missing. The Bureau says it has filled 953,339 potholes over the last three years, but it is unable to provide documentation to back that up. In fact, auditors could not find completion reports or work evaluations for 60% of street paving projects.

Missed Opportunities

Due to the failure to properly calculate appropriate Street Damage Restoration Fees--and to revise the fee structure in response to actual revenue numbers—the Bureau has missed the opportunity to collect $190 million in fees from utility companies that cut and dig into our streets—money that could have been used to perform miles of repairs.

Likewise, between 2010 and 2013, the Bureau did not use all of its funding allocation. Auditors found that $21 million earmarked for street repairs was returned unused. And the City has also spent more to produce its own asphalt than it would have if it had paid a vendor for it.

We recommend that the Street Damage Restoration Fee be amended and that the Bureau periodically analyze costs, completion rates and trends to ensure that goals are met.

Technology: The Road Ahead

Los Angeles needs to invest in its streets. Even in the best of times, the amount of money needed to raise their quality on a grand scale will exceed the revenues the City can allocate during the regular budget process. But before we dedicate additional funds to the Bureau of Street Services, it must reform its management processes, adopt new oversight procedures and implement new technologies. Available software and hardware could allow the Bureau to virtually and timely map street conditions, manage the progress of its work crews, track utility cuts and other damages to our streets, and

even help monitor the condition of other City infrastructure -- such as traffic lights, signs and sidewalks.

Another place where technology is crucial is in the composition of the streets themselves. The Bureau should look at testing new street technologies like solar roadways, permeable paving materials and, possibly, modular subterranean systems. All of these technologies have the potential to provide us with sturdier, refurbished streets that beautify neighborhoods while reducing our environmental impact.

In one year, my office will perform a follow-up audit to determine the Bureau's progress. I'm hoping the Bureau — along with the City's leaders—will take to heart our recommendations to increase efficiency and accountability and to implement new, money-saving technologies. I believe that if the City adopts the recommendations we've called for, we can improve the quality of our streets, raise our performance levels, and increase public trust.

Respectfully Submitted,

RON | GALPERIN
Los Angeles City Controller

Attachment

RON GALPERIN
CONTROLLER

July 31, 2014

Mr. Nazario Sauceda, Director
Bureau of Street Services
Department of Public Works
1149 S. Broadway, 4th Floor
Los Angeles, CA 90015

Dear Mr. Sauceda:

Enclosed is a report entitled "L.A. Streets: The Road to the Future." A draft report was provided to your Department on June 19, 2014 and an exit conference was subsequently held on June 26, 2014. Comments provided by your Department at that meeting were evaluated and considered prior to finalizing this report.

Please review the final report and advise the Controller's Office by September 2, 2014 on planned actions you will take to implement the report's recommendations. An electronic template of the audit's findings and recommendations can be provided to your staff to facilitate this process.

If you have any questions or comments, please contact me at farid.saffar@lacity.org or (213) 978-7392.

Sincerely,

FARID SAFFAR, CPA
Director of Auditing

Enclosure

cc: Ana Guerrero, Chief of Staff, Office the Mayor
Miguel A. Santana, City Administrative Officer
Gerry F. Miller, Chief Legislative Analyst
Holly L. Wolcott, Interim City Clerk
Kevin James, President, Board of Public Works
Independent City Auditors

City of Los Angeles

L.A. Streets:
Road to the Future

July 31, 2014

RON | GALPERIN
Los Angeles City Controller
controller.lacity.org

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SUMMARY

The Bureau of Street Services (BSS) of the Department of Public Works maintains, repairs, resurfaces, and cleans the roadways in Los Angeles's street network, which, with approximately 6,500 centerline miles of dedicated public roadways (28,000 lane miles) and 800 miles of alleys, is the largest municipal street network in the nation.[1]

In the City's 2011 State of the Streets Report, BSS's own assessment rated the majority of LA's streets at a less than satisfactory grade. A 2013 report by TRIP, a private nonprofit organization that researches, evaluates and distributes economic and technical data on surface transportation issues, offers its own assessment. TRIP reported that 90% of streets in the Los Angeles Urban Area were in "poor" and "mediocre" condition.[2] In addition, the LA area had the highest percentage of pavement in poor condition (64%) of all the areas studied with populations of 500,000 or greater. Further, TRIP reported that the average motorist in the Los Angeles area spends the most ($832) in additional annual vehicle operating costs as a result of driving on roads in need of repair, since driving on poor roads accelerates vehicle deterioration, increases the need for frequent maintenance, and requires additional fuel consumption.[3] This amount is 71% higher than the $486 average additional annual vehicle cost found in the 75 large urban areas studied.

This performance audit was undertaken to assess BSS' management and oversight of street maintenance and resurfacing activities, to evaluate whether the Bureau effectively and efficiently uses its resources to maximize the number of streets that are adequately paved and maintained, and to reduce deferred maintenance costs over time. This audit focused on the activities of the Bureau of Street Services, since more than 80% of City resources dedicated to pavement preservation are allocated to BSS.

The City develops a Pavement Preservation Plan each year which identifies funding and establishes the number of centerline street miles that should be

[1]According to BSS, a lane mile is defined as "…an 11 foot wide lane that is one mile long. Area = 11'x 5,280' = 58,080 square feet. For example, a roadway that is 64' wide and 1,000' long, (64'x1,000')/11'/5,280'=1.1 lane miles…"

[2]Comprised of the cities of Los Angeles, Long Beach and Santa Ana and surrounding suburban areas.

[3] TRIP cites that the additional annual vehicle costs were calculated in the Highway Development and Management (HDM) model, which is recognized by the U.S. Department of Transportation and 100 other countries, by taking the average number of miles driven annually by a region's driver, calculating the current vehicle operating costs based on AAA 2012 vehicle operating costs and the using the HDM model to estimate the additional vehicle operating costs being paid by drivers as a result of substandard roads.

maintained and resurfaced. The funding and associated goals related to streets and pavement in recent years have maintained the status quo condition of the City's street network–which is currently rated, by the Bureau's own estimation, as a "C minus." From fiscal year 2010-11 through 2012-13, the City budgeted increasing amounts from various funding sources for its Pavement Preservation Plan, from $90.8 million to $131.9 million, to be used primarily by BSS to maintain and resurface streets.[4] This fiscal year, the City has turned its attention to fund the deferred maintenance of streets that are in significant disrepair. A recent estimate presented to policymakers indicated it will take 20 years and cost $3.86 billion to rehabilitate the 8,200 lane miles of currently rated "D" and "F" streets (which are considered "poor" or "failed"), plus 500 lane miles of streets that may become "D" or "F" rated during the decades it will take to complete the project.[5] This capital investment would be in addition to the approximately $3 billion the City will need to continue to spend on its Pavement Preservation Plan over that same 20-year period--money necessary to keep even more streets from failing.[6]

I. Overall Assessment

While BSS generally met its annual performance goals for street preservation activities, those goals fall short of maintaining streets that are satisfactory by any standard. Industry standards call for maintaining all improved streets, alleys, and related throughways in a perpetually "good to excellent" condition (i.e., rated as "A" or "B"); however, the City has struggled to keep an overall average rating of "C minus" for its street network. The lack of adequate resources and process deficiencies, including under-collections of fees for street cuts identified by this audit, have contributed to the poor quality of the City's streets.

[4] For purposes of this report, street maintenance is comprised of small asphalt/pothole repairs and slurry and crack sealing. Street resurfacing is comprised of asphalt overlays, including resurfacing and reconstruction.

[5] February 2014 report prepared by Bureau of Engineering and Harris & Associates, in response to CF 13-1300-S1, the "Save Our Streets Los Angeles" Program, summarized in February 28, 2014 report from City Engineer.

[6] March 17, 2014 correspondence to Council from CAO/CLA re: Save Our Streets LA Ballot Measure, page 6

II. Key Points

While Best Management Practices recommend that street system infrastructure be maintained at an average condition level of "B" or better, the City falls significantly below that, with an overall average of "C minus."

BSS' resurfacing goals have focused primarily on maintaining the condition of "B" and "C" streets, through slurry seal or crack seal rather than improving poor and failed streets, which are much more costly. As a result, the worst streets are generally not repaved or reconstructed. Over recent years, the majority of miles completed under the Pavement Preservation Plan relate to slurry sealing, which is considered a maintenance activity to extend the street life, but does not improve or change the street's Pavement Condition Index (PCI) rating.

Within geographical regions, BSS does not prioritize street repair activities based on traffic volume, heavy vehicle loads, or mass transit passenger load.

BSS' practices to allocate funding to geographical regions is based, in part, on traffic activity in that area. However, within those regions, streets are not prioritized based on vehicle traffic or loads. BSS prioritizes street repair activities on the condition level of the street, and available resources and plans; however, traffic activity and respective loads are not considered in the prioritization process. Each street's condition level is assessed every three years by a BSS' survey van.

By not prioritizing pavement repairs based on traffic flow or vehicle loads, the City may be missing opportunities to use resources that will provide a greater benefit to more of the public. Additionally, the City may be neglecting streets with a higher propensity to degrade, resulting in more costly reconstruction repairs in the future.

BSS' current pavement management system is not integrated with other pavement management databases and City systems, requiring additional staff efforts. Further, while it is used to assess pavement conditions, it is not a comprehensive asset management system that provides an inventory or condition assessment of other street-related infrastructure, such as street lights, medians, signs, storm drains, sidewalks, etc.

Given the size of the street network, the City requires a robust software system that can sufficiently run a large amount of data to determine PCI and provide various scenarios to help determine the best strategy for repairing and maintaining streets with available funding. The pavement management system should also be reliable, and as fully integrated and user-friendly as possible, requiring minimal staff/developer intervention, manual processing and reliance on additional systems. An integrated system could be used for mapping and provide the condition of other infrastructure assets, such as street lights, sidewalks, etc. to support analysis and decision-making.

BSS has utilized MicroPAVER for more than 15 years and believes it is the only system that can handle the significant data volume that results from having such a large street network. Given the significant technological advancements in the last decade, including geo-based integrated solutions, it may be time to consider alternatives.

Considering the challenges that municipalities face with ensuring coordination and oversight of street activities, the City has taken steps to improve coordination within the Department of Public Works. For example, all of the bureaus utilize GIS systems developed by the Bureau of Engineering to communicate respective projects electronically. The Bureau of Contract Administration also subscribes to monthly BSS street resurfacing and maintenance project notifications to ensure it is aware of where it needs to enforce the street cut moratorium and to inspect curb-to-curb resurfacing activities by contractors. It is also testing a smartphone system, which would allow inspectors to close out projects on the spot, cutting the time by four days.

While the Department of Public Works has taken some important steps to improve coordination, its efforts could be enhanced in a comprehensive system that increases communication, interrelated systems, and/or automated alerts to responsible parties that would

help to improve coordination and enhance the quality of data related to the City's infrastructure assets.

BSS management has no target for an expected direct labor utilization rate; and almost half of the resurfacing and reconstruction salary costs are for costs other than direct repair work.

Well-managed private and public entities that focus on maximizing the utilization of their most significant resource (their employees) generally have an expectation and goal for direct labor utilization, as number of hours or a percentage, which is monitored to identify trends or necessary remediation.

In common practice for government agencies, compensated time off encompasses no more than 15% of available work hours, while general work tasks such as training, administration, etc. may account for an additional 10%, leaving 75-80% of compensated time as available for direct work related to an entity's core activities. However, the Resurfacing and Reconstruction Division's direct labor utilization for its core activities has averaged 57.3% over the audit period.

The unit costs associated with resurfacing and reconstruction used by MicroPAVER and BSS are outdated, which result in an unrealistic estimate of total cost for deferred maintenance.

BSS' 2011 State of the Streets Report estimated that to bring the City's average network PCI up to 80 over the next ten years would require an investment of $2.43 billion over 10 years (while an additional $19 million per year would be needed for preventive maintenance). However, the unit costs used by MicroPAVER to determine the costs of resurfacing and reconstruction work, upon which these estimates were derived, are out of date and may not reflect actual costs. Based on a recent consultant prepared estimate as part of the 2013 "Save Our Streets LA" proposal, the Bureau of Engineering reported that the program cost is estimated at $3.86 billion if it is desired to have a reasonable assurance that all "D" and "F" streets would be improved under the 20-year program.

Unless the City is expecting to hire a consultant to perform ongoing reconstruction estimates and contract out all resurfacing and reconstruction work indefinitely, BSS still needs to track and maintain accurate unit cost information in its MicroPAVER system for City staff

or contractors to do this work. This will ensure that accurate projections and budget scenarios related to resurfacing and reconstruction work are provided to policymakers.

Without an accurate estimate of deferred maintenance costs, BSS cannot determine its funding needs and enable policymakers and the public to make informed decisions.

BSS' cost accounting system does not track costs at a program activity level (i.e., resurfacing, slurry seal, crack seal, etc.) as defined in the City's Pavement Preservation Plan. As a result, management does not use actual cost data for managing its costs and analyzing resource utilization.

BSS does not track costs at a program activity level associated with its specific goals for resurfacing and maintenance activities; therefore, management cannot utilize actual cost data to analyze resource utilization. A prior audit recommended that BSS adopt a system that incorporated activity-based accounting and utilize cost information to measure efficiency. However, we found many of the same issues identified 13 years ago still exist.

While BSS tracks costs at a work order level and the system contains rich and detailed data, the program does not enable aggregating costs by a program activity as defined in the Pavement Preservation Plan. As a result, actual costs cannot be readily linked to the program goals established in the Plan (number of miles resurfaced, number of miles with slurry or crack sealing, number of potholes repaired). The deficiency in BSS' cost accounting system was also raised in the Controller's October 2011 Blueprint for a Transition to Performance-Based Budgeting, which noted this limitation that BSS work orders did not contain coding for program activities.

Without ongoing tracking of costs (resources utilized) for each of the Plan's key activities, BSS is not able to identify opportunities to deliver resurfacing and maintenance more efficiently and cost effectively.

Street Damage Restoration Fees, which were established to recover the annual resurfacing costs associated with the shortened lifespan of City streets due to the street cuts, were based on an inflated assumption of annual excavation work. As a result, total collections have been undercharged by as much as $190 million since the fee was implemented.

Street cuts are primarily performed by utilities, or telecommunication companies to access their assets buried below the pavement. Though the cuts must be refilled at the excavators' expense, regardless of the quality of the fill, the cuts cause the pavement to degrade at a faster rate, affecting the quality of the street network.

The City's Street Damage Restoration Fees (SDRF) were developed "…to recover the annual cost of the damage from street cuts." In 1996, BSS estimated the additional cost to the City to maintain streets that had been cut was $16.4 million per year due to the shortened lifespan of streets with cuts, and approximately 3 million square feet of cuts were expected annually, which was used to derive a unit fee. BSS proposed graduated fee schedules that charged a higher fee for cutting a street that had been more recently resurfaced than an older street. Excavations into streets more than 25 years old, which include cement concrete streets, are not charged a SDRF.

The estimate used for annual street cuts was substantially higher than the actual square footage of street cuts noted on BOE permits, and due to this inflated assumption, the total revenue associated with SDRF fees collected since inception of the fee in 1998 is $190 million less than it should have been.

A subsequent adjustment to the SDRF fees did not reconsider the total costs to be recovered or the expected number of annual street cuts. Rather, an inflationary

The underlying assumptions regarding citywide street cuts have not been reassessed, nor has the estimated additional annual maintenance cost of $16.4 million been recalculated or adjusted, despite the fact that the City has recovered far less than that amount since the fee was established.

Rather than conducting a new study or using actual annual updated costs and street cut data, Council

adjustment was applied in 2006; however, the rates used were understated, resulting in $31 million in additional missed revenue opportunities.

approved a BSS-proposed update to the SDRF amounts using Caltrans' Construction Price Index to adjust for inflation. In 2006, BSS applied the percentage change in asphalt prices on an annual basis, from 1996 through 2005, to reach a revised 2006 amount for the fees. However, BSS did not use the appropriate 2004 or 2005 year-end cost for asphalt concrete, which resulted in lower percentage changes and a lower adopted SDRF. Using the actual Caltrans prices in a consistent manner, the cumulative price adjustment from 1996 through 2005 should have been 101.06%. Applying the impact of the average fee increase to actual excavations since 2006 when the SDRF was updated, we determined that BSS missed an opportunity to collect $31.6 million.

Budgeted funds have not been fully utilized by BSS for pavement activities and more than $21 million was returned to various funding sources for reprogramming.

According to BSS, more funding would lead to more street repairs and a potential increase in the City's Pavement Condition Index ratings. However, during our audit period, from the funding sources included in the Pavement Preservation Plan that were allocated to BSS, $14.14 million (4% of the total amount) and $7.43 million in front-funded ARRA monies was reverted back to the funding source because BSS did not fully utilize the funding.

When a lack of funding is cited as the primary reason why only a limited number of streets can be repaired, BSS should not be in a situation where budgeted funds are left unused. BSS should have had the ability to reprogram the funds internally to repair more streets, including consideration of contracting out resurfacing activities, if necessary, due to a lack of internal resources.

BSS' reported number of repaired potholes may not be accurate, as a reliable audit trail does not exist.

During the audit period, BSS spent a total of $23.8 million on small asphalt repairs, and reported that it completed from 297,561 to 354,125 in pothole equivalents, exceeding the Plan goal in all three years. However, BSS was unable to provide source documentation attesting to the accuracy of the reported pothole repairs completed.

Crews complete daily work sheets for small asphalt repairs denoting the type of repairs made (skin patch, pothole, alley or sidewalk) and the dimensions. The repair dimensions are converted to square footage on the daily sheet, which are then summarized on a biweekly small asphalt repair report area.

Our review of the biweekly small asphalt repair reports disclosed differences between the Fiscal Year totals from the biweekly reports, to what BSS has reported annually. The internal summary reports appear to indicate many more asphalt repairs were made than what was reported. These variances reveal a broader concern regarding the accuracy of reported results. Comparison of program outcomes against a stated goal is critical for measuring program performance.

The City has no moratorium for excavating streets that have recently received slurry seal treatment.

To minimize damage to recently resurfaced streets the City adopted a one-year moratorium on street cuts (excavations) into those streets; however, there is no moratorium on cuts for recently slurry sealed streets. The cities of San Diego and San Jose have moratoriums for both resurfaced and slurry-sealed streets.

In 2004, the City Council considered this issue, but no action was taken as BSS and BOE suggested that "a second moratorium would only make the street work in general more difficult to schedule, manage and coordinate". Instead, a Slurry Seal Damage Restoration Fee (SSDRF) was imposed, and it was envisioned that the fees would be placed in a special account that would solely be utilized by the BSS to re-slurry those specific trenched areas.

Over our three-year audit period, only a small amount in SSDRF was collected --approximately $250,000, averaging less than $84,000 annually. These fees are combined with the much greater amount of SDRF in a special fund; however, the collected fees are not fully dedicated to BSS for specific resurfacing or re-slurry work.

III. Significant Recommendations

- City Policymakers should identify and prioritize significant new funding to improve the overall condition of the City's street network, as well as require BSS to improve processes and management oversight.

- Present to policymakers the unit costs supporting the proposed Street Damage Restoration Fee based on a full cost recovery model that considers the average actual square feet cut annually, as reported by the Bureau of Engineering.

- Periodically analyze actual miles completed compared to goals for each component of the Pavement Preservation Plan, along with the associated costs to identify trends in declining performance and/or increased costs that warrant management intervention.

- The Department of Public Works should continue to proactively identify opportunities and implement strategies to enhance systems technology to better coordinate activities among Bureaus/Divisions with responsibilities over Street Preservation. For example, the Department should consider using readily available online street view technology, as well as possible crowd sourcing applications, to populate a geo-coded citywide integrated system on a real-time basis that manages all activities, such as street cuts, resurfacing and maintenance work.

IV. Review of the Report

On June 19, 2014, a draft report was provided to BSS management. We held an exit conference on June 26, 2014 and BSS representatives and the President of the Public Works' Commission. We considered their comments provided at the exit conference as we finalized the report.

While BSS acknowledged the audit's overall assessment, management representatives disagreed with several of the audit issues and related recommendations. For example, BSS disagreed with the need to measure direct labor utilization. They also indicated that the current cost accounting system adequately meets their needs, and no value would be added by accumulating costs by key activity. It is our opinion that both of these are important management tools that BSS should implement to measure its effectiveness.

Regarding the audit's projected under-collection of SDRF fees, BSS representatives stated that the fee's purpose was not to recover costs, but to change behavior by reducing street cuts. Based on the ordinance establishing the fee, the information presented by BSS to justify the fee, the City's financial policies relative to fees, and the absence of a Council decision or acknowledgement that the fee would be subsidized, this audit finding is appropriate as presented and the recommendation to "present to policymakers the unit costs. . . based on a full cost recovery model" is valid. We acknowledge that Council may choose to adopt a lower fee; however, policymakers must be presented with full and accurate information to inform their legislative actions.

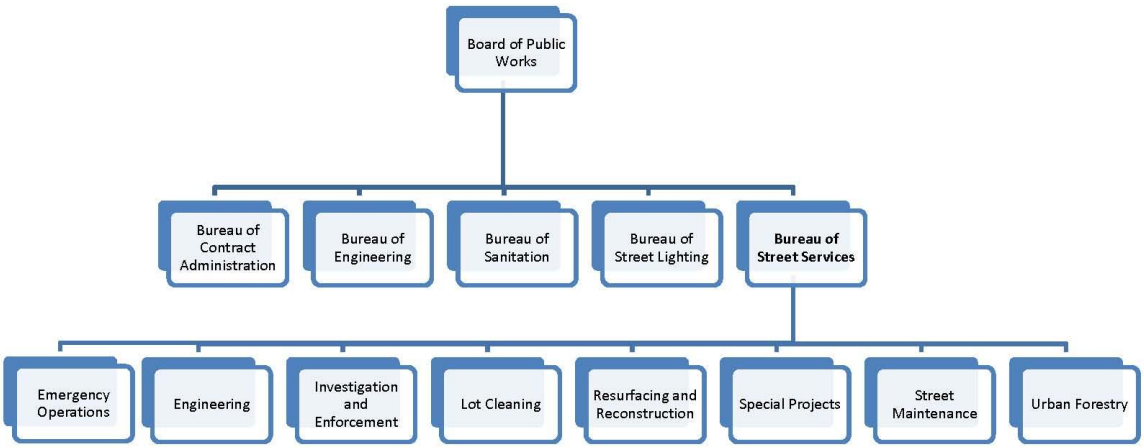
We also added some clarifying language and additional supporting information to address BSS' concerns.

BACKGROUND

A. Mission, Roles & Responsibilities, and Organizational Structure

The Bureau of Street Services (BSS) mission is to provide "…quality street services in a timely and efficient manner.[7]" BSS is one of five bureaus within the Department of Public Works which share responsibilities related to City streets.[8] See **Exhibit 1** for organizational chart and **Exhibit 2** for Bureau responsibilities that affect BSS responsibilities to maintain and resurface pavement.[9]

Exhibit 1: Department of Public Works; and BSS Organizational Chart



This audit focused on street resurfacing and maintenance activities performed by BSS; we did not review the potential for consolidation or reorganization of various functional activities between Department of Public Works' Bureaus or other Departments performing similar or related functions, such as engineering. However, several initiatives have been proposed by Council to review the potential for transferring or consolidating various activities between Departments and Bureaus.[10]

[7] BSS mission statement (http://bss.lacity.org)
[8] Section 580 of the City Charter authorizes the Department of Public Works to "design, construct, excavate and maintain streets…."
[9] For purposes of this report, street maintenance is comprised of small asphalt/pothole repairs, and slurry and crack sealing. Street resurfacing is comprised of overlays, resurfacing and reconstruction. BSS refers to resurfacing as "rehabilitation."
[10] For example, CFI 11-0600-S16; CFI 11-0265-S1; CFI 13-0600-S121.

Exhibit 2: Other Public Works Bureau Responsibilities Affecting Street Pavement Maintenance and Resurfacing[11]

Bureau	Responsibilities
Contract Administration	• Serves as the independent quality control and contract compliance agency responsible for providing assurance that all Public Works projects are constructed and administered in accordance with the plans, specifications, State and Federal laws and safety provisions to achieve a quality product. • Provides oversight of private entities excavating in City streets.
Engineering	• Issues excavation permits to private entities. • Manages Navigate LA GIS system to provide public information on all of the City's construction projects. • Developed the Public Right of Way Reservation System to facilitate coordination and information sharing on private construction activities.
Sanitation	• Inspects and maintains open storm water channels. • Excavates into City streets to maintain, operate, and repair all sanitary sewers. • Administers the watershed program.
Street Lighting	• Designs, constructs, operates, maintains and repairs the street lighting system. • Receives Citywide "DigAlert" notifications of excavations into City streets.
Street Services	• Manages, maintains, repairs, and cleans improved roadways, bridges, tunnels, sidewalks, pedestrian walkways, and related structures. • Resurfaces and reconstructs streets; and constructs street and alley pavements. • Repairs roadway and sidewalk damage due to utility failures.

Note: We excluded other Bureau responsibilities that do not affect street pavement maintenance and resurfacing.

[11]While each DPW Bureau receives funding to perform its key responsibilities through the annual departmental budget process; dedicated program funding for street maintenance and resurfacing, as provided through the citywide Pavement Preservation Plan, are allocated only to BSS and BOE (as well as DOT and GSD); with BSS receiving more than 80% of that amount.

B. City Street Network

BSS is responsible for maintaining the largest municipal street network in the nation. The City's 6,500 centerline miles includes both select and local streets, as described on the next page.

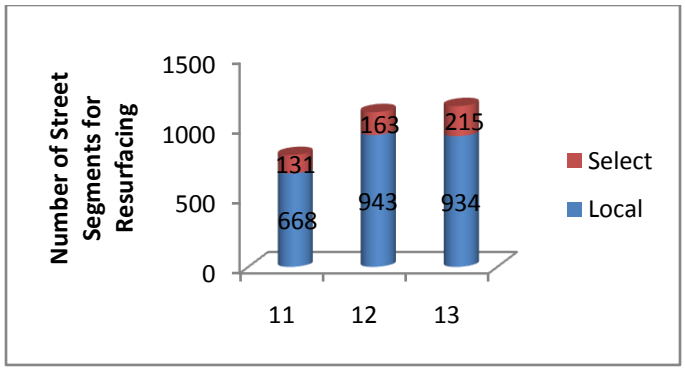
Select streets are considered "non-residential" and are primarily thoroughfares that connect distant locations. These streets are generally wider, including multiple lanes, and carry heavy volumes of traffic. Select streets represent approximately 2,600 centerline miles, and are constructed with thicker layers of asphalt designed to last approximately 15 to 20 years.

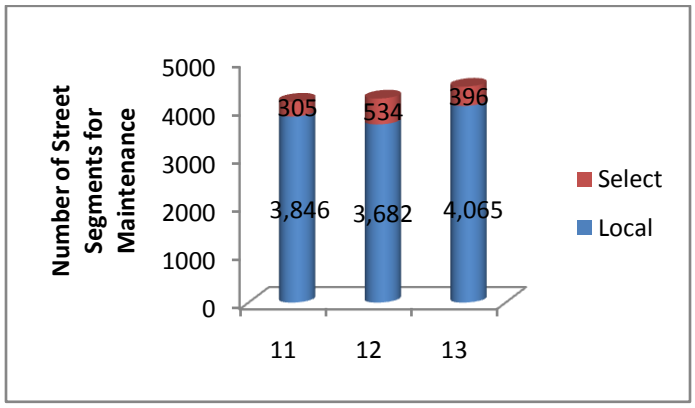
Local streets represent approximately 3,900 centerline miles of the City's network, but their width varies between 15 and 45 feet. They carry local and light traffic but are sporadically exposed to heavy equipment such as sanitation and construction trucks. Local streets are expected to last 30 to 35 years.

BSS tracks the condition of City streets by individual street segment, which is generally the length of a specific roadway from one cross-street to the next (one block). The City's street network comprises 69,000 segments, of which 27% are select (larger, non-residential) and 73% are local (residential) streets.

BSS' responsibilities to repair streets, including maintenance and resurfacing activities, have generally focused on local street segments as shown in **Exhibit 3** and **Exhibit 4.** A description of the maintenance and resurfacing activities can be found in **Exhibit 14**.

Exhibits 3 & 4: Select and Local Streets Resurfaced and Receiving Maintenance





C. Methods of Street Repairs

Street repairs consist of a range of construction techniques for various types of pavement distress. For example, BSS' core responsibilities include pothole repairs, crack filling, slurry sealing, resurfacing, and full reconstruction. These methods are used to repair pavement distresses, such as the ones depicted below in **Exhibit 5.**

Generally, these pavement distresses are caused by a combination of environmental, traffic, vehicle loads, and construction factors. No matter how well a street is maintained or resurfaced, pavement will deteriorate over time. To maintain and restore pavement that has experienced distress, BSS establishes repair goals in its yearly Pavement Preservation Plan.

Exhibit 5: Example Images of Pavement Distresses

Source: Caltrans-Common Distresses on Flexible Pavements.

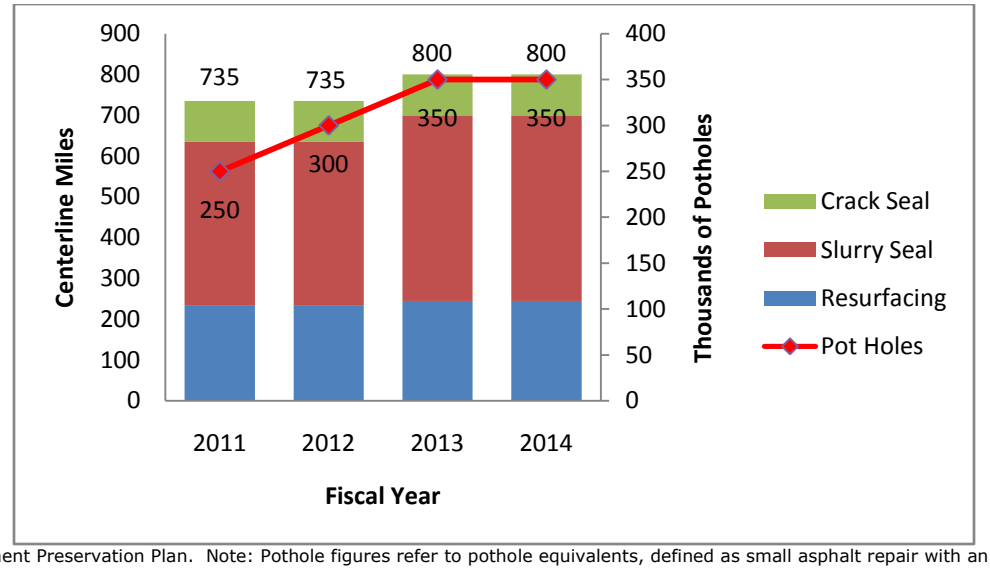
D. Pavement Preservation Plan and Performance Goals

The City's annual proposed budget includes a Pavement Preservation Plan (Plan), which identifies funding and establishes the number of centerline street miles that should be maintained and resurfaced. These performance goals include a number of total combined miles for crack sealing, slurry sealing, and resurfacing and reconstruction, and the number of pothole repairs. Achieving the mileage goals are the primary responsibility of BSS' Resurfacing and Reconstruction Division (RRD), while pothole repairs are the responsibility of the Street Cleaning and Maintenance Division (SCMD).

For FY 2012-13, 800 miles represented about 12 percent of the City's street network of 6,500 miles. According to the Plan, 245 miles related to street resurfacing, 455 miles for slurry seal, and 100 miles for crack seal. These goals remained the same for FY 2013-14 and were slightly more than the goals for Fiscal Years 2010-11 and 2011-12. See **Exhibit 6**. It should be noted that these performance goals were established based on available funding and the intention to continue the City's current overall average PCI of 62 or a C minus, which is significantly less than what best management

practices recommend—that the City's street infrastructure should be maintained at an average condition of "B" or better.

Exhibit 6: Total Resurfacing Miles and Pothole Repair Goals



Source: Pavement Preservation Plan. Note: Pothole figures refer to pothole equivalents, defined as small asphalt repair with an area of 4 square feet

E. Budgeted Allocation and Personnel

In FY 2012-13, BSS was budgeted approximately $111 million as part of the citywide Pavement Preservation Plan to perform resurfacing and reconstruction, small asphalt/pothole repairs, and street maintenance. About $20 million was allocated to other City departments conducting work as part of the Pavement Preservation Plan. See **Exhibit 7** for the total funding by source that has been dedicated to the Plan over the last three FYs.

Exhibit 7: Citywide Pavement Preservation Plan Funding (in Millions)

Source	*FY 11*	*FY 12*	*FY 13*	*Total*
Special Gas Tax	$38.75	$41.58	$52.52	$132.85
Proposition 1B	25.02	32.86	34.73	$92.60
Proposition C	$11.09	$6.50	$26.55	$44.14
ARRA	$16.00	$11.50	$$-0-	$27.50
Measure R	$-0-	$ -0-	$11.50	$11.50
SDRF	$$-0-	$2.42	$6.55	$8.97
Traffic Safety Fund	$-0-	$ -0-	$.11	$.11
Total	**$90.87**	**$94.86**	**$131.95**	**$317.68**

Source: City of Los Angeles Proposed Budget, Pavement Preservation Plan 2011 – 2013.

F. Pavement Management

The American Association of State Highway and Transportation Officials (AASHTO) defines pavement management as "…a set of tools or methods that assist decision-makers in finding optimum strategies for providing, evaluating, and maintaining pavements in a serviceable condition over a period of time…."[12]

BSS utilizes MicroPAVER to monitor, maintain, and manage the City's street network. Not only does this pavement management system provide a systematic method for analyzing and rating street pavement conditions, it offers the Bureau the ability to identify and select maintenance and resurfacing needs, and to determine the optimal time of repair by predicting future pavement condition. (See **Exhibit 31** for a comparison of MicroPAVER with other systems.)

[12] American Association of State Highway and Transportation Officials, Pavement Management Guide Second Edition (Washington, D.C.: Nov. 2012), xix.

i. Survey Van Data Collection

BSS purchased a survey van in 2007 outfitted with specialized equipment for about $733,000 to survey the City's 69,000 street segments. See van image on the next page in **Exhibit 8.** The van captures pavement condition data by utilizing cameras, laser technology, and computers. It takes BSS approximately three years to complete the survey of the entire street network, driving each street and recording images. The van drives a single time down the center of each residential (Local) street, while it must drive down the right lane for each direction on busier non-residential (Select) streets.

Exhibit 8: BSS Survey Van

ii. Data Analysis

Once pavement data is captured by the van, staff manually review the images, identify pavement distresses, and merge this information with automated data produced by the van's laser technology on pavement roughness. See **Exhibit 9** for staff systems for pavement distress identification.

Exhibit 9: BSS Pavement Distress Workstation

After categorizing the identified distresses, a system support staff imports the information into MicroPAVER to calculate the PCI and selects streets for resurfacing and reconstruction activities. (See **Exhibit 31** in the Findings section of this report for a comparison of other automated pavement management software systems).

iii. Selection and Prioritization

The Resurfacing and Reconstruction Division (RRD) identifies street segments with PCI ratings of 0-60 and compiles a list 15 months in advance of resurfacing. This list includes streets with conditions from very poor to fair, requiring maintenance, overlays, resurfacing and/or reconstruction. This resurfacing street listing is shared with utility companies to determine whether there is any planned construction on any of the selected streets. If there is planned construction, that street is placed on hold, removed from the listing, and replaced with another street.

Once the list comes back from the utility companies, RRD determines the number of streets to be worked on each month by grouping the streets together in grids, and a monthly committed list is prepared for each Zone (Valley and Metro). Zone superintendents survey the project list of streets to determine construction and transportation needs, and through visual inspections, superintendents then confirm or adjust the specific street

segment and work to be performed within the grid, and coordinate the transportation and crews needed to fulfill the work.

iv. Citizen Requests

Requests to repair streets are also made by citizens through Council Offices and directly to BSS. Regardless of how a request is received, RRD will verify whether the requested street is already included in the list of streets identified for maintenance and resurfacing for that fiscal year. If it is not, the staff will conduct an investigation to determine when the street was last repaired and what type of treatment it would need by reviewing the street's PCI.

If it is determined that the street needs resurfacing or reconstruction but it is not included in the candidate list for the fiscal year, staff will determine whether the respective Council District chooses to fund the street repairs. If not, the street will be included in the candidate listing of streets to be completed the following fiscal year.

v. Requests by Mayor or Council

Requests to repair a street can also be made by the Mayor or Council members. RRD follows the same process as requests by constituents and verifies whether the street is a valid candidate for repairs. RRD then determines whether its existing resources are sufficient to include the street in the current FY's list of selected streets, or if funding will be provided by a respective Council District to meet that request.

G. City Street Conditions & Triennial State of the Streets Report

i. Comparative City Street Conditions

According to a national transportation research organization, TRIP, the Los Angeles urban area has the worst street conditions and resulting highest additional annual vehicle costs of any other large U.S. City. A sample comparison is provided in **Exhibit 10** on the next page.

Exhibit 10: Selected Cities' Relative Street Condition and Additional Annual Vehicle Operating Costs (VOC), per 2013 TRIP report

City/Urban Area	VOC	Poor	Mediocre	Fair	Good
Los Angeles	$832	64%	26%	5%	5%
Houston	$506	25%	31%	25%	19%
Atlanta	$201	1%	35%	5%	59%
Nashville	$254	10%	21%	10%	59%
Raleigh	$283	14%	11%	19%	56%
Sarasota	$178	7%	11%	14%	68%
Orlando	$254	13%	12%	15%	60%
Chicago	$567	33%	39%	14%	14%
New York City	$673	51%	23%	11%	14%
San Diego	$758	55%	31%	5%	9%
Washington DC	$517	31%	29%	17%	23%
San Francisco	$782	60%	26%	5%	9%
Average	$484[1]	30%	25%	12%	33%

Note 1: In the 2013 TRIP report, the average for 75 cities with populations over 500,000 is $486.

We considered the reported street conditions and practices of large cities with mild climates, as well as other cities noted above, which are summarized in **Appendix II** of this report.

ii. City Street Conditions

Based on BSS' strategic goals and industry standards, the street system of the City should be maintained at an average condition level of "B" or better (80 PCI), and no streets in the network should have a condition rating below "C" (60-100 PCI). However, the City currently maintains an overall average street Pavement Condition Index (PCI) rating of 62, which corresponds to a letter grade of a "C minus." This PCI level is just above the lower limit goals set by BSS for individual street segments. *For a more detailed explanation of the rating system, see section iii. below.*

iii. Triennial State of the Streets Report

BSS publishes the condition of its streets from the survey in its triennial State of the Streets Report (SOSR). In its latest 2011 SOSR, the Bureau quantified its pavement conditions and described its maintenance needs as shown in **Exhibit 11.**

Exhibit 11: Street Conditions and Maintenance Needs

Condition	PCI	% of Street System	Physical Condition	Maintenance Required
A - Good	86-100	21.1%	No cracking, no base failure	None
B - Satisfactory	71-85	23.1%	Minimal cracking, no base failure	Slurry seal
C - Fair	56-70	17.7%	Minimal cracking, no base failure to 5% base failure	Maintenance overlay (1.5-2 inch of asphalt)
D - Poor	41-55	13.2%	Some cracking, 6% base failure to 35% base failure	Resurfacing (2–2.5 inch of asphalt)
F - Failed	0-40	24.9%	Major or unsafe cracking, 36% base failure to 50% base failure	Resurfacing and/or reconstruction (6-12 inch of asphalt)

Source: BSS State of the Streets, 2011.

Note: The conditions of City streets may vary due to increased degradation from utility excavations, traffic, and weather.

iv. Rating Pavement Conditions

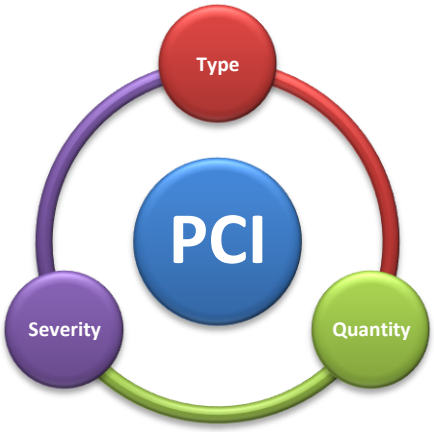
The ratings are based on a letter system (A to F), with A representing the streets in good condition and F being the streets in failed condition. Each pavement condition grade is based on a Pavement Condition Index (PCI) of the pavements' structural and surface condition. The PCI scores range from 0 for a failed pavement to 100 for a pavement in perfect condition.

As mentioned in section F above, PCI scores are calculated by MicroPAVER, which considers the data for each street segment, as derived from the identification of the type and severity of pavement distress types captured

by cameras and evaluated by BSS staff, as well as automated scores for pavement roughness that is generated by laser technology.

The types of pavement distress, as well as their relative severity and the quantity of those distresses on a particular street segment, contribute to the PCI and quality ranking of that street, as depicted in **Exhibit 12** below. Common pavement distresses include alligator cracking, bleeding, longitudinal street cracking, and potholes.

Exhibit 12: Factors Relating to Pavement Distress that Contribute to PCI



v. Five-Year and Annual Resurfacing Plans

MicroPAVER serves as the basis for identifying streets for potential maintenance and resurfacing. See **Exhibit 13.**

Using the software's PCI information, the Bureau compiles a list of candidate streets eligible for maintenance and resurfacing. This candidate list makes up its five-year resurfacing plan. This plan changes often as streets are designated for construction or placed on hold based on annual needs, budget constraints, and construction or event conflicts with other City departments or private entities, such as utilities.

From the five-year plan, BSS creates its annual resurfacing plan. When the Bureau confirms that no construction or event conflicts exist with the annual resurfacing plan, a committed list of streets set for resurfacing or maintenance on a monthly basis is compiled. Thirty days prior to resurfacing/maintenance, BSS sends letters to property owners and posts notices in public areas to notify stakeholders of intended work. This serves as the final clearance before BSS commences its work on a committed street.

Exhibit 13: Process for Selecting Streets for Resurfacing/Maintenance

H. Implementing the Pavement Preservation Plan

Implementation of the Pavement Preservation Plan by BSS is a joint inter- and intra-departmental effort by BSS' Pavement Management Section (PMS), the Resurfacing and Reconstruction Division (RRD), the Financial Management Division (FMD), and the City's General Services Department (GSD). The Plan also involves work by the Department of Transportation as related to street striping, and the Bureau of Engineering, as related to design for major construction.

i. Street Prioritization and Selection

PMS monitors, maintains data, and manages the street network using MicroPAVER. PMS staff are dedicated to identifying distress types and transferring information between computer systems to facilitate the selection of streets eligible for maintenance, rehabilitation, and reconstruction.

Once PMS has produced a list of candidate streets as depicted in **Exhibit 13**, RRD's coordination section uses the information to identify any construction or event conflicts with other City departments and approximately 200 utilities. It does this by communicating with entities on its mailing list 15 months prior to the start of BSS street construction.

Once RRD has narrowed down the candidate list of streets, it works with FMD to open work orders for each street segment for

resurfacing/maintenance work on a monthly basis. The selected streets make up RRD's committed list.

ii. Resurfacing and Maintenance Activities

BSS systematically schedules the repair work for each street segment identified for maintenance and rehabilitation. In order to meet its material demands, BSS operates two City-owned asphalt plants and maintains active contracts to purchase asphalt and slurry seal from three private plants.

BSS street construction crews are City employees that are assigned to one of two Zones, Metro or Valley. Their primary responsibilities are to:

- schedule, monitor, and complete all resurfacing projects;
- issue 30-day notifications to property owners and notify stakeholders of intended construction;
- direct, manage, monitor asphalt plant operations to ensure productivity goals;
- ensure timely delivery of recycled asphalt to City and private asphalt plants; and
- work with private trucking contractors to gather removed pavement.

RRD's construction involves four types of treatment. See **Exhibit 14.**

Exhibit 14: Pavement Treatment Types, Purpose, and Reported Costs/Mile

Treatment	Method	Purpose	BSS Reported Cost Per Mile
Slurry Seal	Applying emulsified rubber asphalt to seal large areas	Extend the useful life of pavement by 7 to 10 years	$30,000 – $50,000
Crack Seal	Applying asphalt filler to cracks	Prevent water erosion and deterioration of streets	$5,000
Asphalt Resurfacing	Grinding down the top layer of a street surface a few inches Adding a new layer of asphalt on top	Rehabilitate the roadway	$300,000-$450,000
Reconstruction	Deep level of grinding below the surface of the street Repair work could extend to the base before a new layer of asphalt is applied	Reconstruct the roadway	$600,000-$2.5 million

iii. Construction Inspections and Project Closeout

When construction is complete, GSD provides pavement compaction testing to ensure asphalt quality meets City specifications. The Department also tests slurry seal to ensure the proper mix of materials. GSD performs on-the-spot and in-lab testing to ensure quality and inform BSS of potential material issues.

Once GSD has approved the construction standards of a project, RRD works with FMD to close out the project work orders.

iv. Other Construction Activities

Potholes

The Street Cleaning and Maintenance Division is charged with repairing potholes. Since potholes vary in size, BSS counts pothole equivalents as 4 square feet. BSS reports the costs for repairing a pothole can vary between

$7 to $21, depending on the dimensions of the repair. Pothole repairs are initiated through public complaints and observations by BSS field crews.

Sidewalk and Ramp Repairs

According to BSS, they inspect requests for sidewalk repair and make interim asphalt repairs where feasible; but concrete sidewalk reconstruction has not been funded since FY 2008-09. Previously, General Funds dedicated to sidewalk repair were allocated evenly by Council District, which determined the locations to repair. In addition, for a four-year period ending in FY 2008-09, the City sponsored a 50/50 sidewalk repair program whereby residential property owners paid half and the City paid half, based on a first-come-first served bases until the funds were exhausted. Sidewalk ramps are constructed in conformance with the Americans with Disabilities Act (ADA) transition plan, and when funding is available, they also coordinate bus pad repairs. BSS' FY 2013-14 budget included about $3.7 million to fund sidewalk access ramps and approximately $1.7 million to fund bus pad and stop improvements.

I. Citywide Coordination Processes for Pavement Preservation

While BSS works to minimize potential pavement excavations into recently resurfaced streets by coordinating and communicating their intended work prior to scheduled repairs, there are other key City processes and systems that facilitate these efforts. These processes are fragmented across the Bureau of Engineering (BOE), Bureau of Contract Administration (BCA), BSS Investigation and Enforcement Division (IED), and the General Services Department (GSD).

i. BOE

BOE serves as the City's grantor of excavation permits (also known as an "E"-permit for private contractors and a "U"-permit for utility companies). The purpose of these permits is to ensure construction and safety oversight of excavators, require them to pay a Street Damage Restoration Fee (SDRF) and a Slurry Seal Restoration Fee (SSRF), and enforce compliance with the one-year street excavation moratorium.[13]

When BOE issues an excavation permit, it collects the SDRF on behalf of BSS. The fee is based on the square footage of the intended excavation and

[13] LAMC 62.06 D prohibits cuts or excavations into streets resurfaced within the past year.

age of the street since it was last maintained or resurfaced/reconstructed. See **Exhibits 15** and **16.**

Exhibit 15: Street Damage Restoration Fee Schedule, Slurry Sealed Streets

Years Since Last Slurry Seal	Square Feet of Excavation	Fee
Less than 2 years	≤ 2,500	$276
	> 2,500 and ≤ 5,000	$552
	> 5,000	$.20 per square foot

Exhibit 16: Street Damage Restoration Fee Schedule, Resurfaced Streets

Year Since Last Resurface[1]	Major Street	Residential Street
	Cost Per Square Foot	
≤ 5	$21.26	$7.78
> 5 and ≤ 10	$17.72	$6.90
> 10 and ≤ 15	$14.18	$6.48
> 15 and ≤ 20	NA	$5.86
>20 and ≤ 25	NA	$5.18

Note 1: Resurface (d) means both resurfaced and reconstructed streets. There is no distinction between concrete and asphalt streets; however, the City's concrete streets are typically older than 25 years.

The SDRF collections are remitted to a Special Revenue Fund, and allocations are made through the budget process for future operational expenses.

BOE also administers NavigateLA and developed the Public Way Reservation System (PWRS) to facilitate communication of citywide construction to all stakeholders. BOE uploads construction and permit information into NavigateLA on an ongoing basis; however, information sharing on PWRS is solely at the discretion of the entities performing construction.

ii. BCA

BCA serves as the contract administrator and oversight body of private entities that have obtained permits through BOE. BCA's responsibilities include construction administration service to ensure quality construction for street improvements; sewer and storm drain construction, bridges, tunnels, recreation and park facilities, airport facilities, and sewage disposal plants. BCA monitors compliance with the LAMC's requirements for curb to curb paving if an entity opts to excavate into a street protected by the excavation moratorium.

iii. IED

IED is the law enforcement agency of the Department of Public Works. The IED works with other Public Works' divisions and bureaus to cite violators of the Los Angeles Municipal Code. IED can become involved and issue citations to a private entity if it does not comply with BCA and BOE's permit requirements.

iv. GSD

GSD works with BCA, BSS, and other City departments to provide quality control testing of material specification standards. As stated previously, they do on the spot field testing as well as testing in the lab to ensure standards are met.

OBJECTIVES

The primary audit objective will be to assess the Bureau's effective and efficient utilization of resources to maximize the number of streets that are adequately paved and to reduce long-term costs (i.e., more deferred maintenance costs over time). The objectives are as follows:

A. Assess whether the Bureau adequately accounted for all street-repair expenditures,

B. Assess the Bureau's existing system and procedures against best practices for grading pavement conditions and selecting and prioritizing streets for repair and maintenance,

C. Assess the cost effectiveness of the asphalt plants,

D. Evaluate the City's existing funding sources and cost recovery measures for street repair and maintenance and identify industry best practices for reducing long-term costs,

E. Evaluate the extent to which limited funding and staffing resources increase the City's deferred maintenance backlog and how much more it will cost the City to maintain and repair streets in the future, and

F. Assess the extent to which City departments and private utilities coordinate work that affects street conditions, resurfacing, and maintenance.

NOTABLE ACCOMPLISHMENTS

In 2012, the Bureau of Street Services' Pavement Preservation Program was the recipient of Roads & Bridges/ARRA Recycling Award in the Cold Planing (Cold Milling) category. According to BSS, the Roads & Bridges Magazine noted that, "During an 18 month period BSS paved 232 miles of roadways utilizing 20% to 50% Reclaimed Asphalt Pavement along with operating the Cold-In-Place Recycling Machine (CIPR). Using these Green recycling technologies the Resurfacing Division did not have to purchase several hundred thousand tons of virgin aggregates saving millions of scarce tax dollars during these momentous challenging economic times."

BSS also received the Roads & Bridges ARRA Recycling Award in the Cold Planing Category for the Canoga Ave. Metro Orange Line Resurfacing Project. This was a coordinated project with the Metropolitan Transit Authority (MTA), Department of Transportation (DOT) and Bureau of Engineering (BOE). The Canoga Avenue Metro Orange Line resurfacing project used 20% to 50 % Reclaimed Asphalt Pavement (RAP). Under the leadership of the Mayor's Office, the BSS Resurfacing and Reconstruction Division (RRD) coordinated its efforts with the other agencies to resurface Canoga Ave between Prairie Ave. and Victory Blvd. and complete this 3.15 mile project in an accelerated timeline, resulting in significant cost savings and ahead of the opening of the Metro Orange Line Bus Station. According to BSS, this collaborative effort demonstrated that public and private partnerships through city and state agencies can deliver timely efficient services to residents and customers on budget.

FINDINGS & RECOMMENDATIONS

Section I: Effective Resource Management

Good business practices in both the public and private sector require that organizations manage their resources effectively in order to achieve their stated goals and objectives. In government, the efficiency and effectiveness of a program should be evaluated to determine how resources (money, material, personnel, etc.) are used to achieve expected goals (outputs and outcomes). By doing so, management can assure policymakers and the public that it has sufficient resources to carry out its activities or inform them that resources are insufficient to meet expected goals.

Overall Goals and Performance

Finding No. 1:	**While Best Management Practices recommend that street system infrastructure be maintained at an average condition level of "B" or better, the City falls significantly below that, with an overall average of "C minus."**

As stated in their most recent "State of the Streets Report" (2011), the broad goal of the Bureau of Street Services is to maintain all improved streets, alleys, and related throughways in a perpetually good to excellent condition, while providing desirable standards of safety, appearance, and convenience to the residents and traveling public within the City of Los Angeles. The Bureau recommended that, as a best management practice, the City's street system infrastructure should be maintained at an average condition level of "B" or better, and no streets in the network should have a condition rating below "C." That is, all streets in the City should have a PCI of 60 to 100, with the overall goal being an average PCI of 80. BSS stated that once that goal is reached, it would be able to economically sustain the City streets in a satisfactory to good condition.

However, the weighted average PCI for the entire City's street network is 61.52, or a "C minus," far below what is recommended as a best practice or by BSS. **Exhibit 17** notes the respective conditions of the payment inventory of Select (larger, non-residential streets) and Local (residential) streets, as well as overall for the entire system.

Exhibit 17: Proportional Condition of City's Street Network

Condition Level Rating and PCI range		Select Streets	Local Streets	Overall System
A - Good	86 - 100	18.31%	30.52%	21.11%
B - Satisfactory	71 - 85	41.55%	20.38%	23.08%
C - Fair	56 - 70	17.27%	16.57%	17.68%
D – Poor	41 – 55	11.41%	11.32%	13.24%
F - Failed	0 - 40	11.46%	21.22%	24.89%
Weighted Average PCIs - Select, Local and Overall				
C		***62.97***	***61.16***	***61.52***

The City has funded a Pavement Preservation Plan with an overall goal to "maintain" the current condition of streets; however, this is far below what is optimal or required. In fact, the average PCI of the network has remained essentially the same as what was reported in the 2005 and 2008 State of the Street network reports.

The funding for pavement preservation, as well as the specific goals/activities to be performed annually by BSS, have focused primarily on maintenance activities, i.e., slurry seal and crack seal, with a relatively lower overall goal for actual resurfacing and reconstruction work.

Select streets, which are considered "non-residential" wide throughways that carry heavy volumes of traffic, are designed to last approximately 15 to 20 years. Local or "residential" streets have widths between 15 and 45 feet, and generally carry local light traffic but are sporadically exposed to heavy loads such as refuse collection trucks, buses or construction equipment. BSS expects these local streets to last 30 to 35 years. The City's funding and resurfacing activities have been insufficient to reconstruct streets when their natural life has been exhausted, which has resulted in a significant backlog of deferred maintenance and poor and failed streets. The City's current approach to maintaining an average PCI for the network focuses its resources on maintaining "B" and "C" streets, rather than improving the "D" and "F" streets.

While preventative maintenance activities (such as slurry and crack seal) can reduce the lifecycle costs of a pavement surface by about one-third, to be effective, those strategies must be applied while the pavement surface is still in good condition, with no apparent deterioration. In addition, the preventative maintenance approach may require several applications of minor sealing or resurfacing. A 2010 Federal Highway Administration Report

found that an over-reliance on short-term pavement repairs will fail to provide the long-term structural integrity needed in a roadway surface to guarantee the future performance of a paved road. In fact, it warned that if transportation agencies focus only on current pavement surface conditions, they will eventually face a network with an overwhelming backlog of pavement rehabilitation and replacement needs. This appears to be the case in the City of Los Angeles.

The City must identify additional and sustained funding to improve the condition of the street network. While baseline funding for preventative maintenance remains important, the overall condition of the City's streets will not improve without significant capital investment. The additional resources, along with the need for improved processes and more effective oversight as identified in this report, are necessary and critical for the City to improve its street network.

Recommendation:

1.1 City Policymakers should identify and prioritize significant new funding to improve the overall condition of the City's street network, as well as require BSS to improve processes and management oversight.

Direct Labor Usage

Most entities strive to continually improve their efficiency. When resources are constrained, as has been the case in the City for the past several years, working efficiently becomes even more important. One way to analyze efficiency is by examining resources used (i.e., labor, materials, equipment usage) to determine whether changes in organizational structure or processes are needed. Salary costs are a significant expense for any organization. Calculating a direct labor utilization rate demonstrates what portion of an entity's total payroll expense pays for direct labor dedicated to achieving an organization's primary purpose, e.g., income-generating activities (for commercial entities), or in fulfilling a public entity's program activities and goals.

Finding No. 2:	**BSS management has no target for an expected direct labor utilization rate; and almost half of the resurfacing and reconstruction salary costs are for costs other than direct repair work.**

BSS' use of labor is inefficient, and does not maximally contribute to direct street paving activities. Approximately half of the direct labor costs, that is- the salary amounts paid to employees of BSS' resurfacing and reconstruction division- was not for time charged to direct street repair activities.

We selected the Resurfacing and Reconstruction Division (RRD) to analyze its direct labor utilization due to the following factors:

- RRD accounts for the majority of the Bureau's budgeted funding ($91 million of $164 million for FY 2012-13);
- it is responsible for the more costly street repair work; and
- resurfacing and reconstruction work is the primary responsibility of RRD, as opposed to other pavement activities (potholes), which are considered part of the Street Cleaning and Maintenance Division's responsibilities.[14]

Resurfacing and Reconstruction Direct Labor Utilization

No entity can achieve 100% direct labor utilization. Employees are compensated for absences (vacation, sick, holidays), as well as for other activities directed by management (e.g., training, administrative tasks, etc.) A common practice for government agencies, compensated time off encompasses no more than 15% of available work hours, while general work tasks such as training, administration, etc. may account for an additional 10%, leaving 75-80% of compensated time as available for direct work related to an entity's core activities. However, the Resurfacing and Reconstruction Division's direct labor utilization for its core activities has averaged 57.3% over the audit period.

We compared the salary costs paid for the core activities related to resurfacing and reconstruction work completed in each of the three years of our audit period to the total salary costs paid. As shown in **Exhibit 18** below, despite the Division's budgeted staffing positions remaining stable, the ratio of salary costs attributed to performing the direct, core activities related to resurfacing and reconstruction decreased from 58.43% in FY 2010-11 to 56.14% in FY 2012-13. (Salary costs noted here do not include employee benefits or overheads).[15]

[14] SMD is also responsible for street sweeping and cleaning.
[15]We acknowledge that actual filled positions can vary from the number of positions budgeted, and are generally less than budget. However, the Department was only able to

Exhibit 18: Direct Labor Utilization for Resurfacing and Reconstruction Activities

Resurfacing & Reconstruction Activities (Net Salary)				
FY	**Direct Salary Costs**	**Total Salary Costs**	**% of Direct Salaries to Total Salaries**	**Budgeted Positions**
2010-11	$7,408,582	$12,679,294	58.43%	122
2011-12	$8,076,489	$14,050,550	57.48%	122
2012-13	$8,158,997	$14,534,016	56.14%	122
Total/Avg	**$23,644,068**	**$41,263,860**	**57.30%**	

Exhibit 18 above demonstrates that there are more labor costs associated with Bureau activities other than those directly associated with street resurfacing and reconstruction. While slightly more than half of the total salary costs are for actual resurfacing and reconstruction work, the remaining Division salary costs are attributable to other non-core, or "indirect" activities/functions, such as compensated time off for vacation, sick leave, Bureau executive management, etc.

Well-managed private and public entities that focus on maximizing the utilization of their most significant resource (their employees) generally have an expectation and goal for direct labor utilization, as number of hours or a percentage, which is monitored to identify trends or necessary remediation. To do this, an organization needs to determine the amount of productive work hours an employee is expected to work on core activities, once compensated time off for holidays, vacation and sick leave are deducted from the 2,080 available work hours in a year, and further reduce it by an average number of hours or time spent on general non-core activities, such as training, administrative tasks, etc. This ensures fairness for the employee, complies with existing labor agreements, and provides management with the ability to properly track direct labor utilization, i.e., hours or proportion of staff time that is dedicated to tasks directly related to staffs' work responsibilities.

provide the number of filled positions for FY 2012-13. Therefore, to enable a comparison for the audit period, we used budgeted staffing.

For example, in the City of Tacoma, fleet maintenance managers determined that their employees should be able to dedicate anywhere between 1,456 to 1,664 hours (or 70 to 80%) of the 2,080 yearly labor hours to maintaining vehicles. Similarly, in the City of Long Beach, the Department of Public Works determined that employees should be able to work a maximum of 1,754 hours per year on direct street maintenance activities.

As part of this audit, we attempted to determine how effectively BSS tracked direct labor utilization and allocated productive work hours. Though we requested BSS' goal for direct labor utilization, it was not provided, and it is unclear if management has a stated expectation for this type of measurement. As a result, we cannot compare the actual direct labor utilization to a rate that management strives for or monitors. Given the current limitations of its cost accounting system, it may not even be possible for management to conduct a meaningful analysis of the staff's direct labor utilization.

Without setting a goal and continuously monitoring its direct labor utilization, BSS management is missing a critical component in understanding and evaluating the efficiency of its resurfacing and reconstruction operations.

Recommendations:

BSS management should:

2.1 Determine an appropriate direct labor utilization rate for each of the program activities related to street resurfacing and maintenance.

2.2 Monitor the direct labor utilization rates for its street resurfacing and maintenance activities on a periodic basis; identify reasons for variances from goals and areas for improvement.

Asphalt Plants & Recycling

Approximately 35% of the asphalt used by BSS to repair City streets is produced by the City's two municipal asphalt plants (AP1 and AP2). AP1 was originally completed in 1915 and was replaced and relocated to its current location in 1947 to serve the central and southern portion of Los Angeles. In 1925, AP2 was completed and is located in the San Fernando Valley.

According to BSS, the two plants can produce as much as 600,000 tons of asphalt annually. The City contracts with two third-party vendors to purchase asphalt to meet its remaining needs.

While the Bureau's contracted asphalt plants are providing material using 50% Reclaimed Asphalt Pavement (RAP), due to the age of AP1, it uses no more than 7.5% to 10% RAP. AP1 uses the "batch" hot mix asphalt technology that was common at the time of its installation. Batch plants are suitable for small or irregular volumes, but they are limited in their capacity to use cost-saving RAP.

Since FY 2006-07, the City has planned to upgrade AP1 to enable the plant to operate more efficiently and increase the percentage of cost-saving RAP that can be used. The City's Municipal Improvement Corporation of Los Angeles (MICLA) Program would provide significant funding for the plant upgrade.

Finding No. 3: The City has not made the capital investment necessary to upgrade Asphalt Plant 1 (AP1) to achieve efficiencies from current production methods. However, even with a $17.7 million investment, the City's asphalt production costs would only be comparable to what BSS pays private vendors. A strategic financial partnership could help the City achieve long-term environmental and cost benefits.

Plans to upgrade AP1 have languished for years due to a lack of sufficient capital funding; however, a 2014 analysis by a BSS consultant notes that even with the significant investment for the upgrade which would enable BSS to achieve significant efficiencies, the City's costs would remain in line with current vendor pricing for asphalt. To best utilize what the City has (dedicated site and partial funding for capital improvement) balanced with the City's needs (additional investment funds, and a stable supply of recycled asphalt at a reasonable cost) the City should explore partnering with a private asphalt production entity to develop a feasible strategic financial partnership for AP1.

Capital Funding Requirements

During the FY 2006-07 budget process, Council approved inclusion of $10 million in the MICLA program "for the retrofit of Asphalt Plan No 1 to

increase asphalt recycling efforts." Although it was not included in the budget request submitted by the Bureau of Street Services, nor in the official proposed budget, BSS management stated it appears this funding recommendation was added by the Mayor's Budget team. A transmittal by the Chief Legislative Analyst to the Budget and Finance Committee indicated that it had "inadvertently been omitted in the Proposed Budget." However, as of our audit fieldwork, the funds have not been formally dedicated or used for this purpose.

Since Council policy requires that unexpended MICLA funds be reauthorized if they are not spent within three years of authority, in May 2013 the City Administrative Officer (CAO) recommended reauthorization of the $10 million, which was approved and reauthorized by the Council and Mayor on June 11, 2013. The CAO's report also noted that the project was currently estimated at $14.1 million, though BSS was working with the CAO to reduce the overall project cost.

In 2013, BSS engaged a consultant to prepare a preliminary assessment of the AP1 Reconstruction Project, and the resulting report included an economic analysis and a discussion on hazardous materials and geologic hazards, and the potential environmental benefits. The capital costs presented in that report (dated February 2014) include demolition, site preparation, equipment, permitting/design/construction management, soil remediation and contingency and total $17.7 million. This is well above the $10 million in set-aside MICLA funding, and the CAO's 2013 estimate.

The current plans call for the City to perform site preparation/readiness including laying the appropriate foundation, while the primary asphalt plant equipment would be provided and installed on site by a contractor. The new facilities would include aggregate storage bins, above-ground liquid asphalt tanks, asphalt processing equipment, power and control centers, material conveyor systems, asphalt-concrete silos, etc. Together, these are classified as "equipment" totaling $10 million in the cost analysis, which is based on a 2013 vendor sales proposal. Significant additional capital costs over and above the "facility equipment" are necessary to fully implement AP1 reconstruction/replacement, as planned. However, additional funds have not yet been identified or committed.

Benefits of an Upgrade or Replacement of AP1

The primary reasons cited for replacing AP1 are the potential environmental benefits and cost savings from the City's current production methods.

- **Increasing the Recycled Content from 7.5% to 50% at AP1**

Sustainable development, such as that promoted by the U.S. Green Building Council's Leadership in Energy and Environmental Design (LEED) addresses how asphalt pavements can contribute towards credits in materials and resources and innovation and design process, by diverting debris from landfills and using recycled materials. According to the National Asphalt Pavement Association, a LEED point should be awarded for incorporating higher than 20% RAP in a pavement.

AP1 has operated at its current location since 1947 and uses a "batch" hot mix asphalt technology. Because this technology is highly sensitive to the moisture inherent in reclaimed asphalt pavement, no more than 7.5 – 10% RAP can be used in the mix, reducing the City's ability to recycle milled pavement and requiring that the asphalt produced be comprised of mostly virgin aggregate materials. Newer technologies of asphalt production allow for using up to 50% recycled content.

The City's two contracted asphalt vendors (All American Asphalt and Vulcan) are both required to produce recycled asphalt concrete, reportedly using about 50% RAP. Both contracts include provisions for the vendor to receive and process the City's milled asphalt pavement into the recycled asphalt concrete that is then purchased by BSS. The contracts also allow the vendors to purchase excess reclaimed asphalt from the City, which can be used in production of asphalt for other customers. Therefore, the City has existing mechanisms to recycle the milled pavement that BSS scrapes from its streets, and to ensure its utilization when paving new streets. The recycled asphalt concrete provided by the vendors helped BSS to achieve its targeted RAP %, which resulted in a 2012 recycling award.

- **Projected Cost Savings from Current Production Methods at AP1**

The projected savings due to an upgrade of AP1 are derived from a decreased need for virgin aggregate materials (by using more recycled materials as inputs) and operational efficiencies. The economic analysis prepared by the BSS consultant compares the current annual operating costs at the current quantity of 175,000 tons of asphalt produced, to different scenarios using the new technology that would be implemented by the replacement facility. The cost drivers are based entirely on the reduction in virgin material and a small savings in natural gas. The primary input, Recycled Asphalt Pavement, moves from 7.5% to 50% at an assumed no cost to the City, while the City's costs for labor and other inputs remain constant in all three scenarios, with an incremental increase in utility costs

at higher production levels. While it may be reasonable to assume zero cost for increasing RAP, the assumption of no increases to 2012 City costs for operations and maintenance (e.g., labor, maintenance, indirect costs), despite significant increases in production quantity, is questionable.

Exhibit 19 below presents a summary of the operating cost analysis presented in the Consultant's study, resulting in an estimated cost/ton of asphalt produced; without considering the effect of the capital investment.[16]

Exhibit 19: Current and Projected Operating Costs for City-Produced Asphalt at AP1

Description	Current Plant Costs for 175,000 tons asphalt produced	Projected Plant Operating Costs with Upgrade		
		Current Qty (175K)	Proj Qty #1 (300K)	Proj Qty #2 (650K)
		Est. Total Costs	Est. Total Costs	Est. Total Costs
Virgin Material	$9,697,153	$5,246,160	$8,991,918	$19,484,238
Recycled Asphalt Pavement	0	0	0	0
Labor	$673,060	$673,060	$673,060	$673,060
Utilities	$403,930	$333,682	$571,931	$1,239,295
Equip & Maintenance	$259,204	$259,204	$259,204	$259,204
Indirect & 3rd party contracts	$470,466	$470,466	$470,466	$470,466
Total Operating Costs	$11,503,813	$6,982,572	$10,966,579	$22,126,263
Operating Cost/Ton	$65.74	$39.90	$36.56	$34.04
RAP % used	7.5%	50.0%	50.0%	50.0%

Source: Parsons Brinckerhoff AP1 Reconstruction Project - Preliminary Assessment; February 2014

Based on the estimated $17.76 million investment and an assumed 30 year amortization of the facility, the economic analysis also calculated the capital cost per ton. By comparing the proposed cost/ton among scenarios, the report calculates an annual savings based on current quantity as well as a projected savings over 30 years. The projected savings from current

[16] The Consultant's Assessment report noted that the City of Los Angeles provided 2012 data for operations and maintenance (O&M) for AP1, the amount of RAP currently used and projected for the new plant, fixed and variable cost assumptions, average of plaint maintenance expenses, indirect City costs for purchase of asphalt from vendors, third party vendor costs for asphalt, etc. *Controller staff did not verify or audit these costs or the reasonableness of operational assumptions.*

operations at AP1 is used to support a conclusion that the investment would be fully recovered in less than 4 years.

A further point that has been made to support the investment to replace/upgrade AP1 is that by enabling the City to produce a larger proportion of asphalt for its pavement preservation needs, it would be less reliant on private suppliers' price increases.

- **Comparative Costs of Production vs. Purchase**

The calculated operational cost of City-produced asphalt under various quantity assumptions, while showing a significant reduction from current operations at AP1, results in a comparable price to what is paid to contracted vendors, as noted below:

Exhibit 20: Comparative Costs of Producing vs. Purchasing Asphalt

CITY produced	tons	Operating cost/ton	Capital cost/ton	Total cost/ton
Current	175,000	$65.74	$0.15	$65.89
Qty #1	300,000	36.56	3.02	39.58
Qty #2	650,000	34.04	1.57	35.61

VENDOR purchased	2012 tons	cost/ton
AAA	330,000	$39.28
Vulcan	266,000	36.16

Source: Parsons Brinckerhoff AP1 Reconstruction Project - Preliminary Assessment; February 2014

Vendor contracts for the purchase of asphalt are competitively bid and allow for annual price increases, though the 2012 reported average costs paid were not more than 10% of their original 2008 bid price per ton for recycled asphalt concrete.

Risks and Other Considerations

To date, the primary obstacle to implementing the planned upgrade has been the lack of complete funding. While estimates have grown since the initial $10 million in MICLA funds were approved, the Consultant's Preliminary Assessment reports total project costs at almost $18 million.

Exhibit 21: Estimated Capital Costs for AP1 Replacement

Description	Projected Costs
Demolition	$350,000
Site Preparation	800,000
Urban Stormwater Mitigation	200,000
Equipment	10,000,000
Subtotal	*$11,350,000*
Permitting/Design/Cons Mgt	2,838,000
Soil Remediation	618,000
Subtotal	*$14,806,000*
Class "C" contingency	2,961,000
TOTAL	**$ 17,767,000**

Source: Parsons Brinckerhoff AP1 Reconstruction Project - Preliminary Assessment; Feb. 2014

During our audit fieldwork, CAO representatives indicated that these cost estimates and construction assumptions were under review by their Office in conjunction with the Bureau of Engineering. The proposed 2014-15 budget also requests an updated report on the potential retrofit of the City's Asphalt Plant, along with alternative approaches.

The AP1 site comprises approximately 2 acres located in an industrial area south of downtown, adjacent to the Los Angeles River channel. The Consultant's Assessment report notes that contaminated soils are present across the AP1 site, and provides recommendations and estimates for mitigation costs associated with construction, which are included in the capital cost estimate. The City has owned and used this site for industrial purposes since 1915; an alternative use or sale has not been formally considered.

Continuing the status quo is not an acceptable option. Asphalt produced at AP1 by the City is more costly and has less recycled content than what can be procured from vendors. A significant capital investment would be required to bring AP1 up to vendor-comparative levels, and while cost estimates have risen, complete funding has not been identified. Based on its location and long-term industrial use, the AP1 site is not well-suited for other commercial uses, but improvements to cost and recycled content are not possible without an upgrade/replacement.

To best utilize what the City *has* (dedicated industrial site; $10 million in dedicated MICLA funding for capital equipment), while considering what the City *needs* (additional capital investment for upgrade; a sustaining and

stable supply of recycled asphalt pavement at a reasonable cost), the City should partner with a private Asphalt Production entity to develop a feasible strategic financial partnership for AP1.

The City could offer a long-term lease on the site and significant investment towards the plant upgrade through capital equipment acquisition, while a private operator could provide the necessary additional investment to implement the replacement plant, and ensure efficient future operations of the facility to produce asphalt for the City's paving needs. By retaining ownership of the site and a method to secure a long-term production supply at lower than market rates, the City could achieve its objectives of both environmental benefit and cost savings.

Recommendation:

3.1 The CAO and BSS management should consider pursuing a strategic financial partnership for the replacement/upgrade of AP1, in order to achieve environmental and cost benefits over the long term.

Finding No. 4: Budgeted funds have not been fully utilized by BSS and more than $21 million was returned to various funding sources for reprogramming.

According to BSS, more funding would lead to more street repairs and a potential increase in PCI ratings. We examined the budgeted amounts for the entire Bureau and found that funds had been returned (reverted) to the funding source, because BSS did not fully utilize the funding.

BSS serves as the City's primary entity responsible for managing the Pavement Preservation Plan by resurfacing or reconstructing streets, completing small pothole repairs, and applying street maintenance techniques to extend the life of municipal roadways. According to BSS, the City's current financial state limits the amount of funding it receives to maintain and rehabilitate all of the City's streets. As a result, BSS must prioritize its repairs to at least maintain the citywide PCI rating at 62 and prevent further degradation of the City's streets.

Until FY 2012-13, the City's budget for the Pavement Preservation Plan did not separately identify funding for each of the four departments involved. Instead, funding was shown as a combined amount for four departments (BSS, DOT, GSD and BOE):

Exhibit 22: Citywide Pavement Preservation Plan Budgeted Funding by Source (in Millions)

Source	FY 11	FY 12	FY 13	Total
Special Gas Tax	$38.75	$41.58	$52.52	$132.85
Proposition 1B	$25.02	$32.86	$34.73	$92.60
Proposition C	$11.09	$6.50	$26.55	$44.14
ARRA	$16.00	$11.50	$-0-	$27.50
Measure R	$-0-	$-0-	$11.50	$11.50
SDRF	$-0-	$2.42	$6.55	$8.97
Traffic Safety Fund	$-0-	$-0-	$.11	$.11
Total	**$90.87**	**$94.86**	**$131.95**	**$317.68**

Source: Budget Documents – Pavement Preservation Plan.

For FYs 2012-13 and 2013-14, the Bureau received 84% of the Plan's budgeted funding.

Budgeted Funds Allocated to BSS

During our audit period, BSS as a whole was budgeted for $381.9 million from the six major funding sources included in the Pavement Preservation Plan. See **Exhibit 23** below.

Exhibit 23: BSS Total Budgeted Funding (in Millions)[17]
(Includes all Bureau functions, including pavement preservation)

Fund	FY 11	FY 12	FY 13	Total
Special Gas Tax	$62.00	$64.53	$64.24	$190.77
Proposition 1B	$25.02	$32.86	$30.59	$88.47
Proposition C	$15.89	$11.12	$28.50	$55.50
Measure R	$3.24	$6.30	$15.07	$24.61
Traffic Safety Fund	$4.72	$4.80	$4.14	$13.65
SDRF	$5.61	$2.42	$.86	$8.89
Total	**$116.47**	**$122.02**	**$143.40**	**$381.90**

During the audit period, the City also received a funding allocation for resurfacing projects through the American Recovery and Reinvestment Act (ARRA). However, these required "front-funding" by the City and were subsequently reimbursed through the California Department of Transportation (Caltrans). ARRA funds actually received as reimbursement for qualified resurfacing projects totaled $26.56 million for FYs 2010-11 and 2011-12.

Our review of certain funding sources used for the Pavement Preservation Plan found that the Bureau returned $14.14 million and an additional $7.43 million in front-funded ARRA monies between FYs 2010-11 and FY 2012-13.

[17]The City also received a funding allocation for resurfacing projects through the American Recovery and Reinvestment Act (ARRA). We did not include ARRA in the table because the amounts were front-funded and subsequently reimbursed to the City.

Exhibit 24: BSS Funding Allocated but Returned for Reprogramming (in Millions)

Fund	FY 11	FY 12	FY 13	Total
ARRA	$-0-	$7.43	$-0-	$7.43
SDRF	$5.61	$-0-	$-0-	$5.61[1]
Proposition C	$-0-	$-0-	$3.65	$3.65
Measure R	$.07	$.19	$2.99	$3.25
Special Gas Tax	$1.36	$.22	$.05	$1.63
Proposition 1B	$-0-	$-0-	$-0-	$-0-
Traffic Safety Fund	$-0-	$-0-	$-0-	$-0-
Total	**$7.04**	**$7.84**	**$6.69**	**$21.56**

Note 1: SDRF appropriated funds were transferred to GSD to pay for fleet and materials testing services, which directly support BSS pavement preservation activities.

The "returned" funds were categorized as reversions or budget adjustments where funding amounts were reduced. These types of returns occur when City departments identify funds it will not utilize during the fiscal year, and the funds may be reallocated by Council, based on CAO recommendations for other City priorities. Of the $381.9 million budgeted for BSS from the sources included in the Pavement Preservation Plan, $14.14 million (4%) and an additional $7.43 in front-funded ARRA funds was returned for reprogramming.

BSS stated that it returned Street Damage Restoration Fee (SDRF) funds in FY 2010-11 to fund asphalt material testing functions provided by the General Services Department (GSD) that were set for budget cuts.

When a lack of funding is cited by BSS as the primary reason as to why only a limited number of streets can be repaired, BSS should not be in a situation where budgeted funds are left unused and returned for other City purposes. While not all of this funding may have been assigned for pavement preservation, BSS should have had the ability to "reprogram" the funds to repair more streets, including consideration of contracting out resurfacing activities, if necessary due to lack of internal resources.

BSS management indicated that using remaining funds for contracting out street repair work that cannot be performed by City forces would be infeasible, since design plans would first need to be developed, which takes a significant amount of time and may not be completed prior to when the funds must to be returned to the City for reprogramming.

However, according to the Bureau of Engineering (BOE), the agency typically responsible for developing design plans, they are not required for street maintenance and rehabilitation contracts. In fact, BOE has been contemplating whether even to use design plans for the "Save Our Streets LA" proposal, which includes contracting out reconstruction of streets in D and F conditions. BOE emphasized that without design plans, sufficient contract administration controls and knowledge of construction are required to ensure cost changes (change orders) are necessary.

BSS does not currently prepare design plans for work performed by internal staff, but indicated they would be necessary for contracted work. If BSS management believes design plans are beneficial, they should be used to help BSS manage costs for street repair work whether it is performed by City employees or contractors.

Recommendations:

BSS management should:

4.1 Work with the CAO to retain available funds to contract out pavement preservation activities that cannot be performed by City staff.

4.2 Work with BCA to establish appropriate controls over contracted work and change orders if street repair work is contracted out.

4.3 Consider the necessity or added value of design plans to manage the costs of street repair work, whether it is performed by City forces or contractors.

Street Damage Restoration Fees

To help protect the structural integrity of City streets and safeguard the value of the public investment for the benefit of all City residents, a Street Damage Restoration Fee (SDRF) was established in 1998. Cutting into street pavement permits water seepage into the street and weakens the pavement support around the repair patch edges, allowing street deterioration at an accelerated rate.[18] The entity making the street/utility cut is required to pay the City a fee that recovers the costs of mitigating damage caused to the pavement and the reduction in the "life" of the street. The intent of the SDRF was to recover the actual cost to the City of more frequent street resurfacing and reconstruction necessitated by utility cuts. Utilities are required to obtain a permit from BOE prior to excavating in or under the surface of any public street.

Finding No. 5: Street Damage Restoration Fees, which were established to recover the annual resurfacing costs associated with the shortened lifespan of City streets due to the street cuts, were based on an inflated assumption of annual excavation work. As a result, total collections have been undercharged by as much as $190 million since the fee was implemented.

According to Council Resolution, the City's Street Damage Restoration Fees (SDRF) were developed "…to recover the annual cost of the damage from street cuts.[19]" However, because BSS used an inflated assumption of the number of annual cuts, the total revenue associated with SDRF fees collected since inception of the fee is $190 million less than it should have been.

Street cuts are primarily performed by utilities, such as the Los Angeles Department of Water and Power (LADWP) and the Southern California Gas Company, or telecommunication companies like AT&T and cable television providers, to access their assets buried below the pavement like pipes or

[18] Cutting into street pavement can also be described as excavation.
[19] Council File 96-0726 Addendum.

wires. While the street cuts must be refilled, regardless of the quality of the fill, the cuts cause the pavement to degrade at a faster rate, requiring added maintenance and costs to BSS to maintain the street network. It should be noted that the Gas Company, through its current franchise agreement with the City, was exempted from paying SDRF fees.[20]

In a study conducted in 1996, BSS estimated the additional cost to the City to maintain streets that had been cut was $16.4 million per year, due to the shortened lifespan of streets with cuts. In addition, it was estimated that approximately 3 million square feet of cuts was expected for 1996-97, which was used to derive a unit fee. BSS proposed graduated fee schedules that charged a much higher fee for cutting a street that had been more recently resurfaced than an older street, and that no fee would be assessed for planned excavations on Select (non-residential) streets more than 15 years old, or for Local (residential) streets more than 25 years old. There is also no distinction in the fee amount if the street is asphalt or cement concrete. While cement concrete streets are more costly to replace, most residential cement streets are more than 25 years old; thus, no SDRF would be charged.

We found that the estimate used for annual street cuts was substantially higher than the actual square footage of street cuts noted on BOE permits. BSS could not provide any documentary support for how the initial 3 million was derived, but BOE indicated that figure appears significantly overinflated for any year.

Our review of BOE records shows an average square footage of excavations with paid SDRF fees at about 787,000 per year from FY 1998-99 through FY 2013-14 (see **Exhibit 25**). Since 1999, BOE has collected $72.3 million in fees, averaging $4.5 million per year as noted below, rather than the anticipated $16.4 million that was determined necessary to recover the annual costs for maintenance overlay due to the shortened lifespan of streets with pavement cuts.

[20] The City's current franchise agreement with Southern California Gas Company was enacted in 1992; it is expected to be extended through December 31, 2014.

Exhibit 25: Square Feet Excavated and Fees Collected

FY	Square Feet Excavated	Fees Collected
1999	18	$-0-
2000	50,320	$130,099
2001	281,076	$844,265
2002	770,200	$3,393,735
2003	1,057,094	$5,969,634
2004	733,833	$3,820,502
2005	761,872	$4,140,958
2006	956,221	$1,994,270
2007	685,400	$3,328,311
2008	883,859	$6,283,197
2009	1,061,969	$7,561,362
2010	1,324,479	$10,103,057
2011	986,974	$6,561,510
2012	867,762	$5,110,551
2013	994,017	$5,701,992
2014	1,179,575	$7,369,004
Total	**12,594,669**	**$72,312,447**
Average	**787,167**	**$4,519,528**

If BSS had used a more accurate average square footage for cuts that were subject to the fee (e.g., 787,000 or 1,000,000 sq. ft. per year), the average unit costs would have been substantially higher than what was adopted in 1998 based on the 1996 study.

Using a more accurate excavation square footage to derive a fee necessary to recover the full amount of additional costs ($16.4 million annually), BSS could have collected an additional $134 million to as much as $190 million since the fee's inception. **Exhibit 26** demonstrates the potential SDRF collections if unit costs had been based on a more accurate square footage. *Note: For purposes of this comparison, we did not consider the fee increase that was implemented in 2006; however, as it was based solely on an inflationary adjustment, it would have raised the higher initial fee as well.*

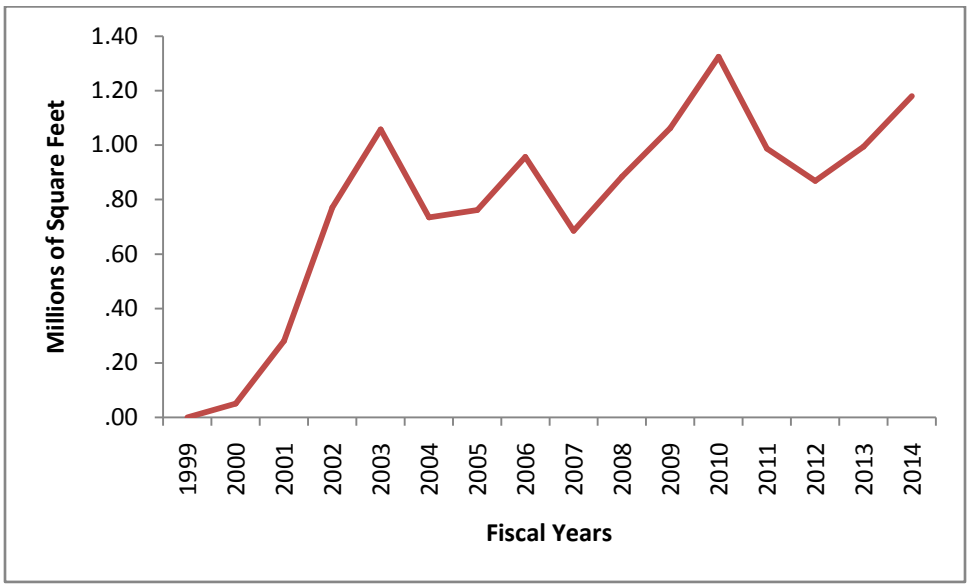
Exhibit 26: Projected SDRF Revenue Based on Total Square Feet Cut

FY	Actual SF Cut	Fees actually collected (based on 3 mil SF)	Fees that would have been collected (based on 1 mil SF)	Fees that would have been collected (based on 787, 167 SF)
1999	18	$-0-	$295	$375
2000	50,320	$130,099	$825,751	$1,049,172
2001	281,076	$844,265	$4,612,457	$5,860,435
2002	770,200	$3,393,735	$12,638,982	$16,058,670
2003	1,057,094	$5,969,634	$17,346,913	$22,040,410
2004	733,833	$3,820,502	$12,042,200	$15,300,418
2005	761,872	$4,140,958	$12,502,320	$15,885,031
2006	956,221	$1,994,270	$15,691,587	$19,937,208
2007	685,400	$3,328,311	$11,247,414	$14,290,590
2008	883,859	$6,283,197	$14,504,126	$18,428,460
2009	1,061,969	$7,561,362	$17,426,911	$22,142,054
2010	1,324,479	$10,103,057	$21,734,700	$27,615,387
2011	986,974	$6,561,510	$16,196,243	$20,578,408
2012	867,762	$5,110,551	$14,239,974	$18,092,838
2013	994,017	$5,701,992	$16,311,819	$20,725,254
2014	1,179,575	$7,369,004	$19,356,826	$24,594,139
Total	12,594,669	$72,312,447	$206,678,518	$262,598,849
Difference from 3 mil SF			**$134,366,071**	**$190,286,402**

BSS indicated that since their study was initiated almost 18 years ago, they would not have any information on how it was determined that 3 million square feet were cut annually. BSS also stated that they believe that the SDRF was not intended to recover costs, but rather, change behavior and decrease the number of cuts that occur into City streets. However, as mentioned previously, Council Resolution 96-0726 and Ordinance 171922 state that any "…entity making or benefiting from an excavation in City streets should be required to pay a Street Damage Restoration Fee that *recovers* the cost of mitigating the damage caused to the street by the excavation."

Furthermore, we found that even though BSS believes that the SDRF was intended to change behavior, actual street cuts where the SDRF is paid are trending upward, even excluding the Gas Company, who is currently exempt from paying the fee. This indicates that not only is the fee not recovering intended costs; it is also not deterring excavations as shown in **Exhibit 27.**

Exhibit 27: Millions of Square Feet Cut, with SDRF payments



In addition to street cuts and excavations, pavement damage can be caused by other non-routine traffic activities, such as construction and extra-heavy loads. While BSS requires that entities obtain permits for overload and construction equipment on City streets, there may be additional revenue opportunities related to damage caused by these activities.

Recommendations:

BSS management should:

5.1 Present to policymakers the unit costs supporting the proposed Street Damage Restoration Fee based on a full cost recovery model that considers the average actual square feet cut annually, as reported by the Bureau of Engineering.

5.2 Report periodically to policymakers on the damage to City streets that is caused by construction activity and heavy load carriers, identifying amounts collected for damages and recommendations for additional cost recovery, if applicable.

Finding No. 6: A subsequent adjustment to the SDRF fees did not reconsider the total costs to be recovered or the expected number of annual street cuts. Rather, an inflationary adjustment was applied in 2006; however, the rates used were understated, resulting in $31 million in additional missed revenue opportunities.

In 2006, Council approved a BSS proposed update to the SDRF amounts using Caltrans' Construction Price Index to adjust for inflation. Our review of the analysis used by BSS to determine the increase found that the resulting new fees were understated, resulting in $31 million in additional missed revenue opportunities. In addition, there was no consideration of the validity or continued reasonableness of the 1996 assumptions, which could have resulted in a more accurate fee.

The initial SDRF fees adopted by Council in 1998 were based on a BSS study that calculated 1996 unit prices, using projected additional annual costs related to the maintenance required for a shorter street lifespan, and an assumed number of street cuts (Finding No. 4 describes issues with the number of assumed vs. actual street cuts). No additional or supplemental cost study has been performed to justify a fee increase; however, the SDRF amounts were increased in 2006 based on an inflationary adjustment, using data provided by Caltrans.

Per LAMC Section 62.06 (B), Council shall establish the SDRF amount, which shall not exceed "an amount reasonably necessary to recover the estimated costs for all future maintenance, repair, reconstruction or resurfacing that would be necessary to fully mitigate the damage and degradations caused by the excavation to the pavement located over and/or adjacent to the trench where the excavation occurs." The initial fee study was based on assumptions made in 1996 regarding the proportion of streets with cuts (70%), and the erroneous anticipated number of square footage of cuts per year (3 million), as well as estimated annual resurfacing costs. The underlying assumptions regarding citywide street cuts have not been reassessed. In addition, the estimated additional annual maintenance cost required of $16.4 million has not been recalculated or adjusted, despite the fact that the City has recovered far less than that amount since the fee was established.

Rather than conducting a new study or using actual annual updated costs and street cut data, BSS applied an inflationary adjustment to the existing fees. To update the fee amounts, which became effective in 2006, BSS determined the annual percentage change for a Caltrans index that is derived from Caltrans' asphalt concrete price per ton, over time.

BSS applied the percentage change in asphalt prices on an annual basis, from 1996 through 2005, to reach a revised 2006 amount for the fees. However, we noted that for 2004, BSS did not use the year-end cost for asphalt concrete, and instead used the second quarter 2004 cost which resulted in a lower factor used: 8.46%, rather than 10.75%. Further, the 2005 inflation factor was actually 41.4%; though BSS applied the same low 2004 figure of 8.46% again. Using the actual Caltrans prices in a consistent manner, the cumulative price increase, or inflationary adjustment from 1996 through 2005, should have been 101.06% as noted below.

Exhibit 28: Caltrans Asphalt Concrete Price Inflation

Year	Asphalt Concrete Cost Per Ton	$ Diff	% Change Actual	% applied by BSS
1996	$37.66	-	-	-
1997	$36.07	($1.59)	-4.22%	-4.22%
1998	$38.78	$2.71	7.51%	7.51%
1999	$40.14	$1.36	3.51%	3.51%
2000	$45.12	$4.98	12.41%	12.41%
2001	$43.89	($1.23)	-2.73%	-2.73%
2002	$49.00	$5.11	11.64%	11.64%
2003	$48.35	($0.65)	-1.33%	-1.33%
2004	$53.55	$5.20	10.75%	8.46%
2005	$75.72	$22.17	41.40%	8.46%
Total / % Change		**$38.06**	**101.06%**	

Had BSS used a consistent methodology for the fee adjustment based on Caltrans' reported annual prices at year-end, the fees would have been set as noted in **Exhibit 29**, below.

Exhibit 29: Impact of Unit Price Fees; Caltrans Price Index and Adopted Fees

Type of Street	Time Frame Since Last Resurface	Unit Cost With Actual Inflator	2006 SDRF as adopted	Difference
Major	Resurfaced one year, one day and five years ago	$28.31	$21.26	$7.05
Major	Resurfaced between five years, one day and ten years ago	$23.58	$17.72	$5.86
Major	Resurfaced between 10 years, one day and fifteen years ago	$18.88	$14.18	$4.70
Local	Resurfaced one year, one day and five years ago	$10.35	$7.78	$2.57
Local	Resurfaced between five years, one day and ten years ago	$9.19	$6.90	$2.29
Local	Resurfaced between 10 years, one day and fifteen years ago	$8.63	$6.48	$2.15
Local	Resurfaced between 15 years, one day and twenty years ago	$7.80	$5.86	$1.94
Local	Resurfaced between 20 years, one day and twenty five years ago	$6.90	$5.18	$1.72
	Average	**$14.21**	**$10.67**	**$3.54**

Applying the impact of the average fee increase to actual excavations since 2006 when the SDRF was updated, we determined that BSS missed an opportunity to collect $31.6 million, as shown in **Exhibit 30.**

Exhibit 30: SDRF Losses due to Inflationary Fee Adjustment

FY	Actual Sq Feet	Apply $3.54 lost cost per sq foot
2006	956,221	$3,385,022
2007	685,400	$2,426,316
2008	883,859	$3,128,861
2009	1,061,969	$3,759,370
2010	1,324,479	$4,688,656
2011	986,974	$3,493,888
2012	867,762	$3,071,877
2013	994,017	$3,518,820
2014	1,179,575	$4,175,696
Total	**8,940,256**	**$31,648,506**

According to BSS, they did not use the correct inflationary rates because they were not released by Caltrans at the time. However, per Council File 02-0600-S33 dated March 24, 2006, BSS informed the Public Works Committee that the 2005 inflationary rates had been released and recommended that fees be updated accordingly.[21] However, the Bureau did not follow through and continued to use the 2004 rates.

Recommendation:

BSS management should:

6.1 Review and consider updating the SDRF fee on an annual basis, based on an updated analysis and/or consistent use of an accepted inflationary index.

[21] Revised Street Damage Restoration Fee Increases (C.F.02-0600-S33), March 24, 2006.

Finding No. 7: Street Damage Restoration Fees were based on estimated costs for specific activities by BSS in 1996, considering the additional resurfacing that would be required on an annual basis and an assumed number of street cuts; however, not all fee collections are dedicated to BSS for street repair work.

The initial SDRF fee study was prepared by a consultant, based on costs associated with pavement rehabilitation "obtained from the City of Los Angeles." These included asphalt patch material (per ton); manhole alignment costs (per mile); and cold planing and profiling (i.e., milling down the existing asphalt, per square foot). The study determined the additional resurfacing that would be required on an annual basis for the entire street network based on the shorter lifespan of City streets which was caused by the street cuts. The assumed costs considered only BSS-related activities, though it is unknown if these unit costs remain an accurate reflection of BSS costs.

While other City departments provide services to support pavement preservation activities and thereby support BSS operations (through materials testing, equipment maintenance, etc.), those direct costs incurred by General Services Department (GSD), BOE and Department of Transportation were not included in the fee calculation. While only BSS costs were considered to derive the fee, the City has not allocated all the SDRF revenue received to BSS for repair work.

- **Fee revenues not fully dedicated to restoring pavement conditions**

BOE is charged with the responsibility of reviewing and approving permits for street excavation/cuts. As part of that process, BOE collects the SDRF fee, which are calculated based on the permit criteria (estimated size of cut and rate based on age of street). All SDRF fees are remitted to Fund #41A, titled the Street Damage Restoration Fee special fund. Transfers from this Fund are made to support the operational activities of various City departments during the budget process. While the fees were based on recovering costs that would be incurred solely by BSS to repair streets that have been cut, we found that BSS received only about $860,000 in SDRF funds in the last three fiscal years (FY 11 – FY 13). This represents about 5% of the $17.8 million in SDRF fees collected by BOE over the same period.

According to BSS management, they requested that $5.6 million in SDRF funds for FY 10-11 be reallocated to fund asphalt material testing functions provided by the General Services Department (GSD) that were set for budget and staffing cuts. BSS also stated that $2.4 million was substituted for Proposition 1B funding in FY 2011-12. While this may explain why BSS received no SDRF funding in those two years, the amounts identified represented 68% ($8 million of $11.7 million) of fees collected by BOE. The rest was allocated to the City's MICLA fund.

The Street Damage Restoration Fee (SDRF) was adopted to recover the increased pavement rehabilitation costs to the City for utility cuts made into the street. However, since the inception of the fee, the City has collected an average of $4.5 million, rather than the $16.4 million determined necessary to recover the actual cost to the City of the more frequent street resurfacing and reconstruction necessitated by utility cuts. No adjustment was made to the fee until 2006, and rather than performing a new study or confirming prior assumptions, BSS applied an inflationary index, but at a lower rate than what was published by Caltrans. The fees have not fully recovered the additional long-term costs of street repair due to the cuts, and fee revenue is not being fully allocated towards BSS' pavement repair activities.

By undercharging the SDRF and by not allocating these revenues toward improving streets that have been most damaged, the City's roadways will continue to degrade at a faster rate and result in more expensive future repairs.

Recommendation:

BSS management should:

7.1 Perform a new fee study that considers underlying assumptions and a total cost basis that includes the actual costs of all departments involved with street repairs (BSS, GSD, DOT and BOE).

Section II: Systems, Tools and Technology

BSS utilizes multiple systems, tools and technology to help in carrying out its responsibilities to maintain and repair City streets. For example, a Cost Accounting System incorporates information from other City systems: Payroll Replacement System (PaySR), Supply Management System (SMS) and Financial Management System (FMS) for labor, materials, equipment and indirect costs for each work order that is established to capture costs for work performed on streets.

A pavement management software system provides a systematic method for rating the physical pavement conditions of City streets. BSS also utilizes a Pavement Management database as a master file of historical street work.

BSS must also ensure that the materials used to maintain and repair streets meet guidelines of the American Association of State Highway and Transportation Officials, the American Public Works Association, and Federal Highway Administration. This helps to ensure the quality of the materials used is acceptable and durable.

Cost Accounting System

BSS' Financial Management Division (FMD) establishes work orders that will capture costs for resurfacing work performed on each street segment. Generally, a blanket work order is established for slurry seal, crack seal and pothole work.[22] BSS also utilizes task codes to further define specific (e.g., asphalt milling, slurry seal, etc.) and general activities (e.g., management and supervision, training, etc.). Indirect cost rates from the City's Cost Allocation Plan are applied to salary costs to capture the costs of fringe benefits, compensated time off, division and departmental overhead, as well as for central services overhead (departments' share of Citywide costs such as City Attorney, Controller, City Administrative Officer, etc.).BSS tasks are associated with specific work orders and work orders may contain multiple tasks. A work order roll-up of tasks provides a good approximation of an activity.

[22] In some cases, a few individual work orders are established in addition to the blanket work order to track a specific activity such as Operation Pothole for overtime weekend activity.

Finding No. 8: BSS' cost accounting system does not track costs at a program activity level (i.e., resurfacing, slurry seal, crack seal, etc.) as defined in the City's Pavement Preservation Plan. As a result, management does not use actual cost data for managing its costs and analyzing resource utilization.

BSS uses an in-house cost accounting system that is managed by its staff and is independent of the City's other financial systems. This system serves as the main repository of all cost information for BSS. However, because it does not track costs at a program activity level associated with BSS' specific goals for resurfacing and maintenance activities, management cannot utilize actual cost data to analyze resource utilization.

In 2001, the Controller's Office noted the following in its audit of BSS related to its cost accounting system:

The Bureau:

- did not have an activity based accounting system;
- did not keep and/or maintain adequate or timely cost accounting records; and
- had some cost data available, but there was no evidence that management had been able to use that information when making decisions that included cost effectiveness.[23]

This prior audit recommended that BSS adopt a system that incorporated activity-based accounting and utilize cost information to measure efficiency. However, based on our current audit, we found many of the same issues identified 13 years ago still exist.

During the audit period, the City budgeted from $85 million to $111 million annually to BSS to fund its operations related to the Pavement Preservation Plan. This substantial funding requires BSS to adequately track and appropriately utilize its budgeted resources, and demonstrate that its street maintenance and resurfacing efforts are maximized.

[23] Office of the Controller, Audit of the Bureau of Street Services, Asphalt Plants, and Management: The City Can Improve (Los Angeles, CA: Sept. 20, 2001).

BSS' cost accounting system tracks costs at the work order level. All work associated with a repair activity can be identified by the division performing the work and the type of work performed (e.g., asphalt milling or paving, pothole, curb or gutter repair, etc.) For resurfacing and reconstruction, work orders are defined by the particular street segment, whereas for others, a blanket work order is generally used. While the system contains rich and detailed data, this information is not captured or reported in a manner that would be useful to manage costs and track efficiencies. When we requested cost accounting information, BSS spent significant effort to generate reports necessary to calculate actual costs for their primary activities.

In order to determine BSS' costs for performing pavement preservation work during the audit period, the Resurfacing and Reconstruction Division had to first identify the work orders completed in each fiscal year for resurfacing and reconstruction work. The Financial Management Division then used these work order numbers and the blanket work order numbers for slurry and crack sealing and pothole work to run reports from its cost accounting system showing each cost component (labor, material, indirect costs, etc.) and the total costs for each work order. FMD excluded indirect cost codes and indirect work orders, since the indirect rates applied to direct labor costs are intended to reflect actual charged costs.

Limitations of Cost Accounting System

While there is reasonable assurance that the cost accounting system contains complete, reliable and accurate data, there are limitations in its usefulness for management purposes.

- **Costs are not linked to program activity**

The current process of using work orders as a basis for capturing costs does not enable aggregating costs by a program activity as defined in the Pavement Preservation Plan. As a result, actual costs cannot be readily linked to the program goals established in the Plan (number of miles resurfaced, number of miles with slurry or crack sealing, number of potholes repaired).[24] The deficiency in BSS' cost accounting system was also raised in the Controller's October 2011 Blueprint for a Transition to Performance-

[24]Note: the numeric goal for pothole repairs is based on a square foot equivalent. Therefore, BSS' actual small asphalt repairs are tracked and converted to an adjusted number based on their relative size. See Finding #16 for related information and observation.

Based Budgeting, which noted this limitation that BSS work orders did not contain coding for program activities.

- **Cost reports are not automatically or easily generated**

As more work orders are opened throughout the year, the system takes a significant amount of time to compile the data and produce a report. For example, BSS had to create specific system queries to accumulate cost data for the audit period. The query encompassed 3,362 work orders and required significant staff time to run the query, review the results, and provide the data.

Because a cost report cannot be generated quickly or easily, the reports are not routinely produced for management's use to monitor performance. Instead, division management monitors project completion and progress toward meeting the Pavement Preservation Plan goals on a weekly basis, by reviewing manually-prepared project completion reports and meeting with the Superintendents. The Bureau also has monthly management meetings to discuss funding, total Bureau-wide costs expended, and Vital Productivity Factors which include output measurements, such as number of miles resurfaced, number of pothole repairs, etc. Since funding for the Pavement Preservation Plan is more than half of the Bureau's budgeted funding, any significant deviations in Bureau-wide expenditures, funding, or goals will be discussed. However, because they are not readily available, program activity costs for the Pavement Preservation Plan are not part of this routine management oversight.

Without ongoing tracking of costs (resources utilized) for each of the Plan's key activities, BSS is not able to identify opportunities to deliver resurfacing and maintenance more efficiently and cost effectively. As mentioned in our 2001 audit, it is important that BSS identify costs by activity and ensure managers obtain ongoing cost information, so that decisions can be made on the cost effectiveness of operations.

Recommendations:

BSS management should:

8.1 Develop a process to code work orders by program activity. This could be accomplished by establishing a number schema that separately designates resurfacing, reconstruction, slurry

seal, crack seal and pothole repair work, while also retaining the location-based work order coding.

8.2 Utilize cost data by program activity to manage its resource utilization in delivering street resurfacing and maintenance efficiently and cost effectively to ensure desired outcomes are achieved.

Finding No. 9: BSS' current pavement management system is not integrated with other pavement management databases and City systems, requiring additional staff efforts. Further, while it is used to assess pavement conditions, it is not a comprehensive asset management system that provides an inventory or condition assessment of other street-related infrastructure, such as street lights, medians, signs, storm drains, sidewalks, etc.

Street Condition Ratings

Since 1998, BSS has utilized "MicroPAVER," a pavement management software system to provide a systematic method for rating the physical pavement conditions of City streets. The ratings are based on a letter system (A to F), with A representing the streets in very good condition and F being the streets in failed condition. Each pavement condition grade is based on a Pavement Condition Index (PCI) of the pavements' structural and surface condition. The PCI scores range from 0 for a failed pavement to 100 for a pavement in perfect condition. The type, severity and quantity of pavement distresses contribute to the PCI score.

BSS completes a comprehensive survey of its entire street network using one City-owned survey van. The van captures pavement distress information using pictures and laser technology as it passes over the roadway. Due to the size of the City's street network and having one survey van, it takes three years to complete the street survey.

Integration with other pavement management databases and systems

From the photographic images and collected data, BSS personnel must manually identify every pavement distress type and severity, then join this information with automated laser data about pavement roughness. Staff then import this information into MicroPAVER to obtain an automated PCI

score for the street segment. MicroPAVER uses PCI information of the City's street network to produce rehabilitation cost scenarios, as well for forecast the degradation of every street and recommended maintenance, which BSS can use for overall planning/prioritization.

Based on a January 2013 California Statewide Local Streets and Roads Needs Assessment report, 24% of the respondent agencies utilized MicroPAVER to assess their streets' conditions. While it is certainly a best practice to utilize technology-based tools to assist with both condition assessment and for planning/prioritization process, BSS must utilize significant staff effort to integrate MicroPAVER's data with other BSS pavement management databases and systems.

Road-assets inventory

BSS' survey covers street pavement only and does not include the collection of images or other information on other street-related infrastructure assets, such as street lights, signs, medians, sidewalks, storm drains, etc. Similarly, MicroPAVER does not assess the condition of other infrastructure assets. It was designed specifically for assessing pavement conditions and assisting agencies to determine alternative budget requirements for pavement maintenance and repairs.

While some of these other infrastructure assets fall outside of BSS' direct responsibilities (e.g., street lights), having a comprehensive system that can also analyze other street-related assets would enable the City to better manage and assess the condition of its entire street infrastructure.

Other pavement management software systems

Different jurisdictions have implemented various system-based solutions. The following table presents a comparison of various pavement and asset management software systems. Of note is that MicroPAVER is one of two systems that does not track other street assets, and one of three systems that does not provide for automated financial reporting, as required by the Governmental Accounting Standards Board (GASB), which requires jurisdictions to present the current value of infrastructure assets. See **Exhibit 31** for a comparison of various pavement management systems.

Exhibit 31: Pavement Management System Comparisons

	Software Information			Software Features				
	Software Name	**Developer**	**Website**	**Analyzes other Assets? (Lights, signs etc.)**	**Pavement Condition Rating System**	**Provides Various Maintenance Scenarios**	**Analyzes Different Budget Scenarios?**	**GASB Reporting Compliant?**
Public Organizations	**MicroPAVER**	US Army Corps of Engineers	apwa.net	No	PCI	Yes	Yes	No
	RoadSoft GIS	Michigan Tech University	roadsoft.org	Yes: signs, pavement markings, traffic counts, traffic crashes	PASER	Yes	Yes	Yes
	Utah LTAP TAMS	Utah Technical Assistance Program	utahltap.org	Yes	RSL	Yes	Yes	No
	StreetSaver	Metropolitan Transportation Commission	mtcpms.org	Yes: sidewalks, lights, signs, curb/gutter; user-defined	PCI	Yes	Yes	Yes
Private Organizations	**RoadCare**	Applied Research Associates	ara.com	Yes	PCI, IRI	Yes	Yes	Yes
	PAVEMENT view Plus	Cartegraph	cartegraph.com	Yes: sewer, signal, sign, storm, bridge, lights	OCI	Yes	Yes	Yes
	PubWorks	Tracker Software Corp.	pubworks.com	Yes: bridges, signs, culverts, guardrails, parks & buildings	PASER	No	No	Yes
	PavePro Manager	Infrastructure Management Services	ims-rst.com	No	PCI	Yes	Yes	No

Other pavement management software programs appear to provide more integrated automated solutions that require less manual analysis and additional work or separate systems to produce reports, mapping, and support decision-making. Further, some of the other programs are capable of analyzing other infrastructure assets, such as street lights, sidewalks, etc. For example,

- *The City of Nashville uses a firm to collect forward/downward/side images as well as laser reading every 20 feet, which feeds directly into a comprehensive Pavement Management System that provides both visual and quantitative distress information for each segment. The system is also linked to GIS, providing mapping capabilities through the use of either Esri base maps or Google Maps to efficiently navigate and plan for operations. They find it a cost effective solution that generates a lot of useful current information, including graphics, costs (for GASB 34 reporting), etc.*

- *The District of Columbia (DC) uses a vendor to perform automated pavement condition surveys annually using a Digital Survey Vehicle. The survey images are used to perform Pavement Condition Index (PCI) surveys, and the right-of-way images combined with GPS location data were used to inventory and rate condition of over two dozen roadside assets, including sidewalks, signs, traffic signals, highway lighting, and others. Though DC had originally implemented MicroPAVER, it migrated to a new system to expand its maintenance and rehabilitation analytical capabilities. Through a supplemental ImageViewer application, a "virtual drive" application links digital survey images with an agency's pavement management and GIS data, providing tabular and graphical views of data synchronized with a driver's perspective view of the roadway at a given location. ImageViewer is also integrated with Google Maps/Earth application and can provide both desktop and web-based viewer functionality.*

The City of Los Angeles has a significantly larger street network system compared to other jurisdictions with 6,500 centerline miles or 28,000 lane miles that are comprised of 69,000 street segments. Given the size of the street network, the City requires a robust software system that can sufficiently run a large amount of data to determine PCI and provide various scenarios to help determine the best strategy for repairing and maintaining streets with available funding. The pavement management system should also be reliable, and as fully integrated and user-friendly as possible, requiring minimal staff/developer intervention, manual processing and reliance on additional systems.

BSS has utilized MicroPAVER for more than 15 years and believes it is the only system that can handle the significant data volume that results from having such a large street network. However, given the significant technological advancements in the last decade including geo-based integrated solutions, it may be time to consider alternatives. These may include utilizing another vendor who offers a more fully developed and integrated system; or partnering with private mapping company(ies) to develop a completely new system that can be used to assess the condition and provide an inventory of City streets/infrastructure and plan for maintenance and upgrade. A more comprehensive asset information system would also provide GASB required financial information for infrastructure assets.

At a minimum, BSS should evaluate its current system and processes against other pavement management systems currently available in the marketplace for feasibility, overall usefulness and total cost. We recognize that transitioning to another pavement management system would be a significant undertaking and may require implementation on a pilot basis to ensure a successful transition.

While our audit did not include an assessment of other infrastructure assets, the City's network of street lights, sidewalks, etc. represents a significant investment and should be part of a single system for inventory and condition assessment purposes. It would be more efficient and cost effective for the City to be able to survey, inventory and assess the condition of all its infrastructure assets at the same time. The Board of Public Works (Board) should consider expanding the capabilities of BSS' pavement management system to include a comprehensive system for the City's infrastructure. Given the size of the City's street network and the expected life and degradation of resurfaced streets, BSS indicated that a three-year survey cycle is sufficient; which is consistent with other cities' practices.

Recommendations:

9.1 BSS management should explore the potential for other pavement management systems that exceed MicroPAVER's capacity and overall usefulness.

9.2 The Board of Public Works should consider expanding the capabilities of BSS' pavement management system to include a comprehensive system for the City's infrastructure.

Finding No. 10: BSS uses a Pavement Management System (MicroPAVER) with limitations and does not fully utilize all of its features.

We noted several limitations with MicroPAVER that potentially impact the ability of BSS to have sufficient data to manage the City's Pavement Preservation Plan. Specifically,

- BSS is using a beta edition of MicroPAVER that has been heavily customized and has experienced system slowness, glitches, and has required ongoing support by the developer, under contract with BSS.
- MicroPAVER does not have the capability to systematically report pre- and post- resurfacing PCI information for City streets, unless staff manually verify the information on each one of the 69,000 street segments.
- MicroPAVER does not have the ability to offer data or report customization that would enable BSS to better manage the pavement preservation program.
- The system lacks automated cost reporting of the City's street infrastructure, to support financial reporting required by GASB 34.
- MicroPAVER's current pavement degradation algorithm does not distinguish streets that have been paved asphalt over cement concrete. It treats these streets as either completely asphalt or completely cement. Therefore, forecasts of PCI degradation may be inaccurate.

In addition, while we did not identify limitations/concerns about MicroPAVER's PCI forecasting (beyond the paved over cement concrete), according to BSS, they do not use the forecasting feature to prioritize or plan work. Instead, BSS relies on actual PCI information obtained through its survey. However, MicroPAVER's PCI forecasting is used in the State of the Streets Report to provide a high level assessment of future pavement conditions to the City Council and Mayor. Since the State of the Streets Report helps policymakers understand the magnitude of funding necessary to improve the street network's average PCI, it is important that these scenarios be as accurate as possible to ensure policy makers have the best

information available on the condition of City streets and make appropriate strategic decisions.

The City of Los Angeles should have a pavement management system that is as reliable and user-friendly as possible, requiring minimal staff/developer intervention, and manual processing. BSS should work with the developer to address the current system's shortcomings, and/or consider the potential for other pavement management systems that exceed MircoPAVER's capacity and overall usefulness (**Recommendation No. 9.1**).

Recommendation:

BSS management should:

10.1 Work with the developer of MicroPAVER to address the issues noted with the beta edition, report customization and consider revising the current algorithm regarding cement streets paved over with asphalt.

Finding No. 11: BSS does not have a dedicated unit/staffing to proactively seek out new materials, equipment or technology. Specialized "Pothole Killer" technology was put into operation in 2000 but was discontinued after a few years, even though it is considered a highly efficient and effective solution to pothole repair by several cities.

BSS does not have a dedicated unit or staff that proactively seeks out new material or technology that could benefit the City's approach to maintaining the street infrastructure.

While BSS is responsible for paving and slurry activities, the General Services Department (GSD) also plays a critical role with BSS' activities. GSD is mandated by the City's Administrative Code to provide quality control and acceptance testing for product samples, equipment and devices and to test construction, design and engineering material and services and environmental samples. As such, GSD provides BSS with ongoing testing of material performance and construction quality. GSD also conducts acceptance testing of new asphalt concrete and slurry mix designs as well as testing of new materials that BSS is considering for future use. GSD is also responsible for the maintenance, repair and replacement of equipment.[25] BSS primarily utilizes City- owned equipment to accomplish its operational goals. Depending on the type and magnitude of work, BSS may also rent equipment and/or contract with private vendors.

Although GSD maintains and deploys BSS equipment, BSS is responsible for identifying the equipment it will purchase for its operations.

Material Testing

While BSS refers new product testing to GSD, this is done on a limited basis and only when vendors contact BSS in an attempt to sell their product to the City. BSS management stated that its budget is insufficient to dedicate resources to research and development of materials and products, but would do so if funding became available. As a result, BSS does not proactively seek new materials that would meet its operational needs in producing better pavement life for the City. Instead, as new products/materials are

[25] City of Los Angeles Administrative Code: Article 7, Sections 22.530 and 22.540.

made known to BSS, materials testing will then take place to determine whether it meets the City's needs.

Although BSS provided a list of new technology products that were evaluated during the audit period, it cannot be determined whether BSS identified the new products or the vendors contacted the Bureau regarding their products.

Equipment, Technology & "Pothole Killer"

According to BSS, they have purchased equipment and identified technologies that could help make their operations more efficient. For instance, in June 2000, the Department leased/purchased a truck-mounted spray patching machine referred to as "Pothole Killer" for $151,000 with option to buy the equipment at zero cost. Subsequent to the lease, BSS rented equipment (this appears to be a newer model of the patching machine than originally leased) from the same vendor for three months totaling $29,763. There is no current record of this equipment, and it may have been salvaged.

BSS stated it was only used for a limited time because of operational and logistical challenges. For example, the required aggregate was only available in Pomona, which required additional transportation costs and the vendor eventually stopped production of the aggregate. Bureau representatives also stated the equipment was designed for cold weather climates, as repair work can be done by a worker sitting in the vehicle cab. However, according to the vendor, this technology can be used in all weather and climates, and was heavily used by the City of Sao Paulo, Brazil in preparation for the soccer world cup.

Other cities that have implemented this technology indicate that it is more cost effective and efficient than the traditional methods of road repair, requiring shovels, a dump truck and three or four workers. Spray patching attacks these inefficiencies by employing:

- "One-man, one-truck" technology allows for greater efficiency and cost-effectiveness

- All operations are controlled from the cab, reducing traffic hazards, safety risks and the state's and local government's exposure to liability.

- All materials are self-contained on the truck - enough for a full, productive day of patching.

- Average pothole repair takes only 45-60 seconds and lasts for years.

- The spray patching trucks can be operated day or night, in any kind of weather and can employ on-board GPS technology to better map and address these potholes in a time-efficient manner.

By not having a dedicated unit/staffing focused on identifying new materials, pavement technology, equipment, tools, etc., BSS is potentially missing opportunities that would enable them to produce better pavement life for the City and do so in an efficient and cost effective manner.

Recommendation:

11.1 The City should consider funding a research and development unit within BSS to (a) focus on developing new products to meet City specifications to improve pavement conditions and (b) identify new equipment and technologies to improve the efficiency and cost effectiveness of operations.

Section III: Efficient Pavement Processes & Outcomes

Finding No. 12: Within geographical regions, BSS does not prioritize street repair activities based on traffic volume, heavy vehicle loads, or mass transit passenger load.

According to BSS, funding is allocated to geographical regions based, in part, on traffic activity in that area. However, within those regions, BSS does not prioritize street repairs based on vehicle traffic or loads. Its current street selection process is based on a combination of variables:

- PCI rating
- Construction conflicts with utilities
- Grid system to distribute work
- Funding availability

BSS prioritizes street repair activities on the condition level of the street, and available resources and plans; however, traffic activity and respective loads are not considered in the prioritization process.

As vehicle traffic and loads increase, so does the distress on pavement. For example, when a heavier vehicle, like a bus, traverses over a street, it has much more impact on the pavement simply because of its weight and also because of the number of axles it utilizes to distribute that weight. Similarly, as traffic increases, so does the distress level on pavement.

To prevent accelerated deterioration and costly repairs, pavement should be maintained at a critical point in its lifespan before it degrades into an expensive construction job. To accomplish this, BSS develops an annual pavement preservation plan to maintain the average City-wide street conditions at its current level of 62 and prevent additional streets from failing. According to BSS, failed streets increase the repair costs by 63% over preventive maintenance costs, up to $650,000 per mile.[26] As such, it is BSS' strategy to maintain a certain level of service with the limited funding the City is able to provide for pavement preservation.

[26] However, as noted in Finding No. 17, BSS' estimated costs are most likely understated due to outdated unit costs.

By not prioritizing pavement repairs based on traffic flow or vehicle loads, the City may be missing opportunities to use resources that will provide a greater benefit to more of the public. Additionally, the City may be neglecting streets with a higher propensity to degrade, resulting in more costly reconstruction repairs in the future.

According to an internal study spearheaded by BSS, increasing MTA bus loads are accelerating pavement degradation. For example, BSS estimated that it takes a bus lane only 4.6 years on average to drop from a PCI of 100 to 60 (from A condition to a C). In comparison, it takes 14.6 years for a street with no bus traffic to degrade to the same C condition. As a consequence, BSS estimated that in order to maintain a PCI of 60, bus lanes will need to be reconstructed every 4.6 years at a cost of $442,850 per lane mile. This translates to $76 million every five years (approximately $15 million per year). BSS has taken some action to address the MTA bus load problems by installing cement concrete at bus stops, but this solution neglects the rest of the lane(s) buses traverse.

Recommendations:

BSS management should:

12.1 Work with DOT on an ongoing basis to identify streets with higher traffic and loads and evaluate which streets can be maintained without incurring higher reconstruction costs.

12.2 Consider allocating a percentage of funding towards streets with higher traffic flow and loads; or at a minimum, when annual resurfacing plans are developed, prioritize streets with higher traffic flow and loads, for those streets with the same PCI.

Finding No. 13: BSS lacks effective supervisory oversight of field crews attesting to quality paving work, per their policy requiring Job Completion Reports.

We found that BSS lacks sufficient procedures to ensure that newly repaved streets meet "good paving work quality" in accordance with their requirement for Job Completion Reports, questioning if these streets deserve of a PCI rating of 100, which is what is entered into MicroPAVER after the segment has been resurfaced.

We selected a sample of 75 street segments (25 for each fiscal year in the audit period) that had been resurfaced during the audit period and noted that 5 segments (on four streets) had current PCI ratings from 32 to 53. These low PCI ratings were noted by BSS surveys conducted within six months after the resurfacing work was completed. In one case, the lower PCI was noted 20 days after the resurfacing work was completed.

We questioned why these newly resurfaced streets had such low PCIs and sought to determine if this was a MicroPAVER system updating error, or if BSS was not meeting their own expectation that a newly resurfaced street should be considered "excellent/very good" with no maintenance required.

We brought these observations to the attention of BSS management for clarification and comment. BSS attested to the accuracy of the current PCI scores for the streets in question, adding that subsequent surveys can detect rutting that may not be visible to the human eye, but can be "observed" by the survey van's laser cameras.

We visited two street segments that were resurfaced in late 2012, and as shown in the pictures below (**Exhibit 32)**, the poor surface condition appears to be the result of shoddy slurry seal. We confirmed through BSS systems' data and supporting documents that these segments were resurfaced by BSS crews (including milling and overlay with new asphalt pavement) on October 18, 2012 and the PCI was updated to "100", consistent with policy. However, four months later on April 14, 2013, the streets' condition was reassessed by the BSS survey van, resulting in revised PCIs of 58 and 46, respectively. This brings into question the adequacy or quality of the resurfacing activities for these segments, since such significant degradation, from "excellent" to "poor" within four months, is not expected.

We also confirmed that these street segments received slurry seal treatment on May 13, 2013. BSS clarified that PCIs are not updated after streets are treated with slurry seal, as slurry is considered a maintenance activity providing increased waterproofing to extend a street's life, but does not impact the underlying condition of the street. Therefore, within seven months, these streets received both resurfacing and slurry seal, yet remain rated as fair or poor condition.

Exhibit 32: Street Segments that were Resurfaced in October 2012 and subsequently Slurry Sealed in May 2013. *(Photos taken March 14, 2014)*

BSS requires its Division supervisors to sign-off on all completed resurfacing work to document that the work was completed, and in accordance with quality standards. A Job Completion Report should be completed and signed by the supervisor describing the paving work quality as "good, fair, or poor." We reviewed the Job Completion Reports for the recently resurfaced streets that subsequently received very low PCIs, and noted that the for three of the streets, the Job Completion Reports indicated the quality of the paving work was good; however, for the fourth street, no Report was found.

We reviewed 25 closing packets for other resurfacing and reconstruction projects that were completed during the audit period, and noted that 15 (60%) did not have a Job Completion Report completed, giving rise to questions about adequate oversight and quality control.

Based on the high proportion of missing reports, as well as those completed reports that indicated good paving quality but a BSS' survey subsequently ranked the street as very poor, management has not ensured that its quality assurance process is consistently followed. As a result, BSS cannot confirm that its resurfacing and reconstruction work has been of sufficient quality to improve the pavement condition beyond the rating it had before any repair work was done.

Recommendations:

BSS management should:

13.1 Ensure supervisors adequately monitor field crews to make certain that work performed meets established standards, and document that paving work quality is acceptable by confirming it in the Job Completion Reports.

13.2 Periodically review closing packets and confirm Job Completion Reports have been prepared and accurately describe the quality of work performed.

Finding No. 14: The City has no moratorium for excavating streets that have recently received slurry seal treatment.

To minimize damage to recently resurfaced streets, i.e., those that were milled down and overlaid with new asphalt pavement, the City adopted a one-year moratorium on street cuts (excavations) into those streets. In addition, the City established a Street Damage Restoration Fee (SDRF) to recover the costs of mitigating the damage caused by the cut. While the City also established a Slurry Seal Damage Restoration Fee (SSDRF), this fee is only charged when the excavation affects a street that has received a slurry seal within the prior two years. The fee varies depending on the size of the cut; however, there is no moratorium on cuts for slurry sealed streets.

The City of San Diego established a one-year moratorium for cutting into recently slurry sealed streets, as well as a three-year moratorium for recently resurfaced streets. San Diego established these moratoria periods to minimize excavations that degrade and shorten the life of City streets.[27] Waivers to the moratoria can be issued by the City Engineer for certain conditions, such as emergencies or new services. However, even when a waiver is granted, excavators are required to slurry seal or repave a street curb-line to curb-line and the full length of the excavation plus an influence area extending beyond the excavation. Similarly, the City of San Jose has instituted a two-year moratorium on both recently resurfaced and slurry sealed streets.

These cities determined that both recently slurry sealed and resurfaced streets require moratoria to prevent degradation of municipal roadways and safeguard the public's investment in infrastructure.

In 2004, the City Council approved a motion that City Attorney, in consultation with BSS and others, present an ordinance to amend the municipal code to extend the one-year street excavation moratorium to streets receiving slurry seal, and that BSS also report back on the

[27]San Diego Municipal Code § 62.1203 and § 62.1204.

advantages of increasing the street construction moratorium from one year to eighteen months (CFI 04-0880). However, no action was taken based on a subsequent recommendation by BSS and BOE that "a second moratorium would only make the street work in general more difficult to schedule, manage and coordinate." The Bureaus instead recommended a Slurry Seal Damage Restoration Fee be imposed, and envisioned that the fees collected during the permit process would be placed in a special account that would solely be utilized by the BSS to re-slurry those specific trenched areas that require slurry seal as a result of a utility trench on a roadway that was slurry sealed less than two years prior.

Over our three-year audit period, we noted that only a small amount in SSDRF was collected --approximately $250,000, averaging less than $84,000 annually. These fees are deposited into Fund #41A, the Street Damage Restoration Fee special fund, along with the SDRF. As noted in Finding #7, the collected fees are not fully dedicated to BSS for specific resurfacing or re-slurry work; rather, funds available from the remittance of fees from both the SDRF and SSDRF are allocated to departments/Bureaus through the City's annual budget process.

Recommendation:

BSS management should:

14.1 Proactively work with policymakers to reconsider an excavation moratorium for recently slurry sealed streets.

Finding No. 15: BSS is facing challenges in meeting overall Pavement Preservation Plan goals for repairing streets, and the unit costs associated with the repairs are increasing.

BSS' ability to meet the its goals has not kept pace and has, generally, decreased since FY 2010-11, as shown in **Exhibits 33, 34, 35** and **36**. In addition, the unit costs associated with completing the number of repaired street miles appears to be increasing. The combined performance and total costs for all activities over the 3 year period is noted on the next page:

Exhibit 33: Pavement Preservation Plan Goals and Completed Miles Combined Total – all activities

Fiscal Year	Completed Miles	Original Goals	Adjusted Goals	Difference (Completed to Adj Goals)	% of Goal Met	Total Costs
2010-11	652.47	735	680[1]	-27.53	96%	$83,684,030
2011-12	710.2	735	735	-24.8	97%	$102,156,669
2012-13	752.72	800	800	-47.28	94%	$111,767,928
Totals/Avg for 3 years	**2115.39**	**2,270**	**2215**	**-99.61**	**96%**	**$297,608,627**

Note 1: BSS decreased its resurfacing miles (from 235 to 219) because City-wide employee furloughs impacted staff availability. Subsequently, BSS determined it could not meet the reduced miles of 219 and further reduced it to 180 miles.

An analysis of Actual Miles Completed vs. Goals and Total and Unit Costs, broken down by the three key Pavement Preservation Activities conducted by BSS is noted in **Exhibits 34, 35** and **36.**

Exhibit 34: Pavement Preservation Plan Goals and Completed Miles Resurfacing and Reconstruction

Fiscal Year	Completed Miles	Original Goals	Adjusted Goals	Difference	% of Goal Met	Total Costs	Cost Per Mile
2010-11	174.54	235	180[1]	-5.46	97%	$69,411,827	$397,684
2011-12	242.67	235	235	7.67	103%	$85,722,179	$353,246
2012-13	248.52	245	245	3.52	101%	$90,726,164	$365,066
Totals/Avg for 3 years	**665.73**	**715**	**660**	**5.73**	**100%**	**$245,860,170**	

Note 1: BSS decreased its resurfacing miles (from 235 to 219) because City-wide employee furloughs impacted staff availability. Subsequently, BSS determined it could not meet the reduced miles of 219 and further reduced it to 180 miles.

Exhibit 35: Pavement Preservation Plan Goals and Completed Miles
Slurry Seal

Fiscal Year	Completed Miles	Goals	Difference	% of Goal Met	Total Costs	Cost Per Mile
2010-11	379.7	400	-20.3	95%	$14,158,678	$37,289
2011-12	373.56	400	26.44	93%	$16,246,131	$43,490
2012-13	413.19	455	41.81	91%	$20,881,883	$50,538
Totals/Avg for 3 years	**1166.45**	**1255**	**-88.55**	**93%**	**$51,286,692**	

Exhibit 36: Pavement Preservation Plan Goals and Completed Miles
Crack Seal

Fiscal Year	Completed Miles	Goals	Difference	% of Goal Met	Total Costs	Cost Per Mile
2010-11(1)	98.23	100	-1.77	98%	$113,526	$1,156
2011-12	93.97	100	-6.03	94%	$188,359	$2,004
2012-13	91.01	100	-8.99	91%	$159,881	$1,756
Totals/Avg for 3 years	**283.21**	**300**	**-16.79**	**94%**	**$461,766**	

Note 1: Budget documents for 2010-11 did not show a goal for crack seal miles. However, since the total number of miles to be repaired did not change and resurfacing and slurry seal miles did not change for 2010-11 and 2011-12, it is reasonable to assume the goal for crack seal miles for FY 2010-11 would be the same.

Although BSS has, on average, completed 96% of the goal for repairing the City's streets, in the last fiscal year reviewed, its performance outputs toward meeting the Pavement Preservation Plan goals declined, while unit costs appear to be on the rise. This may be an indication of challenges that are arising with BSS' ability to meet overall resurfacing and repair goals, and ultimately maintain the City's current average PCI. As demonstrated in Finding #2, only an average of 54.6% of labor costs are associated with direct activities of paving or maintaining streets. In addition, BSS should have the tools to monitor, and therefore effectively manage costs per unit/output, though it is currently unable to do so, as noted in Finding #8. BSS needs to address these issues and/or modify existing goals.

Goals should be established at levels that are achievable. While BSS was able to demonstrate its ability to achieve the overall Pavement Preservation Plan goals, BSS' performance in FYs 2011-12 and 2012-13, particularly for slurry seal and crack seal repairs, is declining. In addition, unit costs for slurry and resurfacing are rising. It is important that BSS ensure that

further declines in performance do not continue and that costs for repair activities are effectively managed to minimize the percentage of failed streets and cause more expensive repairs to be required.

Recommendation:

BSS management should:

15.1 Periodically analyze actual miles completed compared to goals for each component of the Pavement Preservation Plan, along with the associated costs to identify trends in declining performance and/or increased costs that warrant management intervention.

Section IV: Effective Monitoring of Pavement Preservation Activities

Finding No. 16: The City's strategy for pavement preservation does not sufficiently address deferred maintenance by defining specific goals for resurfacing or reconstructing streets in poor or failed condition.

Neither the City nor BSS has formally established the number of street miles with poor or failed conditions that will be resurfaced or reconstructed on an annual basis. In both the 2008 and 2011 State of the Streets Reports, BSS indicated that its strategy is to assign no more than 20% of its resurfacing budget to reconstruction. Despite citing an average unit cost for reconstruction of $650,000 per mile, there is no stated goal for the number of miles to be reconstructed for FY 2010-11 or FY 2012-13.[28]

Due to limited funding, BSS' strategy for street preservation has focused on maintaining streets that are in fair to good condition to prevent the pavement condition from deteriorating further, possibly to poor or failed conditions (also referred to as "D" or "F" streets), which cost much more to repair. According to BSS, mileage goals for "resurfacing and reconstruction" are established with the intent to resurface (typically appropriate for "C" and "D" streets). Reconstruction is necessary when there is major cracking and base failure (typically appropriate for "F" streets), and is generally only performed when a street that is planned for resurfacing reveals significant base failure, and therefore requires full reconstruction. Over the 3-year audit period, just 6% (40) of the 666 miles completed under "resurfacing and reconstruction" were actually reconstructed. The remainder were resurfaced, receiving different levels of asphalt overlay.

There is no specific goal that focuses on streets in poor or failed condition, or distinguishes between the amount of resurfacing versus reconstruction work that will be performed by BSS. Goals established in the Pavement Preservation Plan combine both resurfacing and reconstruction work performed on all streets, including those that are "C"-fair, "D"-poor or "F"-

[28] The 2011 State of the Streets Report indicated that BSS was funded to reconstruct 16 street miles (the actual miles reconstructed was 13.375).

failed. BSS indicates in its 2011 State of the Streets report that spending more of their limited funding on reconstruction would greatly reduce the number of streets resurfaced, and cause an acceleration in the decline of the overall condition of the street system. The funding and respective goals were set with the intention to maintain a citywide average PCI of 62.

As shown in **Exhibit 37**, the percentage of failed streets ("F") increased from 2008 to 2011 at almost the same rate as the decrease in the percentage of streets in poor condition ("D"). Without a clearly stated strategy and goal for addressing streets that have suffered from deferred maintenance, the percentage of failed streets will likely continue to increase and require more costly repairs.

Exhibit 37: PCI for Entire Street System

Condition Level	% of Streets in 2008	% of Streets in 2011	Increase/Decrease
A	28%	21%	Decrease
B	15%	23%	Increase
C	20%	18%	Decrease
D	15%	13%	Decrease
F	22%	25%	Increase

Though BSS currently does very little reconstruction as a portion of their overall resurfacing activities, the City is considering alternatives to provide significant funding for street reconstruction, i.e., the more costly and significant repair work that is necessary for "D" and "F" streets. Therefore, to adequately plan, fund and measure performance outcomes for these activities, it would be beneficial to separately identify the goals for resurfacing versus reconstruction, which would also enable BSS to track their actual performance and costs for those different activities.

Recommendation:

BSS management should:

16.1 Upon commitment of significant additional funding for reconstructing "D" and "F" streets, identify separate and distinct goals for resurfacing work and reconstruction work, in order to better track outcomes and costs.

Finding No. 17: The unit costs associated with resurfacing and reconstruction used by MicroPAVER and BSS are outdated, which result in an unrealistic estimate of total cost for deferred maintenance.

The estimated total costs for the maintenance backlog presented by BSS is based on outdated unit costs. As a result, BSS' estimate of the funding needed to address the backlog appear to be understated. The 2011 State of the Streets Report notes that to bring the City's average network PCI up to 80 over the next ten years would require an investment $243 million annually or $2.43 billion over 10 years (while an additional $19 million per year would be needed for preventive maintenance). This would include a significant amount of reconstruction, resurfacing with varying degrees of base failure removal, and ongoing preventative maintenance. However, the unit costs used by MicroPAVER to determine the cost of resurfacing and reconstruction work, upon which these estimates were derived, have not been updated for at least five years. Therefore, it is likely that these estimates are understated.

According to BSS, the unit costs in MicroPAVER are not important because new estimated costs were presented in a recent report from Harris and Associates, a firm contracted by BOE to estimate the cost of fixing streets in "D" and "F" categories as part of the 2013 "Save Our Streets LA" proposal. While Harris and Associates' estimates are based on industry costs for contracting out the work for reconstruction with a significant contingency, BOE reported that the program cost is estimated at $3.86 billion if it is desired to have a reasonable assurance that all "D" and "F" streets would be improved under the 20-year program.

Unless the City is expecting to hire a consultant to perform ongoing reconstruction estimates and contract out all resurfacing and reconstruction work indefinitely, BSS still needs to track and maintain accurate unit cost information in its MicroPAVER system for City staff or contractors to do this work. This will ensure that accurate projections and budget scenarios related to resurfacing and reconstruction work are provided to policymakers.

Without an accurate estimate of deferred maintenance costs, BSS cannot determine its funding needs and enable policymakers and the public to make informed decisions.

Recommendation:

BSS management should:

17.1 Ensure deferred maintenance funding needs are based on accurate unit costs.

Finding No. 18: BSS' reported number of repaired potholes may not be accurate, as a reliable audit trail does not exist.

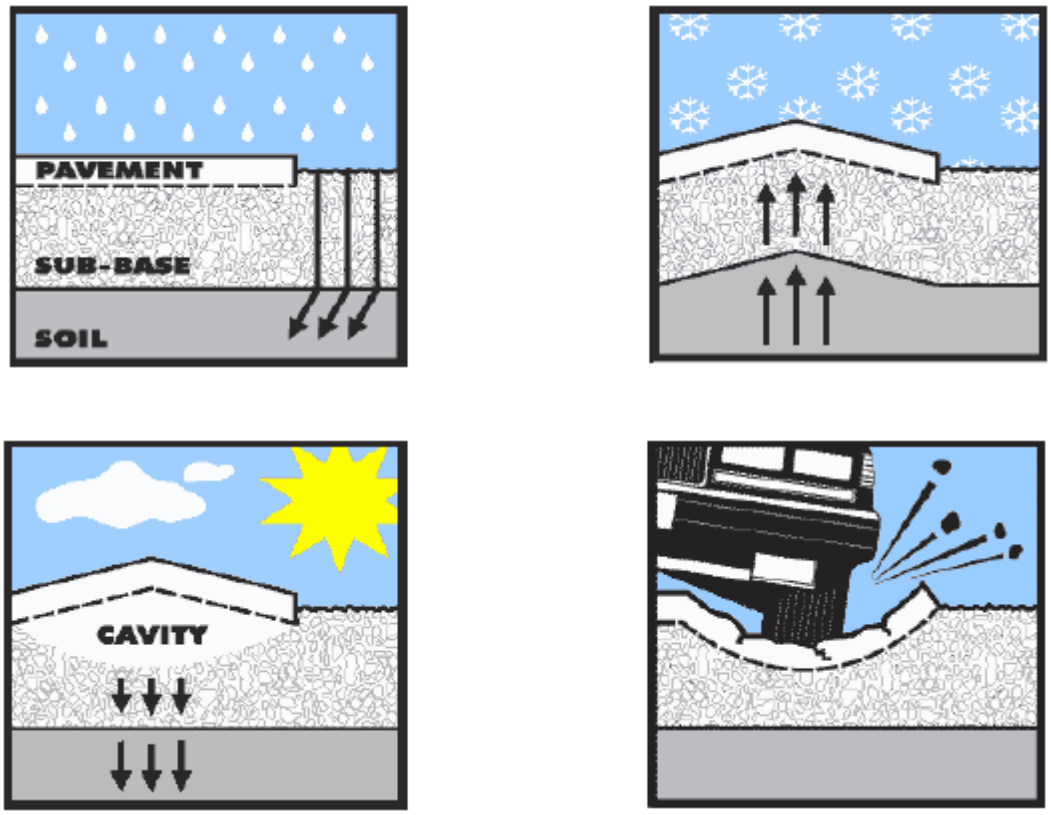
BSS was unable to provide source documentation attesting to the accuracy of the pothole repairs completed, as reported publicly. The information that was available combined defined work units (i.e., small asphalt repairs made to streets, alleys or sidewalks), and the totals indicated significant differences, raising a question of data reliability and accuracy.

Potholes

Potholes are typically the most common and aggravating type of pavement distress encountered by the public. Drivers may first notice that a road is deteriorating when they are jarred by driving over a surface that is rutted or uneven or when the pavement has cracked and a pothole has formed. These tangible signs of pavement distress are usually the final stage in a process of deterioration. Pavement failure can be caused by a combination of traffic loads and moisture. Moisture often works its way into road surfaces and the materials that form the road's foundation. Heavy traffic, particularly from weighty vehicles, puts stress on the road surface, increasing the likelihood that cracks or potholes may form.

According to Caltrans, a pothole will continue to enlarge until it is satisfactorily repaired. See images in **Exhibit 38** below.

Exhibit 38: Pothole Formation Process



Source: Caltrans Technical Advisory Guide, 2003.

Upper Left – Water penetration of pavement. Upper Right – Heaving Effects by Freezing/Thawing. Lower Left – Cavity formation. Lower Right – Traffic enlarges potholes.

As discussed previously in **Finding No. 15**, each year the Pavement Preservation Plan (Plan) establishes the number of street miles that should be resurfaced/repaired and the necessary funding to pay for the repairs as a means to maintain the overall average PCI of the City's street network. The Plan also includes a goal for pothole repairs (also referred to as small asphalt repairs). During the audit period, the goal for pothole repairs increased from 250,000 to 350,000. Since potholes can vary in size, a "pothole equivalent" is used to determine the number of completed repairs. BSS counts pothole equivalents as an area encompassing four square feet.

Completed Pothole Repairs and Costs

During the audit period, BSS spent a total of $23.8 million on small asphalt repairs, and reported to the Mayor's Office that it completed from 297,561 to

354,125 in pothole equivalents, reportedly exceeding the Plan goal in all three years.

Exhibit 39: Pothole Equivalent Goals, Reported Outputs and Costs

Fiscal Year	Pavement Preservation Plan Goal	Reported Pothole Equivalents Completed	Difference between Goal and Reported Outputs	Costs
2010-11	250,000	297,561	47,561	$7,425,499
2011-12	300,000	301,653	1,653	$8,782,450
2012-13	350,000	354,125	4,125	$7,592,019
Totals	**900,000**	**953,339**	**53,339**	**$23,799,968**

Source: Analysis of Pavement Preservation Plan, BSS Small Asphalt Repair Summaries, Cost Accounting System data.

However, BSS was unable to provide source documentation attesting to the accuracy of the reported pothole repairs completed.

Crews complete daily work sheets for small asphalt repairs denoting the type of repairs made (skin patch, pothole, alley or sidewalk) and the dimensions. The repair dimensions are converted to square footage on the daily sheet, which are then summarized on a biweekly small asphalt repair report by maintenance area (Bay Harbor, North Central, East and West Valley) and neighborhood service area (e.g., Central, South L.A., East L.A., etc.).

Our review of the biweekly small asphalt repair reports for the audit period disclosed differences between the Fiscal Year totals from the biweekly reports, to what BSS has reported to the Mayor's Office annually.[29] The internal summary reports appear to indicate many more asphalt repairs were made than what was reported, as noted below in **Exhibit 40**. It is unclear how or if BSS segregated the different types of repairs for reporting purposes (i.e., a skin patch is a more shallow asphalt repair than a full pothole on a street or alley, and sidewalk repairs made with asphalt may not be considered "potholes").

[29]One biweekly report was missing for FY2011-12 and FY2012-13.

Exhibit 40: Pothole Goals, Reported Outputs, and Differences

Fiscal Year	BSS Reported Pothole Equivalent Completed	Outputs per Biweekly Small Asphalt Repair Reports	Difference
2010-11	297,561	316,554	18,993
2011-12	301,653	298,235	(3,418)
2012-13	354,125	404,684	50,559
TOTALS	**953,339**	**1,019,473**	**66,134**

These variances reveal a broader concern regarding the accuracy of reported results. Comparison of program outcomes against a stated goal is critical for measuring program performance. Efficiency and effectiveness can also be measured through an assessment of a per unit cost, given the resources dedicated to a function and the outputs produced. However, such measurements become meaningless without accurate and reliable data.

According to BSS officials, source documents for pothole information are no longer available because of employee transitions and inconsistent, decentralized pothole tracking processes by BSS staff. We attempted to test the accuracy of the biweekly reports by tracing, for selected periods, to the actual source documents (daily worksheets for small asphalt repairs submitted by crews); however, these were not provided during fieldwork. Though BSS stated that the daily work sheets for small asphalt repairs were kept in their records retention section, staff was unable to produce the requested sample of documents for our review and verification. Therefore, BSS is unable to support the accuracy of either the officially reported Exhibits, or the internal summary reports.

In FY 2013-14, BSS took some steps to improve its pothole tracking system using Google Docs, and stated that its records retention processes would be standardized by the implementation of a pilot program using smart phones to open and close pothole repairs. However, based on a limited review of the 2014 database, it still did not reconcile with the total number of pothole repairs reported to the Mayor's Office. BSS officials also indicated that full implementation of the pilot program to use smart phones in the field was not funded; therefore, reliance on that method cannot be assured.

Given that BSS did not have a standardized process for recording and maintaining pothole repair records during our audit period, and that attempts to change these processes have not been implemented, we have no assurance that BSS is accurately reporting its pothole activities, nor can BSS management measure its unit costs or track performance effectiveness. Without records to support its reported results, the City cannot be assured that BSS goals are being achieved, or that it is utilizing its pothole repair funds efficiently and effectively.

Recommendation:

BSS management should:

18.1 Establish a process to confirm the accuracy of reported data related to small asphalt repairs, which will enable BSS to better manage performance results and effectiveness.

Finding No. 19: Utility holds can indefinitely delay planned street resurfacing.

BSS attempts to minimize excavations into recently resurfaced streets by communicating their planned work *prior* to repaving activities. However, we noted that utility holds can indefinitely delay needed street resurfacing.

On an annual basis, BSS emails its proposed candidate list of streets for resurfacing and slurry to BOE, other City departments and 200 utilities. BSS waits for those entities to send back the list with anticipated dates of their construction projects, the current phase and completion dates. From this information, BSS assembles a list of cleared streets, then creates a "committed" list as their work plan for the year. BSS provides that list to BOE for incorporation into their web-based GIS system, NavigateLA, which shows all planned construction projects in the City's right-of-way, including all permitted projects (public and private utilities, other construction, etc.) which are geo-coded and BSS' planned resurfacing work. BSS also sends a 30-day notice to all property owners on the street, and posts signs to allow the public to identify any conflicts.

While it is typical for streets that are recommended or targeted for repair by BSS to be postponed due to "utility holds," this does not necessarily impact

the amount of pavement preservation actual work conducted by BSS, as the need for maintenance greatly exceeds BSS' current resource capacity. The practice of accommodating the planned work of utilities and developers is consistent with other cities we contacted, as all jurisdictions seek to limit cutting into newly repaved streets. All other cities also send their initial one-year resurfacing plan to affected stakeholders, and when notified of conflicts, adjust their plan to accommodate those entities' construction schedules.

However, BSS relies on those entities to notify them, rather than proactively seeking confirmation or further information. In addition, the length of a continued "hold" that is placed by the utility company is not questioned or verified, which could postpone some streets from needed resurfacing work indefinitely. BSS management indicated that calls with utilities occur on a continuous basis. Other cities, including Houston, Atlanta, and Raleigh indicated that ***regular in-person*** coordinator meetings greatly enhance their planning and prioritization process, as they facilitate communication regarding each agency's current priorities and confirm current plans.

Recommendation:

BSS management should:

19.1 Consider conducting regular in-person coordination meeting(s) with various stakeholders to review and confirm planned construction work and timelines, in order to better align their resurfacing and maintenance priorities with actual work to be done by developers and utility companies.

Finding No. 20: Multiple City entities are involved in regulating street cuts which increases the risk of poor quality or unpermitted excavations.

The City has a highly regulated process that is intended to protect the quality of streets against unnecessary or poorly repaired excavations; however, due to the number of agencies and systems involved, there remains a risk that these will occur, which adds to the overall degradation of the City's streets.

Background

Los Angeles Municipal Code (LAMC) Section 62.02A prohibits cuts or excavations in streets without formal approval of the Bureau of Engineering (BOE) in the form a permit. LAMC Section 62.06D further prohibits excavations into streets resurfaced within the past year, unless the excavator resurfaces the entire block curb to curb. In conjunction with the moratorium, LAMC 62.06 requires excavators to pay Street Damage Restoration Fees (SDRF).

The City provides few exceptions to the one-year moratorium and SDRF:

- Emergency repairs to subsurface installations (pipes, wires, etc.).
- Proof that the excavator was not notified by BSS of its resurfacing work 30-days prior to construction.
- Excavations occurring a year prior to City resurfacing/reconstruction.

While slurry sealed streets do not have an excavation moratorium; excavators intending to cut into a recently slurry sealed street must pay Slurry Seal Damage Restoration Fees (SSDRF).

While most emergency excavations cannot be avoided, such as those needed to repair damaged water lines, BSS is made aware of those by the Department of Water and Power (DWP), and there are processes in place whereby BSS receives direct payment from DWP for the street repair work that is necessary. During FY 2012-13, DWP remitted $2.1 million to BSS for this purpose.

Permits and Notification

BOE grants excavation permits, also known as "E"-permits for private contractors, and "U"-permits for utility companies. The purpose of the permit is to help ensure appropriate oversight of construction and safety and payment of the required fee, in compliance with the LAMC.

BOE also administers the NavigateLA and uploads construction and permit information on an ongoing basis) to facilitate communication of all citywide construction to stakeholders.

BSS is responsible for issuing temporary street use permits (e.g., load permits for materials stored in the street, or street closures due to filming or construction work). While BOE also developed a Public Way Reservation System for (PWRS), information sharing on PWRS is at the discretion of the entities involved. The system is reportedly used primarily by BSS and

FilmLA, a nonprofit organization promoting permit coordination for the TV/film industry.

Inspections to Ensure Quality

The Bureau of Contract Administration (BCA) provides oversight of private entities that have obtained permits through BOE. BCA is responsible to ensure construction quality for street improvements made by private entities, including monitoring compliance with LAMC's requirements for curb-to-curb paving if an entity opts to excavate into a street protected by the excavation moratorium.

When an excavation permit is issued by BOE, BCA does not receive a notification. Rather, BCA expects the permit holder to call for an inspection, per City policy. BCA also indicated there is a risk when large developers and telecommunication companies receive blanket permits for several projects, and subsequently contract out the construction work. During that work, subcontractors may become involved and may not notify BCA of an excavation or the necessity of their inspection. Without a proper inspection, there is a lack of assurance regarding the quality of the repair made.

Enforcement

The Investigation and Enforcement Division (IED) of the Bureau of Street Services is responsible for enforcing laws related to the use or misuse of the public right-of-way, including construction-related activities. The IED will work with other Divisions and Public Works' Bureaus to cite violators of the municipal code. IED can become involved and is empowered to issue citations to a private entity if it does not comply with BCA and BOE permit requirements.

While private entities are required to pay a Street Damage Restoration Fee and to perform quality repair work after their excavation, this is assured only when a permit is enforced and the work is inspected.

The City's regulatory activities related to excavations, i.e., permitting, notification, charging and receipt of fees, inspection and enforcement are conducted by separate City agencies. It may be optimal to consolidate all street-related functions within a single Department or Bureau, such as what was implemented in San Diego. However, other cities have improved coordination through other methods. For example, in 2012 Chicago's Department of Transportation (CDOT) developed a Project Coordination Office to foster cooperation among all departments, contractors and utilities that need to dig up streets, reportedly saving the city $10 million in the first year. CDOT combined the high-tech (systems) with the low-tech

(interpersonal communications.) Chicago's public and private utilities enter their scheduled work into an Office of Underground Coordination database that is geo-coded onto the street grid. The system generates cross-departmental reports, and weekly in-person meetings sort out conflicts and find opportunities to combine work.

Given the challenges that municipalities face with ensuring coordination and oversight of street activities, the City of Los Angeles has taken some steps to improve coordination within the Department of Public Works. For example, all of the bureaus utilize GIS systems developed by BOE to communicate respective projects electronically. BCA also subscribes to monthly BSS street resurfacing and maintenance project notifications to ensure it is aware of where it needs to enforce the street cut moratorium and inspect curb-to-curb resurfacing activities by contractors. BCA is also testing a smartphone system on a pilot basis, which allows inspectors to close out projects on the spot, cutting the time to do this by four days.

While the Department of Public Works has taken some important steps to improve coordination, its efforts could be enhanced in a comprehensive system that increases communication, interrelated systems, and/or automated alerts to responsible parties would help to improve coordination, resulting in a reduced number of unnecessary, unpermitted, and/or poor quality repairs of street excavations.

Recommendation:

20.1 The Department of Public Works should continue to proactively identify opportunities and implement strategies to enhance systems technology to better coordinate activities among Bureaus/Divisions with responsibilities over Street Preservation. For example, the Department should consider using readily available online street view technology, as well as possible crowd sourcing applications, to populate a geo-coded citywide integrated system on a real-time basis that manages all activities, such as street cuts, resurfacing and maintenance work.

Respectfully submitted,

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GLOSSARY OF KEY TERMS

Adopted Budget *- Is the Mayor and Council approved plan of financial activity for a specified fiscal year indicating all planned revenues and appropriations for the year.*

American Recovery and Reinvestment Act (ARRA) - *A Federal economic stimulus package that resulted in funding to various levels of government and nonprofits to respond to the Great Recession. Funds from ARRA were used by the City for various approved projects, including capital improvements.*

Bureau of Contract Administration (BCA) – *A City department within the Department of Public Works that serves as the contract administrator and oversight body of private entities that have obtained permits through BOE.*

Bureau of Engineering (BOE) –*A City department within the Department of Public Works that issues street excavation permits and collects Street Damage Restoration and Slurry Seal Damage Restoration fees on behalf of the Bureau of Street Services. This department also conducts capital improvement projects and develops/maintains web-based mapping systems.*

Bureau of Street Services (BSS) – *A City department within the Department of Public Works that maintains, repairs, resurfaces, and cleans the roadways in the City of Los Angeles.*

Caltrans Construction Price Index – *An inflation index that is published by the State of California Department of Transportation (Caltrans) on various highway construction items, such as asphalt concrete. The index shows cost increases quarterly and yearly.*

Centerline Mile(s) – *Is the length of the street measured along the center of the roadway. The width of the street is ignored when calculating centerline miles.*

City Administrative Officer (CAO) – *Is a City department that conducts studies and investigations, carries out research and makes recommendations on a wide variety of City management matters for the Mayor and Council. This department also assists the Mayor and Council in the preparation of the City budget, plans and directs the administration of the budget and directs the development of work programs and standards. The CAO represents the management of the City in negotiating all labor contracts.*

Cost Accounting System – *A Bureau of Street Services accounting system that tracks departmental expenditures by work order. The system was developed in-house and is managed by BSS.*

Crack Seal – *Asphalt filler that is applied to cracks to prevent water erosion and deterioration of streets.*

Department of Public Works (DPW) – *Umbrella department of five City bureaus, including the Bureau of Street Services. Overall, DPW is responsible for the construction, renovation, and operation of City facilities and infrastructure.*

Deferred Maintenance – *Backlog of streets requiring more costly repairs that are currently deferred until additional funding is made available. These streets are usually in failed condition and in need of reconstruction.*

Direct Labor Usage – *The portion of time and costs directly associated with an employee(s) work on core activities, such as street repairs. This does not include non-core, or "indirect" activities/functions, such as compensated time off for vacation, sick leave, Bureau executive management, etc.*

Financial Management Division (FMD) – *A division within Bureau of Street Services, which is responsible for the budget, financial administration, purchase of materials and services, cost accounting and accounts payable, and payroll administration.*

General Fund *- Is used to deposit general receipts, which are not restricted, such as property, sales and business taxes and various fees.*

General Services Department (GSD) – *A City department responsible for providing procurement of City equipment and materials testing and quality control services for Bureau of Street Services.*

Lane Mile(s) - *Is equal to an 11 foot wide lane that is one mile long. Area = 11'x 5,280' = 58,080 square feet. For example, a roadway that is 64' wide and 1,000' long, (64'x1,000')/11'/5,280'=1.1 lane miles.*

Local streets – *Are streets that carry local and light traffic, but are sporadically exposed to heavy equipment such as sanitation and construction trucks. These streets represent approximately 3,900 centerline miles of the City's network, but their width varies between 15 and 45 feet. Local streets are expected to last 30 to 35 years.*

Maintain/Maintenance/Maintaining – *BSS street repairs that include potholes, crack sealing, and slurry sealing. These repairs tend to be less costly than rehabilitation.*

MicroPaver*– Is a pavement management software system that provides a systematic method for rating the physical pavement conditions of City streets. It uses PCI to score these conditions.*

Municipal Improvement Corporation of Los Angeles (MICLA) – *City fund used to front fund capital improvement expenses for BSS, which were reimbursed through the American Recovery and Reinvestment Act (ARRA).*

NavigateLA - *Is a web-based mapping application that delivers maps and reports based on data supplied by various City departments, Los Angeles County, and Thomas Brothers Maps.*

Pavement Condition Index (PCI) *– A scoring system used by the Bureau of Street Services and various pavement management systems that associate pavement conditions to a numerical value. The scores range from 0 for a failed pavement to 100 for a pavement in perfect condition. The type, severity and quantity of pavement distresses contribute to the PCI score. These scores are then assigned corresponding letter grades (A,B,C,D F) to represent the condition.* ***See Exhibit 11.***

Pavement Management - *Is "…a set of tools or methods that assist decision-makers in finding optimum strategies for providing, evaluating, and maintaining pavements in a serviceable condition over a period of time…."*[30]

Pavement Preservation Plan (Plan) – *A yearly plan that identifies funding and establishes the number of centerline and lane miles that should be maintained and resurfaced. The plan also includes potholes and small asphalt repairs.*

Pothole Equivalent – *A small asphalt repair with the area of 4 square feet.*

Public Way Reservation System for (PWRS) – *The PWRS is an internet based geographic information system, which displays (geo-codes) proposed work or activity within an arterial street or highway and identifies the entity performing or permitting the work along with the scope and scheduled time.*

[30] American Association of State Highway and Transportation Officials, Pavement Management Guide Second Edition (Washington, D.C.: Nov. 2012), xix.

Reconstruct/Reconstruction – *The process of deep level of grinding below the surface of the street. This type of repair work could extend to the base before a new layer of asphalt is applied. This process is more costly than all of the other repairs.*

Resurface/Resurfacing – *The process of grinding down the top layer of a street surface by a few inches and adding a new layer of asphalt on top. This rehabilitates the street and is more costly than maintenance.*

Resurfacing and Reconstruction Division (RRD) – *A division within the Bureau of Street Services, which conducts maintenance, resurfacing, and reconstruction on City Streets.*

Reversion(s) –*This is a type of funding return, which occurs when City departments identify funds they will not utilize during the fiscal year. As a result, funds may be reallocated by Council, based on CAO recommendations for other City priorities.*

Save Our Streets LA – *A City proposal to provide financing to reconstruct a large backlog of streets and sidewalks. This effort is intended to renew the City infrastructure, reduce deferred maintenance costs, and increase employment within the City.*

Select streets *- Are considered "non-residential" and are primarily thoroughfares that connect distant locations. These streets are generally wider, including multiple lanes, and carry heavy volumes of traffic. Select streets represent approximately 2,600 centerline miles, and are constructed with thicker layers of asphalt designed to last approximately 15 to 20 years.*

Slurry Seal – *Emulsified rubber asphalt seal applied to large areas, which extends the useful life of pavement between 7 to 10 years.*

Slurry Seal Damage Restoration Fee (SSDRF) – *A fee the City charges excavators for cutting into streets. The fees are charged to recover the cost of additional, future pavement repairs associated with the cuts. The fees are based on the age of the street since the last slurry seal and the dimensions of the cut. For streets that have been resurfaced or reconstructed a different set of fees are charged—See Street Damage Restoration Fee (SDRF).*

Small Asphalt Repair *– repair of small size/quantity performed on potholes, sidewalks or alleys.*

State of the Streets Report – *A BSS report about the condition of City streets that provides information on the pavement preservation plan, funding requirements to improve pavement conditions, and trends for the prior three years.*

Street Cleaning and Maintenance Division (SCMD) – *A division within the Bureau of Street Services, which performed maintenance activities on City streets and is currently responsible for pothole repairs and other small asphalt repairs.*

Street Damage Restoration Fee (SDRF) – *A fee the City charges excavators for cutting into streets. The fees are charged to recover the cost of additional, future pavement repairs associated with the cuts. The fees are based on the age of the street since the last resurface or reconstruction and the dimensions of the cut.*

Rehabilitate/Rehabilitation – *BSS repairs that include overlays, resurfacing, and reconstruction. These repairs tend to be more costly than maintenance.*

TRIP *- private nonprofit organization that researches evaluates and distributes economic and technical data on surface transportation issues, offers its own assessment.*

APPENDIX I – ACTION PLAN

Finding		Page	Recommendation		Page	Entity Responsible for Implementation	Priority
Section I: Effective Resource Management							
1	While Best Management Practices recommend that street system infrastructure be maintained at an average condition level of "B" or better, the City falls significantly below that, with an overall average of "C minus."	21	1.1	City Policymakers should identify and prioritize significant new funding to improve the overall condition of the City's street network, as well as require BSS to improve processes and management oversight.	23	**City Council/Mayor /Board of Public Works**	A
2	BSS management has no target for an expected direct labor utilization rate; and almost half of the resurfacing and reconstruction salary costs are for costs other than direct repair work.	23		BSS Management should:			
			2.1	Determine an appropriate direct labor utilization rate for each of the program activities related to street resurfacing and maintenance.	26	**BSS**	A
			2.2	Monitor the direct labor utilization rates for its street resurfacing and maintenance activities on a periodic basis; identify reasons for variances from goals and areas for improvement.	26	**BSS**	A
3	The City has not made the capital investment necessary to upgrade Asphalt Plant 1 (AP1) to achieve efficiencies from current production methods. However, even with a $17.7 million investment, the City's asphalt production costs would only be comparable to what BSS pays	27	3.1	The CAO and BSS Management should: Consider pursuing a strategic financial partnership for the replacement/upgrade of AP1, in order to achieve environmental and cost benefits over the long term.	33	**CAO** **BSS**	A

Finding		Page	Recommendation		Page	Entity Responsible for Implementation	Priority
	private vendors. A strategic financial partnership could help the City achieve long-term environmental and cost benefits.						
4	Budgeted funds have not been fully utilized by BSS and more than $21 million was returned to various funding sources for reprogramming.	33		BSS management should:			
			4.1	Work with the CAO to retain available funds to contract out pavement preservation activities that cannot be performed by City staff.	37	**BSS**	A
			4.2	Work with BCA to establish appropriate controls over contracted work and change orders if street repair work is contracted out.	37	**BSS** **BCA**	A
			4.3	Consider the necessity or added value of design plans to manage the costs of street repair work, whether it is performed by City forces or contractors.	37	**BSS**	B
5	Street Damage Restoration Fees, which were established to recover the annual resurfacing costs associated with the shortened lifespan of City streets due to the street cuts, were based on an inflated assumption of annual excavation work. As a result, total collections have been undercharged by as much as $190 million since the fee was implemented.	38		BSS Management should:			
			5.1	Present to policymakers the unit costs supporting the proposed Street Damage Restoration Fee based on a full cost recovery model that considers the average actual square feet cut annually, as reported by the Bureau of Engineering.	42	**BSS**	A
			5.2	Report periodically to policymakers on the damage to City streets that is caused by	42	**BSS**	B

Finding		Page	Recommendation		Page	Entity Responsible for Implementation	Priority
				construction activity and heavy load carriers, identifying amounts collected for damages and recommendations for additional cost recovery, if applicable.			
6	A subsequent adjustment to the SDRF fees did not reconsider the total costs to be recovered or the expected number of annual street cuts. Rather, an inflationary adjustment was applied in 2006; however, the rates used were understated, resulting in $31 million in additional missed revenue opportunities.	43	6.1	BSS Management should: Review and consider updating the SDRF fee on an annual basis, based on an updated analysis and/or consistent use of an accepted inflationary index.	46	**BSS**	A
7	Street Damage Restoration Fees were based on estimated costs for specific activities by BSS in 1996, considering the additional resurfacing that would be required on an annual basis and an assumed number of street cuts; however, not all fee collections are dedicated to BSS for street repair work.	47	7.1	BSS Management should: Perform a new fee study that considers underlying assumptions and a total cost basis that includes the actual costs of all departments involved with street repairs (BSS, GSD, DOT and BOE).	48	**BSS** **GSD** **BOE**	A

Finding		Page		Recommendation	Page	Entity Responsible for Implementation	Priority
Section II: Systems, Tools and Technology							
8	BSS' cost accounting system does not track costs at a program activity level (i.e., resurfacing, slurry seal, crack seal, etc.) as defined in the City's Pavement Preservation Plan. As a result, management does not use actual cost data for managing its costs and analyzing resource utilization.	50		BSS Management should:			
			8.1	Develop a process to code work orders by program activity. This could be accomplished by establishing a number schema that separately designates resurfacing, reconstruction, slurry seal, crack seal and pothole repair work, while also retaining the location-based work order coding.	52	**BSS**	A
			8.2	Utilize cost data by program activity to manage its resource utilization in delivering street resurfacing and maintenance efficiently and cost effectively to ensure desired outcomes are achieved.	53	**BSS**	A
9	BSS' current pavement management system is not integrated with other pavement management databases and City systems, requiring additional staff efforts. Further, while it is used to assess pavement conditions, it is not a comprehensive asset management system that provides an inventory or condition assessment of other street-related infrastructure, such as street lights, medians, signs, storm drains, sidewalks, etc.	53		BSS Management should:			
			9.1	Explore the potential for other pavement management systems that exceed MicroPAVER's capacity and overall usefulness.	57	**BSS**	B
				The Board of Public Works should:			
			9.2	Consider expanding the capabilities of BSS' pavement management system to include a comprehensive system for the City's infrastructure	57	**BPW**	B

Finding		Page	Recommendation		Page	Entity Responsible for Implementation	Priority
10	BSS uses a Pavement Management System (MicroPAVER) with limitations and does not fully utilize all of its features.	58	10.1	BSS management should: Work with the developer of MicroPAVER to address the issues noted with the beta edition, report customization and consider revising the current algorithm regarding cement streets paved over with asphalt.	59	**BSS**	A
11	BSS does not have a dedicated unit/staffing to proactively seek out new materials, equipment or technology. Specialized "Pothole Killer" technology was put into operation in 2000 but was discontinued after a few years, even though it is considered a highly efficient and effective solution to pothole repair by several cities.	60	11.1	The City should: Consider funding a research and development unit within BSS to (a) focus on developing new products to meet City specifications to improve pavement conditions and (b) identify new equipment and technologies to improve the efficiency and cost effectiveness of operations.	62	**City Council** **Mayor** **CAO** **BSS**	B

Finding		Page	Recommendation		Page	Entity Responsible for Implementation	Priority
Section III: Efficient Pavement Processes and Outcomes							
12	Within geographical regions, BSS does not prioritize street repair activities based on traffic volume, heavy vehicle loads, or mass transit passenger load.	63		BSS Management should:			
			12.1	Work with DOT on an ongoing basis to identify streets with higher traffic and loads and evaluate which streets can be maintained without incurring higher reconstruction costs.	64	**BSS** **DOT**	A
			12.2	Consider allocating a percentage of funding towards streets with higher traffic flow and loads; or at a minimum, when annual resurfacing plans are developed, prioritize streets with higher traffic flow and loads, for those streets with the same PCI.	64	**BSS**	B
13	BSS lacks effective supervisory oversight of field crews attesting to quality paving work, per their policy requiring Job Completion Reports.	64		BSS Management should:			
			13.1	Ensure supervisors adequately monitor field crews to make certain that work performed meets established standards, and document that paving work quality is acceptable by confirming it in the Job Completion Reports.	66	**BSS**	A
			13.2	Periodically review closing packets and confirm Job Completion Reports have been prepared and accurately describe the quality of work performed.	67	**BSS**	A

Finding		Page	Recommendation		Page	Entity Responsible for Implementation	Priority
14	The City has no moratorium for excavating streets that have recently received slurry seal treatment.	67	14.1	BSS Management should: Proactively work with policymakers to reconsider an excavation moratorium for recently slurry sealed streets.	68	**BSS**	A
15	BSS is facing challenges in meeting overall Pavement Preservation Plan goals for repairing streets, and the unit costs associated with the repairs are increasing	68	15.1	BSS management should: Periodically analyze actual miles completed compared to goals for each component of the Pavement Preservation Plan, along with the associated costs to identify trends in declining performance and/or increased costs that warrant management intervention.	71	**BSS**	A

Finding		Page	Recommendation		Page	Entity Responsible for Implementation	Priority
Section IV: Effective Monitoring of Pavement Preservation Activities							
16	The City's strategy for pavement preservation does not sufficiently address deferred maintenance by defining specific goals for resurfacing or reconstructing streets in poor or failed condition.	72	16.1	BSS Management should: Upon commitment of significant additional funding for reconstructing "D" and "F" streets, identify separate and distinct goals for resurfacing work and reconstruction work, in order to better track outcomes and costs.	73	**BSS**	A
17	The unit costs associated with resurfacing and reconstruction used by MicroPAVER and BSS are outdated, which result in an unrealistic estimate of total cost for deferred maintenance.	74	17.1	BSS Management should: Ensure deferred maintenance funding needs are based on accurate unit costs.	75	**BSS**	A
18	BSS' reported number of repaired potholes may not be accurate, as a reliable audit trail does not exist.	75	18.1	BSS Management should: Establish a process to confirm the accuracy of reported data related to small asphalt repairs, which will enable BSS to better manage performance results and effectiveness.	79	**BSS**	A
19	Utility holds can indefinitely delay planned street resurfacing.	79	19.1	BSS Management should: Consider conducting regular in-person coordination meeting(s) with various stakeholders to review and confirm planned construction work and timelines, in order to better align their resurfacing and maintenance priorities with actual work to be done by developers and utility companies.	80	**BSS**	B

Finding		Page	Recommendation		Page	Entity Responsible for Implementation	Priority
20	Multiple City entities are involved in regulating street cuts which increases the risk of poor quality or unpermitted excavations.	80	20.1	The Department of Public Works should: Continue to proactively identify opportunities and implement strategies to enhance systems technology to better coordinate activities among Bureaus/Divisions with responsibilities over Street Preservation. For example, the Department should consider using readily available online street view technology, as well as possible crowd sourcing applications, to populate a geo-coded citywide integrated system on a real-time basis that manages all activities, such as street cuts, resurfacing and maintenance work.	83	**Department of Public Works**	B

Description of Recommendation Ranking Codes:

A – **High Priority**: The recommendation pertains to a serious or materially significant audit finding or control weakness. Due to the seriousness or significance of the matter, immediate management attention and appropriate corrective action is warranted.

B – Medium Priority: The recommendation pertains to a moderately significant or potentially serious audit finding or control weakness. Reasonably prompt corrective action should be taken by management to address the matter. The recommendation should be implemented within six months.

C – Low Priority: The recommendation pertains to an audit finding or control weakness of relatively minor significance or concern. The timing of any corrective action is left to management's discretion.

APPENDIX II – FINANCIAL SCORECARD

	Finding/Recommendation	Page	Category	Financial Impacts
3	The City has not made the capital investment necessary to upgrade Asphalt Plant 1 (AP1) to achieve efficiencies from current production methods. However, even with a $17.7 million investment, the City's asphalt production costs would only be comparable to what BSS pays private vendors. A strategic financial partnership could help the City achieve long-term environmental and cost benefits.	27	Cost Savings	The City could reduce its ongoing asphalt production costs by $25 per ton, equating to **savings of more than $3.5 million annually** based on current production volume.
4	Budgeted funds have not been fully utilized by BSS and more than $21 million was returned to various funding sources for reprogramming.	33	Cost avoidance	These funds cannot be recovered, but the Bureau may be able to use future, leftover funds for street preservation instead of returning them to City funding sources. Based on prior returns, the department may have **up to $7 million more per year to use** on street preservation activities.

5	Street Damage Restoration Fees, which were established to recover the annual resurfacing costs associated with the shortened lifespan of City streets due to the street cuts, were based on an inflated assumption of annual excavation work. As a result, total collections have been undercharged by as much as $190 million since the fee was implemented.	38	Increased Revenue	Due to faulty assumptions regarding annual number of street cuts used to derive the initial fee, the City has collected an average of $4.5 million per year rather than the anticipated $16.4 million annually. By adjusting the fee to consider the actual historical average of street cuts, even without considering the effect of a 2006 inflationary adjustment (Finding #6) or conducting a new analysis, SDRF collections would **increase by $11.9 million annually**.
6	A subsequent adjustment to the SDRF fees did not reconsider the total costs to be recovered or the expected number of annual street cuts. Rather, an inflationary adjustment was applied in 2006; however, the rates used were understated, resulting in $31 million in additional missed revenue opportunities.	43	Increased Revenue	Due to incorrect inflationary adjustment applied, the average adjusted SDRF unit cost is $3.54 less than what it should be. Applying this increase to the average actual square feet of annual street cuts, SDRF collections would **increase by an additional $3.5 million annually.**

Cost Recovery: Monies that may be recoverable.

Cost Savings and Efficiencies: Cost savings opportunity and process enhancements.

Cost Avoidance: Monies that are lost but are avoidable in the future.

Increased Revenue: Revenue opportunities.

Wasted Funds: Monies that are lost and not recoverable due to reckless act or mismanagement of funds.

We strive to identify and recommend actions that will result in real financial impact, whereby the City can achieve significantly more through cost savings and/or increased revenue than the cost of the audit function. The above dollar estimates are dependent upon various factors, such as full implementation of audit recommendations and should not be used as guaranteed amounts.

APPENDIX III – SCOPE & METHODOLOGY

SCOPE

This performance audit was conducted to assess the extent to which the Bureau of Street Services effectively and efficiently utilizes its resources to maximize the number of streets that are adequately paved, and reduce deferred maintenance costs over time.

The audit focused on the existence and adequacy of internal controls for the accounting of expenditures and the selection of streets for maintenance and repairs. Additionally, the audit assessed the City's plan to upgrade one of its owned asphalt plants. We also evaluated the City's funding and cost recovery measures for funds dedicated to pavement preservation, to safeguard financial resources and maintain street assets.

In connection with our audit objectives, we examined the impact on deferred maintenance and the long-term costs associated with street repairs. Lastly, we reviewed the extent to which City departments and private utilities coordinate work that affects street conditions, resurfacing, and maintenance. In order to evaluate these issues, we reviewed information regarding activities conducted from Fiscal Years 2010-11 through 2012-13; however, for Street Damage Restoration Fees, we also reviewed the basis for setting the fees and the extent of fee collections since inception.

METHODOLOGY

To accomplish our audit objectives, we performed the following procedures:

- Obtained and reviewed a data export of costs recorded in BSS' cost accounting system related to Pavement Preservation Plan activities;
- Obtained and reviewed data exports from BSS' MicroPAVER and Resurfacing Management System for all Pavement Preservation Plan activities to obtain total performance outputs;
- Interviewed key personnel at BSS, Bureau of Engineering, Bureau of Contract Administration, the Office of the Mayor, and City Attorney;
- Researched street paving practices of other cities through public information and/or interviews with management officials. Surveys were conducted with representatives from Atlanta, Nashville, Raleigh,

Sarasota, Houston and San Diego, while general information was obtained from Orlando, Chicago and New York City;

- Selected a sample of 75 resurfacing projects, including documentation related to 25 completed projects to determine PCI scores, verify completed lengths, and determine current pavement conditions;

- Reviewed a sample of crack seal completion reports to verify accuracy and reliability of information reported by BSS;

- Reviewed biweekly management reports for small asphalt repairs and evaluated numbers against those reported to the Mayor in BSS' performance output reports;

- Obtained a data extract of Street Damage Restoration Fee cuts and payments dating back to 1998;

- Reviewed inflationary reports from Caltrans and evaluated rates used by BSS to determine the 2006 Street Damage Restoration Fee update;

- Reviewed literature on pavement management and asset management systems;

- Evaluated prior reports on asphalt plant upgrade proposals made by BSS;

- Reviewed utility hold data exports; and

- Reviewed and evaluated Controller information in the FMIS and FMS financial systems related to BSS funding and reversions.

The audit was performed in accordance with Generally Accepted Government Auditing Standards, and generally covered activities over a three-year period, ending on June 30, 2013. This was expanded prior or subsequent to this period when deemed necessary.

Audit fieldwork was primarily conducted from March through May 15, 2014. 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 reasonable basis for our findings and conclusions based on our audit objectives.

APPENDIX IV –BENCHMARKING & COMPARISONS AMONG CITIES

To inform our audit process, we sought to identify best practices and industry standards related to different cities' approaches to managing and preserving their respective inventories of street and pavement assets. One available source of national comparative data is the most recent (10/3/13) report published by TRIP of Washington, DC, a nonprofit organization that researches, evaluates and distributes economic and technical data on transportation issues. The report indicates that more than a quarter of the nation's major urban roadways are in poor condition, and notes that the Los Angeles-Long Beach-Santa Ana Urban Area has the greatest share of major roads and highways that are in poor condition, and provide for a rough ride. The top ten urban regions with a population of 500,000 or more with the highest share of pavements in ***poor*** condition include the following:

Rank	**Urban Area***(includes the major City and its neighboring or surrounding suburban areas*)	**Pct Poor**
1	Los Angeles - Long Beach - Santa Ana	64%
2	San Francisco – Oakland	60%
3	San Jose	56%
4	San Diego	55%
5	Tucson	53%
6	New York City - Newark	51%
7	Bridgeport – Stamford	51%
8	Milwaukee	48%
9	New Orleans	47%
10	Oklahoma City	47%

The TRIP report also presents an average additional vehicle operating cost because of road conditions, and cites the Los Angeles-Long Beach-Santa Ana area with the highest amount.

Using the information presented for large urban areas with mild climates who had significantly better pavement conditions, we selected several cities for a comparative survey of their paving operations and practices. Representatives of the following cities agreed to participate: Atlanta, GA; Nashville, TN; Raleigh, NC; and Sarasota, FL. Representatives from Houston, TX and San Diego, CA also participated in the survey. In addition, we obtained information through selected interviews and publicly available information for Orlando, FL; Chicago, IL; New York City; Washington, DC; and San Francisco, CA; however, not all requested information was available or provided. While some noteworthy and general practices are cited within the body of this report, the following pages of this Appendix present a summary for each City's general practice. Comparative cost data for resurfacing and maintenance activities among cities was not available; the

cities we contacted did not track or report costs per unit for their internal work, and many used outside vendors for all resurfacing activities.

TRIP notes that transportation agencies can reduce pavement life cycle costs by adopting a pavement preservation approach that emphasizes making initial repairs to pavement surfaces while they are still in good condition, and using higher-quality paving materials. However, it cites a 2010 Federal Highway Administration report noting that over-reliance on short-term repairs will fail to provide the long-term structural integrity needed to guarantee the future performance of a paved road, and that agencies that focus only on current pavement surface conditions will eventually face a street network with an overwhelming backlog of pavement rehabilitation and replacement needs. This appears to be the case in Los Angeles.

TRIP's primary recommendations are contingent on adequate funding to allow transportation agencies to implement the following:

- Implement and adequately fund a pavement preservation program that performs initial maintenance on road surfaces while they are still in good condition, postponing the need for significant rehabilitation.

- Consider using pavement materials and designs that will provide a longer-lasting surface when critical routes are constructed or reconstructed.

- Resurface roads in a timely fashion using pavement materials that are designed to be the most durable, given local climate and the level and mix of traffic on the roadway.

- Invest adequately to insure that 75% of local road surfaces are in Good condition (as compared to "Fair," Mediocre," or "Substandard/Poor").

The following pages provide a high-level summary of comparative cities. The source for the relative Pavement Condition and Additional annual Vehicle Cost was the TRIP report, which reported uniform standard pavement conditions as gathered by the Federal Highway Administration, based on International Roughness Index (IRI) or Present Serviceability Rating (PSR), as noted below:

Rating	**IRI**	**PSR**
Substandard (Poor)	Above 170	2.5 or less
Mediocre	120-170	2.6 – 3.0
Fair	95-119	3.1 – 3.4
Good	0 – 94	3.5 or higher

TRIP cites that the additional annual vehicle operating costs were calculated in the Highway Development and Management (HDM) model, which is recognized by the US Department of Transportation and 100 other countries, by taking the average number of miles driven annually by a region's driver, calculating the current vehicle operating costs based on AAA 2012 vehicle operating costs and then using the HDM model to estimate the additional vehicle operating costs being paid by drivers as a result of substandard roads.

Los Angeles, California

Street Network: 6,500 centerline miles; 28,000 lane miles

Pavement Conditions:
Add'l Vehicle Cost: $832

Poor	Mediocre	Fair	Good
64%	26%	5%	5%

Primary Agency: Dept of Public Works – Bureau of Street Services (BSS)

Functional Responsibilities: BSS primarily responsible for prioritization and selection of streets; communication of plan for input; actual repaving and repairs; quality control for internal projects; permits for right-of-way. BOE responsible for design work for major projects and issuing permits for street excavation. BCA inspects road work by outside contractors; DOT performs road striping.

Condition Assessment of Streets: Performed by City staff with one survey van equipped with cameras and sensors, measuring distresses. Continuous cycle to cover entire network over a 3-year period. Data reviewed and fed into the pavement management system.

Pavement Management System: Heavily customized version of MicroPAVER .

Use of Outside Vendors/Contractors: Resurfacing and maintenance work conducted by City forces, vendors supply and deliver a large portion of the material for overlay projects.

Houston, Texas

Street Network: 5,700 centerline miles; 16,000 lane miles.

Pavement Conditions:
Add'l Vehicle Cost: $506

Poor	Mediocre	Fair	Good
25%	31%	25%	19%

Primary Agency: Public Works & Engineering Department - Street & Drainage Division

Functional Responsibilities: Street Maintenance Branch (SDD) is the designated process owner, and performs resurfacing / overlay which includes milling. Engineering and Construction Division (ECD) and contractors for major thoroughfares and reconstruction, Traffic Operations Division (TOD) handles striping, and Planning & Development Division oversees permits and enforcement.

Condition Assessment of Streets: Performed by SSD via a Street Surface Assessment Vehicle (SSAV) with several lasers and cameras measure roughness, rutting, cracking, and other street conditions. Pavement Condition Rating scores are used to prioritize future capital projects and street maintenance decisions. Street assessments are gathered every 2-3 years

Pavement Management System: No separate pavement management system. The SSAV measures rutting and roughness, producing Pavement Rating scores (PCR) only.

Use of Outside Vendors/Contractors: Engineering and Construction Division (ECD) contract out some of the large reconstruction projects. All asphalt is purchased from a vendor.

Atlanta, Georgia

Street Network: 1,700 centerline miles; 7,500 lane miles

Pavement Conditions:
Add'l Vehicle Cost: $201

Poor	Mediocre	Fair	Good
1%	35%	5%	59%

Primary Agency : Department of Public Works - Office of Transportation

Functional Responsibilities: DOT is responsible for assessing the street condition, prioritization, contract services, quality control and providing permits, some street maintenance (potholes) and milling operations.

Condition Assessment of Streets: Currently done by individual inspectors based on visual assessment; currently considering an automated system to generate particular data quickly and efficiently.

Pavement Management System: Does not have one; just the individual condition assessment.

Use of Outside Vendors/Contractors: City forces do small asphalt repairs and the milling in preparation of resurfacing. All resurfacing projects are performed by contracted vendor(s), with DOT inspectors sign-off for quality.

Nashville, Tennessee

Street Network: 2,300 centerline miles; 5,800 lane miles

Pavement Conditions:
Add'l Vehicle Cost: $254

Poor	Mediocre	Fair	Good
10%	21%	10%	59%

Primary Agency : Public Works Engineering Department - Paving Office

Functional Responsibilities: Paving Office oversees all aspects of street resurfacing by directly conducting or contracting activities related to plan, survey, maintenance/resurfacing, Q/C; striping, permits and enforcement.

Condition Assessment of Streets: Nashville contracts out the pavement condition survey to a vendor who uses vans with multiple cameras and lasers, collecting images every 20 feet. Updates assessment every 2 years.

Pavement Management System: Cartegraph. The vendor performing the survey for condition assessment must collect images/data that are compatible with this system.

Use of Outside Vendors/Contractors: Contractors conduct all resurfacing activities (5 areas put out to bid; primes utilize subs for some activities, e.g., striping, utility adjustments, etc.) City forces are used for alleys, greenways and emergency projects only.

Raleigh, North Carolina

Street Network: 1,055 centerline miles; 2,500 lane miles

Pavement Conditions:
Add'l Vehicle Cost: $283

Poor	Mediocre	Fair	Good
14%	11%	19%	56%

Primary Agency: Department of Public Works -Transportation Field Services

Functional Responsibilities: Transportation Field Services oversees all activities related to street maintenance, street resurfacing, bridgework and storm water. Public Works' Transportation Operations Division issues permits for street cuts and street closures. Right of way permits are issued by Planning Department.

Condition Assessment of Streets: City inspectors drive the streets and conduct a visual survey of the street conditions every 2 years. They use set criteria to determine and rate the pavement condition rating (PCR) of each street segment.

Pavement Management System: None. Assessment from windshield survey is used for prioritization.

Use of Outside Vendors/Contractors: Potholes are repaired using City forces, but all resurfacing and reconstruction work is contracted out. The City prohibits slurry or crack sealing to repair streets, and currently uses 4" depth reclamation for all resurfacing to ensure a longer street life

Sarasota, Florida

Street Network: 232 centerline miles; 464 lane miles

Pavement Conditions:
Add'l Vehicle Cost: $178

Poor	Mediocre	Fair	Good
7%	11%	14%	68%

Primary Agency: Department of Public Works - Engineering/Capital Projects Division

Functional Responsibilities: Public Works oversees all activities related to maintaining public infrastructure, including streets. Contacted vendors perform the assessment and all street resurfacing work; DPW Superintendent of Streets is responsible for quality control.

Condition Assessment of Streets: Vendor, Transmap uses a van with cameras and lasers, collecting information on street conditions/ratings and other infrastructure assets which is directly overlaid onto GIS map. Reassessed every 5 years.

Pavement Management System: Transmap is the pavement (and asset) management system for the City.

Use of Outside Vendors/Contractors: All resurfacing work is contracted out to a prime vendor who is responsible for mobilization/milling/asphalt/paint & striping/loop segments for streetlights/utility covers, etc. No slurry or crack seal is used; hot patch used for small asphalt repairs.

Orlando, Florida

Street Network: unknown centerline miles; 1,100 lane miles.

Pavement Conditions:
Add'l Vehicle Cost: $254

Poor	Mediocre	Fair	Good
13%	12%	15%	60%

Primary Agency: Public Works Department - Streets and Stormwater Division

Functional Responsibilities: All activities related to maintaining and operating the City's roadways and rights-of-way to achieve their maximum design life and to ensure the continuation of efficient and safe transit on all City streets and pedestrian ways.

Condition Assessment of Streets: Conducted by a vendor, unknown frequency.

Pavement Management System: MicroPaver

Use of Outside Vendors/Contractors: All resurfacing work is contracted out, while all potholes are repaired by City Staff. A vendor also assesses the street condition.

Chicago, Illinois

Street Network: 4,000 centerline miles; 9,456 lane miles.

Pavement Conditions:
Add'l Vehicle Cost: $567

Poor	Mediocre	Fair	Good
33%	39%	14%	14%

Primary Agency : Chicago Dept. of Transportation (CDOT)

Functional Responsibilities: CDOT is responsible for public way infrastructure, including planning, design, construction, maintenance and management. CDOT's Public Right of Way Permit Office is responsible for issuing permits, while the CDOT Office of Underground Coordination is responsible for all requests regarding existing utility information and the review/approval of construction work in or adjacent to the Public Way.

Condition Assessment of Streets: No information provided.

Pavement Management System: No information provided.

Use of Outside Vendors/Contractors: Construction is performed by both in-house construction crews and private contractors. No additional information provided.

New York City, New York

Street Network: 6,074 centerline miles; 19,324 lane miles.

Pavement Conditions:
Add'l Vehicle Cost: $673

Poor	Mediocre	Fair	Good
51%	23%	11%	14%

Primary Agency: New York City Department of Transportation (NYCDOT)

Functional Responsibilities: NYDOT is responsible for rehabilitating and maintaining the City's infrastructure, including bridges, tunnels, streets, sidewalks, and highways. DOT conducts regular inspections to assess pavement conditions; street reconstruction work is executed by the Department of Design and Construction on DOT's behalf.

Condition Assessment of Streets: Assessment is mostly carried out through a windshield survey, where teams of assessors periodically evaluate each street and record the condition to the segment's unique identifier. This information is uploaded to a master database where each street segment is attributed with field values such as traffic direction, cracks, patches, trenches, travel rating, and distress percentages.

Pavement Management System: Street Smart, an application used to query, map, and generate reports on street conditions throughout New York City.

Use of Outside Vendors/Contractors: No information was provided.

San Diego, California

Street Network: 2,774 centerline miles; San Diego does not track lane miles.

Pavement Conditions:
Add'l Vehicle Cost: $758

Poor	Mediocre	Fair	Good
55%	31%	5%	9%

Primary Agency: Transportation and Storm Water Department (T&SW) – Street Division

Functional Responsibilities: T&SW is comprised of four distinct divisions; the Street Division is responsible for road assessment, prioritization and road striping. Actual Repaving/ Reconstruction/Maintenance is done by private contractors hired by Street Division, while Street Division or Public Works Engineering performs Quality Control/Inspection of roadwork.

Condition Assessment of Streets: Partial pavement condition assessment surveys have been conducted approximately every 4 years since 2001 by a contractor (have used Stantec, MGIS, and Cartegraph).

Pavement Management System: Cartegraph PAVEMENT view.

Use of Outside Vendors/Contractors: In-house crews are utilized to perform high-priority isolated pavement repairs; while planned pavement maintenance such as overlays and slurry sealing are completed via contracts. Approximately 10% City forces; 90% contractors.

Washington, DC

Street Network: unknown centerline miles; 2,500 lane miles.

Pavement Conditions:
Add'l Vehicle Cost: $517

Poor	Mediocre	Fair	Good
31%	29%	17%	23%

Primary Agency: The District of Columbia Department of Transportation (DDOT)

Functional Responsibilities: DDOT responsible for planning, designing, construction, and maintenance for the District's streets, alleys, sidewalks, bridges, traffic signals, and street lights. The Office of Contracting and Procurement (OCP) is responsible for partnering with vendors and District agencies.

Condition Assessment of Streets: Vendor -ARA performs automated pavement condition surveys annually using a Digital Survey Vehicle. Pavement surface conditions are captured with a very high-resolution downward facing camera, and three other cameras collect images of the surrounding area and other street assets.

Pavement Management System: ARA's RoadCare Asset Management System.

Use of Outside Vendors/Contractors: No information provided.

San Francisco, California

Street Network: 942 centerline miles; 2,138 lane miles.

Pavement Conditions:
Add'l Vehicle Cost: $782

Poor	Mediocre	Fair	Good
60%	26%	5%	9%

Primary Agency: Department of Public Works – Bureau of Street and Sewer Repair (BSSR)

Functional Responsibilities: BSSR is responsible for paving and street repair work, sewer repair, patch paving, pothole filling, and asphalt plant operation and maintenance. The Infrastructure Design Construction Division handles all types of engineering, street structures and construction management.

Condition Assessment of Streets: Residential streets are assessed every five (5) years; arterial and collector streets are assessed every two (2) years. Assessment work performed by certified City forces and/or certified consultants; varies year to year.

Pavement Management System: Pavement Management and Mapping System (PMMS), establishes a rating of streets that allows DPW to determine which streets are nearing the end of their useful lives. DPW selects the City streets repaving priorities according to PMMS data. Pavement condition includes the ride quality, cracking, and raveling ratings of the roadway.

Use of Outside Vendors/Contractors: IDC handles all types of engineering, street structures and construction management. IDC assesses the streets and assigns work to BSSR or to a contractor. No additional information provided.