CITY OF SAN JOSE
CAPITAL OF SILICON VALLEY

Memorandum

TO: Public Safety, Finance and Strategic Support Committee

FROM: Sharon W. Erickson
City Auditor

SUBJECT: REVIEW/VALIDATION OF SEWER LINE CLEANING PERFORMANCE/COST DATA

DATE: March 10, 2010

RECOMMENDATION

We recommend that the Public Safety, Finance and Strategic Support Committee accept the City Auditor's *"Review/Validation of Sewer Line Cleaning Performance and Cost Data"*.

BACKGROUND

In the City Auditor's Fiscal Year 2009-10 Work Plan, the Auditor's Office included an independently verified assessment of current performance and costs for a proposed High Performing Team Service Agreement (see City Manager's 2009-10 Budget Addendum #26 for more details).

In November 2009, the Department of Transportation (DOT) requested that the City Auditor's Office review and validate baseline information relating to the performance and costs associated with the Sanitary Sewer Line Cleaning Program. This program was identified by the City's Beyond Budget Cuts effort to empower employees through team training and performance model development as a way of improving performance and reducing costs over a multi-year period.

A full service level and cost proposal for DOT's High Performing Team Service Agreement is being developed by DOT and will be presented to the City Manager for further consideration in April.

Sharon W. Erickson
City Auditor

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CITY OF SAN JOSE
CAPITAL OF SILICON VALLEY

Memorandum

TO: Hans F. Larsen
Acting Director of Transportation

FROM: Sharon W. Erickson
City Auditor

SUBJECT: **REVIEW AND VALIDATION OF SEWER LINE CLEANING PERFORMANCE AND COST DATA**

DATE: March 4, 2010

SUMMARY

Per your request, the Auditor's Office has verified the Sewer Line Cleaning performance and cost data as indicated below. In assessing the appropriateness and accuracy of performance and cost data, we examined source data on a test basis, performed walkthroughs of key processes, and observed staff perform key processes. Based on our review, DOT's suggested performance and cost measures met the criteria for being meaningful, useful, and sustainable. In addition, based on a review of each measure's methodology and the sampling and testing of underlying data for each measure, the Auditor's Office verified the accuracy of DOT's revised baseline performance measures and costs for FY07-08 and FY08-09.

Review and Validation of Performance Measures and Cost Data

Performance Measure	*Meaningful, Useful, & Sustainable?*	*FY07-08 Accurate?*	*FY08-09 Accurate?*	*Status*	*Comment*
1) Number of sewer line blockages cleared	✓	✓	✓	Verified	Manual count
2) Number of sanitary sewer overflows	✓	✓	✓	Verified	Manual count
3) Number of service requests received and completed	✓	✓	✓	Verified	-
4) Miles of sewer main lines cleaned	✓	✓	✓	Verified	-
5) Feet of sewer main lines cleaned per direct labor hour	✓	✓	✓	Verified	Part of #4 above
6) Percent of sewer line segments without obstructions	✓	✓	✓	Verified	Derived from #1 above
7) Number of sewer line blockages per 100 miles	✓	✓	✓	Verified	Derived from #1 above
8) Number of sanitary sewer overflows per 100 miles	✓	✓	✓	Verified	Derived from #2 above
9) Percent of sewer line blockages within 4 hours	✓	✓	✓	Verified	Same source as #3 above

Review and Validation of Performance Measures and Cost Data					
Performance Measure	***Meaningful, Useful, & Sustainable?***	***FY07-08 Accurate?***	***FY08-09 Accurate?***	***Status***	***Comment***
10) Percent of customers rating services good or better	✓	✓	✓	Verified	Customer survey postcards; ~500 responses each year
11) Cost items (Annual cost for Line Cleaning Program per mile of inventory; Annual cost for Line Cleaning Program per mile cleaned)	✓	N/A	✓	Verified	Baseline cost data; Dept. assumptions

BACKGROUND

In November 2009, the Department of Transportation (DOT) requested that the City Auditor's Office review and validate baseline information relating to the performance and costs associated with the Sanitary Sewer Line Cleaning Program. This program was identified by the City's Beyond Budget Cuts effort to engage in team training and performance model development as a way of improving performance and reducing costs over a multi-year period.

SCOPE & METHODOLOGY

The City Auditor's Office reviewed each of the suggested performance measures for appropriateness, accuracy, and reasonableness, as requested by DOT. For appropriateness, we reviewed each performance measure and determined whether or not it met the criteria of being "meaningful, useful, and sustainable" (see Appendix A for detail). For accuracy and reasonableness, we conducted two separate walkthroughs with DOT staff to discuss the methodology behind each performance measure. During the second walkthrough, we also tested the underlying data of various performance measures. Details of test results can be found in Appendix B.

DISCUSSION

The City Auditor's Office has completed a review of the City's Department of Transportation Sanitary Sewer Line Cleaning Performance and Cost Data for the years ended 2008 and 2009. The purpose of this review was to assess the appropriateness and accuracy of the key performance and cost indicators of the Sanitary Sewer Line Cleaning Program. We conducted this performance audit in accordance with generally accepted government auditing standards. Those standards require that we plan and perform the audit to obtain sufficient, appropriate evidence to provide a reasonable basis for our findings and conclusions based on our audit objectives. We believe that the evidence obtained provides a reasonable basis for our findings and conclusions based on our audit objectives. We limited our work to those areas specified in the Scope & Methodology section of this report, and as detailed in Appendix B.

Appropriateness of Performance Measures

During the Investing in Results (IiR) process, the City developed criteria to determine what to measure and how best to choose reported performance measures. The recommended criteria were that performance measures should be meaningful, useful, and sustainable (see Appendix A for detail).

The Auditor's Office found that all of DOT's suggested performance and cost measures met the criteria for being meaningful, useful, and sustainable. DOT's set of performance and cost measures reflects key workload and activity data, and includes measures that highlight the quality and timeliness of the Sewer Line Cleaning Program. In addition, customer service data and costs per activity are provided to show the Program's effectiveness and efficiency. DOT management and staff track many of these measures internally, as well as report them annually to the Budget Office. DOT also has a mix of manual and automated systems in place to help collect and analyze the necessary data.

Accuracy of Performance Measures

DOT staff used their existing data systems, which include a FoxPro-based DOT Dispatch System, the Hansen Computerized Maintenance Management System, customized Access reports, and manual data collection system, in order to prepare baseline performance and cost data. The Auditor's Office recognizes DOT's ongoing efforts to improve their data collection methods and systems.

Based on a review of each measure's methodology and the sampling and testing of underlying data for each measure, the Auditor's Office verified the accuracy of DOT's revised baseline performance measures and costs for FY07-08 and FY08-09. Details of test results for each measure can be found in Appendix B.

CONCLUSION

The City Auditor's Office commends the Department of Transportation for requesting this audit, and would like to thank the department for their input and cooperation. We have verified the performance measures as indicated above, and there are no recommendations associated with this report.

Respectfully submitted,

Sharon W. Erickson

Sharon W. Erickson
City Auditor

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APPENDIX A

Investing in Results (IiR) Criteria for Selecting Performance Measures

Meaningful	• A measure must be understandable to internal and external stakeholders. • A measure must be based on goals or objectives related to an organization's mission or purpose. • A measure must be focused on a controllable facet of performance.
Useful	• A measure must be based on reliable data. • A measure must accurately assess performance. • A measure must be comparable to other periods or targets. • A measure must be reported at the appropriate level and to the appropriate audience (i.e. high-level measures should be included in high-level reports, certain measures may be important for management decision making and others for public accountability purposes, and so on).
Sustainable	• The value of the data must meet or exceed the effort to collect the data.

APPENDIX B

TESTING DETAILS

1) Number of sewer line blockages cleared	FY 07-08: 757 (Verified) FY 08-09: 700 (Verified)

Meaningful: YES – easy to understand and a controllable facet of performance
Useful: YES – reliable data and assessment of performance
Sustainable: YES – system in place to collect data

The clearing of sewer line blockages or stoppages is a key workload indicator for sewer line maintenance crews. Data for this activity is collected by hand—maintenance crews fill out service reports for all work orders each day and submit them to DOT office staff, who then input each report into the Hansen system. Office specialists also have to tally and enter blockage (or "stoppage") information into an Excel spreadsheet due to some limitations with reporting from the Hansen system. Service reports are then compiled into monthly binders and kept in the office.

The Auditor's Office randomly chose one month in each reporting year and focused on the blockages cleared by one out of a possible five crews. The Auditor's manual count for each month and crew chosen initially showed some slight discrepancies. However, DOT was able to confirm their original counts and provided explanation for why such discrepancies may have appeared, mostly due to the manual nature of documenting, inputting, and compiling this information. The Auditor's Office found that the blockage counts for each chosen month were accurate based on the existing system and the sample months and crews chosen.

2) Number of sanitary sewer overflows	FY 07-08: 188 (Verified) FY 08-09: 221 (Verified)

Meaningful: YES – easy to understand and related to goals and objectives
Useful: YES – reliable data and assessment of performance
Sustainable: YES – system in place to collect data

Sanitary sewer overflows occur when sewer water escapes the sewer system, which is usually due to a blockage or stoppage. Maintenance crews must respond to these calls for service in a timely manner, and all incidents must be reported to the State Water Board. Data for this activity is also collected by hand—sanitary sewer overflow (SSO) forms are completed by field staff and entered into an Excel sheet by an office specialist, as well as into the State Water Board system by a DOT analyst. Hard copies of each individual report and online submission to the State Water board are compiled into binders to track all sanitary sewer overflows.

The Auditor's Office chose one month in each reporting year and verified the date, location, and estimated volume of each SSO in that month with the yearly list compiled by DOT to obtain the year-end count. Each SSO in the sampled months was properly documented and compiled into the yearly list. Based on these sample months, the Auditor's Office verified the accuracy of this performance measure.

3) Number of service requests received & completed	FY 07-08: 4,633	(Verified)
	FY 08-09: 4,505	(Verified)

Meaningful: YES – easy to understand
Useful: YES – reliable data and assessment of performance
Sustainable: YES – system in place to collect data

All sewer service requests typically come to DOT via the Dispatch Center—office staff fills out a paper form and log the information into the Dispatch System. Service requests drive the activities of the maintenance and work crews. Once the call is serviced, the office staff input the resolution into the database. DOT IT staff has written an Access program to run queries on Dispatch data for analysis and for performance measurement reporting.

The Auditor's Office was provided a summary Excel spreadsheet of data exported from the Dispatch system that showed all sanitary sewer-related calls for service, as well as the call category and whether or not the service was completed within DOT's time target. To verify the source data, DOT walked the Auditor's Office through the process of querying all service requests in FY08-09 from Dispatch, exporting the data to Excel, and separating all sanitary sewer-related calls by call type. The Auditor's Office verified that the service calls reported for FY08-09 matched the total provided in DOT's walkthrough.

4) Miles of sewer main lines cleaned	FY 07-08: 604	(Verified)
	FY 08-09: 660	(Verified)

Meaningful: YES – easy to understand and a controllable facet of performance
Useful: YES – reliable data and assessment of performance
Sustainable: YES – system in place to collect data

Daily work reports are filled out by each sanitary sewer work crew and specify the location, sewer segment number, and activity performed, including the cleaning of sanitary sewer main lines. The length in feet for all sewer line segments is tracked in the Public Works inventory database; this information is also available in DOT's Hansen database. Reports are generated using the Crystal Report writer and can be adjusted to specify a date range and/or type of call. The number of feet cleaned is later translated into miles using the standard conversion of 1 mile = 5,280 feet.

To verify the source data, we asked DOT staff to show us the documentation in the Hansen database behind the first line of the data printout for FY08-09, which reflected Crew 3 cleaning 270 feet of pipeline on 2/3/2009. DOT staff queried the Hansen database for the activity code for line cleaning, as well as the date the activity was completed. The query results showed a work order associated with that activity and date, which verified that Crew 3 did clean a segment 270 feet in length on 2/3/2009. Based on this sample, the Auditor's Office verified the accuracy of this performance measure.

5) Feet of sewer main lines cleaned per direct labor hour	FY 07-08: 197	(Verified)
	FY 08-09: 200	(Verified)

Meaningful: YES – easy to understand
Useful: YES – reliable data and assessment of performance
Sustainable: YES – system in place to collect data

This measure looks at the Line Cleaning Program's efficiency by including the actual labor hours associated with line cleaning activities. The same source data for "miles of sewer main lines cleaned" was previously used and verified above in #4. The same Crystal report described above includes labor hours for each work crew, which also comes from each crew's daily work report. Instead of being converted to miles, the total number of feet of sewer main lines cleaned is divided by the total labor hours to calculate this performance measure. The Auditor's Office sampled and verified the underlying data for Measure #4, and the calculation of Measure #5.

6) Percent of sewer line segments without obstruction	FY 07-08: 98.41%	(Verified)
	FY 08-09: 98.53%	(Verified)

Meaningful: YES – easy to understand
Useful: YES – reliable data and assessment of performance
Sustainable: YES – system in place to collect data

This measure reflects the overall quality and condition of the sanitary sewer line system as the result of the Line Cleaning Program. Calculation for this measure is dependent on measure #1 above (number of sewer line blockages cleared) as well as the number of sewer main segments, which is taken from either the Public Works Infrastructure database or the Hansen database. DOT has decided to use the same total of 47,648 segments throughout the year. The Auditor's Office sampled and verified the underlying data for Measure #1, and the calculation of Measure #6.

7) Number of sewer line blockages per 100 miles	FY 07-08: 33.55	(Verified)
	FY 08-09: 30.99	(Verified)

Meaningful: YES – easy to understand
Useful: YES – reliable data and assessment of performance
Sustainable: YES – system in place to collect data

This measure looks closer at the overall condition of the sanitary sewer line system by simplifying the number of blockages over the length of the entire sewer system. According to the Department, the ideal outcome is that zero blockages occur in the system. The number of sewer line blockages is taken directly from Measure #1. The length in feet for all sewer line segments is tracked in the Public Works inventory database; this information is also available in DOT's Hansen database. DOT provided a summary inventory of all sewer lines that verifies the 47,648 segments (see Measure #6) as well as the total pipe length of all segments (2,259 miles). The number of blockages is divided by 100-mile lengths (22.59) to obtain the number of sewer line blockages per 100 miles. The Auditor's Office sampled and verified the underlying data for Measure #1, and the calculation of Measure #7.

8) Number of sanitary sewer overflows per 100 miles	FY 07-08: 8.32	(Verified)
	FY 08-09: 9.78	(Verified)

Meaningful: YES – easy to understand
Useful: YES – reliable data and assessment of performance
Sustainable: YES – system in place to collect data

This measure looks closer at the overall condition of the sanitary sewer line system by simplifying the number of sanitary sewer overflows over the length of the entire sewer system. According to the Department, the ideal outcome is that zero overflows occur in the system. The number of sanitary sewer overflows is taken directly from Measure #2. The length in feet for all sewer line segments is tracked in the Public Works inventory database; this information is also available in DOT's Hansen database. DOT provided a summary inventory of all sewer lines that verifies the total pipe length of all segments (2,259 miles). The number of blockages is divided by 100-mile lengths (22.59) to obtain the number of sewer line blockages per 100 miles. The Auditor's Office sampled and verified the underlying data for Measure #1, and the calculation of Measure #8.

9) Percent of sewer line blockages cleared within 4 hours	FY 07-08: 88%	(Verified)
	FY 08-09: 94%	(Verified)

Meaningful: YES – easy to understand and controllable facet of performance
Useful: YES – reliable data and assessment of performance
Sustainable: YES – system in place to collect data

This measure reflects the timeliness of the work crews' responses to sanitary sewer service requests. DOT clarified that this measure actually counts all sanitary sewer-related calls, not just those that result in a blockage of a City main line, as described in Measure #1. The source data for this performance measure is taken directly from Measure #3. Once service requests are completed, the Dispatch staff input the resolution into the database. DOT IT staff has written an Access program to run queries on Dispatch data for analysis and for performance measurement reporting.

The Auditor's Office was provided a summary Excel spreadsheet of data exported from the Dispatch system that showed all sanitary sewer-related calls for service, as well as the call category and whether or not the service was completed within DOT's time target of 4 hours for all calls. To verify the source data, DOT walked the Auditor's Office through the process of querying all service requests in FY08-09 from Dispatch, exporting the data to Excel, and separating all sanitary sewer-related calls by call type and calls "on time". The Auditor's Office verified that the on-time percentages reported for FY08-09 matched the total provided in DOT's walkthrough.

10) Percent of customers rating services good or better	FY 07-08: 100%	(Verified)
	FY 08-09: 98%	(Verified)

Meaningful: YES – easy to understand
Useful: YES – reliable data and assessment of performance
Sustainable: YES – system in place to collect data

This measure looks at overall customer satisfaction resulting from the activities of the sewer line work crews. DOT crews typically leave a pre-paid customer survey postcard at the location of a sanitary sewer service location; a blank customer survey was provided to the Auditor's Office. Upon receipt of these surveys, office staff compiles the results at the end of each quarter. The survey asks three specific questions rating the City's services from 1 to 5 (1= Unacceptable, 5= Excellent). DOT calculates this measure by tracking the number of responses rated 4 (Good) or higher and dividing that over the total number of responses received.

The Auditor's Office reviewed DOT's quarterly compilations of survey results from FY07-08 and FY08-09 (we did not review the original customer survey postcards themselves), and verified that the measure was accurate based on the Department's methodology.

11) Cost items	FY 08-09:	(Verified)
	Direct Labor	$2,352,650
	Indirect Labor	$621,147
	Administrative Overhead	$158,858
	Supplies, Materials, and Services	$322,750
	Water	$22,608
	Vehicle M&O	$501,538
	Total Annual Cost for Line Cleaning Program	$3,979,151
	Annual Cost per Mile of Sewer Main Line Inventory	$1,762
	Annual Cost per Mile of Sewer Main Line Cleaned	$6,030

Meaningful: YES – easy to understand
Useful: YES – reliable data and assessment of performance
Sustainable: YES – systems in place to collect performance and cost data

These cost measures examine the efficiency of the Line Cleaning Program by reflecting the relationship between the work and activities performed and the resources needed to perform them. DOT described their cost systems and methodology for the various cost indicators reported. Backup support for various cost data indicators is provided to DOT by the Budget Office (including direct and indirect labor distribution reports. All other cost data source documents are maintained by the DOT Senior Analyst.

DOT provided cost methodology and cost allocation schedules for reported cost data for FY08-09. The Auditor's office examined the cost approaches used for each data element by reviewing the cost methodology used, labor distribution reports, budget reports, billing summaries, equipment amortization schedules, and re-performing calculations. Based on our review and examination of the cost data provided we verified cost amounts are accurately presented.