

**Assessment of the Public Works and
Transportation Department**

CITY OF BEVERLY HILLS, CALIFORNIA

matrix 
consulting group
2470 El Camino Real
Palo Alto, California 94306
v.650 – 858 - 0507

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1. INTRODUCTION AND EXECUTIVE SUMMARY

1. INTRODUCTION AND EXECUTIVE SUMMARY

The report, which follows, presents the results of the organization and management analysis of the Public Works and Transportation Department conducted by the Matrix Consulting Group.

This first chapter introduces the analysis – outlining principal objectives and how the analysis was conducted – and presents an Executive Summary.

1. AUDIT SCOPE AND OBJECTIVES.

The project team conducted a comprehensive organization and management analysis of the Department's existing operations, service levels, infrastructure management, and staffing levels. The analysis was to be fact based and include all aspects of service provision by the Department. The analysis focused on:

- Organizational structure, including the division of labor and manager/supervisor spans of control;
- Effectiveness of staffing levels including, but not be limited to, staff assignments, workload, training, and cost-effectiveness of service levels and service delivery;
- Benchmarks and other objective indicators of program effectiveness.

The approach of the project team in meeting this scope is portrayed below.

- Develop an in-depth understanding of the key issues impacting the Public Works and Transportation Department. The Matrix Consulting Group conducted interviews with Public Works and Transportation Department staff at all levels of the Department. Interviews focused on goals and objectives, management systems, the use of technology, the levels of service provided by the Department, the resources available to provide those services, etc.
- Develop a profile of the Public Works and Transportation Department. The Matrix Consulting Group conducted interviews with Departmental staff and other key staff in the City to document the current organization of services, the structure

and functions of the Department, budgets, workload data, management systems, inventory of the infrastructure, etc.

- Conduct a comparison of the Public Works and Transportation Department program and practices to 'best management practices.' The best management practices included comparisons to the American Public Works Association's, *Public Works Management Practices Manual*, standards developed by the American Water Works Association, such as *G200: Distribution Systems Operations and Management*, and the experience of the project team. The project team also conducted a comparative survey of services in other cities to compare the Public Works and Transportation Department's programs and practices to these other cities.
- Evaluate the staffing, organization structure, and service levels in the Public Works and Transportation Department. This included interviews with key staff to develop an understanding of the current service delivery model, evaluation of the adequacy of current service levels, work practices, work planning and scheduling systems, productivity and staffing levels, the plan of organization, and asset management.

The objective of this assessment was to identify opportunities for improvement in the operational and economic efficiency of the Department and practicable opportunities for enhancing the quality of its product and services.

2. THE PUBLIC WORKS AND TRANSPORTATION DEPARTMENT EMPLOYS A NUMBER OF BEST PRACTICES.

An organizational and management analysis by its nature focuses on opportunities for improvement. However, there are a number of strengths in the Public Works and Transportation Department. Examples of these strengths are portrayed below.

- The Department has acquired and installed FASTER for Fleet Management. The Department is in the process of installing the Hansen maintenance and work order management software Version 8.0.
- Customer satisfaction surveys are sent to residents / business owners whose service requests have been input into the Online Business Center (OBC).

- Fleet Services is an ASE Blue Seal of Excellence certified shop. To be eligible for this recognition, a company must have 75% of its repair technicians ASE certified. In addition, there must be a certified technician in each area of service offered. There are only 164 Blue Seal recognized shops in the State, and only 1,559 in the United States.
- Bodywork, mufflers, transmission repair, tire repairs, and smog testing are outsourced within the department.
- The City's streetlights are owned by the City.
- All residential streets are high pressure sodium.
- One-half of the City's streetlights are inspected each month.
- 85% to 90% of the City's traffic signals have been converted to LED – red and green only.
- The City recently acquired PB asphalt patch trucks that significantly enhanced the ability of Street Maintenance to efficiently patch potholes.
- Street Maintenance has been systematically moving from district to district to patch potholes in the City.
- Facilities Maintenance has taken some steps towards energy efficiency. It has relamped facilities to T-8 lamps and electronic ballasts.
- Facilities Maintenance has outsourced custodial maintenance.
- In 2005-06, the City had 20 sewer backups. This amounts to 21 sewer backups per 100 miles of mains annually. This compares favorably to the benchmark used by the project team of less than 20 backups per 100 miles of wastewater main annually.
- Drainage provides a high level of service. In 2004, 184 miles of wastewater mains were cleaned. In 2005, approximately 190 miles of mains were cleaned. Excluding the 30 / 60 / 90 days main cleaning, mains are cleaned every 8 to 9 months. There are 98.74 miles of wastewater mains.
- The City is in the process of updating the SCADA system that will provide monitoring of unauthorized access to water distribution and production distribution and maintenance.
- The City met California and Federal water quality standards in 2005.

- The City is in the process of upgrading its water storage system that will provide storage capacity sufficient for 7 days during off-peak months.
- With two exceptions, all of the staff of Water Distribution and Production possess State licenses for treatment and / or distribution.
- There are 170.78 miles of water mains. There were 29 main breaks in 2005-06 or 17.06 breaks per 100 miles of main. This meets the benchmark used by the project team of 17 breaks or less per 100 miles per year.
- A five-year capital improvement program has been developed and adopted by the City Council.
- Civil Engineering outsources the design of capital improvement projects.
- Project managers can have access to Pentamotion through Cognos to monitor construction costs for capital projects.
- Project managers are responsible for capital improvement projects from “cradle to grave.”
- Parking Operations provides management of 16 parking structures with 4,500 spaces.
- Most of the City’s parking facilities were well lit when observed by the project team and in generally sound condition. Minimal trash and debris were noted.
- The City is currently upgrading its parking facilities to automate the payment process.
- Transportation monitors and has taken measures to minimize delinquent fine collections. The Radix handhelds contain a scofflaw file which searches for vehicles with more than 6 violations. Once a vehicle is flagged by the system, a vehicle can then be towed.
- The number of citations issued has increased over the last three years from 120,850 in FY 2004, to 109,188 in FY 2005, to 132,549 in FY 2006.
- The payment rate for parking citations - 85% to 87% - is comparable to or better than other cities on the west coast such as Seattle, San Francisco, San Diego, and Los Angeles.

These strengths provide a sound basis for further enhancements.

3. FOUR-POINT AGENDA FOR CHANGE

The assessment of the Public Works and Transportation Department identified over 250 recommendations for improvement that the Matrix Consulting Group believes should provide the basis for change in the Department in the coming years. These recommendations fall into four major improvement areas including:

- Management systems;
- Asset management;
- Cost effective service delivery; and
- Enhancing the Department's ability to meet the requirements of the National Pollutant Discharge Elimination System.

Each of these major points in the improvement agenda are briefly summarized below.

(1) Management Systems

The driving force behind any high performing organization is clear direction and the management systems that communicate and translate policy into action. The Public Works and Transportation Department has made initial efforts to provide that direction and the management systems such as the CCG / FASTER. Overall, however, managers and supervisors have little information with which make key service delivery and budgetary decisions. The Public Works and Transportation Department faces a number of challenges to use its resources more efficiently and effectively, and more importantly, to redirect resources and invest in maintenance and preservation of the City's assets. The Department is limited in its ability to address these challenges as a result of the lack of management systems. The management of the Public Works and

Transportation Department needs to enhance the management systems within the Department through such tools as:

- Install the Hansen maintenance and work order management system;
- Develop a maintenance management system that leverages the Department's investment in the Hansen maintenance and work order management system;
- Develop formal work planning and scheduling systems;
- Improve the management of the capital improvement program; and
- Develop comprehensive goals, objectives, performance measures and reporting systems.

The Public Works and Transportation Department should employ these management systems to make the Department a place where performance is centered around goals that serve to drive its operations.

(2) Preventive Maintenance of the Infrastructure

Beverly Hills taxpayers have a significant investment in streets, sidewalks, traffic signals, signs, water distribution systems, sewer collection systems, and stormwater collection systems. Preserving these assets prolongs their useful life and reduces the long-term maintenance and rehabilitation costs. This is the primary objective of preventive maintenance.

The Public Works and Transportation Department is not preventively maintaining this infrastructure on a comprehensive basis. The Department needs to pursue a coordinated and comprehensive effort to ensure the efficient and effective preventive maintenance of those assets assigned to the Department. This includes such efforts as:

- Implementing the water, sanitary sewer, and stormwater master plans that provide long-term direction for the maintenance, repair, and rehabilitation of the

City's assets, including increased funding for rehabilitation and replacement of these assets;

- Developing and installing strategies for the preventive maintenance of the City's street system, including acquisition of pavement management software, evaluation of the pavement condition of the City's streets on a three year cycle with one-third of the streets evaluated each year, and expansion of the non-structural overlays such as slurry seal;
- Expanding the capacity of Street Maintenance to patch potholes, provide base repair, skin patching, and concrete repair;
- Developing and installing strategies for the preventive maintenance of the City's traffic signals including cabinet maintenance and traffic signal inspection;
- Developing and installing strategies for the preventive maintenance system of the City's water distribution systems including valve exercising, fire hydrant maintenance, etc.;
- Developing and installing strategies for the preventive maintenance of the sewer collection system, including CCTV inspection of sewer mains, replacement of outdated equipment assigned to crews, etc.;
- Developing and installing strategies to preventively maintain the City's buildings and enhancing the management of the custodial contract; and
- Developing and installing strategies for the preventive maintenance of the stormwater collection system including annual cleaning of catch basins.

Preventive maintenance improves an asset's operating efficiency, prevents premature replacement, and avoids interruptions in service for residents. Preventive maintenance reduces long-term costs by maximizing the operating capacities of an asset, minimizing downtime, and avoiding breakdowns that would otherwise lead to higher repair costs later.

The effective preventive maintenance of these assets must be an essential goal of the Public Works and Transportation Department – one that is utilized to judge the effectiveness of the Department's management.

(3) Cost Effective Service Delivery

The Public Works and Transportation Department faces a number of challenges including fiscal limitations and aging infrastructure. The effective response of the Department to these challenges requires that the Department transform the way it does its business by injecting competition into service delivery, using activity-based costing to identify how much it costs to deliver services, installing accountability systems for managers and supervisors, and reengineering work processes.

The Public Works and Transportation Department should reduce its costs and increase its productivity, performance, and service levels by redesigning and reengineering the way services are delivered. This includes a multitude of steps including such examples as the following:

- Reducing staffing in selected areas based upon an assessment of workload;
- Changing the mix of talents in the delivery of services to obtain higher levels of skills necessary to maintain the City's assets without increasing the number of authorized positions;
- Insourcing the preventive maintenance and repair of heating, ventilating, and air conditioning systems;
- Enhancing the level of service provided to residents and businesses by enhancing the effective use of existing positions such as facility maintenance and traffic engineering;
- Selective use of managed competition to evaluate opportunities to reduce costs while maintaining adequate levels of service;
- Eliminating underutilized City vehicles;
- Enhancing the energy efficiency of the City's buildings and its water distribution system pumps and motors;
- Increasing the revenue collected by the Department for the services it provides by charging fees for the fats, oils, and grease program, the NPDES program, and

increasing staffing for parking enforcement.

The Public Works and Transportation Department should take steps to assure that it fully recovers its costs for services it delivers and that it effectively utilizes existing resources.

(4) National Pollutant Discharge Elimination System.

City's stormwater system discharges into Bollona Creek estuary. The Ballona Creek estuary comprises 81,980 acres. Cost sharing for addressing the storm water problems associated with this estuary will be allocated proportional to geographic size. The City will be responsible for 4.4%. Preliminary estimates for addressing the TMDL for bacteria in Ballona Creek place the capital costs at an estimated \$375 million (the City's share would approximate \$16.5 million) and annual operating and maintenance costs of approximately \$12.5 million (the City's share would approximate \$550,000). This is just for the first implementation measure – the preferred strategy, which integrates TMDL compliance with multiple non-structural and structural bacteria source controls, cisterns, or sand filters. The compliance deadline is 2014 to 2020.

The City has considerable financial exposure. The City should authorize a Project Civil Engineer to enable the City to begin to comprehensively address the six NPDES controls and to represent the City with Los Angeles County, the County's water Control Board, and the State Water Resources Control Board.

4. EXECUTIVE SUMMARY

The Matrix Consulting Group has prepared this summary of the recommendations and their fiscal impacts contained in the attached report. This summary is presented in the table on the following page.

CITY OF BEVERLY HILLS, CALIFORNIA
Organization and Management Analysis of the
Public Works and Transportation Department

Section	Recommendation	Time Frame	Revenue Increase	Cost Increase	Cost Reduction	Capital Outlay
Chapter 3 – Analysis of Administration						
3.3	The Public Works and Transportation Department should develop a clearly written, five-year minimum, Strategic Plan.	FY 08-09	NA	NA	NA	NA
3.3	The Management Analysts should be responsible for facilitating the development and implementation of the Department's strategic plan.	FY 08-09	NA	NA	NA	NA
3.4	The Department should develop goals, objectives, and performance measures.	FY 07-08	NA	NA	NA	NA
3.4	The Management Analysts should be assigned responsibility for providing training and technical assistance to the Department's division managers and first line supervisors in the development of goals, objectives, and performance measures.	FY 07-08	NA	NA	NA	NA
3.4	The Management Analysts should be assigned responsibility for providing the necessary training and technical assistance required for collecting performance data.	FY 07-08	NA	NA	NA	NA
3.5	The Department should develop an Information Technology Strategic Plan with at least a three-year horizon.	FY 08-09	NA	NA	NA	NA
3.5	The Department should update the Information Technology Strategic Plan annually.	FY 11-12	NA	NA	NA	NA

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Section	Recommendation	Time Frame	Revenue Increase	Cost Increase	Cost Reduction	Capital Outlay
3.5	The Management Analysts should be assigned responsibility for administering the facilitating the development of the Department's IT Strategic Plan, including providing necessary support to the Department's Managers.	FY 07-08	NA	NA	NA	NA
3.6	The Public Works and Transportation Department should develop and install Hansen v.8.	FY 07-09	NA	\$34,000	NA	\$337,200
3.6	The Management Analysts should provide analytical assistance in the development and installation of the maintenance management system.	FY 07-09	NA	NA	NA	NA
3.6	The Department should assign line staff from the Divisions in which Hansen v.8 is being installed to assist with configuration and testing, and backfill these employees with temporary employees.	FY 07-09	NA	\$100,000 (One-Time)	NA	NA
3.7	The City should authorize an Information Technology Systems Integrator position. The position should be authorized for the Public Works and Transportation Department.	FY 07-08	NA	\$121,300	NA	NA
3.8	The Public Works and Transportation Department and the Information Technology Department should adopt a service level agreement.	FY 07-08	NA	NA	NA	NA
3.9	The Public Works and Transportation Department should develop an equipment operator training program for the proper and safe use of heavy equipment.	FY 07-08	NA	NA	NA	NA
3.9	The Vehicle Maintenance Manager should develop the equipment operator training program.	FY 07-08	NA	NA	NA	NA

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Section	Recommendation	Time Frame	Revenue Increase	Cost Increase	Cost Reduction	Capital Outlay
3.10	The City should select a customer relationship management module that best meets the City's needs.	FY 08-09	NA	\$15,000	NA	\$150,000
3.11	The Department should develop an Employee Handbook.	FY 08-09	NA	NA	NA	NA
3.11	The Department's Management Analysts should be assigned responsibility for the development of the employee handbook.	FY 08-09	NA	NA	NA	NA
3.12	The Public Works and Transportation Department should clearly document its policies and procedures.	FY 08-09	NA	NA	NA	NA
3.12	The Public Works and Transportation Department should establish a policies and procedures committee, consisting of five to seven staff, that includes a representation of managers from all divisions.	FY 08-09	NA	NA	NA	NA
3.12	The Management Analysts in the Department should be assigned responsibility for development of the policies and procedures manual working with the committee.	FY 08-09	NA	NA	NA	NA
3.12	The completed policies and procedures manual should be posted on the City's Intranet and website.	FY 08-09	NA	NA	NA	NA
3.13	The Risk Management Division should work with the Public Works and Transportation Department to enhance the Department's employee safety program.	FY 07-08	NA	NA	NA	NA
3.13	The Public Works and Transportation Department should establish goals, objectives, and performance measures for its employee safety program.	FY 07-08	NA	NA	NA	NA
3.13	The Risk Manager should develop and deliver a "core" safety training course for all City employees. All City employees should be required to attend this training.	FY 07-08	NA	NA	NA	NA

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Section	Recommendation	Time Frame	Revenue Increase	Cost Increase	Cost Reduction	Capital Outlay
3.13	The Public Works and Transportation Department should designate an employee as the Safety Coordinator for the Department with this responsibility to be a related duty.	FY 07-08	NA	NA	NA	NA
3.13	The Risk Manager should establish a Citywide safety committee. The Public Works and Transportation Department should establish a Department-wide safety committee.	FY 07-08	NA	NA	NA	NA
3.13	The Risk Manager should develop a Citywide employee safety handbook.	FY 07-08	NA	NA	NA	NA
3.13	Risk Management should develop standard tailgate safety training modules for delivery by first-line supervisors. First-line supervisors should be required to deliver these tailgate safety modules not less than once a month and report the names of the employees that attended.	FY 07-08	NA	NA	NA	NA
3.14(1)	Authorize a Support Services Supervisor as a first-line supervisor for support staff in the Administration Division.	FY 07-08	NA	\$101,400	NA	NA
3.14(1)	Authorize a Senior Customer Service Representative position to lead and participate in the work of the Customer Service Representatives.	FY 07-08	NA	\$76,800	NA	NA
3.14(1)	Eliminate the Customer Service Supervisor position and the Customer Service Specialist position through attrition.	FY 07-012	NA	NA	\$154,400	NA
3.14(1)	Authorize a Senior Accounting Technician position.	FY 07-08	NA	\$80,700	NA	NA
3.14(1)	Eliminate an Accounting Technician position through attrition.	FY 07-08	NA	NA	\$70,200	NA
3.14(1)	Continue to utilize the "pool" concept for the provision of support services to managers and supervisors.	FY 07-08	NA	NA	NA	NA

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Section	Recommendation	Time Frame	Revenue Increase	Cost Increase	Cost Reduction	Capital Outlay
3.14(2)	Reclassify the three Account Clerk II positions to Accounting Technician.	FY 07-08	NA	\$19,900	NA	NA
3.14(3)	A Staff Assistant position should be authorized for the Project Administration Division, but the position should be placed in the support staff "pool", and report to the first-line supervisor responsible for supervising these support staff.	FY 07-08	NA	\$80,700	NA	NA
3.14(3)	The Customer Service Representative assigned on a temporary basis to provide support for the Project Administration Division should be reassigned to Customer Services within Administration of the Public Works and Transportation Department.	FY 07-08	NA	NA	NA	NA
3.14(3)	Update the Staff Assistant classification description to reflect the broader range of duties assigned to these positions in the Public Works and Transportation Department and other departments.	FY 07-08	NA	NA	NA	NA
3.14(4)	Adjust the compensation of the Staff Assistant assigned to public records within the salary range of a Staff Assistant.	FY 07-08	NA	NA	NA	NA
3.14(4)	Utilize the Staff Assistant for a broader range of duties than public records.	FY 07-08	NA	NA	NA	NA
3.14(5)	The level of support staff available within Administration is more than capable of providing effective support to the Public Works Commission and the Traffic and Parking Commission.	FY 07-08	NA	NA	NA	NA
3.15	The number of Customer Service Representatives is adequate given existing call volume.	FY 07-08	NA	NA	NA	NA
3.15	All customer service representative staff located at the Foothill Building should be part of the support staff "pool."	FY 07-08	NA	NA	NA	NA

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Section	Recommendation	Time Frame	Revenue Increase	Cost Increase	Cost Reduction	Capital Outlay
3.16	Eliminate the Administrative Clerk I position through attrition.	FY 07-12	NA	NA	\$60,200	NA
3.17	The responsibility for preparation of the revenue summary reports and the monthly invoice to the City of West Hollywood for parking meter collection services should be reallocated from a Staff Assistant in the Administration Division to the accounting positions in the Administration Division.	FY 07-08	NA	NA	NA	NA
3.17	The responsibility for reconciliation of commercial solid waste invoices and accounts should be reallocated from a Staff Assistant in the Administration Division to the accounting positions in the Administration Division.	FY 07-08	NA	NA	NA	NA
3.17	The responsibility for maintenance of solid waste front loader account information should be reallocated from a Staff Assistant in the Administration Division to the customer service positions in the Administration Division.	FY 07-08	NA	NA	NA	NA
3.18	Increase the effective use of the two Management Analyst positions.	FY 07-08	NA	NA	NA	NA
3.18	Establish a classification of Senior Management Analyst.	FY 07-08	NA	NA	NA	NA
3.18	Upgrade the existing vacant Management Analyst position to Senior Management Analyst.	FY 07-08	NA	\$16,500	NA	NA
3.18	The Deputy Director of Public Works and Transportation should clarify in a written policy the roles and responsibilities of the Management Analysts, the Staff Assistants, and the other support staff.	FY 07-08	NA	NA	NA	NA

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Section	Recommendation	Time Frame	Revenue Increase	Cost Increase	Cost Reduction	Capital Outlay
3.18	Increase the effective use of the Staff Assistants for conducting research, data collection and analysis for special projects.	FY 07-08	NA	NA	NA	NA
3.18	The Management Analysts should be authorized to request support from support staff in the Administration Division as needed.	FY 07-08	NA	NA	NA	NA
3.18	The Management Analyst positions should be provided with analytical training to enhance and maintain their skills, and provided with membership in MMASC (Municipal Management Assistants of Southern California) and encouraged to attend the meetings of this association with attendance reimbursement provide by the City.	FY 07-08	NA	\$4,000	NA	NA
3.19	The Department should increase the extent of internal controls for the daily receipt of parking structure revenue.	FY 07-08	NA	NA	NA	NA
3.20	The Department should develop a training plan for its employees based upon a needs assessment.	FY 08-09	NA	NA	NA	NA
3.21	The Department should develop a career development program.	FY 08-09	NA	NA	NA	NA
3.22	The Human Resources Department should improve the level of recruitment and selection service provided by the Human Resources Department to the Public Works and Transportation Department.	FY 07-08	NA	NA	NA	NA
3.23	Authorize a GIS Analyst position for the Public Works and Transportation Department.	FY 07-08	NA	\$121,300	NA	NA
3.23	The GIS Analyst position should be assigned to the Administration Division of the Public Works and Transportation Department.	FY 07-08	NA	NA	NA	NA

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Section	Recommendation	Time Frame	Revenue Increase	Cost Increase	Cost Reduction	Capital Outlay
3.23	A centralized GIS data repository should be maintained by the Information Technology Department.	FY 07-08	NA	NA	NA	NA
3.24	The remaining staff of the Public Works and Transportation Department – the staff assigned to the Transportation Division – should be moved to the 345 North Foothill Boulevard facility.	FY 07-08	NA	NA	NA	NA
3.25	Parking Operations should continue to be responsible for collection of parking facilities and parking meter revenue and the counting of the revenue. Administrative Services – Finance should be responsible for the reconciliation of these revenues. The Account Clerk II responsible for reconciliation in the Public Works and Transportation Department should be transferred to Administrative Services – Finance. As part of this transfer of responsibility, the two departments should develop a service level agreement that clearly documents the roles and responsibilities of each department in the collection, reconciliation, and auditing of parking facility and meter revenue.	FY 07-08	NA	NA	NA	NA
3.25	The Customer Service Specialist responsible for day-to-day operations related to commercial front loader and roll-off container services, entry of billing tonnage of accounts and matching of work orders for billing to customer accounts, and assisting with customer complaints should be transferred from the Public Works and Transportation Department to Administrative Services – Finance. As part of this transfer of responsibility, the two departments should develop a service level agreement that clearly documents the roles and responsibilities of each department in the provision of these services.	FY 07-08	NA	NA	NA	NA

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Section	Recommendation	Time Frame	Revenue Increase	Cost Increase	Cost Reduction	Capital Outlay
3.25	The Account Clerk II responsible for processing of monthly billings related to commercial roll-off containers should be transferred to transferred from the Public Works and Transportation Department to Administrative Services – Finance. As part of this transfer of responsibility, the two departments should develop a service level agreement that clearly documents the roles and responsibilities of each department in the provision of these services.	FY 07-08	NA	NA	NA	NA
3.25	The responsibility for issuance of monthly parking permits should be transferred to Transportation from Administrative Services – Finance, with the revenue collected by Administrative Services – Finance. As part of this transfer of responsibility, the two departments should develop a service level agreement that clearly documents the roles and responsibilities of each department in the provision of these services.	FY 07-08	NA	NA	NA	NA
3.26	The Department should develop a plan to respond to the opportunities for improvement raised by the members of the Public Works Commission and the Traffic and Parking Commission.	FY 07-08	NA	NA	NA	NA
Chapter 4 – Analysis of Fleet Services						
4.2	Eliminate a Maintenance Supervisor position through attrition.	FY 07-08	NA	NA	\$90,000	NA
4.2	The Maintenance Supervisor position should be eliminated only after the operating hours that Fleet Services is open have been adjusted.	FY 07-08	NA	NA	NA	NA
4.2(3)	The hours that Fleet Services is “open for business” should be adjusted to 7:00 AM to 6:00 PM.	FY 07-08	NA	NA	NA	NA

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Section	Recommendation	Time Frame	Revenue Increase	Cost Increase	Cost Reduction	Capital Outlay
4.4	Equipment Mechanic utilization guidelines should be developed and Equipment Mechanics evaluated against these guidelines on a monthly basis.	FY 07-08	NA	NA	NA	NA
4.5(1)	Vehicle utilization standards should be developed.	FY 07-08	NA	NA	NA	NA
4.5(2)	The Vehicle Maintenance Manager, with the support of the two Management Analysts, should be assigned responsibility for identifying opportunities to reduce the City's fleet.	FY 07-08	NA	NA	NA	NA
4.6	The Vehicle Maintenance Manager should continue the development of the annual five year replacement plan for consideration of the Public Works and Transportation Director.	FY 07-08	NA	NA	NA	NA
4.6	The Public Works and Transportation Department should monitor the age of the fleet to assure that adequate replacement funding is available to avoid problems with excessive downtime and operating and maintenance costs.	FY 08-09	NA	NA	NA	NA
4.7	The City should evaluate the shop labor rates and parts and fuel markups in the context of an evaluation of the City's cost allocation plan.	FY 07-08	NA	NA	NA	NA
4.8(1)	Access to the inventory in Central Stores should be restricted to the staff of Central Stores.	FY 07-08	NA	NA	NA	NA
4.8(1)	Physical access to Central Stores should be limited through installation of fencing and revised location of the parts counter.	FY 07-08	NA	NA	NA	NA

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Section	Recommendation	Time Frame	Revenue Increase	Cost Increase	Cost Reduction	Capital Outlay
4.8(2)	The inventory module in the Hansen asset management system should be utilized to monitor inventory levels, issue parts, and audit parts inventory levels and issuance. Until this module can be installed, a manual log should be used to record all issuance of parts and supplies to the staff of water / sewer utilities and facilities management.	FY 07-08	NA	NA	NA	NA
4.8(3)	Fleet Services should conduct an annual inventory of all Central Stores parts and supplies.	FY 07-08	NA	NA	NA	NA
4.8(3)	Central Stores should conduct spot audits of parts and supplies and reconcile to the inventory system.	FY 07-08	NA	NA	NA	NA
4.9	The level of staffing for equipment maintenance and repair matches existing workload; additional Equipment Mechanic II positions should not be authorized.	FY 07-08	NA	NA	NA	NA
4.10	One of the three Central Store Specialist positions should be eliminated.	FY 07-08	NA	NA	\$64,200	NA
4.11	The Fleet Services Bureau should develop and adopt service level agreements with its major customers.	FY 08-09	NA	NA	NA	NA
4.12	The Finance Department should conduct "spot" audits of the central stores procedures not less than twice a year.	FY 07-08	NA	NA	NA	NA
4.13	The City should develop a take home vehicle policy, and use that policy as the basis for evaluating take home vehicle assignments in the Fire Department and the Police Department	FY 07-08	NA	NA	NA	NA
Chapter 5 – Analysis of Signals and Lights						
5.2	The City should replace mercury vapor streetlights in the next one to two years..	FY 07-08	NA	NA	NA	\$50,000

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Section	Recommendation	Time Frame	Revenue Increase	Cost Increase	Cost Reduction	Capital Outlay
5.3	The City should replace incandescent traffic signals with LED traffic signals in the next year.	FY 07-08	NA	NA	NA	\$36,000
5.4	The City should replace traffic signal controllers on a fifteen (15)-year schedule.	FY 07-08	NA	NA	NA	NA
5.4	The City should replace the estimated twenty-five signal controllers that are twenty years old in the next one to two years.	FY 07-09	NA	NA	NA	\$370,000
5.5	Signals and Lighting should install a comprehensive preventive maintenance program for signalized intersections including quarterly, semi-annual, and annual.	FY 07-08	NA	NA	NA	NA
5.5	The City should utilize the Street Module in the Hansen asset management module to plan and schedule the preventive maintenance of signalized intersections.	FY 08-09	NA	NA	NA	NA
5.5	The second highest priority for Signals and Lighting should be preventive maintenance of traffic signals; the first priority should be the repair of malfunctioning traffic signals.	FY 07-08	NA	NA	NA	NA
5.6	A one-person crew should be utilized for preventive maintenance of signalized intersections as long as staff is able to remain out of the street and not need to utilize an aerial lift.	FY 07-08	NA	NA	NA	NA
5.7	Eliminate the Electronic Technician position upon replacement of the City's street light system.	FY 07-08	NA	NA	\$71,600	NA
5.8	Signals and Lighting should develop a comprehensive asset inventory of traffic signals and streetlights.	FY 08-09	NA	NA	NA	NA

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Section	Recommendation	Time Frame	Revenue Increase	Cost Increase	Cost Reduction	Capital Outlay
5.9	Signals and Lighting should install a formal work planning and scheduling system.	FY 07-08	NA	NA	NA	NA
Chapter 6 – Analysis of Street Maintenance						
6.2	Outsource the annual street striping of the City's streets.	FY 07-08	NA	\$15,000	NA	NA
6.3	Establish guidelines or criteria for sidewalk repair or replacement.	FY 08-09	NA	NA	NA	NA
6.3	Establish criteria that determine when a sidewalk will be repaired versus replaced.	FY 08-09	NA	NA	NA	NA
6.3	Use sidewalk grinding where the displacement is three-quarter inch ($\frac{3}{4}$ ") or less.	FY 08-09	NA	NA	NA	NA
6.3	Develop priorities for sidewalk repair and replacement.	FY 08-09	NA	NA	NA	NA
6.3	Use automated devices developed specifically for sidewalk hazard inspection for data collection.	FY 08-09	NA	\$1,000	NA	\$10,000
6.3	Inspect sidewalks once every two years.	FY 08-09	NA	NA	NA	NA
6.3	Consider other alternatives besides concrete replacement like for like.	FY 08-09	NA	NA	NA	NA
6.3	Further inspection of sidewalks should not be conducted until meaningful progress has been made in reducing the concrete backlog.	FY 08-09	NA	NA	NA	NA
6.4	Those jobs in the asphalt and the concrete backlog that would require three crew days or less to accomplish should be accomplished by in-house staff. These jobs should be forwarded to the Street Maintenance Supervisor and scheduled for removal and replacement.	FY 07-08	NA	NA	NA	NA

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Section	Recommendation	Time Frame	Revenue Increase	Cost Increase	Cost Reduction	Capital Outlay
6.4	Those jobs in the asphalt and the concrete backlog that would require three crew days or more should be assembled into a capital improvement program project that identifies each of the locations, and a request for bids issued. The amount of funding required for this project would amount to approximately \$2.3 million.	FY 07-08	NA	NA	NA	\$2,300,000
6.5	The responsibility for responding to requests for service for pavement repair and for concrete repair should be reassigned from the Civil Engineering Division to Street Maintenance.	FY 07-08	NA	NA	NA	NA
6.5	The Street Maintenance Supervisor should respond to these requests and determine the best method of responding to these requests for service: in-house staff or contractors.	FY 07-08	NA	NA	NA	NA
6.5	The funding for annual contracts for pavement maintenance and concrete maintenance should be reallocated from the capital improvement program to the annual operating budget of Street Maintenance upon resolution of the backlog.	FY 07-08	NA	NA	NA	NA
6.6(1)	Allocate almost six staff to pavement maintenance and repair including pothole patching, skin patching, and base repair.	FY 07-08	NA	\$5,000	NA	\$170,000
6.6(2)	Establish a crew that would perform a mix of asphalt and concrete maintenance and repair, with concrete maintenance and repair requiring approximately 80% of the crew's available work hours.	FY 07-08	NA	NA	NA	NA
6.6(2)	Authorize three additional Street Maintenance Worker II positions.	FY 07-08	NA	\$183,300	NA	\$0

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Section	Recommendation	Time Frame	Revenue Increase	Cost Increase	Cost Reduction	Capital Outlay
6.6(2)	Authorize the acquisition of additional equipment for concrete maintenance and repair.	FY 07-08	NA	\$3,500	NA	\$28,000
6.6(3)	Allocate two staff to traffic sign and paint maintenance.	FY 07-08	NA	NA	NA	NA
6.6(3)	The three (3) Traffic Sign and Paint Technicians should be reclassified as Street Maintenance Worker II's and the classification of Traffic Sign and Paint Technician abolished.	FY 07-08	NA	NA	NA	NA
6.7	The work schedule for the staff allocated to traffic sign and painting maintenance should be adjusted to match the same shift for those staff assigned to pavement maintenance and repair.	FY 07-08	NA	NA	NA	NA
6.8	Street Maintenance should develop a comprehensive asset inventory of signs, pavement legends, street striping, curb painting, parking lot striping, streets and sidewalks.	FY 08-09	NA	NA	NA	NA
6.9	Street Maintenance should develop and install a formal work planning and scheduling system.	FY 078-09	NA	NA	NA	NA
6.10	The Public Works And Transportation Department should utilize thermoplastic for pavement legends for high traffic volume streets.	FY 078-09	NA	\$25,000	NA	NA
Chapter 7 – Analysis of Facility Maintenance						
7.2	Facility Maintenance should conduct an inventory of City-owned building assets.	FY 08-09	NA	NA	NA	NA

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Section	Recommendation	Time Frame	Revenue Increase	Cost Increase	Cost Reduction	Capital Outlay
7.3	Facility Maintenance should conduct facility condition assessments annually to identify the backlog of maintenance projects for City buildings that should be addressed by in-house staff and estimate the amount of funding needed on an ongoing basis to improve the life safety aspects of the building, reduce further deterioration of the building components, comply with current building and safety codes and ensure that the buildings operate as designed, both structurally and mechanically.	FY 09-10	NA	NA	NA	NA
7.3	The City should calculate building system renewal over an anticipated facility life of 50 to 100 years. Annual capital renewal funding requires about 2.74% of the current facility replacement cost (constant dollars).	FY 09-10	NA	NA	NA	NA
7.4	Facilities Maintenance should develop a five-year major maintenance plan.	FY 09-10	NA	NA	NA	NA
7.4	The Facilities Maintenance Manager should develop replacement criteria for facility assets.	FY 09-10	NA	NA	NA	NA
7.5	The Facility Maintenance Manager should develop and implement energy management goals and objectives.	FY 08-09	NA	NA	NA	NA
7.5	The Facility Maintenance Manager should develop and implement energy management performance measures.	FY 08-09	NA	NA	NA	NA
7.5	The Facility Maintenance Manager should conduct a preliminary energy audit of the major buildings owned and operated by the City and of the City's water utility.	FY 08-09	NA	NA	NA	NA
7.5	The Facility Maintenance Manager should develop and implement an energy management plan.	FY 08-09	NA	NA	NA	NA

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Section	Recommendation	Time Frame	Revenue Increase	Cost Increase	Cost Reduction	Capital Outlay
7.5	The Facilities Maintenance Manager should be charged with developing this program of energy management.	FY 08-09	NA	NA	NA	NA
7.6	Facilities Maintenance should develop service level agreements with its major customers.	FY 07-08	NA	NA	NA	NA
7.7	Facilities Maintenance should develop a comprehensive policies and procedures manual.	FY 08-09	NA	NA	NA	NA
7.8	Facilities Maintenance should develop and install a preventive maintenance program for the City's facilities.	FY 07-08	NA	NA	NA	NA
7.9	Facilities Maintenance should contract, initially, for the employment of this predictive testing equipment on an annual basis. In the mid-term, Facilities Maintenance should selectively acquire this equipment and train its staff in its use.	FY 07-08	NA	\$15,000	NA	NA
7.10	Facilities Maintenance and Project Administration should develop a formal written facilities equipment standardization policy.	FY 07-08	NA	NA	NA	NA
7.11	The City should not increase the level of authorized positions for the maintenance and repair of the City's facilities.	FY 07-08	NA	NA	NA	NA
7.11	Eliminate the Plant Engineer position and reallocate the incumbent to a vacant position in the Department that matches the skills and talents of the incumbent.	FY 07-08	NA	NA	\$119,000	NA
7.12	The City should establish skilled trades classifications including three distinct classifications: Electrician, Plumber, and Heating / Refrigeration Technician.	FY 07-08	NA	NA	NA	NA

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Section	Recommendation	Time Frame	Revenue Increase	Cost Increase	Cost Reduction	Capital Outlay
7.12	The General Repair Worker classification and the Building Maintenance Mechanic classification should be consolidated into one classification: Building Maintenance Mechanics. Eliminate the General Repair Worker classification.	FY 07-08	NA	\$21,900	NA	NA
7.12	As General Repair Worker and Building Maintenance Mechanic positions become vacant, reclassify six of these positions to the skilled trades classifications - Electrician, Plumber, and Heating / Refrigeration Technician.	FY 07-08	NA	\$85,000	NA	NA
7.12	The salary ranges for these three proposed skilled trades classifications should be established based upon a salary survey conducted by the Human Resources Department.	FY 07-08	NA	NA	NA	NA
7.13	The City should authorize– two Heating / Refrigeration Technician positions in fiscal year 2007-08. The City should assign these staff to work with ABM for twelve months to maintain and repair the City's mechanical systems, including training for the maintenance and repair of these systems.	FY 07-08	NA	\$321,800	NA	\$40,000
7.13	At the end of that twelve month period, the City should terminate the contract with ABM and assume responsibility for mechanical maintenance and repair services, including heating, ventilating, and air conditioning systems, sump pumps, sewage pits, motors, motor controls, and also subcontractors for fire alarm testing and maintenance, uninterruptible power supply maintenance, fire extinguisher servicing, and generator load testing.	FY 08-09	NA	NA	\$607,134	NA
7.13	Eliminate two (2) Building Maintenance Mechanic positions through attrition.	FY 08-09	NA	NA	\$125,900	NA

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Section	Recommendation	Time Frame	Revenue Increase	Cost Increase	Cost Reduction	Capital Outlay
7.14	Reclassify the Contract Administrator Technician to Electrician.	FY 07-08	NA	\$31,400	NA	NA
7.14	Utilize an existing General Repair Worker or Building Maintenance Mechanic to monitor the custodial contract and the elevator maintenance contract.	FY 07-08	NA	NA	NA	NA
7.15(1)	Require Able Building Maintenance to submit their inspection control forms, inspection reports, and occupancy surveys.	FY 07-08	NA	NA	NA	NA
7.15(2)	Require Able Building Maintenance to conduct daily inspections of the City's buildings that the firm cleans and complete an inspection form on a daily basis indicating that all elements of services required by the Scope of Services have been properly performed and the building / area is being maintained at a level that meets the quality and performance standards of the Scope of Services.	FY 07-08	NA	NA	NA	NA
7.15(3)	Require Able Building Maintenance to complete and post a monthly schedule of cleaning for each building and post the schedule in the building.	FY 07-08	NA	NA	NA	NA
7.15(4)	Assign responsibility for custodial inspections of the City's buildings to the General Repair Worker or Building Maintenance Mechanic assigned as the contract administrator.	FY 07-08	NA	NA	NA	NA
7.15 (4)	The Facilities Maintenance Manager should develop a custodial services inspection form.	FY 07-08	NA	NA	NA	NA

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Section	Recommendation	Time Frame	Revenue Increase	Cost Increase	Cost Reduction	Capital Outlay
7.15(4)	The Building Maintenance Mechanic, assigned as the contract administrator, should conduct weekly inspections of City buildings for routine quality assurance, assessing the performance and compliance with the Scope of Services by Able Building Maintenance.	FY 07-08	NA	NA	NA	NA
7.15(5)	The Facilities Maintenance Manager should utilize these inspections as the basis for a monthly conference with Able Building Maintenance. The purpose of this conference should be to discuss performance, provide direction to attain compliance with the Scope of Services, and reach mutual solutions for resolution.	FY 07-08	NA	NA	NA	NA
7.15(5)	The results of the custodial inspections should be provided to the departmental managers on a monthly basis.	FY 07-08	NA	NA	NA	NA
7.16	Facilities Maintenance should utilize a zone approach to organizing delivery of its services.	FY 07-08	NA	NA	NA	NA
7.17	Eliminate the use of the swing shift for Facilities Maintenance..	FY 07-08	NA	NA	NA	NA
7.18(1)	Develop a work order for Facilities Maintenance.	FY 07-08	NA	NA	NA	NA
7.18(1)	The Facilities Maintenance Staff should not perform any work without the assignment of a written work order.	FY 07-08	NA	NA	NA	NA
7.18(2)	The Facilities Maintenance Manager should develop, install, and utilize a work planning and scheduling system.	FY 07-08	NA	NA	NA	NA
7.19	Assign responsibility to Facilities Maintenance for the City's assets inside the building envelope in the City's parks.	FY 07-08	NA	NA	NA	NA

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Section	Recommendation	Time Frame	Revenue Increase	Cost Increase	Cost Reduction	Capital Outlay
7.19	Assign responsibility to Park Maintenance for the City's assets outside the building envelope in the City's parks.	FY 07-08	NA	NA	NA	NA
7.20	Facilities Maintenance and Property Management should define the service level expectations for maintenance and repair of City-owned commercial, retail and office space in a service level agreement.	FY 07-08	NA	NA	NA	NA
Chapter 8 – Analysis of Drainage Maintenance						
8.2	Eliminate two (2) Drainage Maintenance Worker II positions through attrition.	FY 07-08	NA	NA	\$123,400	NA
8.3	The Department should contract for the inspect ion of not less than 7% of the sanitary sewer mains each year or approximately six (6) miles of mains.	FY 07-08	NA	\$24,000	NA	NA
8.4	The Department should contract for the chemical root treatment of 10% of the City's sanitary sewer mains as a pilot project.	FY 07-08	NA	\$50,000 (One-Time)	NA	NA
8.4	The Public Works and Transportation Department should procure these services using a cooperative purchase agreement with the Los Angeles Bureau of Sanitation.	FY 07-08	NA	NA	NA	NA
8.5	The Public Works and Transportation Department should enhance the effectiveness of the monitoring of the County's enforcement of the Fat, Oil, and Grease program, including assuring that the County includes all of the elements of an effective program in its approach to enforcement.	FY 07-08	NA	NA	NA	NA

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Section	Recommendation	Time Frame	Revenue Increase	Cost Increase	Cost Reduction	Capital Outlay
8.5	The Public Works and Transportation Department should propose a fee-based approach for the FOG program for the consideration of the City Council. This should include the annual operating cost of the 30 / 60 / 90 day program delivered by Drainage Maintenance.	FY 07-08	\$54,800	NA	NA	NA
8.5	The Public Works and Transportation Department should procure these services using a cooperative purchase agreement with the Los Angeles Bureau of Sanitation.	FY 07-08	NA	NA	NA	NA
8.6	Replace vehicle #796 and vehicle #797. Replace vehicle #797 – the second mechanical rodder truck with a hydro flusher truck	FY 07-08	NA	NA	NA	\$300,000
8.7	Drainage Maintenance should develop and install a formal work planning and scheduling system.	FY 07-08	NA	NA	NA	NA
8.8	The City should proceed with implementation of the sanitary sewer master plan	FY 07-012	NA	NA	NA	\$4,300,000 to \$8,300,000
8.8	The Environmental Utilities Manager and the Deputy City Engineer should develop a plan for implementation of the sanitary sewer master plan.	FY 07-08	NA	NA	NA	NA
8.8	Civil Engineering should adjust the capital costs based upon inflation and based upon the projects that have been completed since submittal of the master plan in 1997.	FY 07-08	NA	NA	NA	NA
8.8	The City should proceed with implementation of the storm drain master plan.	FY 07-012	NA	NA	NA	\$11,600,000
8.8	The Environmental Utilities Manager and the Deputy City Engineer should develop a plan for implementation of the sanitary sewer master plan.	FY 07-08	NA	NA	NA	NA

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Section	Recommendation	Time Frame	Revenue Increase	Cost Increase	Cost Reduction	Capital Outlay
8.8	Civil Engineering should adjust the capital costs based upon inflation and based upon the projects that have been completed since submittal of the master plan in 1997.	FY 07-08	NA	NA	NA	NA
	Chapter 9 – Analysis of Water Distribution and Production					
9.2	Increase the level of staffing of Water System Worker III's by one position.	FY 07-08	NA	\$78,300	NA	NA
9.3	Water Distribution Maintenance and Production should enhance the efficient use of staff so that the preventive maintenance of water infrastructure can be enhanced.	FY 07-08	NA	NA	NA	NA
9.3	Water Distribution Maintenance and Production should not use compensatory time as compensation for overtime unless the water infrastructure is preventively maintained consistently.	FY 07-08	NA	NA	NA	NA
9.4	Managers and supervisors of Water Distribution Maintenance and Production should be held accountable for the consistent preventive maintenance of gate and butterfly valves, fire hydrants, and air release valves.	FY 07-08	NA	NA	NA	NA
9.4	Managers and supervisors of Water Distribution Maintenance and Production should consistently dedicate two staff to the preventive maintenance of gate and butterfly valves, fire hydrants, and air release valves.	FY 07-08	NA	NA	NA	NA
9.4	Preventive maintenance should be accorded the second highest work priority – after emergency repairs – and not an “as time permits” priority.	FY 07-08	NA	NA	NA	NA
9.4	Water Distribution and Production should allocate not less than sixty (60) staff days annually to leak testing.	FY 07-08	NA	NA	NA	NA

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Section	Recommendation	Time Frame	Revenue Increase	Cost Increase	Cost Reduction	Capital Outlay
9.4	The frequency of registration accuracy testing for commercial meters should be adjusted from once every six months to once a year upon replacement of the turbine meters with compound meters.	FY 07-08	NA	NA	NA	NA
9.4	The frequency for preventive maintenance of pressure regulating stations should be adjusted from once every six months to once annually.	FY 07-08	NA	NA	NA	NA
9.5	The staffing levels for Water Distribution are sufficient to deliver a comprehensive preventive maintenance program.	FY 07-08	NA	NA	NA	NA
9.5	The staffing levels for Water Distribution should not be increased.	FY 07-08	NA	NA	NA	NA
9.6	Water Distribution and Production should develop and install a work planning and scheduling system.	FY 07-08	NA	NA	NA	NA
9.7	Install automatic circulators at nine water storage tanks.	FY 07-010	NA	NA	NA	\$1,000,000
9.7	Install automatic analyzers at nine water storage tanks.	FY 07-10	NA	NA	NA	\$77,000
9.8	The City should proceed with implementation of the water system master plan.	FY 07-08	NA	NA	NA	NA
9.8	The Environmental Utilities Manager and the Deputy City Engineer should develop a plan for implementation of the sanitary sewer master plan.	FY 07-08	NA	NA	NA	NA
9.9	Water Distribution and Production should initiate a leak detection program using leak noise correlators.	FY 07-08	NA	NA	NA	NA

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Section	Recommendation	Time Frame	Revenue Increase	Cost Increase	Cost Reduction	Capital Outlay
9.10(1)	Civil Engineering and Water Distribution and Production should evaluate the costs of replacing the twenty-seven water pumping units with variable frequency drive energy efficient motors, the energy savings that would be gained, and the payback period. If the payback period is favorable, a capital project should be developed for their replacement.	FY 07-08	NA	NA	NA	NA
9.10(1)	As Water Distribution and Production moves forward with the efficiency tests of these pumping units by Southern California Edison, the evaluation should be expanded to include replacement with variable frequency drive energy efficient units.	FY 07-08	NA	NA	NA	NA
9.10(2)	Water Distribution and Production should expand the extent of off-peak pumping using the SCADA system.	FY 07-08	NA	NA	NA	NA
9.11	Water Distribution and Production should utilize the Infrared thermo-imaging unit it recently purchased to initiate a reliability-centered program, and utilize contractors for oil analysis and vibration analysis on an annual basis.	FY 07-08	NA	\$15,000	NA	NA
9.12	Water Distribution and Production should identify and bring on-line additional sources of groundwater	FY 07-08	NA	NA	NA	NA
9.13	Water Distribution and Production should evaluate opportunities to increase pressure more than the 30 pounds per square inch at Green Acres.	FY 07-08	NA	NA	NA	NA

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Section	Recommendation	Time Frame	Revenue Increase	Cost Increase	Cost Reduction	Capital Outlay
9.14	Once the incumbent of the Field Services Supervisor position meets the certification requirements of the Water System Operations Supervisor classification, and the other requirements of that classification, the Field Services Supervisor should be reclassified as a Water System Operations Supervisor	FY 07-08	NA	\$7,800	NA	NA
9.15	Water Production And Distribution should “square cut” utility cuts and use hot mix for the utility cuts made by its staff.	FY 07-08	NA	NA	NA	NA
Chapter 10 – Analysis of Solid Waste						
10.2	The City should evaluate options to address future challenges of landfill closures, waste hauling by rail, and the volatility of the recycling market and to reduce the impact of the lost time associated with direct haul of solid waste to the Crown Disposal Material Recovery Facility in San Fernando and the Southern California Disposal facility in Santa Monica.	FY 07-08	NA	NA	NA	NA
10.3	Do not modify the authorized level of staffing for street sweeping.	FY 07-08	NA	NA	NA	NA
10.4	Authorize two additional Solid Waste Equipment Operator positions.	FY 07-08	NA	\$156,700	NA	NA
10.5	Acquire a second rear loader collection truck for collection of bulk waste.	FY 07-08	NA	\$28,000	NA	\$180,330
10.6	A task force consisting of a mix of selected solid waste collection staff, the Solid Waste Operations Supervisor, residents, and the Management Analyst should be utilized to evaluate alternatives to the use of 300-gallon containers for collection of solid waste in alleys.	FY 07-08	NA	NA	NA	NA

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Section	Recommendation	Time Frame	Revenue Increase	Cost Increase	Cost Reduction	Capital Outlay
10.7	Acquire an eleventh automated side loader collection truck.	FY 07-08	NA	\$43,000	NA	\$210,000
10.8	Solid Waste should mark the locations of gas and water meters in alleys.	FY 07-08	NA	NA	NA	NA
10.9	The City should charge an annual fee for inspection of restaurants and gas stations.	FY 07-08	\$6,300	NA	NA	NA
10.10(1)	The Public Works Inspectors in the Civil Engineering Division should be responsible for conducting inspections of public and private construction sites for compliance with NPDES.	FY 07-08	NA	NA	NA	NA
10.10(2)	The Public Works and Transportation Department should contract with Los Angeles County for monitoring of restaurants and retail gas stations with NPDES requirements.	FY 07-08	NA	NA	NA	NA
10.10(3)	Drainage Maintenance should be assigned responsibility for annual inspection of catch basins.	FY 07-08	NA	NA	NA	NA
10.10(4)	Street Maintenance should be assigned responsibility for inspection of sidewalks.	FY 07-08	NA	NA	NA	NA
10.10(5)	The Field Services Representative In Water Distribution And Production should inspect verify the installation of low flow toilets for rebates from the water utility.	FY 07-08	NA	NA	NA	NA
10.10	Eliminate two Environmental Program Inspector positions through attrition.	FY 07-08	NA	NA	\$189,300	NA

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Section	Recommendation	Time Frame	Revenue Increase	Cost Increase	Cost Reduction	Capital Outlay
10.11	Utilize a managed competition process for the work performed by the Environmental Maintenance Workers to solicit proposals from both contractors and City staff, and the evaluation of that alternative that provides the most favorable balance of costs versus level of service.	FY 07-08	NA	NA	NA	NA
Chapter 11 – Analysis of Civil Engineering						
11.2	Authorize a Project Civil Engineer to enable the City to begin to comprehensively address the six controls and to represent the City with Los Angeles County, the County's Water Control Board, and the State Water Resources Control Board.	FY 07-08	NA	\$132,800	NA	NA
11.3	The Civil Engineering Division should develop a utility cut ordinance for consideration of the City Council	FY 07-08	NA	NA	NA	NA
11.3	The Civil Engineering Division should develop and impose a pavement restoration fee upon utilities making and benefiting from excavations in public streets, including the City's water and sewer utility.	FY 07-08	NA	NA	NA	NA
11.3	Funds that are collected as pavement restoration fees should be expended for the rehabilitation and resurfacing of streets, and deposited in a special revenue fund established for that purpose. The funds deposited in the special revenue fund should include interdepartmental budget transfers for City water and sewer operations utility cuts, and fund transfers at the time of construction contract award for City water and sewer capital improvement projects.	FY 07-08	NA	NA	NA	NA
11.3	The Civil Engineering Division should require utility companies to submit five-year plans for major facility installation to coordinate excavations with the City's resurfacing and the recommended slurry seal program.	FY 07-08	NA	NA	NA	NA

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Section	Recommendation	Time Frame	Revenue Increase	Cost Increase	Cost Reduction	Capital Outlay
11.3	The Civil Engineering Division should provide an incentive for joint trenching when two or more utility excavators trench by processing a permit as one application saving the utility company costs for permit, plan check, and inspection fees.	FY 07-08	NA	NA	NA	NA
11.4	The roles and responsibilities of the staff of the Civil Engineering Division for management of capital improvement projects should be clarified in a policy and procedure.	FY 07-08	NA	NA	NA	NA
11.5(1)	A design authorization form should be completed by the Project Civil Engineer Civil Engineering Division assigned as project manager before the commencement of design for each capital improvement project.	FY 07-08	NA	NA	NA	NA
11.5(2)	The Civil Engineering Division should utilize cost of construction guidelines to document resource requirements for the design and inspection of capital projects.	FY 07-08	NA	NA	NA	NA
11.5(3)	The information provided by the monthly capital project status report should be expanded.	FY 07-08	NA	NA	NA	NA
11.5(4)	The Civil Engineering Division should utilize the project accounting module within Pentamation to track the costs associated with the design and inspection of capital projects. Access to the information contained within the system should be provided on the City's Intranet.	FY 07-08	NA	NA	NA	NA
11.5(5)	A final report should be prepared for capital projects upon completion of construction and acceptance of the improvements.	FY 07-08	NA	NA	NA	NA

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11.5(6)	Billability targets should be established for staff of the Civil Engineering Division.	FY 07-08	NA	NA	NA	NA
11.5(7)	The Civil Engineering Division should develop a 24-month bar chart schedule for the design and construction of all capital projects, and update that chart monthly.	FY 07-08	NA	NA	NA	NA
11.5(8)	A design report should be completed for each significant and complicated capital project when the design is no more than 10% complete.	FY 07-08	NA	NA	NA	NA
11.5(9)	The Civil Engineering Division should implement a consulting engineer evaluation system and utilize this system as part of the final project close-out.	FY 07-08	NA	NA	NA	NA
11.5(10)	The Civil Engineering Division should develop a project management manual and train all Project Civil Engineers and Public Works Inspectors in its use and application.	FY 07-08	NA	NA	NA	NA
11.6	Upgrade the vacant Project Civil Engineer position to a new classification of Supervising Project Civil Engineer.	FY 07-08	NA	\$19,900	NA	NA
11.7	The paraprofessional duties performed by the Traffic Engineer should be reallocated to the Engineering Aide.	FY 07-08	NA	NA	NA	NA
11.7	The Engineering Aide should be reclassified to Traffic Technician.	FY 07-08	NA	NA	NA	NA
11.7	The Traffic Engineer should be utilized to perform professional traffic engineering responsibilities such as development and installation on an annual ongoing basis of a traffic safety program, development and installation on an annual ongoing basis of a traffic improvement program, review and adjustment of traffic signal timing, etc.	FY 07-08	NA	NA	\$108,000	NA

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Section	Recommendation	Time Frame	Revenue Increase	Cost Increase	Cost Reduction	Capital Outlay
11.8	The Engineering Aide position should be more effectively utilized	FY 07-08	NA	NA	NA	NA
11.9(1)	The Civil Engineering Division should purchase and fully utilize a pavement management system to provide a systematic approach to the repair and maintenance of the City's streets.	FY 07-08	NA	NA	NA	\$1,050
11.9(2)	The Civil Engineering Division should evaluate the pavement condition of the City's streets on a three-year cycle, with 33% of the streets being evaluated each year.	FY 07-08	NA	NA	NA	NA
11.9(3)	The Civil Engineering Division should expand the set of non-structural overlays that it utilizes for preventive maintenance of the City's streets beyond overlay to include slurry seal and micro-surfacing.	FY 07-08	NA	\$333,200	NA	NA
11.9(3)	The Civil Engineering Division should develop strategies to assure the effective use and application of these alternative non-structural overlays.	FY 07-08	NA	NA	NA	NA
11.10	The Civil Engineering Division should prepare a report for consideration of the City Council regarding the status of the implementation of water system, the wastewater system, and the storm water system master plans, and recommendations to implement those projects proposed in the master plans that have not been implemented including proposed sequencing.	FY 07-08	NA	NA	NA	NA
11.11	The Deputy City Engineer should meet with Information Technology to discuss these limitations of OBC from the perspective of the Civil Engineering Division.	FY 07-08	NA	NA	NA	NA

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Section	Recommendation	Time Frame	Revenue Increase	Cost Increase	Cost Reduction	Capital Outlay
11.11	Information Technology should develop a plan for consideration of the Deputy City Engineer to address the limitations of OBC.	FY 07-08	NA	NA	NA	NA
11.12	Civil Engineering should utilize consulting engineering firms for construction inspection and management of the larger capital projects such as replacement of the Coldwater Canyon reservoir and the street light master plan, and phase the construction of other capital projects to fit the workload capacity of Civil Engineering.	FY 07-08	NA	NA	NA	NA
11.13	Civil Engineering should expand the knowledge among its own staff regarding how to use the stormwater, sanitary sewer, and water distribution computer models developed as part of the master plans, and at the same time provide training to operations staff such as the Water Utilities Manager.	FY 07-08	NA	NA	NA	NA
11.14	The classification structure for the Project Civil Engineer series should be modified.	FY 07-08	NA	NA	NA	NA
11.15	The Supervising Public Works Inspector and the four Public Works Inspectors should be provided with compact pickup trucks to provide construction inspection and management services.	FY 07-08	NA	\$15,000	NA	\$90,000
11.15	Civil Engineering and the organizational units responsible for maintenance of these assets (water, wastewater, streets, etc.) should take a number of steps to improve their partnership in the design and construction of new or rehabilitated assets.	FY 08-09	NA	NA	NA	NA

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Section	Recommendation	Time Frame	Revenue Increase	Cost Increase	Cost Reduction	Capital Outlay
11.15	Civil Engineering and the organizational units responsible for maintenance of these assets (water, wastewater, streets, etc.) should develop and adopt a service level agreement that establishes parameters for an effective working relationship.	FY 08-09	NA	NA	NA	NA
11.15	Both Civil Engineering and the organizational units responsible for maintenance of these assets (water, wastewater, streets, etc.) need to cooperate equally for this partnership to function effectively. Project Administration should not be expected to carry this responsibility alone.	FY 08-09	NA	NA	NA	NA
Chapter 12 – Analysis of Project Administration						
12.2	Project Administration and Facilities Maintenance should take a number of steps to improve the partnership between the two units.	FY 07-08	NA	NA	NA	NA
12.2	Project Administration and Facilities Maintenance should develop and adopt a service level agreement that establishes parameters for an effective working relationship.	FY 07-08	NA	NA	NA	NA
12.2	Both Project Administration and Facilities Maintenance need to cooperate equally for this partnership to function effectively. Project Administration should not be expected to carry this responsibility alone.	FY 07-08	NA	NA	NA	NA
12.3(1)	A design authorization form should be completed before commencement of design. The client department or division and Facilities Maintenance should review the design authorization form prior to the commencement of design.	FY 07-08	NA	NA	NA	NA

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Section	Recommendation	Time Frame	Revenue Increase	Cost Increase	Cost Reduction	Capital Outlay
12.3 (2)	Project Administration should develop and utilize cost of construction guidelines to document project management and project administrator staffing requirements for the design and construction management of facility capital improvement projects.	FY 07-08	NA	NA	NA	NA
12.3 (3)	Facilities Maintenance should be provided with the opportunity for input and critique of plans and specifications developed by Project Administration at 30%, 60% and 90% completion.	FY 07-08	NA	NA	NA	NA
12.3 (4)	Modify the monthly capital project status report.	FY 07-08	NA	NA	NA	NA
12.3 (5)	Project Administration should utilize the Pentamation project accounting software to track the costs associated with design administration and construction of facility capital projects.	FY 07-08	NA	NA	NA	NA
12.3 (6)	Project Administration should complete a design report when the design is no more than 10% complete for those projects that are complex or significant.	FY 07-08	NA	NA	NA	NA
12.3(7)	A final report should be prepared upon completion of a facility capital project.	FY 07-08	NA	NA	NA	NA
12.4	Project Administration should continue to utilize consulting architects for design administration, construction management, construction inspection and project closure of capital projects.	FY 07-08	NA	NA	NA	NA
12.5	Given the large capital projects in the near-term future and the skills required to manage these projects, the City should immediately authorize a second Project Manager position as an "overhire", and eliminate a Project Administrator position through attrition.	FY 07-08	NA	\$33,600	NA	NA

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Section	Recommendation	Time Frame	Revenue Increase	Cost Increase	Cost Reduction	Capital Outlay
	Chapter 13 – Analysis of Parking Operations					
13.2	The responsibility for maintenance and repair of the parking facilities should be clarified in a written agreement between Facilities Maintenance and Parking Operations. Parking Operations should be authorized to perform routine, ongoing maintenance of the parking facilities. Facilities Maintenance should address the skilled repair needs associated with these parking facilities.	FY 07-08	NA	NA	NA	NA
13.2	The Parking Operations Director and the Facilities Maintenance Manager should meet quickly to discuss the identified safety issues, cracking in facility walls and in parking surfaces, previous surface repairs failing, exposed rebar and tensioning cables in parking surfaces, and water intrusion, and the facility exhaust fan system not appearing to be functioning at the 221 N. Crescent parking facility.	FY 07-08	NA	NA	NA	NA
13.2	The Facilities Maintenance Manager should develop a schedule within the thirty (30) calendar days subsequent to this meeting to address these issues.	FY 07-08	NA	NA	NA	NA
13.2	The safety issues should be addressed as soon as possible.	FY 07-08	NA	NA	NA	NA
13.3	Parking Operations should develop a parking master plan for on and off-street parking..	FY 07-08	NA	NA	NA	\$150,000
13.4	Parking Operations and Transportation should develop an off-street and on-street parking rate policy for consideration of the City Council.	FY 07-08	NA	NA	NA	NA
13.5	Parking Operations should utilize pay stations in selected areas to address problems with vandalism.	FY 07-08	NA	NA	NA	NA

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Section	Recommendation	Time Frame	Revenue Increase	Cost Increase	Cost Reduction	Capital Outlay
13.6	A third parking Supervisor position should be authorized.	FY 07-08	NA	\$72,300	NA	NA
13.7	Authorize ten (10) additional regular part-time Parking Attendant positions.	FY 07-08	NA	\$365,300	NA	NA
13.8	Utilize a managed competition process for parking meter maintenance and collection to solicit proposals from both contractors and City staff, and the evaluation of that alternative that provides the most favorable balance of costs versus level of service.	FY 07-08	NA	NA	NA	NA
13.9	Parking Operations should continue to provide collection services to the City of West Hollywood.	FY 07-08	NA	NA	NA	NA
13.10	Transition the Revenue Collector positions to the Parking Meter Technician classification based upon the qualifications of the incumbents and as turnover occurs.	FY 07-08	NA	\$47,800	NA	NA
13.11	The Finance Department should conduct "spot" audits of the revenue collection procedures employed by Parking Operations to assure the adequacy of internal controls not less than twice a year.	FY 07-08	NA	NA	NA	NA
13.12 (1)	Parking Operations should convert the parking meters to a "closed" collection system with parking meter coin containers fully "sealed."	FY 07-08	NA	NA	NA	\$90,300
13.12 (2)	Parking Operations should convert the parking meter locks to high security locks.	FY 07-08	NA	NA	NA	\$186,000
13.12 (3)	Parking Operations should acquire MeterTrax 6.0 Software From Duncan and a handheld computer device for use in the field.	FY 07-08	NA	NA	NA	\$30,000

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Section	Recommendation	Time Frame	Revenue Increase	Cost Increase	Cost Reduction	Capital Outlay
	Chapter 14 – Analysis of Transportation					
14.2	Authorize three (3) additional Parking Enforcement Officers and assign these additional Parking Enforcement Officers to the day shift.	FY 07-08	\$670,000	\$182,400	NA	NA
14.2	Authorize an additional Parking Enforcement Supervisor position for the day shift.	FY 07-08	NA	\$70,000	NA	\$0
14.3	The Deputy Director of Transportation should propose for the consideration of the City Council a full cost recovery policy for the parking permit program.	FY 07-08	NA	NA	NA	NA
14.3	The City should adopt a \$2 fee for the processing of overnight and daytime exemptions.	FY 07-08	\$118,000	NA	NA	NA
14.4	Information Technology should modify the Online Business Center so that parking exemptions can be granted using this automated permit information system. This system should be developed so that permit exemptions can be granted on-line using the City's Internet site.	FY 07-08	NA	NA	NA	NA
14.4	If the resident does not have access to the Internet, the resident should be required to come to City Hall to obtain the permit.	FY 07-08	NA	NA	NA	NA
14.4	The resident should be required to display the parking exemption form on their vehicle, either by printing the exemption at their residence after obtaining the permit over the Internet or by coming to City Hall to obtain the exemption permit.	FY 07-08	NA	NA	NA	NA
14.4	The Transportation Division should develop a formal process for issuance of the exemption permits that establishes criteria and restrictions.	FY 07-08	NA	NA	NA	NA

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Section	Recommendation	Time Frame	Revenue Increase	Cost Increase	Cost Reduction	Capital Outlay
14.5	Authorize a Transportation Planning Administrator position.	FY 07-08	NA	\$119,000	NA	NA
14.6	Reclassify the Planning Technician as a Traffic Technician.	FY 07-08	NA	NA	NA	NA
14.7	Revise the classification title and description for the Operations Manager to reflect the additional responsibility for management of parking enforcement.	FY 07-08	NA	NA	NA	NA
14.7	The salary range for the classification should be adjusted to reflect the additional responsibilities for supervising parking enforcement.	FY 07-08	NA	\$16,400	NA	NA
14.8	Reclassify a Customer Service Representative to Senior Customer Service Representative to reflect its responsibility for administrative review of parking citations and administering the City's long-term valet program.	FY 07-08	NA	\$10,000	NA	NA
14.8	Create a new classification of Senior Customer Service Representative.	FY 07-08	NA	NA	NA	NA
14.9	Administration should provide enhanced analytical support to Transportation.	FY 07-08	NA	NA	NA	NA
14.10	Transportation should enhance the administration of the taxicab program.	FY 08-09	NA	NA	NA	NA
14.10	The additional costs associated with administration of the taxicab program should be offset through additional revenues. The specific fees should be evaluated as part of the City's fee study.	FY 08-09	NA	NA	NA	NA

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Section	Recommendation	Time Frame	Revenue Increase	Cost Increase	Cost Reduction	Capital Outlay
14.11	Information Technology should modify the Online Business Center so that valet permits can be granted using this automated permit information system.	FY 08-09	NA	NA	NA	NA
14.11	Authorize an additional Customer Service representative position.	FY 08-09	NA	\$66,80	NA	NA
14.11	Eliminate the budgeted part-time exemption line staff hours.	FY 07-08	NA	NA	\$58,275	NA
Chapter 15 – Analysis of the Plan of Organization						
15.4	Reclassify the Deputy Director of Public Works and Transportation / City Engineer to Assistant Director of Public Works and Transportation.	FY 07-08	NA	NA	NA	NA
15.4	Authorize a Street Superintendent position. The position would be responsible for the management of signal and light maintenance, street and sign maintenance, and street sweeping.	FY 07-08	NA	\$126,300	NA	NA
15.4	Reclassify the Vehicle Maintenance Manager to Fleet Manager.	FY 07-08	NA	NA	NA	NA
15.5	In the long-term, consolidate responsibility for management of parking operations and transportation under a Traffic and Transportation Manager position. Assign responsibility for managing the City's transportation and parking operations to the Traffic and Transportation Manager. Eliminate the Parking Operations Director position and the Deputy Director of Transportation position through attrition. The Traffic and Transportation Manager should report directly to the Assistant Director of the Public Works and Transportation Department.	FY 07-08	NA	\$145,300	\$290,600	NA

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Section	Recommendation	Time Frame	Revenue Increase	Cost Increase	Cost Reduction	Capital Outlay
15.5	In the long-term, consolidate responsibility for capital project management under an Engineering and Architectural Services Manager position. Reclassify the Project Administration Director as City Architect. The City Architect should report to the Engineering and Architectural Services Manager.	FY 07-08	NA	NA	NA	NA
15.6	The roles and responsibilities of the Deputy Director of Public Works and Transportation / City Engineer should be clarified in a written policy.	FY 07-08	NA	NA	NA	NA
15.7	The engineering permitting staff in the Public Works and Transportation Department should not be reallocated to the Community Development Department.	FY 07-08	NA	NA	NA	NA
15.7	Customer service duties in the Finance Department and the Public Works and Transportation Department should not be reallocated.	FY 07-08	NA	NA	NA	NA

2. ANALYSIS OF EMPLOYEE SURVEY

2. ANALYSIS OF EMPLOYEE SURVEY

As part of the Organization and Management Analysis of the Public Works and Transportation Department, the Matrix Consulting Group conducted a confidential employee survey to obtain perceptions regarding staffing, operations, management, etc.

1. A SURVEY WAS DISTRIBUTED TO ALL OF THE EMPLOYEES OF THE PUBLIC WORKS AND TRANSPORTATION DEPARTMENT.

After distributing the survey to all the employees of the Public Works and Transportation Department, 107 employees provided a response, representing a response rate of almost 51%. The number of respondents in each Division is presented in the table below.

Current Assignment	Number of Respondents
Administration	11
Project Administration	4
Transportation	26
Infrastructure Maintenance	19
Environmental Utilities	19
Civil Engineering	12
Parking Operations/Meter Collection	9
Not Stated	7
Total	107

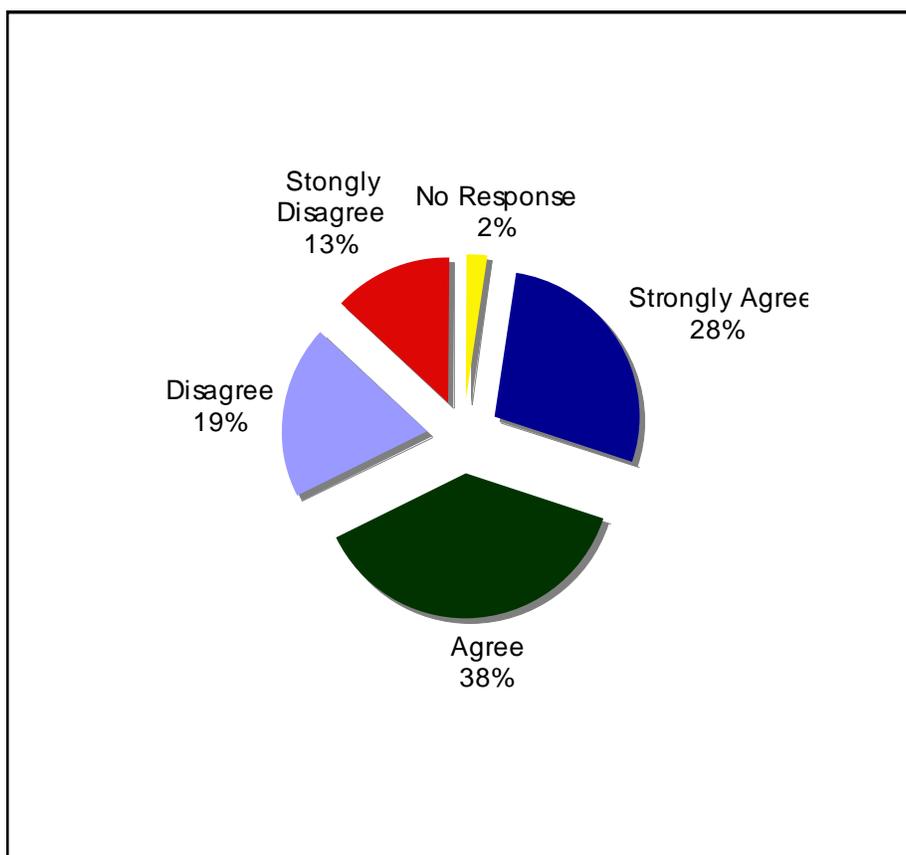
The survey was prepared by the Matrix Consulting Group and contained two sections.

- The first section was a “multiple choice” section designed to cover a wide range of topics about the management, organization, and operation of the Pubic Works and Transportation Department, while minimizing the employee’s time and effort in completing this survey. Employees were asked to respond to 35 statements by selecting “no response,” “strongly agree,” “agree,” “disagree,” and “strongly disagree.”
- The second section consisted of open-ended questions. This question provided the opportunity for employees to identify opportunities for improvement. The question was designed to create opportunities for employees to offer their candid assessment of the process, and to make suggestions for improvements, if needed.

1. OVERALL, EMPLOYEES CITED A HIGH NUMBER OF POSITIVE ASPECTS OF THE PUBLIC WORKS AND TRANSPORTATION DEPARTMENT AND OPPORTUNITIES FOR IMPROVEMENT.

In reviewing the responses to the quantitative responses to the first section of the employee questionnaire, it is important to look at the pattern of responses for the entire group versus individual responses.

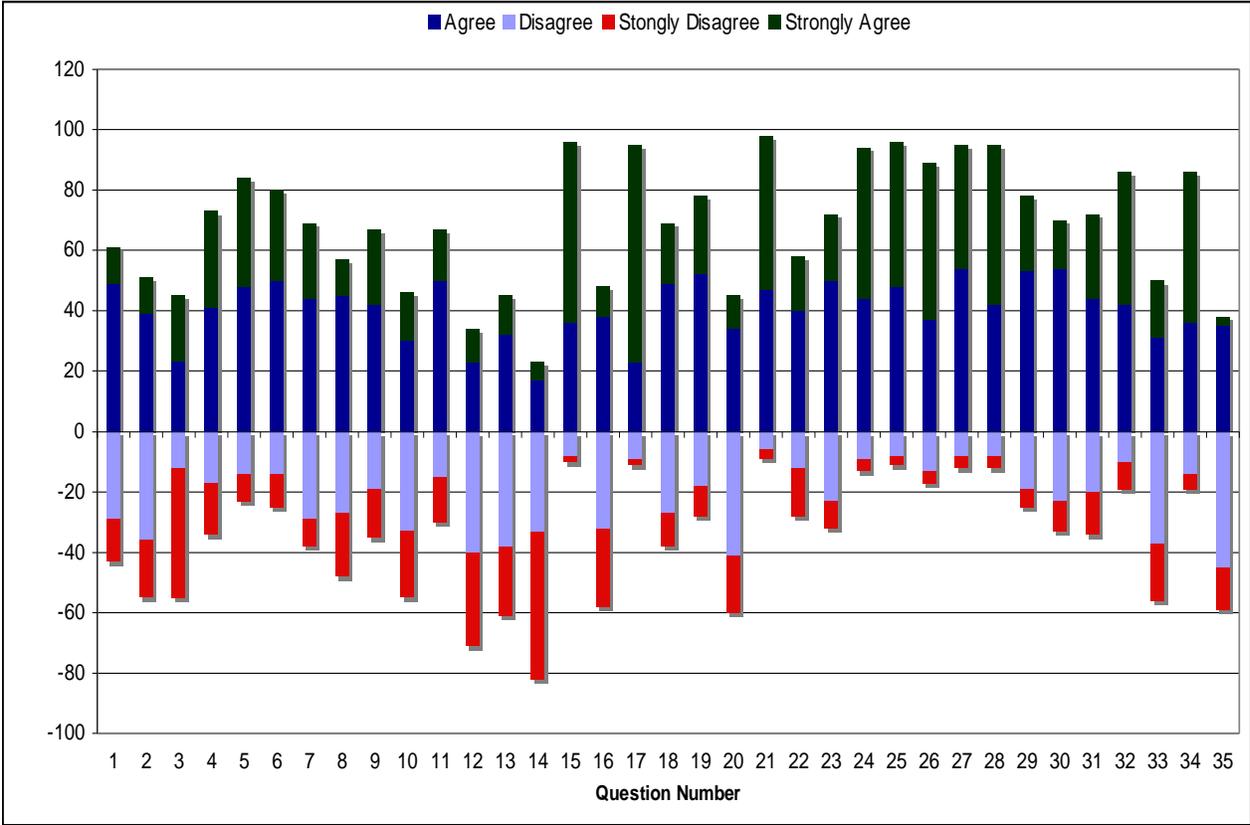
The chart below summarizes the overall distribution of responses to statements to which employees were asked to select a response.



The response pattern for all statements in the first section of the employee survey indicates employees had relatively high levels of agreement with the various

survey statements. Approximately, 66% of responses were positive (either “agree” or “strongly agree”) and 32% were negative (either “disagree” or “strongly disagree.”)

To gain a more detailed sense of the responses from the first section of the employee survey, it is useful to look in more detail at the statements that elicited the strongest positive and negative responses. The chart, found below, plots the actual number of positive and negative responses for each statement. Statement numbers are shown along the bottom of the chart. Neutral responses are excluded.



The chart, above, presents the positive and negative responses for each statement provided in the first section of the employee survey. The positive responses (e.g., “agree” and “strongly agree”) are plotted above the X-axis. The negative responses (e.g., “disagree” and “strongly disagree”) are plotted below the X-axis. The chart

provides an overall visual representation of the response to each statement. It allows strongly positive or negative responses to be singled out. Those strongly positive or negative statements are highlighted below.

(1) Of the Thirty-Five Statements, Respondents Had Positive Perceptions and Attitudes with Respect to Twenty-Three.

A review of the positive and negative responses to the statements provided in the first section of the employee survey shows that there are twenty-three statements to which employees responded positively. At least 60% of respondents selected “agree” or “strongly agree” in response to the statements presented below.

- Questions #4 – 68% of the respondents agreed that they get enough feedback from their immediate supervisor about their performance to know if they are performing up to his/her expectations;
- Question #5 – 79% of the respondents agreed that their immediate supervisor does a good job of communicating important information to them in a timely manner.
- Question #6 – 75% of the respondents agreed with the statement that they receive an appropriate amount of guidance from their immediate supervisor.
- Question #7 – 65% of the respondents agreed with the statement that the goals and objectives of their Division are clearly communicated to them.
- Question #9 – 63% of the respondents agreed with the statement that the disciplinary process was fair.
- Question #11 – 63% of the respondents agreed with the statement that their Division contracts out the right amount of services.
- Question #15 – 90% of the respondents agreed with the statement that their Division provides a high level of service to the residents of Beverly Hills.
- Question #17 – 89% of the respondents agreed with the statement that the staff in their Division work hard in the delivery of services to the residents of Beverly Hills.

- Question #18 – 65% of the respondents agreed with the statement that they have the tools and equipment that they need to perform their job efficiently.
- Question #19 – 73% of the respondents agreed with the statement that they are given a real opportunities in their Division to improve their skills.
- Question #21 – 92% of the respondents agreed with the statement that the quality of work performed by their Division is high.
- Question #22 – 54% of the respondents agreed with the statement that the vehicles in their Division were in good condition, 20% of the respondents had no opinion, and 26% of the respondents disagreed with the statement.
- Question #23 – 67% of the respondents agreed with the statement that their Division has established clear performance expectations for its services.
- Question #24 – 88% of the respondents agreed with the statement that the employees in their Division are dedicated to meeting customer expectations.
- Question #25 – 90% of the respondents agreed with the statement that their immediate supervisor empowers them to make decisions concerning their work.
- Question #26 – 83% of the respondents agreed with the statement that they feel valued as a member of their Division.
- Question #27 – 89% of the respondents agreed with the statement that their current work assignments enable them to apply and practice their knowledge and skills.
- Question #28 – 89% of the respondents agreed with the statement that their Division is a good place to work.
- Question #29 – 73% of the respondents agreed with the statement that in the past year, they have had adequate training to develop their skills that they need to perform their job.
- Question #30 – 65% of the respondents agreed with the statement that the working relationships between the different divisions in the Public Works and Transportation Department are generally good.
- Question #31 – 67% of the respondents agreed with the statement that their Division is open to new ideas.
- Question #32 – 80% of the respondents agreed with the statement that they are recognized and appreciated for their work efforts by their immediate supervisor.

- Question #34 – 80% of the respondents agreed with the statement that the services provided by their Division do not duplicate those provided by another division in the Public Works and Transportation Department or by another department.

The following section presents those statements that respondents cited as opportunities for improvement.

(2) Respondents Had Mixed or Negative Perceptions and Attitudes with Respect to Twelve Statements.

There were twelve statements to which employees had a negative response. The statements are provided in the points below. At least 50% of respondents selected “disagree” or “strongly disagree” in response to the statements presented below.

- Question #1 – 40% of the respondents disagreed with the statement that the organizational structure of their Division was well suited to its responsibilities. 57% of the respondents agreed with the statement.
- Question #2 - 51% of the respondents disagreed with the statement that their Division has clear, well-documented policies and procedures to guide their day-to-day work. 48% of the respondents agreed with the statement.
- Question #3 – 51% of the respondents disagreed with the statement that they receive an annual performance evaluation. 42% of the respondents agreed with the statement.
- Question #8 – 45% of the respondents disagreed with the statement that their Division operates efficiently. 53% of the respondents agreed with the statement.
- Question #10 – 51% of the respondents disagreed with the statement that the promotional process is fair. 43% of the respondents agreed with the statement.
- Question #12 – 66% of the respondents disagreed with the statement that their Division has the administrative support it needs to accomplish its goals and objectives efficiently and effectively. 32% of the respondents agreed with the statement.
- Question #13 – 57% of the respondents disagreed with the statement that their Division is **not** frequently in a crisis mode due to workload that exceeds staff resources. 42% of the respondents agreed with the statement.

- Question # 14 – 77% of the respondents disagreed with the statement that in their Division, at present, staffing was adequate for the workloads that they handle. 22% of the respondents agreed with the statement.
- Question #16 – 54% of the respondents disagreed with the statement that the workload was evenly balanced among staff in their Division. 45% of the respondents agreed with the statement.
- Question #20 – 56% of the respondents disagreed with the statement that opportunities exist in the Public Works and Transportation Department for career advancement. 42% of the respondents agreed with the statement.
- Question #33 – 52% of the respondents disagreed with the statement that they have the right number of managers and supervisors in their Division. 47% of the respondents agreed with the statement.
- Question #35 – 55% of the respondents disagreed with the statement that the consolidation of the Engineering and Transportation Department and the Public Works and Transportation Department has worked well; the staff are now working effectively as a team in the consolidated Public Works and Transportation Department. 36% of the respondents agreed with the statement.

(3) Overall Response Sorted From Most Positive to Least Positive

The following table sorts the results for the respondents from the most positive to the least positive response for the thirty-five questions.

Question	Agree	No Opinion	Disagree
21. The quality of work being done in my Division is high	91.6%	0.0%	8.4%
15. My Division provides a high level of service to the residents of Beverly Hills.	89.7%	0.9%	9.3%
25. My immediate supervisor empowers me to make decisions concerning my work.	89.7%	0.0%	10.3%
17. Staff in our Division work hard in the delivery of services to the residents of Beverly Hills.	88.8%	0.9%	10.3%
27. My current work assignments enable me to apply and practice my knowledge and skills.	88.8%	0.0%	11.2%

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Question	Agree	No Opinion	Disagree
28. My Division is a good place to work.	88.8%	0.0%	11.2%
24. The employees in my Division are dedicated to meeting customer expectations.	87.9%	0.0%	12.1%
26. I feel that I am valued as a member of my Division.	83.2%	0.9%	15.9%
32. I am recognized and appreciated for my work efforts by my immediate supervisor.	80.4%	1.9%	17.8%
34. The services provided by my Division do not duplicate those provided by another division in the Public Works and Transportation Department or by another department.	80.4%	1.9%	17.8%
5. My immediate supervisor does a good job of communicating important information to me in a timely manner.	78.5%	0.0%	21.5%
6. I receive an appropriate amount of guidance from my immediate supervisor.	74.8%	1.9%	23.4%
19. I am given real opportunities in my Division to improve my skills.	72.9%	0.9%	26.2%
29. In the past year, I have had adequate training to develop the skills I need to perform my job well.	72.9%	3.7%	23.4%
4. I get enough feedback from my immediate supervisor about my performance to know if I am performing up to his/her expectations.	68.2%	0.0%	31.8%
23. My Division has established clear performance expectations for its services.	67.3%	2.8%	29.9%
31. My Division is open to new ideas.	67.3%	0.9%	31.8%
30. The working relationships between the different divisions in the Public Works and Transportation Department are generally good.	65.4%	3.7%	30.8%
7. The goals and objectives of my Division are communicated clearly to me.	64.5%	0.0%	35.5%
18. I have the tools and equipment I need to efficiently perform my job.	64.5%	0.0%	35.5%
9. The disciplinary process is fair.	62.6%	4.7%	32.7%
11. My Division contracts out the right types of services.	62.6%	9.3%	28.0%
1. The organizational structure of my Division is well suited to its responsibilities.	57.0%	2.8%	40.2%
22. The vehicles assigned to my Division are in good condition.	54.2%	19.6%	26.2%
8. My Division operates efficiently.	53.3%	1.9%	44.9%
2. My division has clear, well-documented policies and procedures to guide my day-to-day work.	47.7%	0.9%	51.4%
33. We have the right number managers and supervisors in my Division.	46.7%	0.9%	52.3%
16. Workload is evenly balanced among staff in my Division.	44.9%	0.9%	54.2%
10. The promotional process is fair.	43.0%	5.6%	51.4%
3. I receive an annual performance evaluation.	42.1%	6.5%	51.4%

Question	Agree	No Opinion	Disagree
13. My Division is not frequently in a crisis mode due to workload that exceeds staff resources.	42.1%	0.9%	57.0%
20. Opportunities exist in the Public Works and Transportation Department for career advancement.	42.1%	1.9%	56.1%
35. The consolidation of the Engineering and Transportation Department and the Public Works and Transportation Department has worked well. The staff are now working effectively as a team in the consolidated Public Works and Transportation Department.	35.5%	9.3%	55.1%
12. My Division has the administrative support it needs to accomplish its goals and objectives efficiently and effectively.	31.8%	1.9%	66.4%
14. In my Division, at present, staffing is adequate for the workloads we handle.	21.5%	1.9%	76.6%

3. EACH OF THE DIVISIONS WITHIN THE PUBLIC WORKS AND TRANSPORTATION DEPARTMENT IDENTIFIED DIFFERENT CHALLENGES FACING THE DIVISION.

The response patterns within each of the divisions of the Public Works and Transportation Department varied, as would be expected. The respondents in each division identified unique challenges that faced that division. The paragraphs that follow present these challenges for each of the divisions.

(1) Administration

This Division had the highest overall number of least positive responses of all of the divisions. Of the thirty-five questions, thirteen or 37% received a response that consisted largely of disagree or strongly disagree. Two questions received a response of strongly disagree. These include question #3 (I receive an annual performance evaluation) and question #14 (In my Division, at present, staffing is adequate for the workloads we handle.).

(2) Project Administration

This Division had seven responses (or 20% of the total) that consisted largely of disagree or strongly disagree. Three questions received a response of strongly disagree. These include question #3 (I receive an annual performance evaluation), question #30 (The working relationships between the different divisions in the Public Works and Transportation Department are generally good), and question #35 (The consolidation of the Engineering and Transportation Department and the Public Works and Transportation Department has worked well. The staff is now working effectively as a team in the consolidated Public Works and Transportation Department.).

(3) Transportation

This Division had five responses (or 14% of the total) that consisted largely of disagree or strongly disagree. None of the questions received a response of strongly disagree.

(4) Infrastructure Maintenance

This Division had eleven responses (or 31% of the total) that consisted largely of disagree or strongly disagree. One question received a response of strongly disagree. This was question #14 (In my Division, at present, staffing is adequate for the workloads we handle.).

(5) Environmental Utilities

This Division had ten responses (or 29% of the total) that consisted largely of disagree or strongly disagree. One question received a response of strongly disagree. This was question #3 (I receive an annual performance evaluation.).

(6) Civil Engineering

This Division had eight responses (or 23% of the total) that consisted largely of disagree or strongly disagree. Two questions received a response of strongly disagree. These included question #3 (I receive an annual performance evaluation), and question #22 (The vehicles assigned to my Division are in good shape.).

(7) Parking Operations/Collection

This Division had five responses (or 14% of the total) that consisted largely of disagree or strongly disagree. One question received a response of strongly disagree. This was question #22 (The vehicles assigned to my Division are in good shape.).

3. ANALYSIS OF ADMINISTRATION

3. ANALYSIS OF ADMINISTRATION

This chapter presents an analysis of the Administration Division of the Public Works and Transportation Department. This analysis includes the following:

- A strategic plan;
- Goals, objectives, and performance measures;
- A long-term information technology plan;
- An effective asset management plan;
- The use and application of technology;
- The use and application of customer satisfaction surveys;
- The support staff for managers and supervisors;
- A training needs assessment for staff;
- The development of a policy and procedures manual and employee handbook;
- The development of a more formalized safety program;
- The development of an equipment operator training program; and
- An employee recognition program.

The chapter opens with an analysis of strategic planning for the Department.

1. THE PUBLIC WORKS AND TRANSPORTATION DEPARTMENT EMPLOYS A NUMBER OF BEST PRACTICES IN DEPARTMENT ADMINISTRATION.

An organizational and management analysis by its nature focuses on opportunities for improvement. However, there are a number of strengths in the administration of the Public Works and Transportation Department. Examples of these strengths are portrayed below.

- The Public Works and Transportation Department centralizes the public works services delivered by the City.
- The Department has acquired and installed FASTER for Fleet Management. The Department is in the process of installing the Hansen maintenance and work order management software, version 8.0.
- Customer satisfaction surveys are sent to residents / business owners whose service requests have been input into the Online Business Center (OBC).
- The City has recently conducted first-line supervisory training and management training.
- The City is in the process of developing a citywide employee performance management system.
- The City publishes a citywide newsletter.

These strengths in the administration of the Department provide a sound basis for further enhancements.

2. A NUMBER OF BEST PRACTICES FOR EFFECTIVE MANAGEMENT CONTROLS IN PUBLIC WORKS AND TRANSPORTATION DEPARTMENTS WERE IDENTIFIED.

Good management systems and controls can help the Public Works and Transportation Department provide safe, reliable infrastructure and services. The project team's review of industry publications, the *Public Works Management Practices Manual*, standards developed by the American Water Works Association, the Water Environment Research Foundation, other professional associations, and discussions with management of the Public Works and Transportation Department indicates that critical components of good maintenance management should include a number of elements, as follows.

(1) A Comprehensive Maintenance Plan

The adoption of a comprehensive maintenance plan is essential to the effective operation of public works infrastructure. The plan should establish overall maintenance goals, standards for the amount and frequency of work, and maintenance priorities. By defining the amount of maintenance effort that will be conducted, resource requirements can be more precisely estimated. The plan should identify long-term capital replacement needs, estimate the life of the infrastructure assets, and focus efforts on the most important maintenance tasks. The comprehensive plan should also provide benchmarks against which to measure the performance of the maintenance program in addressing goals and standards.

(2) Written Maintenance Policies and Procedures

Written maintenance policies and procedures provide specific guidance on how to carry-out the maintenance plan and perform activities such as hydrant flushing, valve management, and water main replacement. Written policies and procedures should be used to train new staff, ensure maintenance work is correctly and consistently performed, and improve productivity of work crews. Written policies and procedures also provide standards for judging the quality of maintenance work and guidance to contract work crews.

(3) Reliable, Easily Accessible Information on Assets

According to the American Water Works Association, the “collection and management of information is a key element in the successful operation of a water system. Information is the necessary link between the maintenance, operation and design aspects of water distribution system management.” Reliable information on the

nature, function, location, age, and condition of system assets is needed to ensure effective communication and coordination within the organization; to plan, carry out, and manage maintenance and repair work; and to plan capital improvements and replacements. Up-to-date information in the form of maps and data must be readily accessible to all employees and is most effective when fully integrated into an electronic maintenance management system.

(4) Methods For Organizing and Scheduling Work

The Public Works and Transportation Department also requires efficient methods for organizing staff resources in work units and scheduling work crews. A centralized asset management system – Hansen v.8 - should be used to prioritize, assign and track the status of assigned work. Managers can control job costs by monitoring the time and costs of specific job requests and reduce duplicative efforts. This system is also most effective when integrated into geographic information systems.

(5) Performance Goals and Monitoring

Effective management systems should also provide information so managers can actively monitor and measure the organization’s performance in meeting goals and objectives for quality, efficiency, and timeliness. Performance measures track the productivity of work crews, efficiency of maintenance work, and accomplishment of maintenance plans. Performance reporting provides accountability to top management, the Mayor, and the City Council, and aids budget and operational decision-making. Moreover, monitoring performance trends over time provides early warning of maintenance backlogs, declining asset conditions, and the need for corrective actions.

* * * * *

The next several sections of this chapter assess how effectively the Public Works and Transportation Department meets these best practices.

3. THE PUBLIC WORKS AND TRANSPORTATION DEPARTMENT SHOULD DEVELOP A CLEARLY WRITTEN FIVE-YEAR STRATEGIC PLAN.

Public sector managers are often so preoccupied with immediate issues that they lose sight of their ultimate goals. That's why a strategic plan is a virtual necessity. It may not be a recipe for success, but without it the Public Works and Transportation Department is less likely to achieve its goals. A sound plan should:

- Serve as a framework for decisions or for securing support / approval;
- Explain the goals and objectives of the Department to others in order to inform, motivate and involve;
- Assist benchmarking and performance measurement; and
- Stimulate change and become the building block for the next plan.

The best practices regarding development of a strategic plan that should be utilized by the Public Works and Transportation Department are presented in the table below:

<p>The department has a multi-year strategic plan with annual goals and measurable objectives based on identified needs, projected workload, and expenditures and revenues.</p>
<p>The department maintains and publishes a clearly written, multi-year (five years at a minimum) strategic plan to provide vision and direction for the department. The plan links citywide and department goals.</p>
<p>In developing the strategic plan, the department:</p> <ul style="list-style-type: none"> • Identifies and formally adopts a limited number (5 to 10) of departmental priorities to guide the department's strategies and major financial and program decisions; • Considers the impacts of the city's financial condition, current expenditures by the department, and opportunities to reallocate staff and other resources to enhance performance; and • Instructs departmental management on how these priorities should be considered in making program and budget decisions.

<p>The strategic plan clearly delineates the department goals, and objectives and strategies for achieving them. In developing these strategies, the department considers alternative service delivery systems such as outsourcing.</p>
<p>The plan also delineates the priorities the City Council and City Manager assign to its goals, objectives, and strategies.</p>
<p>The objectives in the strategic plan are measurable, and the department has set annual objectives for each goal for at least five years into the future.</p>
<p>The department's goals, objectives, and performance measures are based on past performance, identified needs, projected workload, and expenditures and revenues.</p>
<p>The plan delineates the managers responsible for implementing the strategies in the plan and the time frames for implementation.</p>
<p>The department head annually assesses the progress the department has made toward achieving the goals and objectives in the plan.</p>

In developing the strategic plan for the department, the Department should (1) identify its strengths, weaknesses, threats (e.g., slowdown in growth of City revenues), and opportunities (e.g., increased use of technology); (2) develop a vision and mission statement for the Department; (3) define the goals, objectives and strategies the Department will utilize to achieve those goals, objectives and strategies; and (4) define the managerial responsibilities for accomplishing those goals, objectives and strategies.

The Los Angeles County Department of Public Works developed a strategic plan. This plan identifies a number of strategic planning issues including the quality of the County's infrastructure, the large unfunded mandates in water quality and waste reduction, and enhancing the Department's workforce configuration and career opportunities. The strategic plan then lays out eleven (11) action plans to address each of these issues. Examples of these action plans include infrastructure assessment, funding strategies, career paths and workforce planning, internal departmental

communication, etc. The strategic plan developed by this department is eighty-six pages long.

The two Management Analysts in the Administration Division should be responsible for facilitating the development and implementation of the Department's strategic plan.

Recommendation: The Public Works and Transportation Department should develop a clearly written, five-year minimum, Strategic Plan.

Recommendation: The Management Analysts should be responsible for facilitating the development and implementation of the Department's strategic plan.

4. EACH PROGRAM WITHIN THE PUBLIC WORKS AND TRANSPORTATION DEPARTMENT SHOULD DEVELOP GOALS, OBJECTIVES, AND PERFORMANCE MEASURES.

Each division head should be held accountable for developing goals, objectives, and performance measures and presenting them to the Director each year as part of their budget proposal at the program level.

Goals should be developed for each division with objectives developed for each cost center or activity such as traffic signal maintenance and repair, signal construction, street striping and legend painting, sign maintenance and repair, and the like. Performance measures should then be developed to assess the workload, efficiency, and effectiveness with which these objectives are accomplished.

The development of goals, objectives and performance measures at the program level by the Department should consider the guidelines presented below.

- **Goals could be developed for each division and each program within a division.** These goals could give specific direction on how the divisions, and the programs within these divisions, will contribute to the mission and goals of the

Department. These goals could be not quantifiable. These goals could span multiple years.

- **Objectives could be developed for each program.** Objectives are outcome-based statements of what specifically will be achieved within the fiscal year. Each program could have 3 to 5 objectives. The objectives could clearly demonstrate progress toward the goal of the program. These objectives could be written to allow measurement of progress, and be quantifiable.
- **Performance measures could be developed for each objective.** Performance measures could convey the extent to which an objective has been met. These measures could include a range of indicators including input, output, efficiency, service quality and outcome. For example, an input measure would be the value of the resources used to produce output such as the dollars spent on contract seal coating of streets or the staff hours used to patch potholes in streets. An output measure is the quantity or number of units produced such as the linear feet of sewer mains that were cleaned. An efficiency measure is the inputs used per unit of output such as the cost per water distribution valve exercised. A service quality measure is the degree to which customers are satisfied with a program or how accurately or timely a service is provided such as the frequency that all of the water distribution valves are exercised. An outcome measure is the qualitative consequences associated with a program or service – the ultimate benefit to a customer. An example would be the amount of claims paid by the City for tripping over sidewalks.
- **The Department could develop reliable and accurate data to measure performance.** Each performance measure needs a consistent reliable data source. The Department could acquire and install the information systems necessary to develop good data sources. This would include a range of data sources such as citizen satisfaction indicators, facility condition ratings, etc. Departmental management and staff could work closely together to define the method, frequency, and reliability of data collection.
- **The Department could communicate and use performance measurement data for decision-making and accountability reporting.** Top management of the Department could communicate their commitment to the value and use of goals, objectives, and performance measures to all Departmental managers and supervisors. Management could involve line managers and staff in the development and reporting of goals, objectives, and performance measures. The Departmental managers could communicate the results of these goals, objectives, and performance measures internally to its staff.

Each division head should report quarterly to the Director regarding their progress in achieving their goals and objectives using the performance measures as a measure of progress.

The Management Analysts should be assigned responsibility for providing training and technical assistance to the Department's managers and first-line supervisors in the development of goals, objectives, and performance measures.

Concurrently, the Department's Management Analysts should be assigned responsibility for providing training and technical assistance to first-line supervisors and other staff as needed for collecting the data needed to track their activities against established goals, objectives, and performance measures. Data gathered by staff should be compiled on a regular basis by Management Analyst positions, and a report generated monthly to the Division and Department Heads.

Recommendation: The Department should develop goals, objectives, and performance measures.

Recommendation: The Management Analysts should be assigned responsibility for providing training and technical assistance to the Department's division managers and first-line supervisors in the development of goals, objectives, and performance measures.

Recommendation: The Management Analysts should be assigned responsibility for providing the necessary training and technical assistance required for collecting performance data.

5. THE DEPARTMENT SHOULD DEVELOP AN INFORMATION TECHNOLOGY STRATEGIC PLAN.

The near explosive expansion of technology, the advent of PDA technology and applications, and increasing demands for technology in the field to support field operations -- all part of the information revolution -- intensify the need to look at a full

array of information technologies (data, voice, image) and the needs of the Public Works and Transportation Department over the next several years.

These are all reasons for the Public Works and Transportation Department to develop an information technology strategic plan: to focus scarce resources where they will have the greatest and most beneficial impact. The information technology strategic plan should have a three-year horizon, but should be updated every fiscal year.

The Los Angeles County Department of Public Works developed an information technology strategic plan. The department described the purpose of its strategic plan as follows:

- The purpose of the Information Technology Strategic Plan was to provide a strategic direction for information systems and guide the use of information technology to support the achievement of the department's business goals. The Information Technology Strategic Plan will provide a roadmap for implementation of future information technology. It also will serve as management's principal working document for the next three years as DPW continues to upgrade and enhance its information systems.
- The objectives of this effort included:
 - Articulate the department's business vision, mission and key goals to provide a framework for information technology strategic planning.
 - Conduct high-level assessment of department's current information technology environment including:
 - Organization
 - Applications
 - Data
 - Infrastructure
 - Projects.
- Develop recommendations for improved technology that will support the achievement of the department's business goals.
- Prepare a three-year information technology strategic plan that reflected a vision for future use of technology and provides a framework for operational and tactical decisions.

The Public Works and Transportation Department should develop its own information technology strategic plan. The two Management Analysts should be assigned responsibility for development of the plan with the cooperation of departmental management and first-line supervisors.

The Department should utilize the following approach in developing its information strategic plan:

- **Briefly describe the major business challenges and how the Department plans to use information technology to contribute to overcoming these challenges.** Include the contributions the Department's initiatives will make to Beverly Hills' information technology goals as described in the citywide information technology strategic plan. Describe the planning process used and the parties included.
- **Describe the mission of the department.** This is a statement of why the Department exists and its fundamental purpose. Also, briefly describe the primary program or service areas of the Department.
- **Describe the primary business objectives for the next three years (or for that time frame for which they are formally established).** A three-year business-planning horizon starts with the first day of the next fiscal year. This serves as the point of reference for information technology strategies and tactics required in the Department plans.
- **Describe the Department's information technology strategies to support the business functions of the Department.** An information technology strategy is a statement of direction, approach, and/or method as to how the Department will apply information technology to achieve its business functions. Department information technology strategies should conform to the citywide information technology strategic plan currently being developed or should be justified and approved by the Information Systems department before implementation.
- **Describe the Department's level of compliance and/or plans to comply with the approved Information Systems Department standards.** If the Department is not currently in compliance with these standards, it should list the activities, time frames, and major issues associated with achieving compliance.
- **Describe all department information technology projects that will have an estimated development and implementation cost (not operations) of**

\$25,000 or more and that will be submitted to the City Council for approval to begin in or continue into the next three fiscal year(s). A project is defined as an expenditure of resources to build and implement an information technology based product or service or the capability to provide a information technology based product or service. Examples of such activities involve software applications, information technology equipment, information technology training and planning. Include all information technology projects meeting this threshold regardless of source of funds or funding category. For each project, include the following:

- Project title.
- Project description. Is this a new project or an upgrade to an existing project?
- Project start and end dates (nearest quarter).
- Project focus. What strategies, goals and business needs of the Department and the City does the project support? What opportunities have been identified for sharing of hardware and software resources?
- Cost-benefit analysis:
 - What are the measurable improvements in effectiveness and productivity (i.e., service level increase, service outcome and cost reduction) that will result from the technology?
 - What is the measurable reduction in organizational overhead that can be achieved or the amount of overhead resources that can be transferred to direct customer service?
 - How will current equipment and technology investments be maximized?
 - What is the detailed project costs, including personnel, integration and annual support?
 - What re-engineered work processes have been considered?
- Project Management:
 - Identify the system development, maintenance, operation and project management practices that will be used to successfully support the investment over the life of the application?
 - Identify who has been given the responsibility and authority to manage the project and what are the project outcome measurements?
- Data Management:

- Does the project focus on providing front-line, service delivery staff with the tools to access all needed information? If so, how?
 - Will information captured or generated by the application, regardless of its location within the City, be universally available (subject to the need and right to know)?
 - Will information be delivered for direct client services, for management analysis and for business decisions? If so, how?
 - What opportunities have been identified for information to be shared by other departments to minimize the cost of collection and maintenance and to maximize accuracy?
- Project Technology:
- How does the technology support the integration of different products acquired at different times for different purposes?
 - Will the project employ technology that includes proven off-the-shelf systems, or does the project include production pilots and other small-scale trials in order to reduce project risks or to evaluate the creative use of technology?
 - Are the communication systems compatible with the City's communication infrastructure? If so, how?
 - In what ways will the technology improve public access to City government by citizens?
- Project Funding:
- What is the source of funding?
 - If this project is funded outside the general fund, what are the restrictions?
 - Who will pay for on-going project maintenance and support?

The Department should provide a summary of information technology expenditures requests. The budget and the Department's information technology plans should include the following costs:

- Current and on-going hardware acquisition and maintenance;
- Infrastructure acquisition and maintenance;
- Software acquisition and maintenance; and
- Staff training.

In developing this information technology strategic plan, the Department should strive to achieve the best practices presented in the exhibit on the following page.

The Management Analysts should be assigned responsibility for providing support to the Department's managers in the development of the information technology strategic plan.

Recommendation: The Department should develop an Information Technology Strategic Plan with at least a three-year horizon.

Recommendation: The Department should update the Information Technology Strategic Plan annually.

Recommendation: The Management Analysts should be assigned responsibility for facilitating the development of the IT Strategic Plan, including providing necessary training and technical support to the Department's Managers.

6. THE PUBLIC WORKS AND TRANSPORTATION DEPARTMENT SHOULD INSTALL THE HANSEN ASSET MANAGEMENT SYSTEM.

The Public Works and Transportation Department has not developed a comprehensive maintenance plan. While the department has had the Hansen maintenance management system available for installation since 1997, it has not been installed.

The Public Works and Transportation Department should install version 8 of the Hansen maintenance management system and install this system for traffic signal and street light maintenance, facility maintenance, wastewater collection system maintenance, storm water collection system maintenance, and water distribution system maintenance. The City's should use Hansen V.8 to enable managers to answer such questions as the following:

- **Are Public Works and Transportation Department preventive maintenance procedures working?** The management of the Department should be able to look at total employee hours, grouped by work type or class, comparing the amount of Emergency/Breakdown repairs to the amount of preventive maintenance work accomplished. This should enable management to assess the extent of a decline in Emergency/Breakdown repairs if preventive maintenance tasks are performed at the correct frequency. The Public Works and Transportation Department cannot answer this question at present.
- **Are Public Works and Transportation Department preventive maintenance inspection frequencies adequate?** The management of the Department should be able to look at the number of scheduled work orders, grouped by work type or asset comparing the amount of work that was identified as a result of performing preventive maintenance (such as televised inspections of sewer mains or leak detection inspections of water mains) to preventive maintenance standards and guidelines promulgated by such organizations as the American Water Works Association. The Public Works and Transportation Department cannot answer this question at present.
- **Where are my problems in reliability and where should my maintenance department focus their limited resources?** The management of the Department should be able to look at the total cost for work type or class Emergency/Breakdown and Call-In, sort the work requests by asset, and sort by location. This will identify by asset where all the costs are being accumulated. This is typically referred to as the “Top 10” list or “Bad Actors” report. This is essential in identifying where water or wastewater mains should be replaced, streets resurfaced, etc. The Public Works and Transportation Department cannot answer this question at present.
- **Where is maintenance spending their energy?** The management of the Department should be able to look at the total employee hours grouped by work type or class. Depending on the established work types, this will identify the type of work that the maintenance organization is accomplishing. This is critical to ensure true maintenance work is being accomplished in support of production goals and targets. The Public Works and Transportation Department cannot answer this question at present.
- **What is our backlog of work?** The management of the Department should be able to look at the backlog of work, assuring that there is no less than 2 weeks and no more than 4 weeks of backlog (all parts/materials available waiting scheduling). The Public Works and Transportation Department cannot answer this question at present.
- **How efficient is our maintenance workforce?** The management of the Department should be able to review the labor hours per work order and

compare these to benchmarks that exist for the different work activities such as pothole patching, street sweeping, distribution valve exercising, etc. The Public Works and Transportation Department cannot answer this question at present.

- **How much money is our department spending on maintenance and repair for the various types of work activities?** This includes parts, material and supply costs, contractor costs, and maintenance labor costs. The management of the Department should be able to look at the material cost, contractor cost, and labor cost grouped by work type. The Public Works and Transportation Department cannot answer this question at present.

Hansen should be utilized to serve as the basis of a comprehensive maintenance plan that identifies the services provided (e.g., traffic signal cabinet preventive maintenance), the levels of service (e.g., traffic signal cabinets are preventively maintained once a year), the outputs of each of these services (e.g., the number of traffic signal cabinets preventively maintained), and the costs of those service, both total and per unit of output. This is not an idealized perspective of what the Public Works and Transportation Department should be doing, but a basic perspective of what is necessary to manage the maintenance and repair of the City's infrastructure.

There are a number of elements to the successful installation of a comprehensive maintenance plan by the Public Works and Transportation Department.

These elements include the following:

- **Asset Management.** An asset inventory must be developed. This data is the constant of a successful comprehensive maintenance plan. Even if the latest technology tools have been implemented, a system without data is not very useful. Keeping asset information – features and location – up-to-date, accessible and understandable is the challenge of a successful comprehensive maintenance plan.
- **Work Management.** Work management includes all the activities involved in maintaining assets at a pre-defined condition level. The value of a successful comprehensive maintenance plan is its ability to recommend maintenance actions, such as which assets should be inspected or evaluated; and of those, which should have maintenance activities scheduled. Effective work

management predicts and tracks the costs of labor, equipment and materials needed for maintenance and budget planning, and monitors the performance of actions taken.

- **Service Request Management.** As a starting point for many of the activities and work orders within a Public Works and Transportation Department, service request management provides access to information such as citizen requests, work order generation and caller history. The ability to track the request(s) for work on an asset(s) provides a Public Works and Transportation Department with the ability to keep better track of their data and in turn provide a better level of service to their citizens.
- **GIS Integration.** The term Geographic Information System (GIS) has often been used as the broad term to describe asset management. In reality, a GIS is only **one piece** of the process—without up-to-date supporting asset data it has limited use. However, linking a database and a GIS makes another level of management available by providing more options to analyze asset information.
 - **Visual information.** A GIS can display asset symbols on a map with links to their corresponding database records. The GIS provides the ability to analyze data based on geographic information, allowing patterns to emerge on a map that may not be as obvious in rows and columns of data.
 - **Communication.** Asset information can be shared in a visual format that is often better understood by others including the Mayor, City Council and the public.
 - **Asset location.** Finding the location of an asset is faster and easier with the help of a map.

The Public Works and Transportation Department should install version 8 of the Hansen maintenance management system and install this system for traffic signal and street light maintenance, facility maintenance, wastewater collection system maintenance, stormwater collection system maintenance, and water distribution system maintenance. However, there are a number of steps that need to be accomplished before the Hansen management system can be effectively utilized in the development of this comprehensive maintenance plan. These steps are presented below.

(1) A Complete Inventory of Work Activities Performed By Traffic Signal And Street Light Maintenance, Facility Maintenance, Wastewater Collection System Maintenance, Stormwater Collection System Maintenance, and Water Distribution System Maintenance Needs to Be Developed.

The Public Works and Transportation Department needs to assure that all of the primary work activities (i.e., signal cabinet preventive maintenance, street sweeping, repairing water main leaks, pothole patching, crack sealing, drainage inlet cleaning, pavement legend painting, etc.) that consume the majority of staff work hours are defined. This would include all forms of leave. All 2,080 staff hours for each employee should be included within the system.

(2) Performance Standards Need to Be Developed.

Performance standards are formally established criteria for determining the need for work, required quality of work, the resources necessary to achieve quality and expected rate of productivity, etc. Maintenance standards are developed for each maintenance activity.

Each performance standard should include, at a minimum, six components:

- A brief description of the specific work involved;
- The frequency with which the work should be performed (or the level of service);
- The crew size required for the job;
- The equipment, material, and tools needed;
- The performance expectations for each job or average daily productivity; and
- The recommended procedures for completing the job.

A sample performance standard for traffic signal cabinet maintenance is presented in the exhibit following this page.

Example of a Performance Standard

ACTIVITY NO: 101	ACTIVITY NAME: Traffic Signal Cabinet Maintenance	DATE: Jan 99
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ACTIVITY DESCRIPTION:

Traffic signal cabinet maintenance includes the inspection, testing, cleaning and adjustments made to the traffic signal electronic equipment cabinet.

PERFORMANCE CRITERIA:

PRIORITY SERVICE

Preventative maintenance activity to be scheduled

SCHEDULED MAINTENANCE

Cabinet Maintenance will be performed twice annually

TYPICAL CREW SIZE:

1 Person

WORK METHOD:

- Test conflict monitor with computerized tester, record results
- Vacuum cabinet, open controller door, blow out controller
- Check timing on controller
- Spray cabinet with bug spray
- Check condition of cabinet documentation, replace as necessary
- List cabinet equipment on inventory sheet
- Check operation of vehicle loop detectors, tune if necessary
- Visually inspect loops and test pedestrian pushbuttons
- Check operation of cooling fan, set to 100°F
- Lubricate door locks

EQUIPMENT:

Hand tools	Vacuum Cleaner or	1 Van
Conflict monitor tester	compressed air bottle	

MATERIAL:

Non-conductive bug spray	Timing sheets	Checklists
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PRODUCTION STANDARDS:

- | | | |
|-----|---------------------------|----------|
| (1) | UNIT OF MEASUREMENT: | Cabinets |
| (2) | AVERAGE DAILY PRODUCTION: | 10 |
| (3) | MAN HOURS PER WORK UNIT: | 1.0 |

(3) An Annual Work Plan Needs to Be Developed.

An annual work plan needs to be developed within the Hansen maintenance management system that will not only guide managers and first-line supervisors in prioritizing and performing specific tasks, but will provide a document to hold managers and first-line supervisors accountable for results. The annual work plan estimates the kind and amount of work to be done in the next fiscal year. The managers and first-line supervisors should prepare the annual work plans as part of the budgetary preparation process. The development of an annual work program takes into consideration two major questions:

- What amount of work is needed to provide the desired levels of service to the public?
- What required levels of staff, equipment, and materials will be needed to provide that level of service and at what cost?

The annual work program serves as a planning document that establishes objectives for the coming fiscal year in terms of the specific work activities to be performed, the service levels to be provided, and the allocation of staff in the provision of these services. It provides a clear indication of the relationship between funding and service levels. It also serves as a valuable tool to model trade-offs between different funding levels and the level of service that can be provided.

The process for development of this annual work plan, outlined in the exhibit following this page, will fundamentally change the focus of managers and first-line supervisors from their current roles of field supervision to that of management of resources in order to ensure conformance with the annual work programs.

The second exhibit following this page presents a sample annual work program for street maintenance.

(4) A Monthly Performance Report Should Be Generated Comparing Planned Versus Actual Performance and Costs.

A sample monthly report is presented in the third exhibit following this page. The monthly report should be generated by the automated work order system. It should be designed to enable:

- A comparison of planned versus actual staff hours per work activity for the previous month and year-to-date for each work activity;
- A comparison of actual versus planned work output (miles of curbs swept by street sweepers) per month and year-to-date for each work activity;
- A unit cost analysis that compares the planned versus actual unit costs for each work activity per month and year-to-date; and
- A comparison of actual productivity (work output per staff hour) versus the expected productivity as stated in the performance standards.

* * * * *

Unfortunately, some asset management systems are unsuccessful or fail to even make it off the ground. This was the case in the Public Works and Transportation Department with Hansen v.7. The points below present common pitfalls to which departments, without the proper planning, often fall victim. Anticipating these challenges will help the department head off any potential problems and ensure the success of its management system.

- **Unclear Goals.** Having unclear goals and conflicting priorities lead to a system that will not satisfy the needs of the Public Works and Transportation Department. Identify the short- and long-term goals that the system is expected to produce and prioritize these.

Exhibit 2 (1)

**Management Requirements For
the Development of an Annual Work Plan**

Component in the Development of the Annual Plan	Requirement	Responsibility
<p>Identification of Information Sources and Needs</p>	<ul style="list-style-type: none"> • The Divisions should analyze the sources of information available in its determination of feasible service level targets. These include the daily work orders generated by each crew. • Work orders should be re-examined and re-designed to ensure the consistent and comprehensive capture of activity data between the component Units within the Division. 	<ul style="list-style-type: none"> • Although this step should be initiated by the managers and supervisors for each unit, it should involve, initially, the first-line supervisors as well.
<p>Analysis of Historical Trends in Services Provided</p>	<ul style="list-style-type: none"> • The Divisions should determine the levels of service which have been provided in previous years in order to proceed to the next step in the process, which is the determination of appropriate “targeted” service levels commensurate with the resources available. • This analysis should result in a historical listing of inputs as well as outputs for each service or activity. Examples include numbers of person-hours expended by work task such as pothole patching, signal cabinet preventive maintenance, etc. • This analysis will require a thorough review of the Division’s data within Hansen in order to extract person-hour data by activity. 	<ul style="list-style-type: none"> • Although the analysis may be delegated to first-line supervisors, the effort should be initiated by the managers for each unit. The Management Analysts should provide analytical assistance. • The Public Works and Transportation Director should be consulted in the process to ensure that proposed service levels are appropriate

Exhibit 2 (2)

Component in the Development of the Annual Plan	Requirement	Responsibility
Service Level Needs Analysis	<ul style="list-style-type: none"> • After the development and presentation of the raw data regarding historical trends, this trend data should be matched against available resources to determine the feasible targeted service levels for each activity. Input factors such as optimal crew sizes, required work, numbers of citizen requests, equipment availability, and others will be utilized in this determination. • The result of this step will be a definition of feasible targeted service levels for each activity type, as well as a priority listing of activities that are most critical for the Divisions to accomplish. This definition represents the foundation for future analyses that will focus upon the acceptability of the defined service levels, and the resulting refinement of resources needed, or alternatively, the need to reallocate existing resources to higher-priority activities. 	<ul style="list-style-type: none"> • Division Heads • First-line supervisors • The Public Works and Transportation Director should provide input into the process to ensure that priorities for work accomplishment are in accordance with Departmental expectations.
Identification of Personnel and Equipment Resources Needed to Accomplish Targeted Service Levels	<ul style="list-style-type: none"> • This step will be the natural result of the preceding step. The Divisions may, after analyzing historical trends and available staff and equipment resources, find that there is a mismatch between feasible and desired service levels. Refinements will be made, and will lead to the next step, which is the development of budgetary needs commensurate with the targeted service levels. 	<ul style="list-style-type: none"> • Division Heads • First-line supervisors • The Public Works and Transportation Director should provide input into the process to ensure that priorities for work accomplishment are in accordance with Departmental expectations.

Exhibit 2 (3)

Component in the Development of the Annual Plan	Requirement	Responsibility
Development of Program Budgets	<ul style="list-style-type: none"> • This step represents the relatively mechanical process of developing program budgets for each of the activities provided by the Division. It is important to note that this step should entail a routine examination of the feasibility of outsourcing specific functions, either due to the relative cost of in-house performance, or to the inability to accomplish certain tasks, defined in the work plan, with existing resources. • The development of the Division budget, therefore, is the result of an analysis of the work activities and service levels, as opposed to the projected escalation of expenses for the Division as a whole, based on the previous years' expenditures. 	<ul style="list-style-type: none"> • Division Heads • First-line supervisors • The Public Works and Transportation Director should be responsible for guiding the process, and for assembling and presenting the final budget package to the City Manager. The Public Works and Transportation Director will also be responsible for making decisions regarding budgetary reductions, additions or reallocations between Divisions prior to the development of the final package.
Activity Monitoring and Reporting	<ul style="list-style-type: none"> • Once targeted service levels have been defined and budgets established for each activity, each Division Head and first-line supervisor should receive weekly and monthly reports regarding work accomplished, work planned, and any resulting variations from the plan. • Variances from the plan must be documented, with a narrative explaining the impact on the Division's ability to meet performance targets. • Corrective actions must be defined. 	<ul style="list-style-type: none"> • Division Heads should be responsible for monitoring of budgets and work accomplishment according to plan, for each of their assigned areas. • Monthly meetings with the Public Works and Transportation Director should be planned. These meetings should focus on variances from plans, and the corrective actions necessary.
Management of Resources	<ul style="list-style-type: none"> • The reporting of time, activities and expenditures should not be a strictly reactive function. Refinements must be made to the allocation of resources as it becomes clear that problems have surfaced. Examples of problems that may legitimately cause deviations from original plans may include weather related problems, unforeseen employee absences or turnover, or cost/labor issues with contractors. 	<ul style="list-style-type: none"> • Division Heads should monitor these issues daily and make refinements.

Exhibit 3

**Sample Annual Work Program for
 Street Maintenance**

Work Activity	Quantity	Inventory Unit	Effort Level	Work Quantity	Work Unit	ADP	Crew Days	Crew Size	Labor Days	Labor \$	Equip. \$	Mat'l \$	Total \$
Program 01 – Street Maintenance Administration													
Vacation	2,200	Labor Hour	1.0	2,200.0	Labor Hour	24.0	91.7	3.0	275.0	\$68,750	\$0	\$0	\$68,750
Other Time Off	800	Labor Hour	1.0	800.0	Labor Hour	32.0	25.0	4.0	100.0	\$25,000	\$0	\$0	\$25,000
Sick	800	Labor Hour	1.0	800.0	Labor Hour	28.5	28.1	3.6	101.1	\$25,263	\$0	\$0	\$25,263
Meetings/Training	850	Labor Hour	1.0	850.0	Labor Hour	30.0	28.3	3.7	104.8	\$26,208	\$1,784	\$0	\$27,992
Program Totals									580.9	\$145,221	\$1,784	\$0	\$147,005
Program 02- Pavement Maintenance and Repair													
Pothole Patching	420	Lane Mile	0.6	252.0	Tons	2.8	90.0	2.0	180.0	\$45,000	\$19,008	\$19,548	\$83,556
Remove/Replace Base	420	Lane Mile	6.0	2,520.0	Sq. Yds	62.5	40.3	3.0	121.0	\$30,240	\$13,862	\$10,777	\$54,879
Skin Patching	420	Lane Mile	55.0	23,100.0	Sq. Yds	218.0	106.0	3.0	317.9	\$79,472	\$59,315	\$52,830	\$191,617
Crack Sealing	420	Lane Mile	5.0	2,100.0	Lbs. Sealant	350.0	6.0	3.0	18.0	\$4,500	\$3,586	\$1,775	\$9,861
Program Totals									636.8	\$159,212	\$95,771	\$84,930	\$339,913

Exhibit 4

Sample Performance
Report For Street Maintenance

Year-to-Date Work Progress Report for Street Maintenance
Period: July 1, 2006 – July 30, 2006

Work Activity	Labor Days		Amount of Work		Total Cost		Productivity	
	Plan	Actual	Plan	Actual	Plan	Actual	Plan	Actual
<i>Program: 08 – Pavement Maintenance</i>								
Pothole Patching	15	18	42 tons	40 tons	\$6,963	\$7,862	2.8 tons per crew day	2.4 tons per day
Remove/ Replace Base	10	26	210 Sq. Yds.	456 Sq. Yds.	\$4,573	\$9,602	62 ½ Sq. Yds. Per crew day	68 ½ Sq. Yds. Per crew day

- **Underestimating the Investment.** Underestimating the money, employee resources and length of time required to implement a maintenance management system is common. Be sure to budget dollars accordingly, planning not only for immediate expenses, but to maintain, update and enhance the system. Carefully planning the implementation process and the ongoing daily operations will help an organization realistically understand expectations, projected timeframes and associated costs. Data is an investment and has real value.
- **Bad Data.** The quantity of data is not as important as the quality of data. Too much data can be a hindrance—and inaccurate or inconsistent data cannot be processed or utilized effectively. The Public Works and Transportation Department should start with the most crucial elements and determine the standards for recording this information. The system can be expanded in the future by collecting additional fields of data.
- **The Maintenance Management System Is Not Maintained.** A system can't remain effective if it fails to be used according to procedure and does not receive periodic evaluations and enhancements. Relying on a single person – such as a Management Analyst – to carry the ongoing weight of keeping the system up and running is also a mistake. It is necessary that all managerial and supervisory levels within the Public Works and Transportation Department accept and adopt this new discipline and practice it daily. Without this commitment, the results will ultimately fall short of the defined goals.
- **Failure to Plan For the Future.** The system that is in use today is not the system that will be needed tomorrow. Systems that were selected based on price alone or for features that meet only the current goals are often inflexible – prohibiting the exchange of information with other agencies or departments. These systems are often difficult or impossible to expand or upgrade as needs change. The Public Works and Transportation Department should define long-term goals and make sure the decisions made today by the Department help reach those goals and will not hinder the process.

In April 2006, Hansen Information Technologies presented an estimate of the costs to transition to v.8. The estimated costs for installation of the Hansen version 8 asset management software necessary to support the maintenance management system are presented below.

- One (1) migration server license for work management, asset analysis, storm, street, water, and inventory control modules amounted to \$52,000.
- Eight (8) migration client access licenses for asset and work management

amounted to \$16,000.

- One (1) migration extended license for the Hansen Mobile Solution amounted to \$2,500.
- One (1) new server license for plant and sewer would amount to \$13,000.
- Twenty-two (22) new client access licenses for asset and work management would amount to \$44,000.
- New extended licenses for the Hansen Mobile Solution (3 licenses), GeoAdministrator (1 license), and MapDrawer (1 license) would amount to \$42,500.
- Professional services and fees charged by Hansen for implementation and installation assistance would amount to \$203,700. This includes such assistance as data analysis, data conversion, interface analysis and development, setup and installation of Mobile Solution, training, and out-of-pocket expenses.

The estimated one-time and annual cost for transitioning to Hansen version 8 is presented in the table below.

One-Time Cost Increase		Annual Cost Increase	
Transition to Hansen v 8	\$337,200	Annual Hansen licensing costs	\$34,000
Total Cost Increase	\$337,200	Total Cost Decrease	\$34,000

Recommendation: The Public Works and Transportation Department should develop and install Hansen v.8.

Recommendation: The Management Analysts should provide analytical assistance in the development and installation of the maintenance management system.

Recommendation: The Department should assign line staff from the Divisions in which Hansen v.8 is being installed to assist with configuration and testing, and backfill these employees with temporary employees.

7. THE CITY SHOULD AUTHORIZE AN INFORMATION TECHNOLOGY SYSTEMS INTEGRATOR FOR THE PUBLIC WORKS AND TRANSPORTATION DEPARTMENT.

There are a number of information technology research and consulting organizations that utilize benchmarks to assess the adequacy of an organization’s

staffing levels. Matrix Consulting Group utilizes benchmarks developed from its experience conducting management audits around the United States. In addition, benchmarks have been developed by and are compared to other industry leaders such as Gartner Group as a point of reference. These benchmarks include the following:

- Gartner reports that the average ratio of staff to users for private and public organizations is approximately 5 information technology staff to 100 users (“Benchmarks can help determine staff sizes”, February 2005). It is important to note that the ratio above represents all industries (i.e. private enterprises, government, and non-profit) and include information technology contractors and external service providers.
- Matrix Consulting Group has identified a best management practice for information technology staffing for municipal governments that was developed through our experience with local governments across the country. This measure calls for information technology staffing to represent between 2% to 3% of total City employment.
- The main difference between the ratio utilized by the Gartner Group and Matrix Consulting Group is that Gartner’s survey encompasses organizations in several industries, not just local government. As a result, software production companies and other corporate service organizations are included in Gartner’s figure. Matrix’s ratio includes only local governments across the United States.

The ratios identified above include all City information technology staff not just Information Technology Department employees. However, their application to the Information Technology Department, with its current staffing levels (excluding CATV, graphic arts, document production, and other non-information technology staff), indicate that the Information Technology Department is incapable of supporting the Public Works and Transportation Department in the installation and application of information systems essential to the goals of the Department.

The Public Works and Transportation Department attempted to install the Hansen asset management system once before; it failed. The Department is installing

or will be installing a number of other information technology systems including SCADA (supervisory control and data acquisition) for its water utility, an adaptive traffic signal control system for traffic engineering, a pavement management system, etc.

The Department, if it is to succeed in the installation and application systems, needs enhanced level of information technology support. The Information Technology Department is limited in their ability to provide this support, particularly for information systems that will not be used citywide, but only in the Public Works and Transportation Department.

To assure that these systems are successfully installed and applied, the City should authorize an Information Technology Systems Integrator. The role of the position would be to provide technical hardware and software support to users to improve and enhance computer systems to meet specific departmental business needs. The work would include assisting users with the evaluation, selection, acquisition and installation of hardware, software, and communications packages, and assisting users in problem analysis and providing advice leading to improved productivity and better integration of technology into their business operations. The essential functions of this position are provided below.

- Provide the day-to-day administration and maintenance of the Department's information software and hardware systems including Hansen, CCG / FASTER, the SCADA system, etc.
- Evaluate and analyzes Departmental processes, procedures, and workflow to determine the feasibility of different technology options and solutions to meet their requirements.
- Assist in system analysis, computer configuration, planning and training of employees on the Department's information technology systems to ensure optimal performance of the systems.

- Resolve information technology operational problems for users in their Department.
- Research, test and evaluate new software applications and upgrades of existing applications, and implement the installation and upgrades to the systems.
- Design and develop the Department's web pages.
- Assist in providing technical direction and support, including budget projections, for the Department in determining current and future software and hardware needs.
- Develop procedures manual and related forms to ensure smooth operations of information systems.
- Serve as a liaison to the Information Technology Department, and assist in prioritization, submission, and implementation of requests for service for the Department.
- Assure the development and installation of effective disaster recovery and contingency planning policies and procedures and security management and virus protection policies and procedures.

There is sufficient workload within the Public Works and Transportation Department to warrant the full-time assignment of this position exclusively to the Department. It is also a practice the Matrix Consulting Group has observed in other cities such as Scottsdale, Arizona and in Alexandria, Virginia, for example. These cities have assigned the equivalent of an Information Technology Systems Integrator to their public works department, and these positions are budgeted in these departments. These positions are utilized to support applications unique to these departments, while these information technology departments focus on city-wide applications.

This position should be authorized in the 2007-08 budget. It should be authorized for the Public Works and Transportation Department and be assigned full-time to the Department.

The estimated annual cost for this additional position, in terms of its annual salary and fringe benefits, is presented in the table below.

Cost Increase		Cost Decrease	
Authorize an Information Technology Systems Integrator	\$121,300	NA	
Total Cost Increase	\$121,300	Total Cost Decrease	\$0

Recommendation: The City should authorize an Information Technology Systems Integrator position. The position should be authorized for the Public Works and Transportation Department.

8. THE PUBLIC WORKS AND TRANSPORTATION DEPARTMENT AND THE INFORMATION TECHNOLOGY DEPARTMENT SHOULD DEVELOP AND ADOPT A SERVICE LEVEL AGREEMENT.

Information technology service level agreements have not been developed between the Public Works and Transportation Department and the Information Technology Department.

The purpose of service level agreements is to define the responsibilities of the Information Technology Department for doing business with its customers. These service agreements should document the following:

- The services to be provided;
- The funding resources required for acquisitions, maintenance, and repair;
- The terms and conditions under which the customer and the Information Technology Department will operate in order to properly support the Department’s information technology investment;
- The standard business practices including how compliance with the service agreement will be measured, problem (trouble) reporting protocol, how to request services, emergency service priorities, services provided after hours, etc.;
- The services provided and not provided; and
- The dispute resolution process.

The service level agreement is intended to provide a cost effective and reliable method for the Information Technology Department to provide technical support for:

- Network engineering;
- Desktop hardware services;
- Workgroup and enterprise applications support;
- Departmental mission critical applications services; and
- Application development services.

To ensure a predictable and cost effective level of availability of computers, networks and peripherals during normal business hours and an expectation of reasonable availability outside those times, the Information Technology Department is required to administer and maintain technology in a prescribed manner. The service level agreement is intended to provide an acceptable method of achieving this requirement.

Recommendation: The Public Works and Transportation Department and the Information Technology Department should adopt a service level agreement.

9. DEVELOP AN EQUIPMENT OPERATOR TRAINING PROGRAM.

The Public Works and Transportation Department lacks a formal equipment operator training program to provide training in the operation of heavy equipment such as backhoes, skip loaders, rollers, three-axle dump trucks, etc.

The Department should develop such a program to establish a standardized process by which equipment operators may advance through the progressive job classifications and so that the Department can be sure that its employees have been certified to operate heavy equipment before their actual use. Employees should be required to successfully complete operator safety instruction, and operator effectiveness

instruction consisting of classroom instruction and on-the-job equipment instruction. Training, for example, for operation of a backhoe could include earthmoving fundamentals such as the proper use of a variety of attachments to dig trenches, break rock and/or concrete, back-fill excavations, and scoop and/or dump materials, personal, work site and machine safety, pre-operation inspection and hands-on operation, and machinery maintenance. Training in the proper operation of a backhoe, for example, should not just focus on how to manipulate the controls and choose the right digging attachments. Operators should also learn applicable safety measures such as safe moving and operating procedures, safe excavating procedures and loading procedures.

Recommendation: The Public Works and Transportation Department should develop an equipment operator-training program for the proper and safe use of heavy equipment.

Recommendation: The Vehicle Maintenance Manager should develop the equipment operator-training program.

10. THE CITY SHOULD EVALUATE THE HANSEN AND THE ONLINE BUSINESS CENTER CUSTOMER RELATIONSHIP MANAGEMENT MODULES AND SELECT THAT SYSTEM THAT BEST MEETS THE CITY'S NEEDS.

In 1997, the Federal Communications Commission (FCC) designated 311 as the new national, voluntary, toll-free, three-digit phone number for non-emergency public calls. The Commission determined that:

- A 311 code would help facilitate effective and efficient communication between municipal government and citizens.
- An easily remembered 311 service would greatly help citizens access municipal services

3-1-1 is a straightforward concept. If citizens have questions or want information about City services, programs or facilities, they simply call 3-1-1, 24-hours a day, seven

days a week to speak with a call center agent. A number of cities in the United States have implemented 3-1-1 centers. This includes small to medium sized cities such as West Palm Beach, Florida; Reno, Nevada; Savannah, Georgia; Somerville, Massachusetts; Virginia Beach, Virginia; Hartford, Connecticut; Hampton, Virginia; Bethel, Alaska; Akron, Ohio; and Columbia, South Carolina,

The City of Beverly Hills does not operate a single point-of-communication for customers requesting non-emergency services and information. The City uses a decentralized approach with departments using one or more general information telephone numbers. Callers are often frustrated with this decentralized approach. It is not unusual for the customer to be transferred multiple times without receiving assistance. There are a number of problems with this decentralized approach as identified below.

- The decentralized approach inhibits the City's ability to establish an enterprise-wide view of customer interactions, implement citizen response standards, optimize citywide call center resources and evaluate call taker performances.
- In addition, it is not unusual for a high proportion of calls that are received by the Police Department's 9-1-1 Public Safety Operators are non-emergency in nature. Examples typically cited include citizens requesting general information or reporting non-urgent police and fire calls such as potholes, abandoned cars and traffic issues. The 9-1-1 Public Safety Dispatcher personnel generally handle the calls directly or refer the caller to the appropriate departments. This high percentage of non-emergency communications diverts resources and creates time delays from priority activities.

In cities and counties that instituted call centers, there was a belief that their current systems of customer service were insufficient and ultimately costly, and that the call center was a straightforward manner of reflecting a managerial philosophy of improving customer service and accountability. These cities have reported significant

and beneficial results from instituting 3-1-1 call centers. These results are portrayed.

- **Baltimore.** Baltimore implemented a 3-1-1 system in approximately June 2001. The City uses the system to enhance general citywide accountability. The City experienced a dramatic drop, nearly one-third, in non-emergency calls to the 9-1-1 system. Baltimore also experienced a reduction in the number of emergency dispatchers needed to staff the 9-1-1 function and improved 9-1-1 handling resulting in quicker response times. Additionally, after implementing 3-1-1, Baltimore experienced a:
 - 78% decrease in callers getting busy signals;
 - 67% reduction in average answer time;
 - 35% reduction in average abandoned time;
 - 82% reduction in calls receiving a recording; and
 - 17% decrease in times operators are busy on calls.
- **Chicago.** Chicago created its 3-1-1 call center by relocating 300 employees from various departments who already performed call center type functions, combining them into a single call center facility. Response time to service requests was a major focus in Chicago. With the new 3-1-1 Call Center, customer requests must be acknowledged or responded within two and a half hours, which allows for an opportunity to measure results and improve service delivery. Chicago also has a Web interface for creating service requests that are handled through the online service request system that supports their 3-1-1 Call Center.

The cities and counties that changed from old systems of customer service to centralized call centers to improve customer service and enhance accountability. In addition, even though cities and counties are in their early years of having installed the centers (an average of 16 months), all reported savings to the their respective municipalities.

The City is working with two vendors presently that offer 3-1-1- solutions: Hansen and Motorola, and has already installed a 3-1-1 system of sorts with the OBC.

The City utilizes the On-Line Business Center (OBC) as a central hub for almost all city applications including permit processing, project management, fee processing, asset management, building permits, inspections data, interdepartmental work orders, customer relationship management and document imaging.

The Public Works and Transportation Department also utilizes OBC for work orders and customer relationship management. The Department is acquiring the Hansen asset management system. This system also includes a customer relationship management module.

The City, including the Public Works and Transportation Department, should utilize the same 3-1-1 system. The Department should not utilize a different module than other departments in the City. The benefits of a single module include reduced costs from:

- Eliminating duplicate data capture and reducing errors resulting from transcription and reentry;
- Improving the consistency of information so it can be shared and reused;
- Improving the quality of information through increased standardization decreasing the need to reconcile inconsistent information and reduce the risks of poor decisions based on erroneous information; and
- Having the ability to cross reference information from residents and businesses so each department knows that they are dealing with the same individual and correlation tasks are minimized.

There is a community of interest in the City's departments in sharing information regarding their customers.

The project team recommends that the City evaluate the ability of the OBC, Motorola, and the ability of the Hansen to meet the City’s long-term needs. This evaluation should includes three steps.

- **Determine requirements for the 3-1-1 system.** This would include the objectives, functional needs, and technical requirements. Examples of these requirements could include the following:

Seamless integration of 3-1-1 system with GIS, the City’s financial system, OBC, and Hansen.
Ability to capture, track, and manage customer incidents via a queue centric workflow based upon the customer support process.
Workflow engine must support rules based and ad-hoc routing to queues.
Ability to clone customer incidents and establish parent / child relationship between related incidents.
Ability to define support processes and target resolution times or turnaround times specific to individual customers.
Support for multi-level alerts and notifications when a customer incident is exceeding a target turnaround time.
Ability to establish personalized customer support portals or pages for individual customers.
Integrated e-mail response management so that e-mails are automatically turned into service incidents and routed into the correct workflow queue.
Configurable “live chat” so that the City’s support staff can chat live with customers via a web page.
A simple to use knowledge base that allows the City’s support staff to search frequently asked questions and responses to those questions and submit questions and expose the knowledge base across the service organization.

- **Request both vendors conduct demonstrations.** The intent of these demonstrations should be to make obvious that they can meet these requirements, explaining how the City’s objectives will be met or exceeded, how the City’s technical requirements will be satisfied, how the deployment process is pain free, the nature and extent of their technical support and training, etc.
- **The total cost of ownership (TCO) over a three to five year period including initial one-time cost and ongoing licensing costs.** This is designed to enable the City to make an intelligent decision regarding the system and its associated costs.

In evaluating these systems, the City needs to also evaluate three aspects of OBC and Hansen. These three aspects are presented below.

- First is the work order management system, which lets them track and route requests appropriately. Work order management systems use workflow technology to route work requests to the appropriate city agency. With workflow tools, work orders can be handled differently according to predefined business rules.
- The second is the customer database, a subsystem allowing customer service representatives to reuse information already collected from residents and businesses to provide better service. It contains names, addresses, phone numbers, e-mail addresses, account numbers and other demographic data that keeps the City from having to repeatedly ask these questions. Properly configured, this subsystem can also serve as a basis for an online account for residents and businesses using the web, allowing them to review the status of other transactions.
- The third component is the FAQ (Frequently Asked Questions) database system. The FAQ collection of facts and information, cataloged and indexed, is known as knowledge management. FAQ feature could be adapted to allow customer service representatives to answer information requests quickly and easily. To fill the FAQ database, the City would comb the City's organization for questions and answers, finding out what types of calls divisions and departments received and how they handled them. During the implementation process, the City would develop the FAQ database for customer service representatives to use as a reference tool. Questions would be input into the system with their respective answers. The database would be indexed by keywords, meaning it could be searched in a Google-esque way. The system would keep track of hot topics and organizes the entry page accordingly, displaying the most popular FAQ's first. A valuable asset, the FAQ database would represent the intellectual capital of the enterprise. The database puts the knowledge of the entire work force at customer service representatives' fingertips.

Whether the City selects OBC or Hansen to provides the 3-1-1 system, the selected system must be able to successfully address each of these three aspects.

Recommendation: The City should select a customer relationship management module that best meets the City's needs.

11. THE PUBLIC WORKS AND TRANSPORTATION DEPARTMENT SHOULD DEVELOP A COMPREHENSIVE EMPLOYEE HANDBOOK.

The Public Works and Transportation Department should expand their employee handbook to include the Transportation and Engineering Divisions. The handbook should include information on such subjects as the Department's essential policies and procedures, the department's values and mission, employee rights and responsibilities, fringe benefits, general working requirements (workdays, leave policies, holidays, etc.), personnel evaluation process, grievance procedures, and compensation policies.

The handbook should provide an overview of policies and procedures. A comprehensive employee handbook not only places the Department in compliance with employment laws and regulations, but also reduces the risk of employment litigation and claims, and helps retain staff by providing them with the information they need.

Recommendation: The Department should develop an Employee Handbook.

Recommendation: The Department's Management Analysts should be assigned responsibility for the development of the employee handbook.

12. POLICIES AND PROCEDURES FOR THE DEPARTMENT SHOULD BE CLEARLY DOCUMENTED.

Many of the different divisions within the Public Works and Transportation Department are developing their own policies and procedures to guide their managers and supervisors in areas such as disciplinary action. This is a problem in that the different divisions could develop different policies to address the same issue.

The Public Works and Transportation Department should develop a policies and procedures manual to guide its managers and first line supervisors and assure uniformity in the critical processes of the Department.

In developing policies and procedures for the Department, the following approach should be utilized.

- Minimize. The policies and procedures should be kept to a minimum.
- Best Methods. Make certain the procedure represents the “best method”. This means the procedure has undergone detailed analysis and is continually challenged.
- Review and Revise. All policies and procedures should be reviewed annually.
- Keep Current. The problem with many policies and procedures is that they have long ago outlived their usefulness. No one remembers why the policies and procedures were created in the first place. Sometimes they contradict each other and create even more confusion. Responsibility for updating these policies and procedures should be clear.
- Short is better than long. It is not the quantity, but the quality of information that is the essential problem of the information age.
- Be ready to change. The key to organizational effectiveness and efficiency is finding a better way. The Department must always be ready to challenge current policy – throw it out – change it.
- The policies should be available on the Department’s intranet site. This should facilitate easy updating.

The two Management Analysts should be assigned responsibility for providing training and technical support to the department’s managers in the development of the policies and procedures manual.

Recommendation: The Public Works and Transportation Department should clearly document its policies and procedures.

Recommendation: The Public Works and Transportation Department should establish a policies and procedures committee, consisting of five to seven staff, that includes a representation of managers from all divisions.

Recommendation: The Management Analysts in the Department should be assigned responsibility for development of the policies and procedures manual working with the committee.

Recommendation: The completed policies and procedures manual should be posted on the City's Intranet and Website.

13. A FORMAL SAFETY MANAGEMENT PROGRAM SHOULD BE ESTABLISHED AND IMPLEMENTED.

The City of Beverly Hills' Risk Management Office is authorized one Risk Manager, is in the process of recruiting a Safety Officer, has developed citywide safety policies, and recently drafted a risk management manual.

However, the Public Works and Transportation Department does not have a comprehensive employee safety program. There are a number of elements, essential to effective employee safety program that are absent.

- The Department has not established goals, objectives, and performance measures for its employee safety program. These could include such objectives as the total number of recordable injuries and illness cases per 100 full-time employees shall be less than the average for local governments in California as reported by the Division of Occupational Safety and Health (DOSH) of California.
- The City does not provide a "core" safety training program for employees.
- The Public Works and Transportation Department does not have a designated Safety Coordinator.
- Neither the City nor the Department have active safety committees. Both should exist.
- An employee safety handbook has not been developed.
- Risk Management has not developed any tailgate safety training modules for delivery by first-line supervisors.

There are clearly a number of opportunities for the Public Works and Transportation Department to improve its employee safety program.

Recommendation: The Risk Management Division should work with the Public Works and Transportation Department to enhance the Department's employee safety program.

Recommendation; The Public Works and Transportation Department should establish goals, objectives, and performance measures for its employee safety program.

Recommendation: The Risk Manager should develop and deliver a “core” safety training course for all City employees. All City employees should be required to attend this training.

Recommendation: The Public Works and Transportation Department should designate an employee as the Safety Coordinator for the Department with this responsibility to be a related duty, and not a primary duty.

Recommendation: The Risk Manager should establish a citywide safety committee. The Public Works and Transportation Department should establish a Department-wide safety committee.

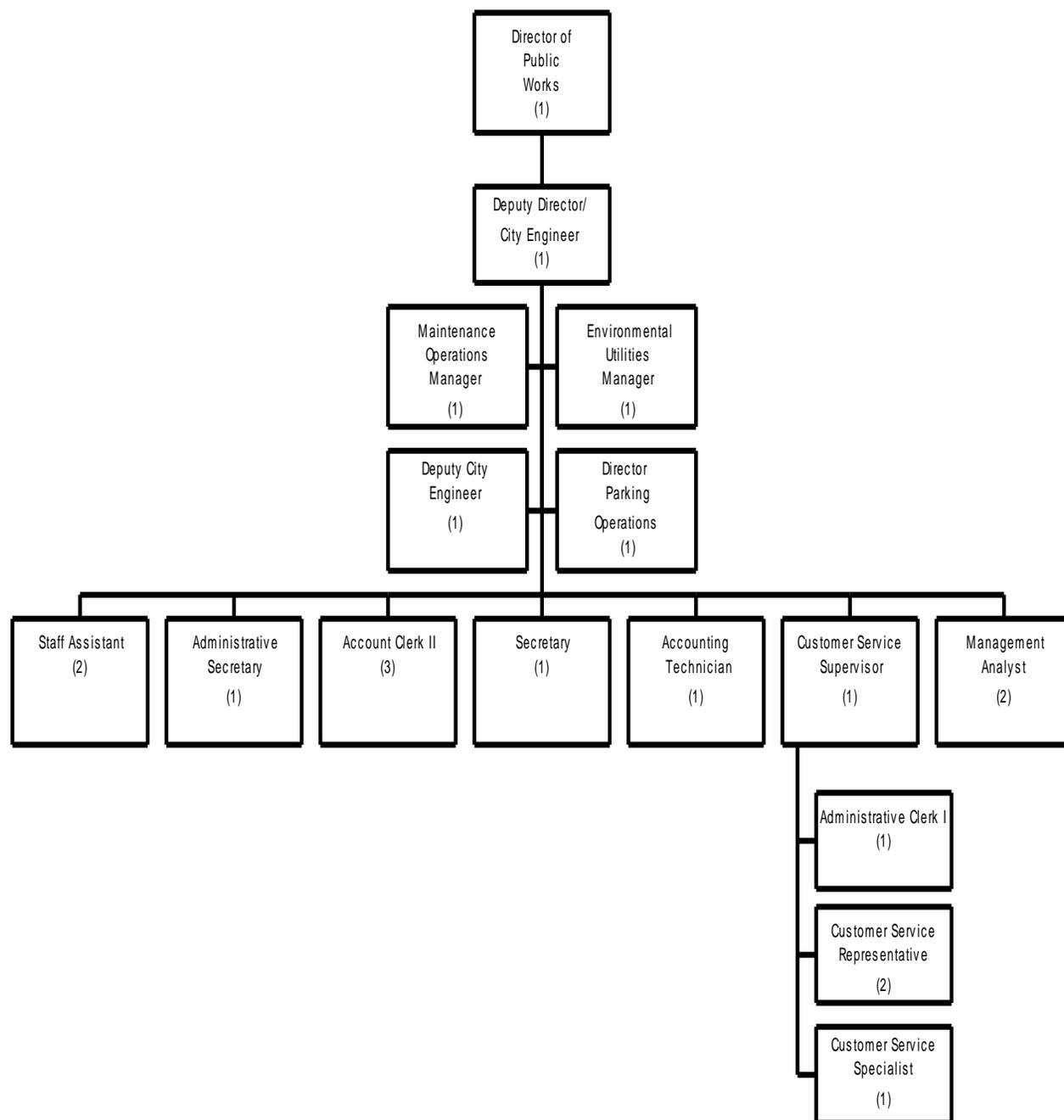
Recommendation: The Risk Manager should develop a citywide employee safety handbook.

Recommendation: The Risk Management Division should develop standard tailgate safety training modules for delivery by first line supervisors. First-line supervisors should be required to deliver these tailgate safety modules not less than once a month and report the names of the employees that attended.

14. A NUMBER OF OPPORTUNITIES FOR IMPROVEMENT NEED TO BE ADDRESSED IN THE ORGANIZATION AND SUPERVISION OF SUPPORT STAFF

The existing plan of organization for the Administration Division is presented in the chart below. As noted in the chart, the Deputy Director of Public Works and Transportation / City Engineer has a span of control of fourteen (14). The Deputy Director of Public Works and Transportation / City Engineer supervises all of the support staff, but when interviewed by the project team, support staff in many instances were not able to easily answer the questions, “who do you report to?” or “who assigns and monitors your workload on a daily basis?” The Deputy Director of Public Works and Transportation / City Engineer cannot effectively supervise fourteen (14) staff.

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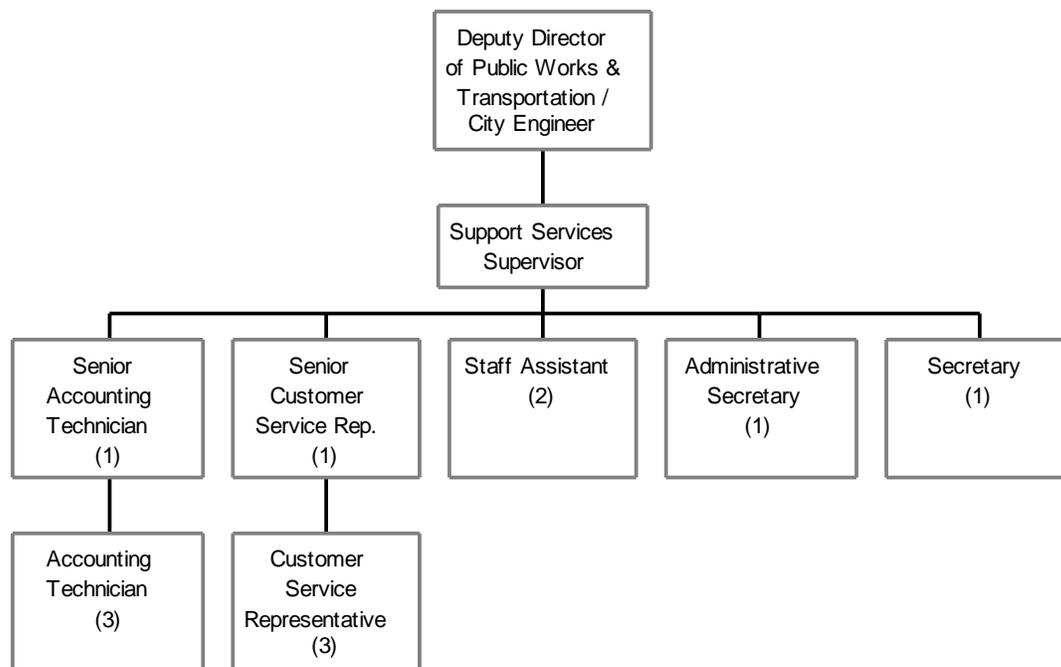
Lack of supervision for support staff, other than the Deputy Director of Public Works and Transportation / City Engineer, has created staff “silos” among accounting and support staff, and a lack of cross training and back-up support. The challenges noted by the project team among accounting and support staff include the following:

- Lack of effective day-to-day supervision for support staff with the exception of Customer Services;
- Inadequate work planning and scheduling for support staff with the exception of Customer Services;
- Imbalance of workload among support staff;
- A mismatch of work and compensation for support staff in several instances;
- The use of restrictive job classifications for support staff that limit flexibility in work assignments;
- The need to enhance internal controls for receipt of cash revenues;
- Lack of access to information by support staff that hinders productivity;
- The salary range for the Customer Services Supervisor is less than that of a position that the Customer Services Supervisor supervises – the Customer Services Specialist;
- The span of control for the Customer Service Supervisor is narrow; and
- A lack of annual formal performance evaluations for support staff.

To address these challenges, the project team recommends a number of changes to the plan of organization for the Administration Division and to a number of classifications in the Division.

(1) A Support Services Supervisor Position Should Be Created and Assigned Responsibility For Supervision of the Support Staff In the Administration Division.

Presented below is the proposed plan of organization for the Administration Division as it pertains to support staff.



Important points to note concerning the proposed plan of organization are presented below.

- The proposed plan continues the provision of support staff using a “pool” concept. The project team recommends that the Department continue to utilize the “pool” concept for the provision of its support services including as staff move to the Foothill facility from City Hall. The positives of maintaining this concept clearly outweigh the negatives. The ability to provide cross-training, provide coverage for leave and turnover, enhance segregation of duties, reduce “turf” battles, enable a “pooled” response to emergencies, etc.
- A Support Services Supervisor position should be established and assigned responsibility for supervision of all of the support staff in the Administrative Division. This position would report to the Deputy Director of Public Works / City Engineer. The classification necessary for this proposed plan of organization does not presently exist in the City’s classification plan.
- The Support Services Supervisor would supervise a Senior Accounting Technician, a Senior Customer Services Representative, two Staff Assistants, an Administrative Secretary, and one Secretary. This would result in a span of control of six for the Support Services Supervisor.
- A Senior Accounting Technician position would function as a lead worker responsible for leading and participating in the accounting work performed by the Division. The Senior Accounting technician classification does not presently exist

in the City's classification plan. With the creation of this position, one of the existing Accounting Technician / Clerk positions in Administration should be eliminated through attrition.

- A Senior Customer Services Representative should be established with responsibility to lead and participate in serving as the initial point of contact for the Public Works and Transportation Department regarding information inquiries, complaints and service requests. The Senior Customer Services Representative would lead and participate in the work of the Customer Service Representatives. The Senior Customer Services Representative classification does not presently exist in the City's classification plan. The existing Customer Services Supervisor position and the Customer Service Specialist position would be eliminated through attrition. The Senior Customer Services Representative should coordinate commercial roll off services, but also act as a day-to-day lead worker for the Customer Service Representatives.

This first-line supervisor would have primary responsibility for the day-to-day supervision of the clerical, secretarial, accounting and customer service functions of the Administration Division. The following would be the major roles and responsibilities of the Support Services Supervisor.

- Establish administrative procedures for the Division related to customer service, accounting, and clerical functions.
- Manage the provision of clerical and secretarial support to the Public Works Commission and the Traffic and Parking Commission.
- Act as the central receiver and distributor of accounting, administrative, technical and clerical support requests from Senior Managers and Management Analysts in the Department.
- Ensure the implementation of the City's general accounting procedures by accounting staff.
- Supervise support service employees providing customer service.
- Prepare correspondence, agenda statements, resolutions, revisions of the administrative procedural manual, rules and regulations, etc.
- Prepare correspondence and administer the maintenance of files and records for the department.

- Coordinate the implementation of any other special administrative, accounting, or customer service related special projects or programs as may be needed within the department.
- Complete performance evaluations of support staff.

The annual cost impact of establishing the Services Supervisor position with responsibility for supervising all of the support services staff and the Senior Customer Service Representative position is presented in the table below.

Cost Increase		Cost Decrease	
Authorize a Services Supervisor position	\$101,400	Eliminate a Customer Service Supervisor position through attrition	\$76,800
Authorize a Senior Customer Service Representative position	\$76,800	Eliminate the Customer Service Specialist position through attrition	\$77,600
Authorize a Senior Accounting Technician position	\$80,700	Eliminate an Accounting Technician position through attrition.	\$70,200
Total Cost Increase	\$178,200	Total Cost Decrease	\$154,500

Recommendation: Authorize a Support Services Supervisor as a first-line supervisor for support staff in the Administration Division.

Recommendation: Authorize a Senior Customer Service Representative position to lead and participate in the work of the Customer Service Representatives.

Recommendation: Eliminate the Customer Service Supervisor position and the Customer Service Specialist position through attrition.

Recommendation: Authorize a Senior Accounting Technician position.

Recommendation: Eliminate an Accounting Technician position through attrition.

Recommendation: Continue to utilize the “pool” concept for delivery of support services to managers and supervisors of the Department.

(2) The Account Clerk II Positions Should Be Reclassified To Accounting Technicians.

The Administration Division is authorized one (1) Accounting Technician, and three (3) Account Clerk II positions. The project team reviewed the roles and responsibilities of each of the Account Clerk II positions, and interviewed each of the incumbents. These positions are each performing duties that require the same level of knowledge and skills with the same level of difficulty. The exhibit on the following page compares the duties of each Account Clerk II position in comparison to the City’s Accounting Technician classification. There is no substantive difference between the duties performed by the Account Clerk II’s and the duties contained in the Accounting Technician position. These positions should be reclassified as Accounting Technicians. By reclassifying these positions into the same classification of Accounting Technician, the Department will be able to cross train these staff, eliminating existing silos, and balance workload. As a point of comparison, the Finance Department does not utilize the Account Clerk II position classification for its positions; the Department utilizes the Accounting Technician classification.

The annual cost impact of reclassifying the three Account Clerk II positions to Accounting Technician is presented in the table below.

Cost Increase		Cost Decrease	
Reclassify three Account Clerk II positions to Accounting Technician.	\$19,900	NA	
Total Cost Increase	\$19,900	Total Cost Decrease	\$0

Recommendation: Reclassify the three Account Clerk II positions to Accounting Technician

Exhibit 5 (1)

**Comparison of the Duties of
Account Clerk II's
To the Classification Description
Of Accounting Technician**

Position	Current Account Clerk Roles and Responsibilities	Accounting Technician Duties Performed
Account Clerk II Position #1	<ul style="list-style-type: none"> • This position is responsible for the reconciliation of the daily cash receipts related to parking facilities revenue. This includes the counting of daily revenue from parking facilities, auditing of daily paperwork and tickets, and preparation of month end reports for parking facilities. • Reports directly to the Staff Assistant although daily assignments come directly from the Director of Parking Operations. • Maintains monthly parking permits waiting list for the City. • Takes calls regarding issues with employee keycards, and activates/deactivates keycards per Finance's instructions. • Updates and distributes the following monthly reports: Uncollected Funds, Special Event Count, Unclaimed Vehicle Closing Inventory. • Conducts training for newly hired attendants. 	<ul style="list-style-type: none"> • Assists in auditing, recording and receiving of parking revenues • Examines, reconciles, balances, and adjusts accounting records. • Identifies and resolves problems and inconsistencies, determining corrective entries involved in maintaining accounting controls. • Coordinates accounting activities with other City departments, divisions, and sections. • Routinely utilizes Excel spreadsheets to efficiently perform cash receipts functions. • Approximately nine years of experience in the maintenance of financial accounting records for the City.

Position	Current Account Clerk Roles and Responsibilities	Accounting Technician Duties Performed
<p>Account Clerk II Position #2</p>	<ul style="list-style-type: none"> • This position is responsible for the processing of monthly billings related to commercial roll-off containers. • Creates new roll-off customer accounts. • Processes billing adjustments and applies credits for roll-off customers as needed. • Generate monthly customer statements for open (unpaid) invoices. • Generate monthly open invoice report for delinquent accounts. • Reconcile Crown Disposal's roll-off billing records to Beverly Hills' records, recommend payment credits or billing adjustments as needed. • Receive roll-of customer billing inquiries, produce copies of invoices, resolve customer concerns. • Pick up roll-off payments made at City Hall. • Reconciles previous day's processed revenue deposits. • Cashier previous day's parking structures, roll offs, parking meters, and valet (Amco) deposits. • Processes Water Division deposits for water meter installation, temporary meters, and flow tests. • Prepares costing reports for completed Water Division work orders. • Process billings for special trash pick ups. • Maintain Hansen Asset Management system for Water Division related activities as needed. • Serves as a back up for parking revenue counts. 	<ul style="list-style-type: none"> • Assists in the auditing, approving, processing, and receipt of payment for commercial roll-off container invoices. • Prepares and maintains complex accounting clerical records in an important accounting system. • Participates in the preparation of financial statements, journal entries, schedules and other statistical and financial reports. • Examines, reconciles, balances, and adjusts accounting records. • Answers questions and provides advice related to preparing accounting transactions. • Prepares and submits accounting information for input into computerized system, reconciles difference between accounting records and computerized records. • Coordinates accounting activities with other City departments, divisions and sections. • Routinely utilizes Excel spreadsheets, Hansen, and Access databases to efficiently perform daily functions.

Exhibit 5 (3)

Position	Current Roles and Responsibilities	Accounting Technician Related Duties Performed
<p>Account Clerk II Position #3</p>	<ul style="list-style-type: none"> • This position is primarily responsible for the accounting functions related to facilities and fleet maintenance support. These activities include invoice reconciliation, accounts payable, agreements, and purchasing functions (including furniture, vehicles and repairs for the entire City). • Processes lost ticket refunds for parking facilities. • Prepares quarterly fuel reports. • Reports to the Maintenance Operations Manager for workload related activities. For personnel related supervision, position reports to Staff Assistant. • Assists with budgeting and expenditure research. • Petty cash reimbursement for Division. 	<ul style="list-style-type: none"> • Assists in the auditing, approving, processing, and payment of invoices; inputs data on accounts payable in computerized environment. • Prepares and maintains complex accounting clerical records in an important accounting system. • Examines, reconciles, balances, and adjusts accounting records. • Identifies and resolves problems and inconsistencies, determining corrective entries involved in maintaining accounting controls. • Coordinates accounting activities with other City departments, divisions and sections. • Routinely utilizes Excel spreadsheets, Hansen, and Access databases to efficiently perform daily functions. • More than three years of experience in the maintenance of financial accounting records for the City.

(3) A Staff Assistant Should Be Authorized For the Project Administration Division.

The table below presents the duties assigned to the Customer Service Representative temporarily assigned to the Project Administration Division.

Roles And Responsibilities Of The Customer Service Representative Temporarily Assigned To The Project Administration Division
<ul style="list-style-type: none">• Performs administrative functions for the Director, maintains records of budget expenditures.• Prepares requisitions and associated purchasing documents and processes payment requests, invoices for consultants and contractors.• Prepares a variety of reports, letters, memos; collects and assembles data and background materials for a variety of reports including agenda reports.• Prepares draft agreement for services with consultants.• Prepares notices to bidders and processes advertisement with City Clerk; assembles bid documents for bidders and follow through until bid is complete.• Assembles contract documents and processes for final execution of contract; prepares Notice of Completion and processes through the City Clerk.

Workload in the Project Administration Division necessitates an ongoing need for the support described in the table above. These duties, and others that could be assumed by this position, are more appropriate for a Staff Assistant, and not a Customer Service Representative. This classification functions as a paraprofessional. The major duties of the position, as defined in the existing classification description, are presented below.

- Provide administrative, technical, and clerical support for the Assistant City Manager and other administrative staff in the City Manager's Office;
- Prepare correspondence, agenda statements, resolutions, revisions of procedural manuals, rules and regulations, etc.;
- Coordinate, monitor, and update the City's Administrative Regulations Manual;
- Coordinate research, data collection, and analysis for special projects resulting in written reports including options and recommendations;
- Provide administrative and clerical support for various committees and task forces including the Health Commission and Technology Committee. This

includes preparing agendas, assembling data, taking minutes at the meetings, and performing related duties.

- Coordinate the Department’s Master Calendar and City Work Program under the coordination of the Assistant City Manager.
- Supervise the Information Center of the City Manager / City Council Office including scheduling and evaluation.

While the classification description is clearly structured for the City Manager’s Office, it also reflects the clear intent that the positions assigned to this classification are paraprofessionals. In fact, the classification requires a bachelor’s degree in Public or Business Administration.

The classification description for Staff Assistant needs to be updated to reflect the broader range of duties assigned to these positions in the Public Works and Transportation Department and in other departments.

However, the position should be placed in the support staff “pool”, and report to the first-line supervisor responsible for supervising these support staff. Assigning this position as proposed would enable cross training and flexibility of work assignments based upon workload and priorities.

The Customer Service Representative assigned on a temporary basis to provide support for the Project Administration Division should be reassigned to Customer Services within Administration of the Public Works and Transportation Department.

The annual cost impact of this change is presented in the table below.

Cost Increase		Cost Decrease	
Authorize a Staff Assistant position	\$80,700	NA	\$0
Total Cost Increase	\$80,700	Total Cost Decrease	\$0

Recommendation: Authorize a Staff Assistant position for the Project Administration Division, but the position should be placed in the support staff “pool” and report to the first-line supervisor responsible for supervising support staff. Assigning this position as proposed would enable cross training and flexibility of work assignments based upon workload and priorities.

Recommendation: The Customer Service Representative assigned on a temporary basis to provide support for the Project Administration Division should be reassigned to Customer Services within Administration of the Public Works and Transportation Department.

Recommendation: Update the Staff Assistant classification description to reflect the broader range of duties assigned to these positions in the Public Works and Transportation Department and other departments.

(4) Adjust The Compensation Of The Staff Assistant Assigned To Public Records Within The Salary Range Of the Staff Assistant Classification.

One of two Staff Assistants assigned to the Administration Division is largely assigned responsibility for the coordination and management of public records for the Public Works and Transportation Department. This is not a full-time job.

This Staff Assistant position also provides technical and administrative support to the Deputy Director of Public Works and Transportation / City Engineer and the senior managers of the Department as needed. The duties performed by this position are summarized in the table below.

Roles and Responsibilities of the Staff Assistant (Public Records)
<ul style="list-style-type: none">• This position provides technical and administrative support to the Deputy Director of Public Works, Environmental Utility Manager, and other division managers.• Responsible for the preparation of the Department’s agenda materials for City Council meetings, including assisting managers in the preparation of contracts, agenda reports, resolutions, and ordinances, compiling materials submitted by Senior Managers for proofreading, signature, and submission, updating the Public Works agenda materials spreadsheet and scanning materials to hyperlinks, and coordinating with the City Attorney and City Clerk’s offices regarding the preparation, scheduling and submission of materials.• Coordinator and liaison for new contracts and renewals.• Public records coordinator for the division.

This position is not compensated within the range of Staff Assistant, and is referred to as a Public Records Coordinator even though the position is classified as a Staff Assistant. The position and the incumbent of the position are underutilized.

The project team recommends that the salary for this position be adjusted within the salary range of the Staff Assistant classification.

Recommendation: Adjust the compensation of the Staff Assistant assigned to public records within the salary range of a Staff Assistant.

Recommendation: Utilize the Staff Assistant for a broader range of duties than public records.

(5) The Level of Support Staffing Within Administration Is More Than Sufficient To Provide Effective Support for the Department's Commissions and Committees.

The Public Works and Transportation Department provides support to a variety of commissions and committees. These include the following:

- The Public Works Commission, a five-member commission that meets the second and fourth Thursday of each month; and
- The Traffic and Parking Commission, a seven-member commission that meets the first Thursday of the month.

In addition, the Department will, on occasion, support other committees such as the Groundwater Technical Committee.

This workload is not significant, and the level of support staff within the Department is capable of providing effective and responsive support to these commissions and committees. The support "pool" is currently allocated two (2) Staff Assistants, an Administrative Secretary, a Secretary, an Administrative Clerk, and two (2) Management Analysts. With the moving of other Departmental staff from City hall, the available number of support staff will increase.

Recommendation: The level of support staff available within Administration is more than capable of providing effective support to the Public Works Commission and the Traffic and Parking Commission.

15. THE EXISTING LEVEL OF STAFFING FOR CUSTOMER SERVICE REPRESENTATIVES IS ADEQUATE GIVEN EXISTING WORKLOAD.

The call volume for the Customer Service Center in fiscal year 2005 - 2006 is presented in the table below.

Month	Number of Calls	% of Total
July	1,357	8%
August	2,221	13%
September	1,870	11%
October	1,284	7%
November	1,149	7%
December	902	5%
January	1,572	9%
February	1,245	7%
March	1,561	9%
April	1,310	7%
May	1,413	8%
June	1,600	9%
TOTAL	17,484	100%

Important points to note concerning the data presented in the table are presented below the table.

- The hours of operation for the Customer Service Center are Monday through Friday, 8 AM to 5 PM.
- Some percentage of the calls above are related to incoming and outgoing radio dispatch.
- There are three phone lines answered by the customer service staff. If all phone lines are busy, the caller is directed to a voicemail to leave a message, rather than being placed in a queue. Voicemail is checked as soon as notification of a message is received.

To evaluate the staffing requirements for the Customer Service Center, the project team utilized an Erlang C Calculator program. To analyze the staffing

requirements, the project team first utilized the average number of 67 incoming calls per day or 8 per hour based upon the volume for fiscal year 2005 - 06.

The project team then utilized an average duration of 180 seconds for each call, and a 30 second wrap up. Finally, the project team used an average answering delay of 20 seconds that the Customer Service Center should be prepared to tolerate for incoming calls.

If too many Customer Service Representatives are provided, the Public Works and Transportation Department would obviously be wasting valuable resources. However, if the Department provides too few Customer Service Representatives, the Department runs the risk of imposing unacceptably long ring times on customers, or even worse, suffering from abandoned calls or lack of capacity to handle emergency situations.

The formula utilized by the project team is based on the Erlang C traffic model which is an established model for predicting call center performance under situations in which offered calls are queued. Even though the Department does not utilize a traditional “queuing” system, the methodology still applies given that the number of calls ending in voicemail is minimal, and voicemail messages are checked and acted upon immediately after indication of a message is received.

The Erlang C Traffic model was developed by A.K. Erlang, a Danish scientist who was responsible for much of the early work in telephone traffic theory. As such, it can be applied to the design and analysis of inbound call centers similar to the Public Works and Transportation Department. The model makes the following assumptions:

- Service times are exponential;

- Callers are answered in the order in which they arrived; and
- Callers are directed towards the first available Customer Service Representative.

It is important to understand that there is a bare minimum number of Customer Service Representatives the Public Works and Transportation Department will need, regardless of the call answering delays it is prepared to tolerate. For instance, if during an hour, you receive a total of 10 calls, you must, at the very minimum, provide two Customer Service Representatives for answering these calls. If you fail to provide this number of agents, the call queue will constantly increase and incoming calls will be abandoned. However, if the number of calls doubles to 20 calls per hour, the number of Customer Service Representatives required only increases to three.

By providing more than the minimum number of Customer Service Representatives, the Department regains control of the queue of incoming calls that results in a stable and predictable situation. The Erlang C Calculator will never return a number of Customer Service representatives that is lower than this bare minimum.

Based upon Erlang C Traffic model, the Customer Service Center will require not less than two full-time Customer Service Representatives. The Public Works and Transportation Department is authorized a total of two Customer Service Representatives in the fiscal year 2006 - 2007 budget. This includes a position that is currently allocated to support of the Project Administration Division.

There has been a great deal of discussion regarding which support staff should be in the "pool" in Administration and which support staff should not be in the "pool." From the perspective of the project team, all of the support staff located in the Foothill

Building should be in a “pool” and supervised by one supervisor: the Support Services Supervisor. This suggests that when Transportation relocates to the Foothill Building, that the customer service representatives that also relocate to that building should be part of this “pool.” However, those customer service representatives in Transportation that do not relocate to the Foothill Building should not be part of the “pool,” and should continue to report to the Deputy Director of Transportation. The dispersion of these staff among different buildings will present a supervisory challenge to the Support Services Supervisor. The Support Services Supervisor will already be facing a number of challenges in terms of establishing the supervisory and administrative systems necessary for the “pool” to function effectively. The Support Services Supervisor does not need the additional challenge of supervising staff located in a different building.

Recommendation: The number of Customer Service Representatives is adequate for the existing call volume.

Recommendation: All customer service representative staff located in the Foothill Building should be part of the support staff “pool.”

16. THE ADMINISTRATIVE CLERK I POSITION SHOULD BE ELIMINATED THROUGH ATTRITION.

The customer service function within the Administration Division includes an Administrative Clerk I position. The duties of the position consist of “meet and greet” receptionist duties on the second floor, downloading of the previous night’s voicemail messages, basic data entry into OBC, processing incoming and outgoing mail, and maintaining and ordering office supplies for the Division. This position also provides support to the customer service function as needed, primarily as back-up telephone and

dispatch duty during the lunch hour and miscellaneous clerical projects as needed by the Customer Service Supervisor.

There is insufficient ongoing workload to warrant this position. The duties performed by this position duplicate the capacity of other support positions within the Administration Division including the Customer Service Representatives, Secretary, and Administrative Secretary.

The annual cost impact of eliminating this position is presented in the table below.

Cost Increase		Cost Decrease	
NA	\$0	Eliminate the Administrative Clerk I position through attrition	\$60,200
Total Cost Increase	\$0	Total Cost Decrease	\$60,200

Recommendation: Eliminate the Administrative Clerk I position through attrition.

17. SOME DUTIES OF A STAFF ASSISTANT POSITION SHOULD BE REALLOCATED.

In interviewing the support staff within the Administration Division, there appears to be a number of instances in which duties performed by one of the Staff Assistant positions should be reassigned to other positions in Administration to better match the duties being performed by these positions. These instances are described below.

- One of the Staff Assistants is responsible for preparation of the revenue summary reports and the monthly invoice to the City of West Hollywood for parking meter collection services. This responsibility should be reassigned to one of the accounting positions in the Administration Division.
- The coordination and billing for commercial solid waste services is allocated among the (1) Customer Services Specialist who handles coordination of services and account information for roll off containers, (2) an Account Clerk II position that processes the invoices and payments for commercial roll off services, and (3) a Staff Assistant position that administers commercial solid waste billing for front loader services including invoice and account reconciliation

and maintenance of account information. The reconciliation of commercial solid waste invoices and accounts should be an accounting function. The maintenance of commercial solid waste account information should be a customer service related function.

Recommendation: The responsibility for preparation the revenue summary reports and the monthly invoice to the City of West Hollywood for parking meter collection services should be reallocated from a Staff Assistant to the accounting positions in the Administration Division.

Recommendation: The responsibility for reconciliation of commercial solid waste invoices and accounts should be reallocated from a Staff Assistant to the accounting positions in the Administration Division.

Recommendation: The responsibility for maintenance of solid waste front loader account information should be reallocated from a Staff Assistant to the customer service positions in the Administration Division.

18. THE MANAGEMENT ANALYST POSITIONS SHOULD BE MORE EFFECTIVELY UTILIZED AND ONE OF THE TWO POSITIONS UPGRADED TO SENIOR MANAGEMENT ANALYST.

The Public Works and Transportation Department is authorized two Management Analyst positions. These two positions are responsible for providing administrative and technical support to the Department Head and senior managers in the Department. Both Management Analysts report to the Deputy Director of Public Works and Transportation / City Engineer.

These positions are currently assigned a myriad of projects, some of which are better suited for skills available from the Staff Assistants and support staff, and not the Management Analysts. Management Analysts should be assigned projects that require skilled project management of special projects, complex analytical research, preparation and analysis of the budget and expenditures, etc. In contrast, support staff should be utilized to perform such duties as basic data collection and analysis, processing of

routine documents or reports (staff reports, budget reports, meeting agendas, monthly utility reports, invoices, etc.), etc.

The project team reviewed the forty-(40) projects assigned to the two Management Analysts. The project team also performed a desk audit of one of the Management Analysts to sample the actual assignments being performed. The exhibit presented at the end of this chapter presents recommendations regarding the projects that should be assigned to the two Management Analysts and the projects that should be assigned to the two Staff Assistants or other support staff. For example, the Management Analysts would administer the collection and preparation of performance measurement data for monthly reports, but the actual collection of the data and preparation of the reports would be accomplished by the two Staff Assistants. As another example, the two Management Analysts would work with the Deputy Director of Public Works and Transportation / City Engineer to determine structure and content of the human resources database for the Department, but the two Staff Assistants would enter the data into the database and maintain the database.

This use of Staff Assistants is entirely in keeping with the classification description for these positions that includes such tasks as conducting research, data collection and analysis for special projects resulting in written reports including options and recommendations.

One of the two Management Analyst positions, presently vacant, should be upgraded to Senior Management Analyst. This position should be distinguished from the Management Analyst position by assignment of projects with a greater degree of complexity and self-initiated nature of the policies, projects, and program(s) and

department visibility and impact. This is a new classification; the City presently utilizes a Planning and Research Analyst classification as its Senior Management Analyst classification.

In addition, these two positions need to be provided with analytical training to enhance and maintain their skills, and provided with membership in MMASC – Municipal Management Assistants of Southern California and encouraged to attend the meetings of this association with attendance reimbursement provide by the City.

In addition, the Department requested a third Management Analyst position. The project team does not recommend the addition of a third Management Analyst position until the Department demonstrates the effective use of the two existing positions.

The annual cost impact of upgrading the existing vacant Management Analyst position to Senior Management Analyst is presented in the table below.

Cost Increase		Cost Decrease	
Reclassify the existing vacant Management Analyst position to Senior Management Analyst	\$16,500	NA	\$0
Total Cost Increase	\$16,500	Total Cost Decrease	\$0

Recommendation: Increase the effective use of the two Management Analyst positions.

Recommendation: Establish a classification of Senior Management Analyst.

Recommendation: Upgrade the existing vacant Management Analyst position to Senior Management Analyst.

Recommendation: The Deputy Director of Public Works and Transportation should clarify in a written policy the roles and responsibilities of the Management Analysts, the Staff Assistants, and the other support staff.

Recommendation: Increase the effective use of the Staff Assistants for conducting research, data collection and analysis for special projects in support of the Management Analysts.

Recommendation: The Management Analysts should be authorized to request support from support staff in the Administration Division as needed.

Recommendation: The two Management Analyst positions should be provided with analytical training to enhance and maintain their skills, and provided with membership in MMASC – Municipal Management Assistants of Southern California and encouraged to attend the meetings of this association with attendance reimbursement provide by the City.

19. RECEIPT OF DAILY PARKING STRUCTURE REVENUES REQUIRES ADDITIONAL INTERNAL CONTROLS.

One Account Clerk II position in the Department is primarily responsible for the daily cash receipts and deposits of the City's parking structure revenue. Current procedures in place for receipts and deposits of parking structure revenue are mostly in accordance with the best management practices for internal controls. The process, in brief, is portrayed below.

- Receipt of cash is centralized to the Account Clerk II position.
- Cash and check receipts are locked up prior to making deposits. Parking Attendants are responsible for making multiple mini-cash receipt deposits throughout the day, which are stored in separate, sealed, and disposable deposit bags. Periodic deposit pick-ups are made throughout the day by Parking Attendant Supervisors. Internal controls for these pick-ups are strong, consisting of both parties signing off on a deposit transfer log that denotes the date, amount and parties involved. These deposit transfer logs along with the individual deposits are then dropped into a locked safe within the Account Clerk's office.
- Deposits are made on a timely basis. The Account Clerk has as an objective to make deposits of cash receipts within the following business day.
- The individual who collects cash and prepares the deposit is independent of the employee who authorizes and records the transactions. Cash receipts from each parking structure are counted by the Account Clerk (often with assistance from a Parking Attendant who does not work the facilities), checked against register tally tapes, prepared for deposit, and dropped into another safe for armored pick up.
- A separate Account Clerk II is responsible for posting (cashiering) daily receipts of all parking revenue to the City's internal financial system.

- Evidence of deposits are submitted to Finance. Finance reconciles monthly revenue reports to deposits for the same period.

However, there are important internal control steps absent from the process of reconciling the receipt of parking structure revenue. The first step is to ensure that the safe, located within the Account Clerk II's office, is never opened without at least two parties being there for verification. Verification of the safe contents should be recorded on a "Vault Opening Log" consisting of: (1) Bag Number, (2) Deposit Amount, (3) Deposit Date and (4) Parking Attendant responsible for Deposit. From this point, a master deposit, which incorporates all the individual daily deposits, could be then be prepared for transfer by armored pick up.

A separate reconciliation should then be conducted comparing the Daily "Vault Opening Log" to the master deposit done for that corresponding day. An independent party, such as the Parking Operations Manager, should perform this reconciliation. This reconciliation should include comparison of dates and amounts of deposits as shown on the "Vault Opening Log" to deposit records with original cash receipts documentation prepared by the Account Clerk II. This reconciliation activity could also be assigned to the Parking Operations Manager, and performed, at minimum, on a weekly basis.

Recommendation: The Department should increase the extent of internal controls for the daily receipt of parking structure revenue.

20. THE DEPARTMENT SHOULD DEVELOP A TRAINING PLAN FOR ITS EMPLOYEES INCLUDING A NEEDS ASSESSMENT.

The project team documented the extent of training provided to employees for fiscal year 2006-07 (as of May 2, 2007). Findings developed from this analysis are presented below.

- The hours of training are reflective of documents submitted, and free workshop / training from memberships outside the City organization may not be included;
- Excluding temporary employees and employees that resigned or retired this fiscal year, a total of 3,949 hours of training provided to a total of 178 employees;
- Of this training, 90% consisted of in-house training while 10% was provided by external trainers;
- The median hours of training received by these 178 employees amounts to 18 per employee, the average number of hours amounted to 22 hours per employee, with a 25th percentile of 10 hours per employee and a 75th percentile of 31 hours per employee;
- 15 employees or 8.4% did not receive any training whatsoever;
- Some of the skilled positions did not receive much training. For example:
 - Two of the four Water System Worker III's received one-half day of training or less;
 - Two of the five Water System Worker II's receive received one day of training or less; and
 - Two of the three Senior Water System Workers received two days of training or less.

In comparison, the American Society of Training and Development reported in their 2006 *State of the Industry in Leading Enterprises* a sample of twenty-two large Fortune 500 companies and public sector organizations with 70,487 employees provided an average of 41 hours of training per employee in 2005. This compares to the average for the Department for fiscal year 2006-07 (as of May 2, 2007) of 22 hours per employee.

The Department should develop a formal, written training plan to address this challenge. Development and execution of a well-conceived training plan is the

cornerstone upon which a successful training program rests. A training plan exists on at least two levels:

- Department-wide - encompassing the entire department and covering a relatively elastic time period of several years (this is a reflection of a strategic plan or overall set of goals)
- Division-specific - describing divisions within the department and covering a discrete fiscal or calendar time frame (this is a reflection of concrete, measurable goals and objectives)

In developing a training plan, the Department is linking the skill development of its employees to its own strategic plan and an assessment of its strengths and weaknesses. The Department should strive to achieve the best practices presented below and on the following page in developing this training plan.

The department provides a comprehensive staff development program to achieve and maintain high levels of productivity and employee performance.
The department: <ul style="list-style-type: none"> • Conducts orientation programs for all new employees, and includes information on departmental procedures, performance expectations and evaluations, training and career opportunities, and personnel policies regarding such issues as absences, leave approval and tardiness; and • Has a department-wide training program and maintains training records on each staff member.
The department has solicited and used input from supervisors and employees hired within the last three years to establish, revise, or affirm its new employee orientation programs, including content and approach.
The department has mentoring programs, as appropriate, for new employees.
The department plans training programs based on department-wide needs assessment that includes input from employees and their supervisors at least every other year.
The department establishes and implements formal staff development plans to provide on-going training for employees. The responsibility for training classes for employees may be delegated to a division within the department (i.e., Fleet Management employees may be trained by Fleet Management), but that unit provides the Departmental Advisor with copies of annual plans, training schedules, and attendance rosters.
The department has procedures to evaluate individual in-service training activities, including employee feedback, and to evaluate the extent to which annual training efforts have met identified long-term training objectives.
The department provides a comprehensive staff development program for managers and supervisors.
All managers and supervisors have completed (or anticipate completing within the current fiscal year) management and supervisory training programs.
The department has a process for identifying employees with the potential for employment in managerial and/or supervisory positions, and for providing training to them prior to appointment to a managerial and/or supervisory position.
The training program for new managers includes a mentoring component.

The Management Analysts should be assigned responsibility for providing training and technical support to the Department's managers in the development of the training plan.

Recommendation: The Department should develop a training plan for its employees based upon a needs assessment.

21. THE PUBLIC WORKS AND TRANSPORTATION DEPARTMENT SHOULD ESTABLISH A CAREER DEVELOPMENT PROGRAM FOR ITS EMPLOYEES.

The old career model of remaining with one organization for an entire career and in one classification series and one division has become outmoded. Employees now make lateral moves, work for three to ten organizations, and change professions. This new model requires employees and the organizations that they work for to be adaptable and flexible, continuously learning, and upgrading the skills of the employees and the organization.

Career development is the ongoing acquisition or refinement of skills and knowledge, including job mastery and professional development, coupled with career planning activities.

Since career development is an ongoing, dynamic process, employees would need encouragement and support in reviewing and re-assessing their goals and activities. Formal training and classes away from the job are effective in providing new information, but adult learners also need to practice new skills. Therefore, the Public Works and Transportation Department can contribute significantly to your staff member's career development by supporting career development activities within the Department.

The Department's support for career development is important for a number of reasons including the following:

- A focus on skill development contributes to learning opportunities that benefit both the employee and the Department;
- Career development enhances opportunities for employee promotion and/or lateral moves that contribute to an employee's career satisfaction;
- The Department should promote a greater sense of employee responsibility for managing their own career;
- Career planning and development clarifies the match between the Department's and an individual employee's goals;
- It's cost-effective for the Department to use its own staff talent to provide career development opportunities within the Department – recruitment and selection costs are reduced and positions are vacant for a less amount of time;
- Career development increases employee motivation and productivity; and
- Attention to career development helps the Department attract top staff and retain valued employees.

The Department should take a number of steps to develop a career development program within the Department.

- Annually, the employee's supervisor should develop an individual development plan and career discussion with his or her employees;
- Supervisors should be held accountable for supporting employee development efforts;
- The Department should create programs and activities to provide skill development, such as job rotation, cross-training, mentoring, internships, coaching, and career strategy groups;
- The Department should recognize that part of the development of the career plan for the employee should include providing support and/or release time for development beyond their current jobs; and
- The Department should support requests for flexible work arrangements from staff members.

Recommendation: The Department should develop a career development program.

22. THE HUMAN RESOURCES DEPARTMENT SHOULD IMPROVE THE LEVEL OF SERVICE FOR RECRUITMENT AND SELECTION FOR THE PUBLIC WORKS AND TRANSPORTATION DEPARTMENT.

The project team utilizes a benchmark of 60 calendar days for the amount of time the Human Resources Department requires to generate an eligibility list from the date the requisition was approved by the City Manager's Office.

A review of the actual amount of calendar days required by the Human Resources Department to generate eligibility lists indicates that the Human Resources Department is not meeting this benchmark.

- For Central Stores Supervisor, the Human Resources Department required 151 calendar days from the date the requisition was approved by the City Manager on May 11, 2006 until the review of applications by the Public Works and Transportation Department (an eligibility list had not been provided by November 13, 2006);
- For Electrical Technician, the Human Resources Department required 252 calendar days from the date the requisition was approved by the City Manager on February 23, 2006 until the review of applications by the Public Works and Transportation Department (an eligibility list had not been provided by November 13, 2006);
- For Solid Waste Equipment Operator, the Human Resources Department required 137 calendar days from the date the requisition was approved by the City Manager on May 11, 2006 until the review of applications by the Public Works and Transportation Department (an eligibility list had not been provided by November 13, 2006); and
- For Water System Worker II, the Human Resources Department required 113 calendar days from the date the requisition was approved by the City Manager on July 23, 2006 until the review of applications by the Human Resources Department (the Public Works and Transportation Department had not yet reviewed the applications by November 13, 2006);

While a study of the Human Resources Department is beyond the scope of this analysis, it is clear the level of recruitment and selection service provided by the Human Resources Department to the Public Works and Transportation Department needs to be improved.

Recommendation: The Human Resources Department should improve the level of recruitment and selection service provided by the Human Resources Department to the Public Works and Transportation Department.

23. A GIS ANALYST POSITION SHOULD BE AUTHORIZED FOR THE PUBLIC WORKS AND TRANSPORTATION DEPARTMENT TO ENABLE INTEGRATION OF THE HANSEN MAINTENANCE AND WORK MANAGEMENT SOFTWARE AND GIS.

The Public Works and Transportation Department must quickly respond to crises, manage high volumes of data, and manage workflow. To meet the growing needs of the City of Beverly Hills and to effectively work with other departments, the Department needs to be able to rely on updated enterprise geographic information system (GIS) technology.

GIS organizes geographic data so a person can select data necessary for a job such as road repairs, tree trimming, or solid waste collection. An enterprise-wide GIS allows all sections within a department, even those with little or no GIS experience, to share and easily access data, which facilitates better communication, improves data integrity, and enhances productivity within a department and with other departments. Employees can tap into the Department's database to create maps, design new projects, build and maintain the infrastructure, and make decisions based on current and accurate information. GIS applications such as asset management, street sweeper routing, traffic analysis, mobile computing, pavement management, and work order

management make it easier to understand a problem, participate in a project, and communicate ideas.

The Public Works and Transportation Department lacks the staff to update and maintain its GIS layers. The City should authorize a GIS Analyst position for the Department to fulfill this role. The role of the GIS Analyst should be to develop and maintain the geographic information systems (GIS) databases, coverages, and linkages to various databases including reading and interpreting source documents, such as civil engineering plans, plot maps, and legal descriptions; and entering required data into the GIS. The essential functions fulfilled by this position should include the following:

- Performs complex GIS analysis and mapping; analyzes cartographic and statistical data and prepares reports, charts, and tables, and coordinates with managers and supervisors to address and respond to mapping, tabular, analytical, and report needs;
- Confers with divisions to coordinate system integration and define required output, and works with clients to ensure specific requirements are met.
- Provides quality assurance and control for map layers, seeking out appropriate information for mapping purposes, and performs field checks to verify locations of infrastructure.
- Performs data entry and data conversion through tablet digitization, on-screen digitization, keyboard data entry, scanning, GPS, remote sensing analysis, portable data entry units, and field data collection, preparing, designing and printing maps and related information, and communicating GIS related information to Department staff and the public.
- Researches, collects, compiles, evaluates, reconciles, integrates, and analyzes complex spatial data and attributes for mapping; edits geographic and tabular data; maintains metadata and documentation, online and hard copy;
- Analyses and manipulates databases to support a variety of infrastructure planning, engineering, administrative, and other applications; designs and produces high quality cartographic output suitable for publication and public display.

- Presents maps and data to Department staff; analyzes and presents demographic and census data; responds to a variety of inquiries and requests for information and resolves issues or complaints.
- Trains and assists Department staff and clients with GIS applications and software.

The Department lacks a vital staff resource necessary to update and maintain its mapping systems and GIS layers databases, coverages, and linkages.

This position should be budgeted in the Administration Division of the Public Works and Transportation Department, and report to the Information Technology Systems Integrator.

However, a centralized GIS data repository should be maintained by the Information Technology Department. The centralized GIS data repository will generate cost savings resulting from reduced effort to retrieve, verify currency, and distribute GIS data to other divisions, departments, and external users. Additionally, a centralized GIS data repository will minimize duplicative copies of typically very large files and reduce hardware components such as server space. Finally, the greatest benefits of the Hub would be for casual users who could begin accessing GIS data from their desktop computers. To minimize duplicative or outdated data sets stored at other locations, all GIS data should be provided at the Hub.

The annual cost impact of the addition of a GIS Analyst is presented in the table below.

Cost Increase		Cost Decrease	
Authorize a GIS Analyst position	\$121,300	NA	\$0
Total Cost Increase	\$121,300	Total Cost Decrease	\$0

Recommendation: Authorize a GIS Analyst position for the Public Works and Transportation Department.

Recommendation: The GIS Analyst position should be assigned to the Administration Division of the Public Works and Transportation Department.

Recommendation: A centralized GIS data repository should be maintained by the Information Technology Department.

24. ADDITIONAL STAFF OF THE PUBLIC WORKS AND TRANSPORTATION DEPARTMENT SHOULD BE CO-LOCATED AT 345 NORTH FOOTHILL FACILITY.

At present, the staff of the Public Works and Transportation Department is located at both City Hall and at the facility at 345 North Foothill Boulevard.

The City has initiated a project to remodel the ground floor of City Hall. The primary focus is to create a Customer Service Center that would address the public's needs for development projects (through the collaboration among Community Development Department, Public Works and Transportation Department, and the Administrative Services Department), and other transactions. These would include basic cashiering (pay a water bill), and issuance of engineering permits (street use, heavy hauling, etc.). A recent addition to the functional plan is to introduce a segment of the Transportation Division in this location for servicing parking permits.

This project requires the relocation of the staff of the Civil Engineering Division to the facility at 345 North Foothill Boulevard. This is an appropriate relocation as long as an "engineer of the day" is allocated a workstation in the Customer Service Center to continue to provide support to customers. This is, in fact, part of the construction plans.

An analysis by the Project Administration Division indicates that the remaining Transportation Division staff that could be moved to the 345 North Foothill Boulevard facility and fit within the remaining configuration on the second floor.

The costs for providing system furniture for the staff assigned to the Transportation Division was included in the authorization by the City Council on February 20, 2007. Based on the number of Transportation Division staff to move into the 345 North Foothill Boulevard facility, the current plan that had been developed to accommodate the Civil Engineering Division will also provide adequate space for the Transportation Division without necessitating the removal of the interior private offices for mid-management staff. The plan calls for seventeen (17) new workstations (open office concept) that will serve all administrative staff for all of the Department's divisions. The existing private offices include eight (8) offices along the north wall that will work for the executive staff. The existing interior private offices (with minor modifications to convert three offices into five offices) will then provide space for management and professional staff.

A purchase order for the new workstations was on the City Council agenda for February 20, 2007 agenda for approval.

The one group of staff in Transportation Division that would not fit into the 2nd floor of the 345 North Foothill Boulevard facility is the parking enforcement staff. That group needs space for daily roll calls and storage for their radios and other equipment. At this time, it is believed that some space on the 1st floor could be developed for these staff that would require limited funds.

The project team recommends that the remaining staff of the Public Works and Transportation Department – the staff assigned to the Transportation Division and the Director of the Public Works and Transportation Department – should be moved to the 345 North Foothill Boulevard facility.

Recommendation: The remaining staff of the Public Works and Transportation Department – the staff assigned to the Transportation Division and the Director of the Public Works and Transportation Department – should be moved to the 345 North Foothill Boulevard facility.

25. MINOR ADJUSTMENTS SHOULD BE MADE IN THE CUSTOMER SERVICES DELIVERED BY THE ADMINISTRATIVE SERVICES DEPARTMENT AND THE PUBLIC WORKS AND TRANSPORTATION DEPARTMENT.

In cities that provide utility services, there is always a degree of crossover in the utility services provided by Administrative Services – Finance and by the Public Works and Transportation Department.

In this case, Administrative Services – Finance is responsible for a number of duties in the financial administration of the City's utilities such as the tasks presented below.

- Accounts Receivable is responsible for the accounts receivable function of the City including Utility, Monthly and Preferential Parking, False Alarm, Business Permits and Miscellaneous billing including. The services provided include file maintenance, transaction recordation, account billing, late and penalty notices and account collection.
- Cashiering is responsible for providing cashiering services and posting and processing payments received by the City.
- Accounting is responsible for the accurate and fair presentation of the City's financial transactions. This program will continue to apply the most current accounting requirements as imposed by the Governmental Accounting Standards Board, the Financial Accounting Standards Board, the Governmental Finance Officers Association (GFOA) and the California Society of Municipal Finance Officers (CSMFO). Journal entries and allocations are prepared routinely, and the Comprehensive Annual Financial Report (CAFR) is prepared annually. Other types of financial reports are prepared that meet the needs of internal users, regulatory agencies, and other "stake-holders."

At the same point in time, the Public Works and Transportation Department also provide a number of tasks related to the financial administration of the City's utilities as noted below.

- A Customer Service Specialist is responsible for the day-to-day operations related to commercial front loader and roll-off container services, enters billing tonnage of accounts and matches work orders for billing to customer accounts, and assists with customer complaints.
- An Accounting Technician is responsible for the monthly billing related to commercial roll-off containers.
- An Account Clerk II is responsible for the reconciliation of the daily cash receipts related to parking facilities and parking meter revenue. This includes the auditing of daily paperwork and month end reports.
- A Water System Technician is dedicated to meter reading on largely a full-time basis.
- A Field Services Representative is responsible for turn off and on of water services, reading meters and recording readings, Investigating utility billing irregularities, high and low water pressure and water quality concerns, and performing a wide-variety of field tests and evaluations to resolve customer problems and agency concerns, etc.

This crossover is not unusual in other local governments. The project team has observed meter reading services provided by finance departments and also by utility departments. The project team has observed for turn off and on of water services provided by finance departments and also by utility departments. The project team does not believe that there is any material significance to these services being provided by Administrative Services – Finance or by the Public Works and Transportation Department. These services could be located in either department; their organizational location is immaterial.

However, there are issues with the placement of responsibility for the reconciliation of the daily cash receipts related to parking facilities and parking meter revenue – internal controls. Internal controls help to provide assurance that City assets are protected from theft, loss, or misuse, and that reliable financial information is

produced in a timely manner. Specific internal control objectives that help to achieve these broader goals include the following:

- Proper authorization of all transactions and activities to reduce the possibility that incorrect or fraudulent transactions or activities occur;
- Assigning different people the responsibilities of authorizing transactions, recording transactions, and maintaining custody of assets to reduce the opportunity for any individual employee to both commit and conceal errors or theft of assets (or segregation of duties);
- Design and use of adequate documents and records to help ensure proper recording of transactions and events; and
- Adequate safeguards over access to and use of assets and records to reduce the possibility of theft of those assets and concealment of illegal activity.

Establishing good internal control procedures will help minimize potential problems such as theft, fraud and unintentional errors in recording accounting data. The crossover of these utility administration responsibilities is designed to enable segregation of duties.

The project team is concerned, however, that Parking Operations is responsible for collection of revenue and reconciliation of this revenue. Revenue Collectors in Parking Operations collect the revenue from parking facilities and parking meters, and an Account Clerk II in Parking Operations is responsible for the reconciliation of these receipts from parking facilities. These two responsibilities should be segregated in two different departments. Parking Operations should continue to be responsible for collection of revenue and the counting of the revenue. Administrative Services – Finance should be responsible for the reconciliation.

In addition, the work performed by the Customer Services Specialist - the day-to-day operations related to commercial front loader and roll-off container services, entry of

billing tonnage of accounts and matching of work orders for billing to customer accounts, and assisting with customer complaints – is comparable to the water utility billing work performed by Administrative Services – Finance. This responsibility should be transferred to Administrative Services – Finance to consolidate responsibility for billing and inquiries regarding billing. The work performed by an Account Clerk II – responsible for the monthly billings related to commercial roll-off containers – is also comparable to the work performed by Administrative Services – Finance. This includes such tasks as the following:

- Create new roll-off customer accounts;
- Process billing adjustments and applies credits for roll-off customers as needed;
- Generate monthly customer statements for open (unpaid) invoices;
- Generate monthly open invoice report for delinquent accounts;
- Reconcile Crown Disposal's roll-off billing records to Beverly Hills' records, recommend payment credits or billing adjustments as needed;
- Receive roll-of customer billing inquiries, produce copies of invoices, resolve customer concerns;
- Pick up roll-off payments made at City Hall;
- Reconciles previous day's processed revenue deposits;
- Cashier previous day's parking structures, roll offs, parking meters, and valet (Amco) deposits;
- Processes Water Division deposits for water meter installation, temporary meters, and flow tests;
- Prepares costing reports for completed Water Division work orders; and
- Process billings for special trash pickups.

On the other hand, Administrative Services – Finance is issuing monthly parking

permits. These should be issued by Transportation, with the revenue collected by Administrative Services – Finance.

Overall, some minor adjustments should be made in the allocation of customer services amongst Administrative Services – Finance and the Public Works and Transportation Department.

Recommendation: Parking Operations should continue to be responsible for collection of parking facilities and parking meter revenue and the counting of the revenue. Administrative Services – Finance should be responsible for the reconciliation of these revenues. The Account Clerk II responsible for reconciliation in the Public Works and Transportation Department should be transferred to Administrative Services – Finance. As part of this transfer of responsibility, the two departments should develop a service level agreement that clearly documents the roles and responsibilities of each department in the collection, reconciliation, and auditing of parking facility and meter revenue.

Recommendation: The Customer Service Specialist responsible for day-to-day operations related to commercial front loader and roll-off container services, entry of billing tonnage of accounts and matching of work orders for billing to customer accounts, and assisting with customer complaints should be transferred from the Public Works and Transportation Department to Administrative Services – Finance. As part of this transfer of responsibility, the two departments should develop a service level agreement that clearly documents the roles and responsibilities of each department in the provision of these services.

Recommendation: The Account Clerk II responsible for processing of monthly billings related to commercial roll-off containers should be transferred to transferred from the Public Works and Transportation Department to Administrative Services – Finance. As part of this transfer of responsibility, the two departments should develop a service level agreement that clearly documents the roles and responsibilities of each department in the provision of these services.

Recommendation: The responsibility for issuance of monthly parking permits should be transferred to Transportation from Administrative Services – Finance, with the revenue collected by Administrative Services – Finance. As part of this transfer of responsibility, the two departments should develop a service level agreement that clearly documents the roles and responsibilities of each department in the provision of these services.

26. A NUMBER OF ISSUES SHOULD BE ADDRESSED WITH THE PUBLIC WORKS COMMISSION AND THE TRAFFIC AND PARKING COMMISSION

The project team conducted telephone interviews with all of the members of the Public Works Commission and the Traffic and Parking Commission. There were a number of issues raised by each commission. These issues are summarized by in the paragraphs below.

- **Public Works Commission.** The members of the Commission believed that the support from the staff of the Department was excellent. Other positive comments from the Commissioners included that the Department is responsive to service requests from residents and businesses, and that the role of the Commission is clearly defined. The opportunities for improvement identified by members of the Commission include the following:
 - The Department should prepare a two or three-month schedule of items that will be presented to the Commission to provide a longer-term notice of issues that the Commission needs to address. Some members cited the recent increase in utility fees as an example of a lack of advance notice by staff.
 - The Department should enhance the extent of public information provided to the community including presentations to neighborhood associations. The community does not seem to understand the infrastructure maintained and repaired by the Department.
 - The Department should provide a formal orientation to new members of the Commission.
 - The liaison with the City Council and other commissions needs to be improved. The Commission rarely meets with the City Council liaison for the Commission.
 - The Department should develop an annual plan to address study issues much the same way as the City of Sunnyvale. These would represent future study issues that have been generated by the Commission that would define the key elements of the issue, the origin of the issue, the estimated staff hours required to address the study issue, etc.
- **Traffic and Parking Commission.** The members of this commission believed that staff support for the Commission was adequate given the staff resources, but that a higher level of staff support was required. The opportunities for

improvement identified by members of the Commission include the following:

- The Department has limited staff resources, but additional staff support for the Commission is required.
- The level of motorcycle traffic enforcement in the neighborhoods needs to be improved, particularly at rush hour, to address the vehicles that block intersections.
- The Department is not demonstrating “best of breed” in addressing transportation and traffic issues in the City. The Department is slow in replacing the “walk / don’t walk” pedestrian signals, slow in deploying the scofflaw recognition devices for parking enforcement, slow in deploying solar powered parking meters.
- The Traffic and Parking Commission should be involved in the review of parking and transportation impacts for proposed development. The Commissioners believed that their involvement is limited to problems after the fact.
- The role of the Traffic and Parking Commission needs to be clarified. Is the commission supposed to be involved with issues proactively or reactively? Is the role of the Commission an expansive role or a limited role?
- The Department should develop an annual plan to address study issues much the same way as the City of Sunnyvale. These would represent future study issues that have been generated by the Commission that would define the key elements of the issue, the origin of the issue, the estimated staff hours required to address the study issue, etc.

Recommendation: The Department should develop a plan to respond to the opportunities for improvement raised by the members of the Public Works Commission and the Traffic and Parking Commission.

Exhibit 6 (1)

**Proposed Allocation of Roles and Responsibilities
Between Management Analysts and Staff Assistants**

Project	Management Analyst	Staff Assistant / Other Support Staff
Develop Annual Budget for the Department	<ul style="list-style-type: none"> Attend Budget Coordination Meetings Develop Report/Budget Document Submittal 	<ul style="list-style-type: none"> Data gathering Document formatting
Budget Monitoring	<ul style="list-style-type: none"> Develop specific / special reports as needed Assist Managers and Supervisors with special budget analysis / projections Monitor overall Department expenditures 	<ul style="list-style-type: none"> Develop routine monthly reports as needed
Management Audit	<ul style="list-style-type: none"> Support managers in ensuring tasks are completed on time. Coordinate data collection from department staff 	
Monthly Reports (Work Plan)	<ul style="list-style-type: none"> Compile and prepare data by month end. 	<ul style="list-style-type: none"> Report preparation as needed
Public Works Open House	<ul style="list-style-type: none"> Plan and coordinate event 	<ul style="list-style-type: none"> Support as needed
APWA Self Assessment Accreditation	<ul style="list-style-type: none"> Analyze survey results and report findings 	<ul style="list-style-type: none"> Collect survey data
Asset Management System	<ul style="list-style-type: none"> Participate in project team, develop data collection forms and systems, and coordinate data collection Analyze and report data 	<ul style="list-style-type: none"> Collect data from supervisors and enter data into Hansen
Annual Report for Department	<ul style="list-style-type: none"> Develop, edit and produce final report 	<ul style="list-style-type: none"> Collect data as needed Format document
Grants	<ul style="list-style-type: none"> Research grant opportunities Develop and write grants 	
Emergency Preparedness	<ul style="list-style-type: none"> Update and develop emergency operations plans 	

Exhibit 6 (2)

Project	Management Analyst	Staff Assistant / Other Support Staff
HR Database	<ul style="list-style-type: none"> • Determine structure and content of database • Coordinate conversion of existing data to new database 	<ul style="list-style-type: none"> • Data entry of pertinent information • Ongoing data updates and maintenance
Single Space Meter Replacement Study	<ul style="list-style-type: none"> • Financial analysis and report of results 	<ul style="list-style-type: none"> • Data collection and entry as needed for analysis
Bus Stops	<ul style="list-style-type: none"> • Research options and standards 	
Taxi Licensing RFQ	<ul style="list-style-type: none"> • Research pros and cons of licensing vs. franchising • Research for Municipal Code modifications • Develop recommendations 	
On-street Meter Rates	<ul style="list-style-type: none"> • Develop survey instrument for local, regional and national cities • Financial analysis of meter rate increase, etc. 	<ul style="list-style-type: none"> • Collect data from local, regional and national cities, and compile response data
Street Sign Replacement (street sweeping re-routing)	<ul style="list-style-type: none"> • Evaluate and update street sign plan master report • Research consultants to conduct street sweeping survey • Evaluate contractor vs. in-house installation 	
Off Street Parking Rates	<ul style="list-style-type: none"> • Collect data and analyze off-street utilization for various City owned parking facilities • Develop survey of local, regional, and national cities • Develop recommended rates and time increments based on results of analysis 	<ul style="list-style-type: none"> • Collect data – mailing, follow up, compile data

Exhibit 6 (3)

Project	Management Analyst	Staff Assistant / Other Support Staff
Fee Analysis for Engineering	<ul style="list-style-type: none"> • Support Engineering to ensure data collection tasks are completed on time. • Coordinate data collection from staff 	
Utility Rates	<ul style="list-style-type: none"> • Support managers to ensure tasks are completed on time. • Coordinate data collection from department staff 	
Multi Space Santa Monica 5	<ul style="list-style-type: none"> • Develop survey of local, regional, and national cities • Financial analysis as needed 	<ul style="list-style-type: none"> • Collect data – mailing, follow up, compile data
Preferential and Overnight Parking Permit Program	<ul style="list-style-type: none"> • Participate in task force meetings • Analyze program data • Develop fee structure • Identify enhancements for OBC 	
Santa Monica Boulevard	<ul style="list-style-type: none"> • Research projects of similar scope • Develop report with recommendations for RFQ • Draft new public outreach materials • Assist with community outreach 	<ul style="list-style-type: none"> • Edit public outreach materials, and mail.
Auto View Analysis	<ul style="list-style-type: none"> • Analyze data collected from Auto view • Produce report of findings 	<ul style="list-style-type: none"> • Collect data, and enter data as needed
ISF Review	<ul style="list-style-type: none"> • Research as needed 	<ul style="list-style-type: none"> • Collect data as needed
Environmental Utility Legislative Tracking	<ul style="list-style-type: none"> • Attend legislative coordinator meetings as needed • Track legislation related to environmental utilities 	<ul style="list-style-type: none"> • Collect data and compile as needed • Back-up for meeting attendance
CUWCC Annual Report	<ul style="list-style-type: none"> • Complete on-line report 	<ul style="list-style-type: none"> • Collect data as needed
Public Outreach – materials, Earth Day, Safety Expo, 100 Yr. Celebration, Flower & Design Showcase	<ul style="list-style-type: none"> • Draft new public outreach materials • Participate in community events 	<ul style="list-style-type: none"> • Edit public outreach materials, and mail

Exhibit 6 (4)

Project	Management Analyst	Staff Assistant / Other Support Staff
Hazardous Waste Round-Up	<ul style="list-style-type: none"> • Prepare memo briefing City Council and Commission • Research other sources of funding 	
LARA Meeting		<ul style="list-style-type: none"> • Serve as back up to attend LARA meetings. Take notes.
Westside Recycling	<ul style="list-style-type: none"> • Attend Westside Recycling meetings (monthly). Coordinate programs within the City. 	<ul style="list-style-type: none"> • Back up for meeting attendance.
MWD Conservation	<ul style="list-style-type: none"> • Attend monthly meetings. Take minutes. 	<ul style="list-style-type: none"> • Back up for meeting attendance.
Sustainable Task Force/Summit	<ul style="list-style-type: none"> • Attend meetings 	<ul style="list-style-type: none"> • Coordinate mailings • Data collection as needed • Back up for meeting attendance
Utility Bill Messages	<ul style="list-style-type: none"> • Draft six bill messages at the beginning of the fiscal year. 	
Sewer LA Report	<ul style="list-style-type: none"> • Create monthly monitoring report format 	<ul style="list-style-type: none"> • Collect data and prepare on-going monthly report
Newspaper Clipping		<ul style="list-style-type: none"> • Review newspapers for current affairs related to PW and Trans. for first 30 minutes of each day. • Scan and collect articles, distribute to Senior Management as needed
Commission Support	<ul style="list-style-type: none"> • Review minutes • Coordinate preparation of staff reports • Coordinate response to Commission inquiries • Special research as needed 	<ul style="list-style-type: none"> • Prepare staff reports • General support as needed • Respond to Commission inquiries as needed • Prepare minutes • Attend meetings and be the recording secretary

Exhibit 6 (5)

Project	Management Analyst	Staff Assistant / Other Support Staff
Parking Rate and Operations Report – Quarterly	<ul style="list-style-type: none"> • Generate, compare and analyze reports for the PARCS equipment to determine pre/post occupancy and lot closings • Report with percentages of occupancy and capacity for the City’s garages 	<ul style="list-style-type: none"> • Collect data and compile as needed
Development Impact Fee Study	<ul style="list-style-type: none"> • Support managers in ensuring tasks are completed on time. • Coordinate data collection from department staff 	<ul style="list-style-type: none"> • Collect data and compile as needed
Department Emergency Management Representative	<ul style="list-style-type: none"> • Attend Emergency Management Meetings • Administer development of policies and procedures for the Department 	<ul style="list-style-type: none"> • Update policies and procedures documents as needed • Back up for meetings
Holiday “Parking Dollars” Program	<ul style="list-style-type: none"> • Determine the cost and process for creating this program • Produce a plan with suggestions on program policies, etc. 	

4. ANALYSIS OF FLEET SERVICES

4. ANALYSIS OF FLEET SERVICES

This chapter of the report analyzes the operations of Fleet Services. Fleet Services is responsible for the repair and maintenance of the City's fleet of vehicles and equipment. Services include vehicle and equipment repair, preventive maintenance, welding, tire repair and replacement, vehicle replacement and specification development, as well as other related services. Fleet Services operates two shifts – the day shift being from 6:30 a.m. till 4:00 P.M. (9/80 Schedule) and the evening shift being from 1:30 p.m. till 12:00 A.M. (4/10 schedule). Fleet Services is authorized eleven maintenance positions (excluding the positions assigned to Stores). Central Stores includes one (1) supervisor and three (3) central store specialists, which are responsible for fleet, water and facilities maintenance inventories.

1. THE PUBLIC WORKS AND TRANSPORTATION DEPARTMENT EMPLOYS A NUMBER OF BEST PRACTICES IN FLEET SERVICES.

An organizational and management analysis by its nature focuses on opportunities for improvement. However, there are a number of strengths in Fleet Services. Examples of these strengths are portrayed below.

- Fleet is centrally located under the Infrastructure Maintenance Division and reports to the Maintenance Superintendent.
- The replacement schedule is based on a point system that incorporates aspects such as age, mileage, operating costs, and downtime.
- The Maintenance Supervisors and the Vehicle Maintenance Manager work with the various city departments to determine the specifications related to vehicle procurement.
- Blanket purchase orders and State contracts are used to take advantage of discounts and volume pricing.

- The City disposes of vehicles using two methodologies. One is to sell the vehicle to a movie company which purchases the vehicles at the market price. The City also uses a contracted auctioneer to sell its vehicles at a public auction. The auctioneer receives a portion of the proceeds.
- Fleet Services is an ASE Blue Seal of Excellence certified shop. To be eligible for this recognition, a company must have 75% of its repair technicians ASE certified. In addition, there must be a certified technician in each area of service offered. There are only 164 Blue Seal recognized shops in the State, and only 1,559 in the United States.
- Bodywork, mufflers, transmission repair, tire repairs, and smog testing are outsourced within the department.
- Fleet Services uses the CCG / FASTER System to track mechanic utilization and maintenance costs related to City vehicles.
- Fleet Services uses the Gas Boy Fuel System.

These strengths in Fleet Services provide a sound basis for further enhancements.

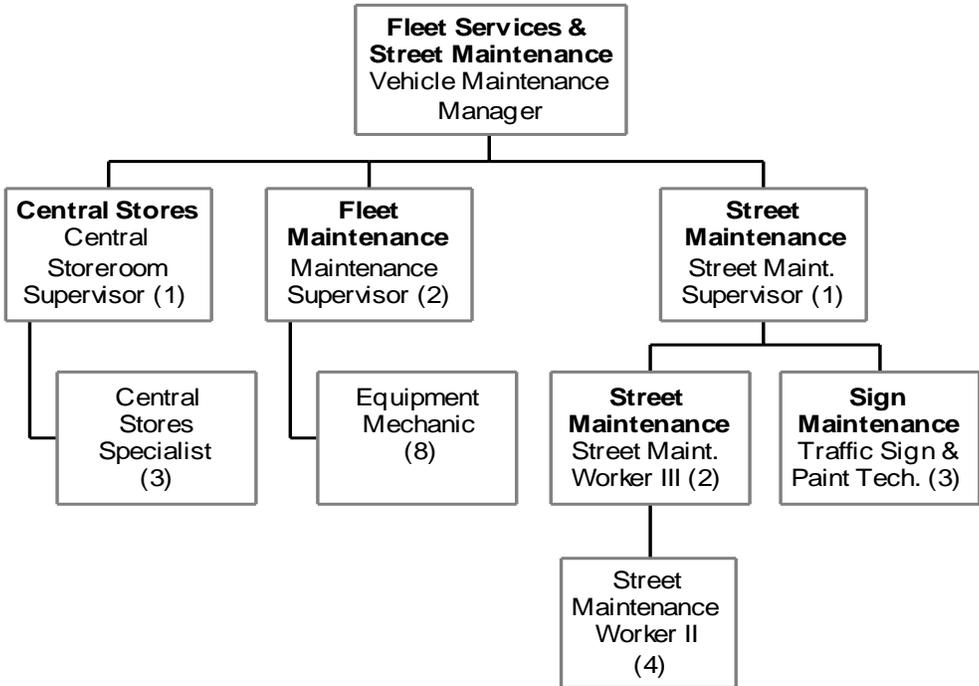
2. THE PLAN OF ORGANIZATION FOR THE FLEET SERVICES DIVISION SHOULD BE STREAMLINED.

Fleet Services is authorized fifteen (15) positions. The following list shows the services provided by Fleet Services based upon interviews with managers and supervisors.

- Annual procurement of fleet replacements including the development of specifications;
- Providing vehicle maintenance services for the City's fleet Monday through Friday from 6:30 AM to 11:30 PM;
- Scheduling preventive maintenance for the City's fleet in accordance with original manufacturers recommendations;
- Dispensing gasoline and diesel fuel;
- Maintenance of a parts inventory for the fleet, water utility, and facilities;
- Performing all title and tag activity;

- Performing all safety and emission inspections;
- Maintaining all certifications for emergency equipment including fire rescue and suppression vehicles.

The existing plan of organization for Fleet Services in delivering these services is presented below.



In analyzing organizational structure, the project team utilized benchmarks for spans of control. These benchmarks were developed based upon analysis conducted by a number of organizations such as the City of Seattle, City of Kansas City, City of Portland, King County, etc. These benchmarks are presented in the table below.

Position	Actual Span of Control	Best Practice Guideline
Vehicle Maintenance Manager	4:1	3:1 to 6:1
Maintenance Supervisor	4:1	8:1 to 10:1

A comparison of the actual spans of control in Fleet Services to these best management practices indicate an opportunity to streamline this plan of organization.

These opportunities are presented below.

- **The plan of organization for Fleet Services is top heavy.** There are three supervisors for twelve line positions. These three supervisors include the two Maintenance Supervisors and the Central Stores Supervisor. These three supervisors supervise eight (8) Equipment Mechanics, one (1) Mechanic Helper, and three (3) Central Stores Specialists. This is an average span of control of 4:1. This is a narrow span of control.
- **The spans of control for the two Maintenance Supervisors are narrow.** These two Maintenance Supervisors supervise a total of nine staff: eight (8) equipment Mechanics and one (1) Mechanic Helper. This equates to one supervisor for each four and one-half staff. This is a narrow span of control. One of these two positions should be eliminated through attrition.

A total of one position should be eliminated through attrition: a Maintenance Supervisor. The estimated annual cost eliminating the Maintenance Supervisor position, in terms of its annual salary and fringe benefits, is presented in the table below.

Cost Increase		Cost Decrease	
N / A	\$0	Eliminate a Maintenance Supervisor position	\$90,000
Total Cost Increase	\$0	Total Cost Decrease	\$90,000

Recommendation: Eliminate a Maintenance Supervisor position through attrition.

Recommendation: The Maintenance Supervisor position should be eliminated only after the operating hours that Fleet Services is open have been adjusted.

3. THE OPERATING HOURS THAT FLEET SERVICES IS “OPEN FOR BUSINESS” SHOULD BE REVISED.

Fleet Services operates two shifts - the day shift being from 6:30 a.m. till 4:00 P.M. (9/80 Schedule) and the evening shift being from 1:30 p.m. till 12:00 A.M.

Providing after-hours service is a best management practice. Fleet Services established the swing shift to accommodate vehicles that were used during the City’s

normal hours of operation such as police cars, refuse collectors, street sweepers, etc., and vehicles that had low tolerance for downtime. Preventive maintenance for the City’s fleet were to be performed during the swing shift. Yet, in November 2006, Fleet Services reported that 56% of the scheduled preventive maintenance was overdue and 21% were late.

In addition, the use of a swing shift is unusual. The comparative survey of Redondo Beach, Santa Monica, Santa Barbara, and Pasadena found that these cities do not provide a swing shift. This comparison is presented in the table below.

Question	Redondo Beach	Santa Monica	Santa Barbara	Pasadena
What are the hours of operation for your shop and how many days is the shop open?	7 AM to-4 PM.	4:30 AM to 6:00 PM.	7:30 AM to 4:00 PM Monday-Friday.	6:30 AM to 6:00 PM. 9/80 workweek

These four other cities operate their Fleet Services no later than 6:00 PM.

However, there are other reasons for eliminating the swing shift in Fleet Services. These reasons are presented below.

(1) Many Vehicles Are Not Accessible For Servicing During The Swing Shift.

Typically, the solid waste collection operators take the loads to the materials recycling facility at the end of their shift. As a result of the distance and traffic implications associated with the materials recycling facility, many of the trucks remain full at the end of the day shift and are driven to the materials recycling facility first thing in the morning. The weight of the loaded trucks precludes this equipment from being maintained and repaired by Fleet Services due to the weight limits associated with the lifts. This commonly occurs with street sweepers as well.

(2) The Swing Shift Is Not Supervised By A Maintenance Supervisor.

Currently the day shift works from 6:30 A.M. to 4:00 P.M. and the swing shift is from 1:30 P.M. to 12:00 A.M. Both Maintenance Supervisors are assigned to the day shift. The lack of supervision may contribute to increases in the number of hours needed to complete each work order as well as to the number of hours associated with each vehicle in comparing the day shift to the swing shift (see the table below).

	Billable Hours	Work Order	Vehicles	Average Hours Per Work Order	Average Hour per Vehicle
Swing Shift					
Mechanic 1	1,300.74	194	76	6.7	17.1
Mechanic 2	1,435.21	198	69	7.2	20.8
Mechanic 3	1,227.87	175	34	7.0	36.1
Mechanic 4	1,891.09	327	61	5.8	31.0
Swing Shift Average	5,854.91	894	240	6.5	24.4
Day Shift					
Mechanic 5	966.93	214	141	4.5	6.9
Mechanic 6	1,028.03	166	50	6.2	20.6
Mechanic 7	1,350.97	282	129	4.8	10.5
Mechanic 8	1,735.18	255	26	6.8	66.7
Day Shift Average	5,081.11	917	346	5.5	14.7

The swing shift requires an average of 6.5 hours per work order, while the day shift requires 5.5 hours to complete each work order. The swing shift spends almost 10 hours more per vehicle than the day shift. While the swing shift had more billable hours than the day shift, the swing shift completed a significantly smaller amount of work orders than the day shift.

(3) The Availability Of Parts Also Contributes To Inefficiencies Associated With The Night Shift.

Fleet Services staff also expressed concern regarding the availability of parts after 5:00 PM. If a part is not kept in stock by Fleet Services, the vehicle must sit in the shop until the next morning before a new part can be ordered and received.

Recommendation: The hours that Fleet Services is “open for business” should be adjusted to 7:00 AM to 6:00 PM. The hours that Central Stores is open should be adjusted to match these hours.

4. EQUIPMENT MECHANIC UTILIZATION GUIDELINES SHOULD BE DEVELOPED.

Many fleets have established performance measures regarding the number billable hours that an equipment mechanic should bill each month to work orders. Typically, the measures have been established that each mechanic, on average, should bill approximately 125 hours per month to work orders.

During the past fiscal year, the Equipment Mechanics in Fleet Services charged an average of 114 hours per month to work orders, but there was significant variation as indicated in the table below.

Mechanic	Billable Hours for Year	Billable Hours per Month
Mechanic 1	1,300.74	108.40
Mechanic 2	1,435.21	119.60
Mechanic 3	1,227.87	102.32
Mechanic 4	1,891.09	157.59
Total Night Shift	5,854.91	121.98
Mechanic 5	966.93	80.58
Mechanic 6	1,028.03	85.67
Mechanic 7	1,350.97	112.58
Mechanic 8	1,735.18	144.60
Total Day Shift	5,081.11	105.86
Total Staff	10,936.02	113.92

Only two staff reached the 125-hour standard for billable hours per month with a high of 157.59 hours and a low of 80.58 hours. The median number of hours was 110.49 and the average number was 113.92.

Guidelines should be established and used in the evaluation process to ensure that utilization guidelines are maintained for each mechanic. An additional 1,000 billable staff-hours could be billed to work orders annually if a 125 billable monthly average was consistently billed to work orders by each Equipment Mechanic. This would increase the number of work orders processed each year by almost 200.

Recommendation: Equipment Mechanic utilization guidelines should be developed and Equipment Mechanics evaluated against these guidelines on a monthly basis.

5. THE CITY SHOULD “RIGHT SIZE” THE CITY’S FLEET.

The purpose of or work in this area was to ensure that the substantial asset investment that the City has in its fleet is appropriate in terms of the number of vehicles. Since a fleet user’s need for a vehicle or piece of equipment can continue to change over time, justifying the initial acquisition and assignment of a vehicle does not ensure that a fleet of vehicles will remain properly sized. It is important then, that the City periodically analyze available information on the utilization of fleet assets and determine if there are opportunities to make adjustments to fleet size and/or share assets. This type of analysis should be conducted at least annually and include measurement criteria that is derived from actual experience.

As a first step in the analysis of utilization, the project team mapped the distribution of vehicles and equipment by class. This information helped the project

team map the fleet and provides the basis for future activities such as creating effective motor pools.

The second step in analyzing the utilization of the City’s fleet involved obtaining 2005-06 utilization information about the fleet inventory. Fleet Services provided a complete list of vehicles and equipment including unit numbers, descriptions, current organizational assignments, in-service dates, and odometer/hour meter readings. The data was compiled into an Excel spreadsheet where it could be easily manipulated. Calculations were made to extrapolate data such as months in service, and annual use.

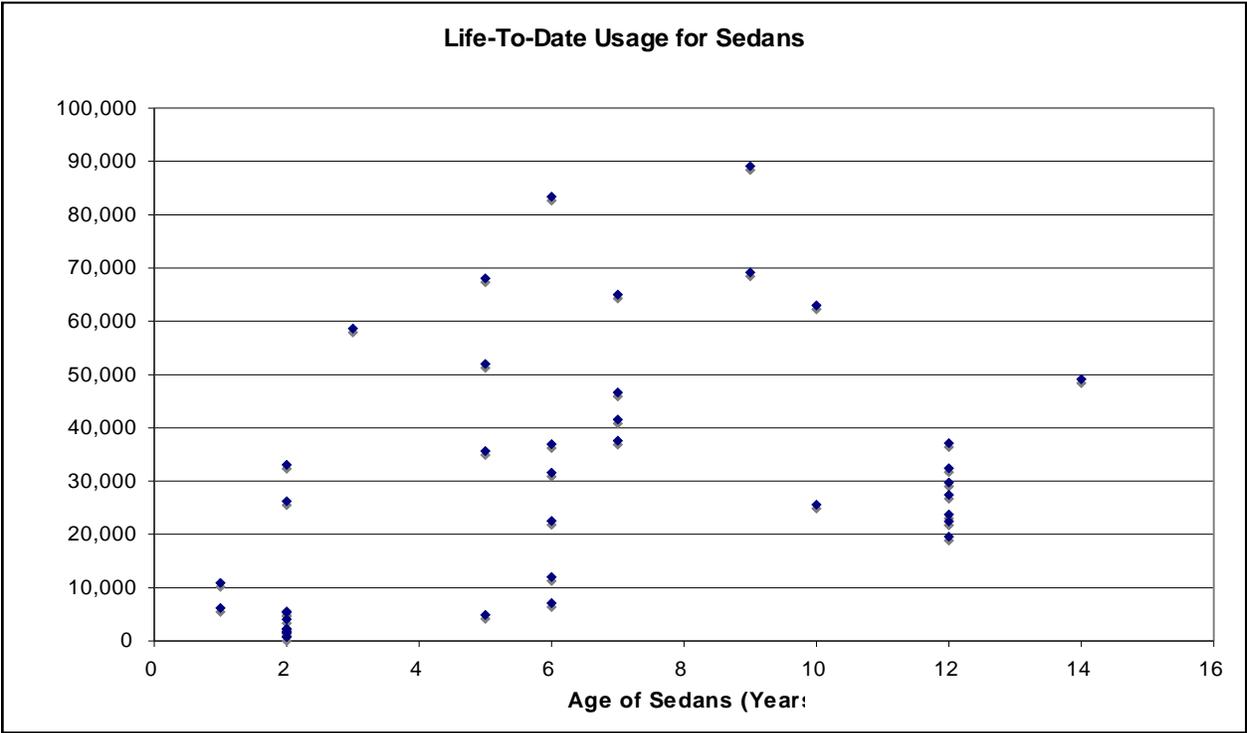
The data indicate that there are many units in the fleet that have low levels of utilization. The following table provides a summary of the results for all of the City’s fleet.

Mileage Data	Actual Miles
Average	4,252
Median	2,982
25th Percentile	998
75th Percentile	27,890

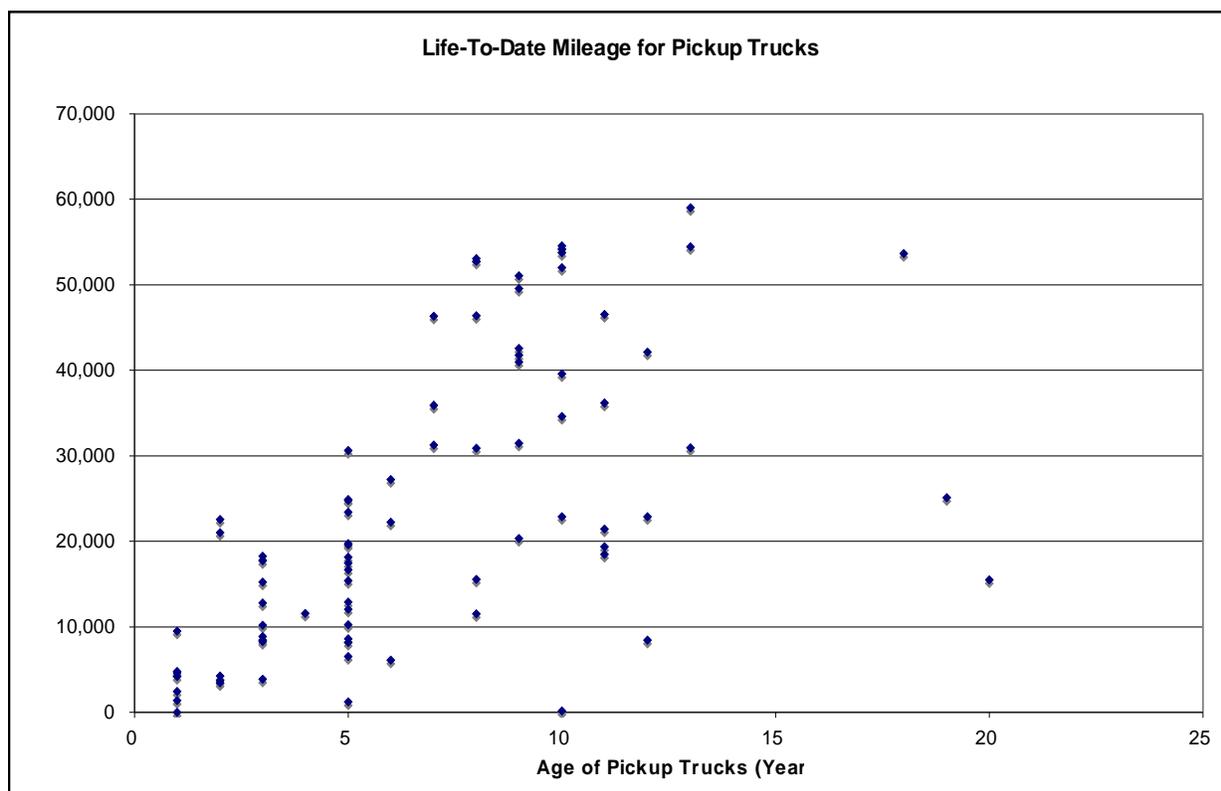
When analyzing the utilization of City vehicles, it is important to examine the entire City fleet because of factors related to the small size of the City. The average vehicle in the City’s fleet was driven an average of 4,252 miles in fiscal year 2005-06, while the 75th percentile approximated 27,890 miles. The need for a specific vehicle should be assessed when its level of utilization is one-half the median. This would amount to 1,491 miles. The exhibit at the end of this chapter presents a listing of vehicles that fall below this threshold.

Not all of these vehicles can be eliminated. Some of this equipment, such as reserve fire apparatus, will not achieve high levels of utilization. However, other vehicles are clearly underutilized.

To further evaluate levels of utilization, the project team compared average annual utilization data among similar units – general purpose sedans (excluding three sedans acquired in 2006). The project team documented the general purpose sedan class in terms of age and life-to-date mileage. The scattergram at the top of the next page represents each general purpose sedan in the City’s fleet. This comprises forty (40) general purpose sedans. Each diamond in the table represents an individual unit in the fleet. The horizontal and vertical lines represent the age of the vehicle and life-to-date mileage, respectively, for this class of vehicles. This chart shows that the oldest general purpose sedans are not necessarily the ones with the highest mileage. While there are instances where this could be justified, the project team would not expect to find this many general purpose sedans with low life-to-date mileage in a fleet the size and composition of Beverly Hills’.



The project team completed the same analysis for pickup trucks. The project team documented the pickup truck class in terms of age and life-to-date mileage. The scattergram at the top of the next page represents each pickup truck in the City’s fleet. This comprises eighty (80) pickup trucks; five pickup trucks were excluded since these trucks were acquired in 2006. Each diamond in the table represents an individual unit in the fleet. The horizontal and vertical lines represent the age of the vehicle and life-to-date mileage, respectively, for this class of vehicles. This chart shows that the oldest pickup trucks are not necessarily the ones with the highest mileage. While there are instances where this could be justified, the project team would not expect to find this many pickup trucks with low life-to-date mileage in a fleet the size and composition of Beverly Hills’.



This analysis of vehicle and equipment utilization indicates an opportunity to reduce the number of vehicles within the City's fleet. The City should take a number of steps to reduce the number of vehicles within its fleet. These steps include the following.

(1) Vehicle Utilization Standards Should be Developed and Adopted.

The City should develop and implement vehicle utilization standards as screening devices along with a regular vehicle justification process. In establishing new fleet assignment and utilization monitoring policies and procedures, the fleet management organizations should be careful to define the proper use of monthly or annual vehicle usage standards. There is a tendency to define vehicles as needed or unneeded based on such standards. This tendency should be avoided.

Mileage, and daily or hourly usage amounts can be used to identify potentially underutilized units. However, usage statistics alone can also be very poor indicators of the true need for a vehicle or piece of equipment. The project team defines a vehicle as being in use when it is not readily available for use by another organization or employee. In such situations a vehicle may or may not be accumulating miles or engine hours. For example, a plumber's van loaded with supplies and equipment might fit this description. Its odometer will indicate that it is not driven very much, but this is clearly does not mean that the vehicle is under-utilized or not needed.

For these reasons, vehicle assignment justification and utilization monitoring procedures should define the need for and use of vehicles and equipment from as many perspectives as possible. Odometer readings are only one of these. In addition, other utilization standards should be used to screen vehicle assignments or vehicle purchase requests for detailed scrutiny and should be tailored to the different types of vehicles and the different environments in which departments and divisions operate. Other pertinent factors in determining need are included in the table presented on the following page.

INFORMATION FOR THE EVALUATION OF FLEET SIZE AND COMPOSITION

1. Timing and intensity of vehicle usage, including the following: <ul style="list-style-type: none">- Average daily miles and/or hours of use- Typical times of use, including evening and weekend hours- Peak periods of use- Seasonality of use- Ability to predict and control timing and intensity of use
2. General nature of vehicle usage, including the following: <ul style="list-style-type: none">- Typical number of passengers- Types of passengers (e.g., other employees, private citizens, suspected criminals, inmates, etc.)- Level of tolerance for vehicle unreliability- Maximum acceptable waiting time when a vehicle is needed- Personal use of City-owned vehicles

<p>3. Special needs associated with vehicle usage, including the following:</p> <ul style="list-style-type: none"> - Frequency, timing, and duration of responses to emergency calls
<p>- Auxiliary equipment (e.g., light bar, phone/radio, tool chest)</p> <ul style="list-style-type: none"> - Security of vehicle and contents - Transportation of materials, tools, and/or equipment that are not easily transferred to another vehicle
<p>4. Location of vehicle usage, including the following:</p> <ul style="list-style-type: none"> - Proximity of vehicle user's office or work place to those of other vehicle users - Proximity of user office to a motor pool - Proximity of user office to commercial vehicle rental facilities - Variability in user work place locations - Typical destinations
<p>5. Suitability, in light of vehicle usage requirements and comparative costs, and alternative means of transportation, such as the following:</p> <ul style="list-style-type: none"> - Assignment of a vehicle to an individual - Shared use of an assigned vehicle - Use of a motor pool vehicle - Use of a commercial rental vehicle - Use of an employee-owned vehicle

Recommendation: Vehicle utilization standards should be developed.

(2) The Vehicle Maintenance Manager Should Be Charged With The Development Of A Proposal For Consideration Of The Public Works And Transportation Director For Reduction Of The City's Fleet By 10%.

The Vehicle Maintenance Manager should be assigned responsibility for the development of a proposal for consideration of the Public Works and Transportation Director for downsizing the fleet. The basic steps involved in the analysis presented in the table below.

<p>Interview managers in departments to whom the vehicles are assigned to gain an understanding regarding how each vehicle is utilized and assigned.</p> <p>Establish criteria to test the cost-effectiveness of all components of the fleet. These criteria should include such items as:</p> <ul style="list-style-type: none"> • Utilization (mileage/hour) ranges by equipment class and assignment. • Utilization patterns including seasonal peaks and valleys.
<p>Identify specific units within the fleet which appear to be underutilized</p> <p>Once specific units have been isolated, explore opportunities to increase utilization and/or reduce costs through a variety of approaches such as:</p>

<ul style="list-style-type: none"> • Expanded pooling. • Replacing vehicle assignment with mileage reimbursement and/or car allowances for selected users.
<p>Based on the above, develop a preliminary list of specific units that are candidates for either elimination or alternative means for providing vehicle/equipment capabilities to user units.</p> <p>Then, we will analyze other opportunities to reduce fleet costs through such approaches as:</p> <ul style="list-style-type: none"> • Pooling of vehicles. • Expanded use of mileage reimbursement/car allowances as per above.

The reduction of the City’s fleet by 10% (or approximately 38 vehicles) provides the opportunity for the City to reduce its annual costs for labor, parts commercial repair and replacement as indicated in the table below.

Cost Increase		Cost Decrease	
NA	\$0	Reduce the City’s fleet by 10%	\$299,800
NA	\$0	Total Cost Decrease	\$299,800

Recommendation: The Vehicle Maintenance Manager, with the support of the two Management Analysts, should be assigned responsibility for identifying opportunities to reduce the City’s fleet.

6. THE CITY SHOULD CONTINUE TO MONITOR ITS FLEET TO ENSURE THAT THE AGE OF THE FLEET DOES NOT SIGNIFICANTLY EXCEED REPLACEMENT GUIDELINES.

In well-managed fleet operations, the Vehicle Maintenance Manager plays a critical role in the timely and programmed replacement of the fleet of vehicles and equipment. This is the case in Fleet Services. The City maintains a fleet replacement program based upon expected life cycles of the equipment in question.

The amounts proposed for fleet replacement from fiscal year 2007 through 2011 are presented in the table below.

Fiscal Year	Replacement Allocation
2007	\$1,600,000
2008	\$1,500,000
2009	\$1,500,000
2010	\$1,500,000
2011	\$1,500,000
Total	\$7,600,000

As can be seen in the table, the total allocation for fleet replacement from 2007 through 2011 is expected to be \$7,600,000, averaging \$1,520,000 per year over the five-year period. There are approximately 380 pieces of equipment assigned to the Public Works and Transportation Department. The total value of the fleet is approximated at \$16,898,679. The allocation of \$1,520,000 per year to replacing the fleet effectively results in an overall replacement cycle of eleven (11) years.

The project team analyzed the extent to which the City adhered to these minimal guidelines, and found that the age of the existing fleet approximates the replacement guidelines on the whole (see the table below), and that the average age of the fleet is not excessive.

Analysis	Age of Fleet (Years)	Life-To-Date Mileage of Fleet
Average	5.5	22,264
Median	5	17,488
1 st Quartile	1	4,761
3 rd Quartile	8	34,086

When analyzing the age of the fleet, the data showed that 59% of the City fleet is less than 5 years old and only 19% is older than 10 years old. The median age was 5 years, while the 1st and 3rd quartile was 1 year and 8 years respectively. The 2006 end-of-year mileage analysis showed that the median number of life-to-date miles for each vehicle was 17,488, while the 1st and 3rd Quartile was 4,761 life-to-date miles and 34,086, life-to-date miles respectively.

However, if the City continues to replace the fleet at this level – an average of eleven years – the fleet will age to unacceptable levels. The age of a fleet, overall, should approximate one-half the weighted average of the fleet’s replacement guidelines. Eleven years far exceeds that weighted average. Unless the City substantially increases its replacement funding – by a factor of two – or reduces the amount of vehicles in the fleet, the City will begin to experience problems with excessive downtime and operating and maintenance costs associated with an old fleet.

Recommendation: The Vehicle Maintenance Manager should continue the development of the annual five year replacement plan for consideration of the Public Works and Transportation Director.

Recommendation: The Public Works and Transportation Department should monitor the age of the fleet to assure that adequate replacement funding is available to avoid problems with excessive downtime and operating and maintenance costs.

7. THE SHOP LABOR RATE AND MARKUPS SHOULD BE EVALUATED AS PART OF A BROADER EVALUATION OF THE CITY’S COST ALLOCATION PLAN.

In analyzing the rates that are currently charged by Fleet Services, the project team utilized practices recommended by the American Public Works Association in its

publications *Constructing Fleet Charge-Back Rates in Public Works and Shop Rate Guide*.

Rate calculation is the process of converting the total costs attributable to the Fleet Services operating and maintenance costs to a charge back rate that will recover the full cost of providing these services. This is accomplished by dividing the costs in each cost center (i.e., fleet acquisition, fleet maintenance, Central Stores, etc.) by the total number of units that is anticipated to be consumed or provided in the next fiscal year (i.e., number of vehicles in the fleet, hours billed to work orders, parts billed to work orders, etc.).

In calculating the rates for Fleet Services, the actual fiscal year 2005-06 costs for Fleet Services were utilized. These costs were allocated to various cost centers corresponding to the principal types of goods and services Fleet Services sells, and then the sum of the costs in each cost center were divided by the annual volume of services (i.e., direct labor hours billed to work orders). These unit rate costs were then compared to the rates currently employed by Fleet Services to assess their reasonableness.

Charge back rates should be designed so as to promote cost recognition and control. In general, this means that rates should be tied to discrete goods and services that are recognizable to the average fleet user and they should differentiate the goods and services provided insofar as the costs of these goods and services are significantly different. One of the best indicators of the appropriateness of a rate structure is that the rates employed are logical and intuitively acceptable. While the methodology employed

by Fleet Services is sound, the rate structure should be evaluated as part of a broader evaluation of the City's cost allocation plan.

(1) The City Currently Charges \$161 For Each Mechanic Hour Billed.

Many elements go into calculating a shop labor rates. Items such as salaries and benefits, supplies, utilities, maintenance, and overhead all factor into the equation. The City rate calculation was calculated using the following table.

Expense Category	2007 Budget	Rate By Expense Category	% of Total
Salaries	\$681,629	\$56.80	35.3%
Benefits	\$313,186	\$26.10	16.2%
Supplies	\$7,478	\$0.62	0.4%
Services	\$73,854	\$6.15	3.8%
Overhead	\$819,912	\$68.33	42.5%
Utilities	\$32,249	\$2.69	1.7%
Total	\$1,928,307		
Estimated Billable Hours	12,000		
Rate	\$160.69	\$160.69	100.0%

This rate is high in comparison to other cities included by the project team in the comparative survey that ranged from \$65 per hour to \$90 per hour in Redondo Beach, Santa Monica, Santa Barbara, and Pasadena. The shop labor rate charged by Beverly Hills - \$161 per hour – far exceeds that charged by these four other cities, whose rate varies from \$65 per hour to \$98 per hour.

Fleet Services high labor rate is largely due to overhead charges that come from other City departments related to Information Technology, Facilities, Administration, Legal, Insurance, etc. Overhead amounts to almost 43% of the shop labor rate. Based upon the experience of the project team, these charges seem excessive. The facility service charges in overhead, which does not include facility replacement charges, amount to \$204,426. Information technology administrative charges amount to \$51,984.

The project team reevaluated the shop labor rate based upon actual fiscal year 2005-06 labor rates using a 20% overhead rate and not the existing 82% overhead rate (overhead as a percentage of salaries and benefits). The 20% overhead rate is what the project team typically develops as an overhead rate in its cost allocation studies.

The results of this reevaluation of the shop labor rate are presented in the table below.

Cost Component	FY 2005-06	Cost Per Billable Hour
Salaries	\$681,629	\$56.80
Benefits	\$313,186	\$26.10
Supplies	\$7,478	\$0.62
Services	\$73,854	\$6.15
Overhead	\$198,963	\$16.58
Utilities	\$32,249	\$2.69
Total	\$1,307,358	\$108.95

As the table indicates, the shop labor rate would be \$109 under this scenario, and not \$160. This is still higher than the other cities, but is based upon the expenditures incurred by Fleet Services and a more realistic overhead rate.

(2) The Inventory Markup Percentage Is Currently 35% Of Parts Cost.

The inventory mark-up should be based upon the costs for the Central Stores cost center divided by the value of the parts billed to work orders as identified within CCG / FASTER. The mark-up represents a number of components including the following:

- The costs associated with the staff that operates the Central Stores;
- Services and supply costs attributable to Central Stores;
- Internal support charges and overhead charges allocated to this cost center by the Fleet Services, again using a 20% overhead rate.

The following table illustrates the proposed inventory markup calculation.

Cost Component	FY 2005-06	Cost Per Billable Hour
Salaries	\$45,866	10.23%
Benefits	\$26,158	5.83%
Supplies	\$18,599	4.15%
Overhead	\$14,404	3.21%
Total	\$105,027	23.43%
Total Parts Costs	\$448,333	

Just like the shop labor rate calculation, the largest portion of the Inventory Markup Percentage stems from the City overhead transfer. This portion accounts for approximately 15.07% of the current 35.28% markup percentage. The inventory markup percentage for inventory, under this scenario, would be 23%.

(3) The Fuel Markup Percentage Is Currently 19.8% Of Fuel Charges.

The objective of this mark-up is to recover the cost that Fleet Services incurs in acquiring, storing, managing, and dispensing fuel. The fuel mark-up represents a number of components including the following:

- The costs associated with staff ordering fuel and the costs associated with the maintenance and repair of fuel islands.
- Services and supply costs attributable to the fuel, including the cost of the fuel, the costs of commercial repair of the fuel islands, the cost of parts for the fuel dispensing equipment, the costs of taxes and assessments of fuel dispensing, etc.
- Internal support charges that were specifically allocated to this cost center (i.e., information services, voice communication, etc).

The following table illustrates the proposed fuel markup calculation.

Cost Component	FY 2005-06	Cost Per Billable Hour
Salaries	\$36,693	\$0.18
Benefits	\$21,008	\$0.10
Supplies	\$4,000	\$0.02
Overhead	\$11,540	\$0.06
Subtotal	\$73,241	\$0.36
Total Fuel Used	206,000	
Fuel Markup	\$0.356	
Approximate Fuel Cost	\$2.50	
Fuel Markup Percentage	14.22%	

Just like the inventory markup percentage calculation, the largest portion of the existing Fuel Markup stems from the City overhead allocation. This portion accounts for approximately 7.82% of the current 19.8% markup percentage. The fuel markup percentage, under this scenario, should be 14%.

Recommendation: The City should evaluate the shop labor rates and parts and fuel markups in the context of an evaluation of the City’s cost allocation plan.

8. TIGHTER INTERNAL CONTROLS SHOULD BE IMPLEMENTED TO ENSURE SAFEGUARDS CONCERNING INVENTORY MANAGEMENT.

There are a number of problems with the internal controls of the Central Stores. The Central Store Supervisor position has been vacant for more than six (6) months. A Central Stores Specialist position has been vacant due to an extended leave of absence due to a physical disability. Fleet Services has substituted these staff with temporary or part-time staff, which creates internal control issues on its own. The acting Central Stores Supervisor is one of the two Maintenance Supervisors in Fleet Services. Central Stores provides inventory management for fleet, water / sewer utilities, and facilities management.

Several issues concerning inventory management need to be addressed by the division.

(1) Access To The Inventory Storeroom Should Be Restricted To Central Stores Staff.

Currently all Department staff have access to the Central Stores storeroom. In fact, there is a back door that backs up to an alley that City staff uses to pick up parts from Central Stores. This door is open all day and occasionally at night. Once staff enters the building, staff has unfettered access to Central Stores if Central Stores staff is not present. Staff should log out parts that this staff issues to themselves, but this rarely occurs.

Loosely controlled physical access causes inventory shrinkage because employees who take inventory frequently do not inform the Central Stores employees responsible for charging the inventory against work orders. Loosely controlled physical access also allows for inventory shrinkage due to theft.

A number of steps need to be taken to address these issues including the following:

- All parts inventory should be stored inside and locked;
- Physical access to the parts inventory should be restricted through installation of fencing and revised location of the parts counter;
- All existing locks to Central Stores inventory should be changed;
- Keys should be distributed to Central Stores employees and the Maintenance Supervisors; and
- Wherever possible, there should be a single point of entry into every parts room that is easily monitored by the Central Stores employees.

Recommendation: Access to the inventory in Central Stores should be restricted to the staff of Central Stores.

Recommendation: Physical access to Central Stores should be limited through installation of fencing and revised location of the parts counter.

(2) The Hansen Inventory Module Should Be Utilized For Water / Sewer Utilities And Facilities Management.

Fleet Services utilizes the inventory information system in CCG / FASTER. This information system is effective in maintaining an audit trail for issuance of parts and maintaining appropriate levels of parts to assure a high fill rate for parts requests by Equipment Mechanics.

The tracking and safekeeping of inventory levels for non-Fleet Services parts and supplies is difficult due to the lack of an inventory information system. The Department will be installing the Hansen asset management system. The inventory module in this system should be utilized to monitor inventory levels, audit parts inventory levels and issuance of parts and supplies to Water / Sewer Utilities And Facilities Management.

Recommendation: The inventory module in the Hansen asset management system should be utilized to monitor inventory levels, issue parts, and audit parts inventory levels and issuance. Until this module can be installed, a manual log should be used to record all issuance of parts and supplies to the staff of water / sewer utilities and facilities management.

(3) Annual Inventories and Spot Audits Should Be Conducted To Determine the Percentage of Loss Associated With The Implemented Internal Controls.

An annual inventory of parts in the Central Stores inventory has not been conducted for two years. The lack of this data, as well as spot audits conducted monthly, impedes the ability of the City to determine inventory shrinkage.

Strong internal inventory controls consist of conducting annual inventory audits of the division. Periodic spot audits should also be conducted on a periodic basis as well.

Recommendation: Fleet Services should conduct an annual inventory of all Central Stores parts and supplies.

Recommendation: Central Stores should conduct spot audits of parts and supplies and reconcile to the inventory system.

9. FLEET SERVICES IS COMPETITIVE IN TERMS OF EQUIPMENT MECHANIC STAFFING, OPERATING AND MAINTENANCE COSTS AND SERVICE LEVELS.

In order to make some high-level judgments regarding the amount of maintenance effort required to keep a fleet in good condition, we utilized an approach called Vehicle Equivalents (VE's). Each piece of equipment is compared to the average amount of maintenance effort that is required to keep an average sedan in a fleet in good repair. The amount of this maintenance effort is expressed as one Vehicle Equivalent (1 VE). Each general class of vehicles is then assigned a vehicle equivalency that expresses the service effort required to maintain that vehicle as a multiple of fleet sedans. For example, the typical police patrol car (used 2 to 3 shifts per day) equates to 2.5 vehicle equivalents, meaning that it takes about two and one-half times as much maintenance effort per year to maintain the average police patrol car as it does to maintain the average fleet sedan.

This approach has been in use for years in the fleet industry. The National Association of Fleet Administrators (NAFA) conducted a survey of its members in 2001 to establish average VE values for many vehicle classes. Some fleet managers have used similar approaches to help them determine the appropriate staffing levels for their various maintenance facilities. The VE values utilized by the project team are derived from a number of sources, and are primarily based on costs for government and utility fleets. As with any standardized industry benchmarking tool, the information must be

used judiciously and to help identify areas where more detailed study is needed. The benefit of using vehicle equivalents is its relative simplicity, and the fact that diverse types of vehicles and equipment can be compared using a common standard.

Vehicle Equivalencies are a high level diagnostic tool to evaluate the relative level of maintenance effort for large groups of vehicles. They are not meant to apply separate values to individual vehicles.

In general, one VE means the equivalent of approximately 15 to 20 labor hours of maintenance per year, averaged over the life of the vehicle. Or, in monetary terms, we can estimate that one VE represents \$900 to \$1,200 of maintenance cost per year including direct labor, parts, and outsourced repair costs combined, but *excluding* accidents, abuse, and other unusual events.

Using the value for VE's, we can calculate staffing measures such as those in the following table.

Performance Measure	Fleet Services Value for FY 2005-06	Industry Guideline
Mechanic Labor Hours per VE	12	12 to 15
VE's per Mechanic	116	100 to 125
Annual Billable Hours Per Mechanic	1,367	1,500
Maintenance and repair cost per VE	\$1,072	\$900 to \$1,200 per VE
Repair turnaround time – services completed within one workday	76%	80%

Fleet Services maintains a fleet that consists of 926 VEU's. Currently, Fleet Services is authorized eight (8) Equipment Mechanic positions. The ratio of VE's per

Equipment Mechanic is 116 to 1. This compares to the industry guideline of 100 to 125 to 1. This indicates that Fleet Services is handling an appropriate level of workload.

The maintenance and repair cost for the City's fleet meets industry guidelines. The City's costs are \$1,072 per VE. The guideline is \$900 to \$1,200 per VE. A range of costs is utilized to allow for varying conditions in different regions that are difficult to quantify in a VE analysis. These conditions include fleet utilization levels, the age of the fleet, and the local market for labor, parts, and vendor services. Beverly Hills has an average aged fleet, but a higher priced labor market, and higher priced vendor and parts services.

Fleet Services completed 76% of its work orders within one workday. This is a good level of service.

Recommendation: The level of staffing for equipment maintenance and repair matches existing workload; additional Equipment Mechanic II positions should not be authorized.

10. ONE OF THE THREE CENTRAL STORE SPECIALISTS POSITIONS SHOULD BE ELIMINATED THROUGH ATTRITION.

The level of staffing in Central Stores exceeds industry guidelines. The industry guideline that the project team utilizes for staffing of Central Stores is presented in the table below.

Performance Measure	Fleet Services Value for FY 2005-06	Industry Guideline
Parts staff per equipment Mechanic	4:8	1:8 to 1:10

Fleet Services is authorized eight (8) equipment Mechanics. Central Stores is authorized one (1) Central Stores Supervisor and three (3) Central Stores Specialists. The three (3) Central Stores Specialist positions and a Senior Central Stores Specialist

position are three more positions than required solely to serve Fleet Services based upon the industry guidelines.

However, the Central Stores is also responsible for the receipt and issuance of parts and supplies for Water / Sewer utilities, and Facilities Management. Approximately thirty (30) transactions are processed each day for the water / sewer utilities and fifty (50) transactions are processed each day for facilities management. Based upon an average processing time of five minutes per transaction, a total of 6.6 hours of a Central Stores Specialist would be required on a daily basis to issue parts and supplies for Water / Sewer utilities, and Facilities Management.

This would result in the need for two positions in Central Stores. However, the Central Stores staff is responsible for staffing two different stores facilities in two different locations. This requires one additional position to provide coverage of these facilities for leave such as vacations, holidays, sick leave, etc.

This would enable the elimination, through attrition, of one of the three Central Stores Specialist positions. The estimated annual cost impact of eliminating the Central Stores Specialist position is presented in the table below.

Cost Increase		Cost Decrease	
NA	NA	Eliminate a Central Stores Specialist position	\$64,200
Total Cost Increase	\$0	Total Cost Decrease	\$64,200

Recommendation: One of the three Central Store Specialist positions should be eliminated.

11. FLEET SERVICES SHOULD DEVELOP SERVICE AGREEMENTS WITH ALL OF ITS MAJOR CUSTOMERS.

The purpose of service level agreements is to define the responsibilities of Fleet Services for doing business with its customers. These service agreements document:

- The services to be provided;
- The funding resources required for acquisitions, maintenance, and repair;
- The terms and conditions under which the customer and Fleet Services will operate in order to properly support the City's investment in the fleet.
- The standard business practices including how compliance with the service agreement will be measured, problem (trouble) reporting protocol, how to request services, emergency service priorities, services provided after hours, etc.
- The services provided and not provided.
- The dispute resolution process.

Fleet Services should develop service agreements with its major customers. The second exhibit following this chapter presents an example of a service level agreement utilized by the City of Winston-Salem.

Recommendation: The Fleet Services Bureau should develop and adopt service level agreements with its major customers.

12. THE FINANCE DEPARTMENT SHOULD CONDUCT "SPOT" AUDITS OF THE CENTRAL STORES PROCEDURES EMPLOYED BY FLEET SERVICES.

As noted earlier in this chapter, the internal controls for Central Stores needs to be improved. To assure that these internal controls meet reasonable standards, the Finance Department should conduct periodic "spot" audits to assure their adequacy. These "spot" audits should be conducted not less than twice a year.

Recommendation: The Finance Department should conduct "spot" audits of the central stores procedures not less than twice a year.

13. THE CITY SHOULD DEVELOP AND IMPLEMENT A VEHICLE TAKE HOME POLICY.

At present, there is a number of staff within the Police Department and the Fire Department that take City vehicles home. These include the vehicles and staff portrayed in the table below.

Unit #	Year / Model	Assignment
837	2007 Tahoe	Assistant Fire Chief
838	2007 Tahoe	Assistant Fire Chief
851	2006 Dodge Caravan	Deputy Fire Marshal
853	2006 Dodge Stratus	Communications Tech. Officer
870	2006 Crown Victoria	Training Officer
856	1998 Windstar	Suppression
857	2005 Crown Victoria	Fire Marshal
1	205 300C	Police Chief
9	2007 Magnum	Lt. / XO / Office of the Chief
47	2004 Trailblazer	Capt. / Administrative Services
33	2006 Crown Victoria	Capt. / Field Services
29	2006 Honda Accord	Capt. / Investigative Services
32	2000 Crown Victoria	Lt. /Field Services
30	2006 Honda Accord	Sgt. / Investigative Services
15	2002 Crown Victoria	Lt. / Investigative Services
41	2002 Impala	Sgt. / Office of the Chief / Intelligence Unit
108	2004 BMW Motorcycle	Lt. / Field Services - Traffic
73	2006 Crown Victoria	K9
58	2004 Crown Victoria	K9
70	2006 Crown Victoria	K9
20	2006 Crown Victoria	Sgt. / Field Services
62	2005 Crown Victoria	K9

The City should review and evaluate these take home vehicle assignments to verify the value of these assignments. For example, what is the value to the City of assigning take home vehicles to both Assistant Fire Chief's, to both the Fire Marshall and the Deputy Fire Marshal, to the Training Officer in the Fire Department, to Captains, Lieutenants, and Sergeants in Investigative Services and in Field Services? To guide this evaluation, the City should develop a take home vehicle policy as a first step.

Recommendation: The City should develop a take home vehicle policy, and use that policy as the basis for evaluating take home vehicle assignments in the Fire Department and the Police Department.

Exhibit 7 (1)

Low Utilization Equipment
In the City's Fleet

Department Name	User	Equipment #	Make/Model	(Miles)
Fire Admin Dept	Supprsn Car	856	1998 Ford Windstar	954
Fire Ambulance Dept	Backup Rescue	845	1988 Ford E350	252
Fire Ambulance Dept	Backup Rescue	846	1994 Freightliner FI-60	673
Fire Prevention Dept	Dpty Fire Mshl	851	2006 Dodge Caravan Se	529
Fire Suppressn Dept	Trng Ofcr	870	2006 Ford Crown Victoria	122
Fire Suppressn Dept	Battalion Car	869	1989 Chevrolet Suburban	129
Fire Suppressn Dept	Usar	825	2004 Spartan Gladiator	368
Fire Suppressn Dept	Truck	808	1988 Spartan/Lti Ms202042	369
Fire Suppressn Dept	Engine	805	1993 Pierce Arrow	518
Fire Suppressn Dept	Engine	806	1993 Pierce Arrow	923
IT Cable Tv Dept	Cable TV	510	2005 Dodge Caravan Se	964
IT Doc Mngmnt Dept	Doc Admin	531	2005 Toyota Prius	1,090
Pkng Enf Admin Dept	Fld Ops	529	2005 Toyota Prius	98
Pkng Enf Admin Dept	Fld Ops	528	2005 Toyota Prius	101
Pkng Enf Admin Dept	Fld Ops	583	2006 Daimler Chrysler Wrangler 4x4	126
Pkng Enf Admin Dept	Fld Ops	588	2006 Daimler Chrysler Wrangler 4x4	553
Pkng Enf Admin Dept	Fld Ops	527	2005 Toyota Prius	764
Police Crime Pr Dept	Mob Cmnd Cntr	2	1989 GMC Elite	1
Police Crime Pr Dept	Detective	35	2006 Ford Explorer	1
Police Crime Pr Dept	Jail	44	2001 Daimler Chrysler Ram 1500	199
Police Crime Pr Dept	Det / Crms Agnst	25	1995 Chevrolet Caprice	346
Police Crime Pr Dept	Det / Crime Prev	12	1993 Ford Taurus	859
Police Crime Pr Dept	CSU	16	2004 Chevrolet Trailblazer	1,072

CITY OF BEVERLY HILLS, CALIFORNIA
Organization and Management Analysis of the
Public Works and Transportation Department

Exhibit 7 (2)

Department Name	User	Equipment #	Make/Model	(Miles)
Police Field Dept	Rescue	39	1982 Cadillac Gage Peacekeeper	181
Police Field Dept	Traffic	119	1996 Kawasaki Kz1000p	200
Police Field Dept	DARE	100	2006 Mercedes-Benz MI350	474
Police Field Dept	Traffic	111	2006 BMW R1150rtp	723
Police Field Dept	Traffic	112	2006 BMW R1150rtp	724
Police Field Dept	Traffic	118	1996 Kawasaki Kz1000p	865
Police Field Dept	Traffic	117	2006 BMW R1150rtp	868
Police Field Dept	Traffic	116	2006 BMW R1150rtp	953
Police Field Dept	Traffic	124	2000 Kawasaki Kz1000p	1,002
Police Field Dept	Patrol / Ai	87	1999 Chevrolet Tahoe	1,518
Pub Wks Fcltys Dept	Fcltys Mnt	430	1995 Ford Ranger	1,011
Pub Wks Fcltys Dept	Fcltys Mnt	439	1994 Ford F250	1,219
Pub Wks Fcltys Dept	Fcltys Mnt	402	1995 Ford F-250xl	1,347
Pub Wks Fcltys Dept	Fcltys Mnt	400	1996 Ford Ranger	1,357
Pub Wks Fcltys Dept	Fcltys Mnt	401	2001 Daimler / Chrysler Ram 2500hd St	1,474
Pub Wks Fleet Dept	Pool Sedan	22	1995 Ford Crown Victoria	555
Pub Wks Fleet Dept	Shp Suppt Pckup	451	1994 Ford F250-XI	598
Pub Wks Fleet Dept	Pool Fltbd	405	2002 Chevrolet 3500hd	1,150
Pub Wks Fleet Dept	Pool Sedan	21	1995 Ford Crown Victoria	1,244
Pub Wks Pkg Mtr Dept	Pkg Mtr Cltn	654	2005 Chevrolet Colorado	1,274
Pub Wks Sol Wst Dept	Sol Wst Inspctr	213	2006 Dodge Ram 2500hd St	279
Pub Wks Sol Wst Dept	Rental	260	2006 International 7400	717
Pub Wks Sol Wst Dept	Sol Wst Cltn	256	2005 Sterling Condor	1,001

Exhibit 7 (3)

Department Name	User	Equipment #	Make/Model	(Miles)
Pub Wks Streets Dept	Str Mnt	708	1980 Ford Tc80-45/Ln8000	184
Pub Wks Streets Dept	Str Mnt	678	2003 Chevrolet Silverado 3500	515
Pub Wks Streets Dept	Str Sgn & Paint	630	2001 Ford/Altec F550/At35g	576
Pub Wks Water Dept	Wtr Mnt & Rpr	737	1986 Ford Tc80-36/C800	112
Pub Wks Water Dept	Wtr Mnt & Rpr	755	2002 International 4700 4x2	286
Pub Wks Water Dept	Wtr Mnt & Rpr	713	1996 Ford F150	998
Pub Wks Water Dept	Wtr Mnt & Rpr	716	2006 Ford F350	1,260
Pub Wks Water Dept	Wtr Mnt & Rpr	712	1996 Ford F150	1,485
Pub Wks Wstewtr Dept	Sewer Camera Trk	799	1982 Chevrolet Cudlx30 Swr Vid	157

5. ANALYSIS OF SIGNALS AND LIGHTS

5. ANALYSIS OF SIGNALS AND LIGHTS

This chapter presents an analysis of signals and lights. This unit is authorized seven (7) staff: an Electrical Communication Systems Supervisor, a Traffic Control Systems Specialist, four Traffic Signal Technicians, and an Electronic Technician. This staff is responsible for the maintenance and repair of 98 signalized intersections and 6,000 streetlights.

In evaluating signals and lights, the project team utilized guidelines promulgated by the National Transportation Operations Coalition in the *National Traffic Signal Report Card*.

1. THE PUBLIC WORKS AND TRANSPORTATION DEPARTMENT EMPLOYS A NUMBER OF BEST PRACTICES IN SIGNALS AND LIGHTS.

An organizational and management analysis by its nature focuses on opportunities for improvement. However, there are a number of strengths in Signals and Lights. Examples of these strengths are portrayed below.

- Streetlights are owned by the City of Beverly Hills.
- All residential streets are high pressure sodium.
- One-half of the City's streetlights are inspected each month.
- 85% to 90% of the City's traffic signals have been converted to LED – red and green only.
- Signals and Lights is catching up with preventive maintenance at the present and is preventively maintaining two cabinets a day.
- Signal head alignment is checked once annually.
- Three of the existing four positions in Signals and Lights hold International Municipal Signal Association certification.

- Coordinated traffic signal timing plans have been developed for the Sabbath.
- Signal timing has been developed for major corridors such as Santa Monica Boulevard and Wilshire Boulevard.
- Signal timing has been coordinated with Los Angeles.
- Signals and Lights maintains a documented inventory of approved signal phasing and timing for each signalized intersection.

These strengths in Signals and Lights provide a sound basis for further enhancements.

2. THE CITY SHOULD MIGRATE THOSE STREETLIGHTS USING MERCURY VAPOR AND METAL HALIDE TO HIGH PRESSURE SODIUM.

The City of Beverly Hills has an estimated 6,000 streetlights. The energy costs for streetlights and traffic signals is not insignificant: \$545,200 in 2005-06. Data from the California Energy Commission indicate that about 20% to 25% of California's municipal energy expenditures go to pay for the energy costs associated with streetlights. The Public Works and Transportation Department has taken and is taking steps to increase the energy efficiency of traffic signals by shifting to LED lamps.

The streetlight lamps utilized by the City include high-pressure sodium for residential streets, metal halide for arterial streets, and mercury vapory for some arterial streets (estimated at several hundred streetlights). The different types of lamps, and their advantages and disadvantages, are presented below.

- **Mercury Vapor.** Mercury vapor was the first widely accepted high intensity discharge lighting source. Advances in technology have lead to color corrected mercury vapor lamps, which cast a relatively clean white light. By the late 1950s, mercury lamps were very widely used around the United States. The lamps were about as efficient as fluorescents, an old inefficient lamp technology, the fixtures were smaller, and lasted much longer. Mercury vapor lamps have the longest life (approximately 24,000 hours), but the lowest energy efficiency among electric-discharge lamps (30 to 65 lumens per watt). Another difficulty with mercury lamps was "lumen depreciation." Lumen depreciation is a drop in light output of the lamp over time. In a lot of cases, a mercury lamp will burn for years past its

rated life, but it will burn much dimmer while using the same amount of wattage.

- **Metal Halide.** Metal halide lamps are a distant cousin of mercury lamps. The basic lamp is the same as a mercury lamp, but with other metallic elements added. The result is a good quality white light. Metal halide has not gained wide acceptance as a source of streetlight. It is mostly found in parking lots and inside commercial and industrial buildings. The light is more efficient than mercury vapor (75 to 125 lumens per watt), but the lamp life is shorter (15,000 hours). Another problem incurred with metal halide lamps is "color shift." The color of the light produced by each lamp varies slightly, which leads to a cluttered effect. There are now lamps on the market that keep color shift to a minimum, helping to alleviate that problem. Of course, since the metal halide lamps are related to mercury, they too suffer from lumen depreciation, but not as extreme as mercury vapor. There has also been a noted issue with the lamps "exploding/shattering" during a failure. High cost and low life hours has kept them from becoming popular municipal lighting sources even though they have a much improved Color Rendering Index around 85.
- **High Pressure Sodium.** High Pressure Sodium lamps are now commonly used around the United States in streetlights. The lamps were developed in the early 1970's and are more energy efficient than mercury and metal halide lamps. The lamps have a life of 20,000 hours and are efficient at 75 to 130 lumens per watt. The lamps give off an amber color, have virtually no problem with color shift, and last for long periods of time. The lamps begin to incur problems when they near the end of their life. Lumen depreciation is a problem with high-pressure sodium, though still not as severe as the depreciation seen with mercury vapor. The lamps begin to "cycle," which means they turn themselves off and come back on a minute later. This problem has been addressed with the recent introduction of non-cycling high pressure sodium lamps. Advances in photo controls can also stop cycling.

The City should migrate its mercury vapor lights to high-pressure sodium to replace high energy consumption streetlights (mercury vapor) with low energy consumption streetlights (high pressure sodium). High-pressure sodium lamps cost approximately \$90 including the head, bulb, and photocell. However, in replacing the mercury vapor lights, the age of the infrastructure may also require replacement of the electrical conduit, pull boxes, and electroliers. The cost in those circumstances could increase to approximately \$400 per streetlight. A full cutoff head should be utilized since

this directs all lighting in a downward direction, where the lighting is needed eliminating wasted skyward and horizontal illumination.

The replacement should be accomplished with the Signals and Lighting staff. The cost to contract the replacement of these lights would likely approximate \$1,500 to \$2,500 per streetlight.

The estimated one-time cost impact of replacing the mercury vapor streetlights is presented in the table below. This excludes the cost of in-house staff that would be allocated to the replacement.

One-Time Cost Increase		Cost Decrease	
Replace an estimated 250 mercury vapor and metal halide street lights with high pressure sodium lights	\$50,000	NA	\$0
Total Cost Increase	\$50,000	Total Cost Decrease	\$0

Recommendation: The City should replace mercury vapor streetlights in the next one to two years.

3. THE CITY SHOULD CONVERT ITS REMAINING TRAFFIC SIGNALS TO LED.

California law now requires traffic signals in the state to be energy efficient - so energy efficient that only light emitting diodes (LED) lamps meets the new standard. Traffic signals that use LED's consume 80% to 90% less energy and generally last five to seven years LED. LED traffic signals last 100,000 hours compared to 8,000 hours for incandescent. The longer lamp life significantly reduces maintenance, resulting in lower costs to cities.

Another advantage is that LED signals are made up of hundreds of small diodes rather than a single light source, so the signal is less likely to burn out and cause traffic delays or accidents.

LED has become the predominant choice for lamping traffic signals. The California Energy Commission, in a survey completed by 302 local governments in 2005, the Commission reported the following:

- 65% of the traffic signal modules in California are LED's, with the red and green being the predominant types, constituting nearly 80% of the LED module types installed.
- 23% of the respondents indicated that LED modules had been installed for all red, green and amber balls, arrows, and flashing beacons (if applicable).
- 76% of those surveyed indicated that their LED traffic signals have reduced utility bills.
- 56% of those surveyed reported that the LED modules have reduced their maintenance cost. Three jurisdictions specifically reported no maintenance savings.
- Though most have converted some of their traffic signals to LED's, only 30% (59) have plans to convert the remaining ones to LED's and 43% indicated no plans unless funding is available. The remaining 27% did not specify whether they do or do not have plans.
- 35 jurisdictions reported that they had no intersections and did not report any traffic signals.

The acting Electrical Communication Systems Supervisor estimated that 10% to 15% of the City's traffic signals have not been converted to LED. These signals should be converted to LED.

The estimated one-time cost impact of replacing the green and red incandescent traffic signal lamps with LED traffic signal lamps is presented in the table below. This excludes the cost of in-house staff that would be allocated to the replacement.

One-Time Cost Increase		Cost Decrease	
Replace 100 incandescent traffic signal lamps with LED traffic signal lamps	\$36,000	NA	\$0
Total Cost Increase	\$36,000	Total Cost Decrease	\$0

Recommendation: The City should replace incandescent traffic signals with LED traffic signals in the next year.

4. TRAFFIC SIGNAL CONTROLLERS SHOULD BE REPLACED ON A FIFTEEN-YEAR REPLACEMENT SCHEDULE.

Traffic signal controllers should be replaced at approximately fifteen (15)-year intervals due to obsolescence or changes in functionality. These computer-based controllers deteriorate with time and replacement parts become difficult to find as the equipment is phased out of manufacture. In addition, controllers that are older than fifteen (15)-years are not able to integrate any Intelligent Transportation Systems (ITS) traffic management features such as video monitoring and traffic adaptive technology, which are available in the newer traffic signal systems and can improve overall traffic flow by adjusting signal timing in response to real-time traffic conditions.

The acting Electrical Communication Systems Supervisor estimated that 25% of the City’s traffic signal controllers are approximately twenty (20) years old. The cost to replace these controllers approximates \$15,000 per controller. The estimated one-time cost impact of replacing these signal controllers is presented in the table below. This includes the cost of contractors that would be allocated to the replacement.

One-Time Cost Increase		Cost Decrease	
Replace 25 signal controllers	\$370,000	NA	\$0
Total Cost Increase	\$370,000	Total Cost Decrease	\$0

Recommendation: The City should replace traffic signal controllers on a fifteen (15)-year schedule.

Recommendation: The City should replace the estimated twenty-five signal controllers that are twenty years old in the next one to two years.

5. SIGNALS AND LIGHTING SHOULD INSTALL A COMPREHENSIVE PREVENTIVE MAINTENANCE SYSTEM FOR TRAFFIC SIGNALS.

Preventative maintenance as defined by the Traffic Control Devices Handbook as “the systematic and scheduled inspection, cleaning, adjustment and lubrication of equipment so that it will operate at maximum capability.”

Preventive maintenance of signalized intersections should be performed on quarterly, semi-annual and annual intervals. Each operation includes various checks of the system and orderly recordkeeping. This is particularly important for liability purposes. Call out or repair work is generally related to operational failures, vehicle damage, weather related damage and obsolescence. A sample outline of a traffic signal maintenance program is attached (see the first exhibit presented at the end of this chapter). The program recommends that signalized intersections be preventively maintained on a six-month schedule.

Signals and Lighting has not consistently been preventively maintaining signalized intersections, although it has recently been catching up.

The City should utilize the Street Module in the Hansen asset management module to plan and schedule the preventive maintenance.

The second highest priority for Signals and Lighting should be preventive maintenance of traffic signals; the first priority should be the repair of malfunctioning traffic signals.

As will be noted later in this chapter, Signals and Lighting has sufficient authorized staffing to preventively maintain signalized intersections, although this may

be problematic for Signals and Lighting since the crew size that it is using for preventive maintenance is too large.

Recommendations: Signals and Lighting should install a comprehensive preventive maintenance program for signalized intersections including quarterly, semi-annual, and annual.

Recommendation: The City should utilize the Street Module in the Hansen asset management module to plan and schedule the preventive maintenance of signalized intersections.

Recommendation: The second highest priority for Signals and Lighting should be preventive maintenance of traffic signals; the first priority should be the repair of malfunctioning traffic signals.

6. CREW SIZES SHOULD BE REDUCED FOR THE PREVENTIVE MAINTENANCE OF TRAFFIC SIGNAL CONTROLLERS.

Signals and Lighting is using a two-person crew for the preventive maintenance of its traffic signal controllers or cabinets. With only six staff available for maintenance and repair of signalized intersections and streetlights (excluding the Electrical Communication Systems Supervisor), this practice effectively reduces the amount of staff available by one-half.

The practice in many other cities, such as Scottsdale, AZ, is to utilize a one-person crew as long as the staff is able to remain out of the street and not in an aerial lift. The preventive maintenance of signalized controllers will occur out of the street; the controllers are located adjacent to the intersection at street level.

The City of Scottsdale developed a performance standard for preventive maintenance of traffic signal cabinets. The performance standard specifies the use of a one-person crew. That performance standard is presented in the second exhibit at the end of this chapter. In other instances, when the crew is required to be in the street,

such as loop replacement, Scottsdale utilizes a two-person crew. In other instances, such as preventive maintenance of traffic signal poles including painting of traffic signal poles, mast arms, signal heads, control cabinet, and the electrical service cabinet, re-lamping of incandescent amber signal heads, checking signal head alignment, and visual inspection of intersection, Scottsdale uses a three-person crew.

The size of the crew should be adjusted to the type of work being performed by Signals and Lighting. This will require that the crew size be flexible based upon the location of the traffic signal controllers or cabinets. There are sufficient aerial ladders to enable the user of this crew size.

Recommendation: A one-person crew should be utilized for preventive maintenance of signalized intersections as long as the staff is able to remain out of the street and not need to utilize an aerial lift.

7. THE LEVEL OF STAFFING AUTHORIZED FOR SIGNALS AND LIGHTING SHOULD BE REDUCED BY ONE POSITION THROUGH ATTRITION AFTER THE STREET LIGHT SYSTEM HAS BEEN UPGRADED.

Signals and Lighting is authorized seven staff. This includes an Electrical Communication Systems Supervisor, a Traffic Control Systems Specialist, four Traffic Signal Technicians, and an Electrical Technician. The responsibilities of these staff are portrayed below.

- Maintain and repair approximately 98 signalized intersections and an estimated 6,000 city-owned streetlights;
- Street light maintenance and repair activities include replacing wires, fixtures, fuses; troubleshooting the high-voltage lighting system
- Traffic signal maintenance and repair maintenance activities include changing lights, repairing heads, correcting lights that have gotten out of phase; investigating and correcting problems associated with power outages; replacing knock-downs.

- Supervise the planning of traffic signal installation for new construction projects.
- Assist Facilities Maintenance in electrical projects associated with City buildings and facilities.

The project team utilizes a number of benchmarks in analyzing the staffing requirements for Signal and Street Lighting. These benchmarks are provided below.

- **Thirty (30) to (40) signalized intersections per signal technician.** Good maintenance is one of the keys to effective signal operation. A well-timed traffic signal system must be accompanied by effective maintenance if it is to provide continued high quality service to the traveling public. This section is intended to assess the effectiveness of the planning, management and execution of maintenance activities. A very basic level of maintenance is one item that is not easily ignored, since non-functional traffic signals are highly visible to the traveling public. Key components of an excellent maintenance program include adequate maintenance staffing for traffic signals with a recommended staffing level of 30 to 40 intersections per technician. (This benchmark was developed by the National Transportation Operations Coalition.)
- **6,500 street lights per signal technician.** The project team utilizes a benchmark of 6,500 streetlights per signal technician. The City maintains and repairs 6,000 streetlights.

Overall, there appears to be sufficient ongoing workload for five staff for the maintenance of signals and streetlights or one less position than currently authorized excluding the Electrical Communication Systems Supervisor. The Electrical Technician position should be eliminated through attrition. This reduction should be made after the replacement of the City’s streetlights.

The annual cost impact of eliminating this position is presented in the table below.

Cost Increase		Cost Decrease	
NA	\$0	Eliminate an Electrical Technician position through attrition	\$71,600
Total Cost Increase	\$0	Total Cost Decrease	\$71,600

The net cost impact would be an annual cost savings of approximately \$71,600.

Recommendation: Eliminate a vacant Electrical Technician position upon replacement of the City's street light system.

8. DEVELOP AN INVENTORY OF SIGNAL AND STREET LIGHT INFRASTRUCTURE.

Signals and Lighting does not have an inventory of the infrastructure that it is responsible for maintaining and repairing.

An asset inventory needs to exist in some basic format in every organization that effectively manages the maintenance of the City's assets. Keeping asset inventory information up-to-date, accessible and understandable is the challenge of management.

The Federal Highway Administration published a report in December 2004 entitled *Elements of a Comprehensive Signal Asset Management System*. A key element of asset management noted in this report was the development of a comprehensive inventory. This inventory should include those elements described below.

- **Intersection Inventory** – Identification of the signal subsystems (groups of interconnected or coordinated intersections), and the physical locations of signal equipment at each intersection. This may include documents (design drawings, traffic studies).
- **Equipment Inventory** – Information about the equipment at each intersection (signal structures, signal heads, controllers, detectors). Inventory data for signal systems is more heterogeneous than that for pavement covering distinct sets of information for intersections, different types of equipment, and systems components. This includes model numbers, serial numbers, vendor information, and functional specifications whereas the latter includes materials composition, and design and structural properties.
- **Systems Inventory** – Information about the communications and computer hardware and software deployed in the field and at the central management center (if any).
- **Operating Parameters** – Information about the current timing plans in effect.

- **Real-Time Signal Status Information** – Real-time information available from signal system management software on the operational status of different system components.

Information for signals asset management must include tracking of the interdependencies across different system components to a much greater extent than pavement management systems. For signal systems, analysis of technology upgrades is done for groupings of interrelated components. Therefore, it is important to keep track of the different sub-systems, and understand how different pieces of equipment within each sub-system relate to one another – if one is replaced, do the others need replacement also? Signal systems asset management requires a more detailed understanding of traffic characteristics (e.g., turning movements, speeds, variations in traffic by time-of-day, day-of-week, and season) and changes in these characteristics over time – these are used to select appropriate control strategies and determine detailed operating parameters.

Recommendation: Signals and Lighting should develop a comprehensive asset inventory of traffic signals and streetlights.

9. SIGNALS AND LIGHTS SHOULD DEVELOP A FORMAL PLANNING AND SCHEDULING SYSTEM.

Good maintenance is one of the keys to effective signal operation. Effective planning and scheduling of work must accompany a well-timed traffic signal system if it is to provide continued high quality service to the traveling public. This planning and scheduling includes a number of components according to *Elements of a Comprehensive Signal Asset Management System*, a report published in 204 by the Federal Highway Administration. These elements are presented below.

- Work Orders – Scheduled work activities including location/component identification, resource assignments, and status.
- Work History – Historical information about signal work completed - description of actions taken, components repaired and replaced, and resources utilized.
- Trouble Reports – Historical information on trouble tickets including location / equipment involved, nature of problem, resolution, and response time.
- Planned Work – List of planned and approved work activities to be scheduled.

Signals and Lights should install a formal planning and scheduling system. The planning and scheduling system would take information about available resources (personnel, vehicles, and equipment), and schedule work activities over a period of time. The elements of this planning and scheduling system should include the following:

- Monthly work schedule prepared for preventive maintenance services to be performed during that month. Work order(s) generated by signalized intersection covering the equipment components to be serviced at that intersection. Work order(s) provided to assigned staff with attached document listing equipment, services required, and parts needed for routine preventive maintenance.
- Project and repair work generated by work order. This should be a paper system pending the installation of Hansen. The supervisor should monitor work orders to determine status/completion – follow up with assigned staff when not completed within time frame scheduled.
- Supervisor meets with staff not less than once per week to monitor status of completion for assigned preventive maintenance and other, non-scheduled repair work orders.
- When work is completed, assigned Signals and Lights staff notes completion on the work order, services provided, parts used, and labor time expended. Reviewed by Signals and Lights supervisor and approved. Supervisor retains work order by signalized intersection to provide maintenance history by signalized intersection.

Recommendation: Signals and Lights should install a formal work planning and scheduling system.

Sample Traffic Signal Maintenance Program

6 - MONTH ROUTINE MAINTENANCE

Inspect controller and cabinet for proper operation.
Check operation of the fan.
Inspect all vehicular and pedestrian signals for proper operation, alignment, visibility and replace outages found.
Check operations of all pedestrian pushbuttons.
Verify correct clock settings in the controller, correct as needed.
Visually check for wear and function of controllers.
Inspect illuminated street name signs for proper operation, including lamps and photocells.
Test emergency/transit pre-emption.
Check that intersection is adequately serving traffic demands.
Complete maintenance checklist, noting any comments.
Manually record inspection date and time in controller cabinet, file checklist and send written confirmation of monthly inspection with recommendations by intersection.
Visually inspect roadway along loop detectors for possible exposed wires, cracks and potholes.
Check manual operation.
Check pullbox covers.
Check controller cabinet filter.
Note vegetation preventing access to or visibility of traffic controls.
Check detector amplifiers and tune if needed.
Check ground rod clamp and wire.
Check wire schematics and records to make sure they are in the cabinet.
Check operation of ground fault receptacle.
Measure voltage at service inputs in cabinet and record.
Visually check integrity of splices.
Verify controller signal timing plans against the time sheet. Forward any discrepancies to Traffic Engineering.
Test the battery back-up system.
Manually record inspection date and time in controller cabinet and send written confirmation of 6-month inspection with recommendations by intersection.

YEARLY ROUTINE MAINTENANCE (In addition to 6-month)

Clean and polish all lenses and reflectors, as needed.
Test the conflict monitor unit.

Exhibit 8 (2)

Vacuum and clean controller cabinet and contents.
Replace cabinet filter.
Check weatherproof gasket seal on controller cabinets.
Check for water accumulation and duct sealant.
Lubricate hinges and lock on controller cabinets.
Check indicator lamps.
Check all connectors.
Check detector extensions.
Check load switches.
Check relays.
Verify flash rate.
Spot-check LED luminacy.
Manually record inspection date and time in controller cabinet and send written confirmation of yearly inspection with recommendations by intersection.
Luminosity

Exhibit 9

Performance Standard for Traffic Signal Cabinet Preventive Maintenance

ACTIVITY DESCRIPTION:

Cabinet maintenance includes the inspection, testing, cleaning and adjustments made to the traffic signal electronic equipment cabinet.

PERFORMANCE CRITERIA:

Priority Service - Preventative maintenance activity to be scheduled

Scheduled Maintenance - Cabinet Maintenance will be performed twice annually

TYPICAL CREW SIZE:

1 Person

WORK METHOD:

Test conflict monitor with computerized tester, record results.

Vacuum cabinet, open controller door, blow out controller

Check timing on controller

Spray cabinet with bug spray

Check condition of cabinet documentation, replace as necessary

List cabinet equipment on inventory sheet

Check operation of vehicle loop detectors, tune if necessary

Visually inspect loops and test pedestrian pushbuttons

Check operation of cooling fan, set to 100°F

Lubricate door locks

EQUIPMENT:

Hand tools	Vacuum Cleaner or	1 Van
Conflict monitor tester	compressed air bottle	

MATERIAL:

Non-conductive bug spray	Timing sheets	Checklists
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PRODUCTION STANDARDS:

Unit Of Measurement: Cabinets

Average Daily Production: 10

Man Hours Per Work Unit: 1.0

6. ANALYSIS OF STREET MAINTENANCE

6. ANALYSIS OF STREET MAINTENANCE

This chapter presents an analysis of street maintenance. This function is authorized ten (10) positions. These ten (10) positions include a Street Maintenance Supervisor, two (2) Street Maintenance Worker III's, four (4) Street Maintenance Worker II's, and three (3) Traffic Sign and Paint Technicians. This staff performs a number of tasks including the following:

- Repair and maintenance of sidewalks and curbs that pose a hazardous condition to citizens when not provided by annual maintenance contract;
- Provide pothole and street maintenance repair to City infrastructure;
- Prepare sand bags for the citizens and businesses of Beverly Hills;
- On-call for oils spills and debris in roadway;
- Provide barricades for road closures (coning, light towers, etc.);
- Special projects as needed;
- Responsibilities include the maintenance, repair, and painting of street signs located within the City of Beverly Hills;
- Provide painting of street crosswalks and curbs for the City;
- Install and maintain parking meter posts; and
- Hanging of decorative banners for special occasions.

This function is responsible for the maintenance of 109 centerline miles of streets.

1. THE PUBLIC WORKS AND TRANSPORTATION DEPARTMENT EMPLOYS A NUMBER OF BEST PRACTICES IN STREET MAINTENANCE.

An organizational and management analysis by its nature focuses on opportunities for improvement. However, there are a number of strengths in Street Maintenance. Examples of these strengths are portrayed below.

- The crew size used for pavement messaging / crosswalks is two persons. After training is completed, the crew size for pothole patching will be two persons.
- Potholes are patched consistently within one workday of the receipt of the complaint.
- The City recently acquired PB asphalt patch trucks that have significantly enhanced the ability of Street Maintenance to efficiently patch potholes.
- Street Maintenance has been systematically moving from district to district to patch potholes in the City.

These strengths in Street Maintenance provide a sound basis for further enhancements.

2. THE PUBLIC WORKS AND TRANSPORTATION DEPARTMENT SHOULD OUTSOURCE STREET STRIPING.

At present, the Public Works and Transportation Department performs its roadway striping with in-house staff and a walk-behind street striper. While the Department lacks an inventory of the linear feet of street striping, the project team estimates that the City has approximately 95,000 linear feet of street striping. The project team estimates that the use of this equipment would require approximately one and one-half months – approximately 285 staff hours – to stripe the City's streets. These walk behind street striper are more commonly used for striping parking lots and parking stalls, not roadways.

The City could purchase a truck-mounted street striper, but the one-time capital outlay cost of this equipment amounts to approximately \$190,000. With the use of this equipment, the City would be able to complete the striping of its streets in approximately forty-(40) staff hours. The acquisition cost of this equipment does not merit the equipment sitting idle for 98% of the fiscal year.

The Public Works and Transportation Department should outsource street

striping. It should continue to paint street legends with in-house staff.

The estimated annual cost for outsourcing street striping is presented below.

Cost Increase		Cost Decrease	
Outsource annual roadway striping of the City's streets.	\$25,000	NA	\$0
Total Cost Increase	\$25,000	Total Cost Decrease	\$0

The net cost impact would be an annual cost increase of approximately \$25,000.

Recommendation: Outsource the annual street striping of the City's streets.

3. THE RESPONSIBILITY FOR SIDEWALK INSPECTION SHOULD BE ASSIGNED TO STREET MAINTENANCE.

At present, the two Environmental Inspectors are assigned responsibility for sidewalk inspection. These two staff inspects all of the City's sidewalks on a nine (9) month cycle. This is a high level of service, but places the City at risk given the extensive backlog of sidewalk repairs.

The responsibility for sidewalk inspection should be placed with Street Maintenance. The proposed elements of this program are presented below.

- **Establish guidelines or criteria for sidewalk repair or replacement.** These guidelines should include the sidewalk inspection procedures, defining when sidewalk replacement is required, etc. The California Joint Powers Insurance Authority has a model policy. This may be located at the following web site: http://www.cjpia.org/4dcgi/resources/policy_library.shtml.
- **Establish criteria that determine when a sidewalk will be repaired versus replaced.** The project team would recommend a policy that sidewalks raised a minimum of three quarter inch (¾") be temporarily ramped until a more permanent repair or replacement can be undertaken. Permanent repairs should be provided under the following circumstances:
 - Vertical displacement of ¾ inch or more in the curb and gutter, sidewalk, or driveway.
 - Vertical change in design grade of one (1) inch or more within a two (2) foot length of curb and gutter, sidewalk, or driveway.

- Broken or shattered concrete, concrete with open holes, or concrete raised projections which, in the judgment of the City, constitute a hazard to pedestrians or block drainage.
- **Use sidewalk grinding where the displacement is three-quarter inch ($\frac{3}{4}$ ") or less.** Grinding minimizes the long-term costs associated with removal and replacement of curb and gutter. City staff can perform the curb and gutter grinding work using a one-person crew. The grinding process may need to be repeated in subsequent years until the curb and gutter require replacement
- **Develop priorities for sidewalk repair and replacement.** The City should develop and adopt formal sidewalk prioritization replacement criteria. For each location where a sidewalk deficiency is found, a rating on the deviation from 1 to 4 should be noted with 4 being the highest priority. The rating is as follows:
 - 1 = displacement is less than $\frac{3}{4}$ inch
 - 2 = displacement is between $\frac{3}{4}$ inch and 1 $\frac{1}{4}$ inches
 - 3 = displacement is more than 1 $\frac{1}{4}$ inches
 - 4 = deficiency is in the vicinity of a sensitive location (i.e. adjacent to a school, senior housing, high pedestrian area, etc). The deficiency rating of 4 could be given no matter the amount of displacement. It places priority onto the location needing repair due to the pedestrian activity at the site.
- **Use automated devices developed specifically for sidewalk hazard inspection for data collection.** For example, there is a PDA device with GPS receiver and accompanying software known as the Sidewalks+ that allows completion of a hazards inspection within a simple one screen application while simultaneously saving positional information and defect details. By collecting the defect information with high-resolution GPS data the defects can be imported into a GIS system for immediate mapping of priority repairs. Sidewalks+ can identify and categorize all defects in real-time while the mobile inspector is observing the conditions. Every action within Sidewalks+ is time and date stamped and verified along with GPS information. All data is available at any time and is completely verifiable and defensible in court. A standard ODBC compliant database is generated, readable by all major GIS systems. When utilized with a bicycle, approximately eight (8) to twelve (12) miles of sidewalks can be evaluated in a day.
- **Inspect sidewalks once every two years.** The City should be divided into five zones. Each year a different zone should be inspected. The City should then

earmark the concrete crew and contractual funding as necessary for repairs in that zone. Repairs outside of that zone should be based upon the level of pedestrian activity, the severity of the trip hazard, and the dates of the repair requests.

- **Consider other alternatives besides concrete replacement like for like.** This could include a meandering sidewalk that is curved away from the tree in the parkway, an enlarged tree well (and reduced sidewalk width, a ramped sidewalk (rather than root cutting), and poured-in-place rubberized sidewalks and rubberized pavers. So much of the ambience of Beverly Hills is based upon its street trees that Street Maintenance should explore alternatives to reduce the damage to these trees in replacement of the sidewalk.
- **Further inspection of sidewalks should not be conducted until meaningful progress has been made in reducing the concrete backlog.** If the City is aware of the problem, it is liable for the problem until the fixed. There is a significant backlog of concrete repairs. The City should not conduct further inspections until the backlog of concrete repairs has been significantly reduced.

Recommendation: Establish guidelines or criteria for sidewalk repair or replacement.

Recommendation: Establish criteria that determine when a sidewalk will be repaired versus replaced.

Recommendation: Use sidewalk grinding where the displacement is three-quarter inch ($\frac{3}{4}$ ") or less.

Recommendation: Develop priorities for sidewalk repair and replacement.

Recommendation: Use automated devices developed specifically for sidewalk hazard inspection for data collection.

Recommendation: Inspect sidewalks once every two years.

Recommendation: Consider other alternatives besides concrete replacement like for like.

Recommendation: Further inspection of sidewalks should not be conducted until meaningful progress has been made in reducing the concrete backlog.

4. THE STREET MAINTENANCE FUNCTION HAS A SIGNIFICANT BACKLOG OF STREET AND CONCRETE REPAIR THAT SHOULD BE ADDRESSED THROUGH THE USE OF A MIX OF CONTRACTORS AND IN-HOUSE STAFF.

The staff assigned to the Street Maintenance function has been underutilized. The Department has just recently acquired a PB Loader asphalt patch truck to provide the equipment and material for a two-man crew to repair potholes and utility cuts. These PB patch trucks feature an insulated and heated asphalt box that keeps asphalt hot and usable all day.

However, a significant backlog in asphalt repair has developed over the past several years (based upon material provided by Civil Engineering). Important points to note regarding the backlog are presented below.

- There are two hundred forty-nine (249) asphalt repair jobs with an estimated contractual cost of \$2,720,000 to repair or replace provided to the project team by the Civil Engineering Division in an Excel spreadsheet. This includes asphalt jobs included in the concrete backlog Excel spreadsheet.
- The estimated square yards of pavement that needs to be removed and replaced amounts to 309,700 square feet of asphalt (or 34,400 square yards). There are also an estimated 153 tons of asphalt skin patching in the backlog. This includes asphalt jobs that were included in the concrete backlog Excel spreadsheet.
- This backlog of pavement that needs to be removed and replaced amounts a little more than two crew years of effort and largely consists of asphalt base repair.
- Much of the work consists of removing and replacing pavement in alleys.
- Much of this work consists of small jobs that would require one crew day of effort. In fact, 50% of the 138 jobs constituting the backlog of pavement that needs to be removed and replaced would require less than one crew day. Another 12% would require two crew days and 7% would require three crew days.
- There are a number of large jobs as well. Approximately forty-three (43) jobs or 31% of all of the jobs would require more than three crew days of effort by in-house staff. These forty jobs consist of 228,400 square feet of asphalt repair.

The cost to remove and replace this amount of asphalt (or grind and overlay) would approximate an estimated \$1.3 million in one-time capital outlay. One half of this amount originates from thirteen (13) jobs.

A significant backlog has also developed in concrete repair over the past several years (based upon material provided by Civil Engineering). Important points to note regarding the backlog are presented below.

- There are 247 jobs in the concrete backlog with an estimated contractual cost of \$1,347,000 to repair or replace that were provided to the project team by the Civil Engineering Division in an Excel spreadsheet.
- There are an estimated 6,172 linear feet of curbs and gutters that need to be replaced, and 59,625 square of sidewalks, alley approaches, etc.
- This backlog of concrete curb and gutters and sidewalks, alley approaches, etc., that needs to be removed and replaced amounts to two crew years of effort and largely consists of sidewalks, alley approaches, etc., and less so curbs and gutters. The amount of jobs involving removal and replacement of sidewalks amounts to 36,800 square feet with an estimated replacement cost amounting to \$922,200.
- Much of this work consists of small jobs that would require one crew day of effort. In fact, 55% of the 112 sidewalk, alley approaches, etc., replacement jobs constituting the backlog that needs to be removed and replaced would require one crew day or less. Another 24% would require two crew days and 4% would require three crew days. Most of the curb and gutter replacement jobs are small as well. A total of 66% would require one crew day or less, 11% would require two crew days, and 9% would require three crew days.
- There are a number of large jobs as well. Approximately twenty-three (23) jobs or 20% of all of the sidewalk, alley approach, etc., jobs would require more than three crew days of effort by in-house staff. These twenty-three jobs consist of 46,400 square feet of replacement. The cost to remove and replace this amount of sidewalk would approximate an estimated \$0.9 million in one-time capital outlay. Approximately twelve (12) or 14% of the curb and gutter replacement jobs would require more than three crew days of effort by in-house staff. These jobs amount to 3,500 linear feet of curb and gutter replacement at an approximate cost of \$70,500.

Given the significant number of small asphalt and concrete jobs, it would not be appropriate to outsource all of this work. At the same time, this is a significant backlog

constituting more than four crew years of effort or sixteen staff years. This backlog cannot be realistically resolved in the short-term through the exclusive use of in-house staff.

The project team recommends that those jobs in the asphalt and the concrete backlog that would require three crew days or less to accomplish should be accomplished by in-house staff. Those jobs, on the Excel spreadsheets maintained by the Civil Engineering Division, should be forwarded to the Street Maintenance Supervisor. The Street Maintenance Supervisor should plan and schedule his staff to address this backlog, providing a proposed schedule to the Deputy Director of Public Works and Transportation / City Engineer.

The remainder of the jobs in the asphalt and concrete backlog – those jobs that require more than three (3) crew days – should be assembled into a capital improvement program project that identifies each of the locations, and a request for bids issued. The amount of funding required for this project would amount to approximately \$2.3 million. A single contract should be issued to a single contractor to resolve this backlog. The City has a total of \$1.9 million available in the 2006-07 budget. This problem would need to be addressed over two or three years.

Recommendation: Those jobs in the asphalt and the concrete backlog that would require three crew days or less to accomplish should be accomplished by in-house staff. These jobs should be forwarded to the Street Maintenance Supervisor and scheduled for removal and replacement.

Recommendation: Those jobs in the asphalt and the concrete backlog that would require three crew days or more should be assembled into a capital improvement program project that identifies each of the locations, and a request for bids issued. The amount of funding required for this project would amount to approximately \$2.3 million.

5. A DIFFERENT APPROACH SHOULD BE UTILIZED FOR RESPONDING TO REQUESTS FOR SERVICE FOR PAVEMENT AND CONCRETE REMOVAL AND REPLACEMENT.

At present, requests for service received from residents and businesses for concrete / pavement maintenance and repair are routed to the Civil Engineering Division. The Division, upon receipt of the request, will dispatch an Project Civil Engineer to assess the request for service, scope the nature of the request (i.e., remove and replace sidewalk, remove and replace curb and gutter, remove and replace asphalt, grind and overlay, etc.), and determine the extent of the problem (e.g., the amount of sidewalk that needs to be removed and replaced). The Division then adds the request for service to an Excel spreadsheet that the Division maintains for asphalt and for concrete removal and replacement. The Division is responsible for preparing the request for bids, and providing the construction inspection for the removal and replacement for asphalt and for concrete removal and replacement.

This is an ineffective approach to responding to requests for service. The delay to these responses is significant using this approach. The approach misplaces responsibility for managing the maintenance and repair of these assets.

The process utilized for responding to these requests for service should be modified. The proposed process is presented below.

- These requests for service should be routed to the Street Maintenance Supervisor.
- The Street Maintenance Supervisor should respond to the request, evaluate the nature of the infrastructure problem, and determine the best methodology for responding to the request – in-house staff or contractors.
- If the Street Maintenance Supervisor believes that in-house staff are the best approach to addressing the request (the job will require less than three crew

days), then the Street Maintenance Supervisor schedules the job and notifies the resident or the business that made the request of the scheduled week for responding to the request (e.g., the week in which the sidewalk will be removed and replaced).

- If the Street Maintenance Supervisor believes that the use of contractors are the best approach to addressing the request (the job will require more than three crew days), the Street Maintenance Supervisor schedules the job with a contractor that the City has already selected for providing this service. The funding for this contract should be placed in the budget for the Street Maintenance function.
- The City will annually need to issue a request for bids for asphalt and for concrete removal and replacement. This request for bids should include the estimated volume of annual work to obtain a more attractive unit price. The City should seek to cooperatively bid this contract with other neighboring cities such as West Hollywood.

Recommendation: The responsibility for responding to requests for service for pavement repair and for concrete repair should be reassigned from the Civil Engineering Division to Street Maintenance.

Recommendation: The Street Maintenance Supervisor should respond to these requests and determine the best method of responding to these requests for service: in-house staff or contractors.

Recommendation: The funding for annual contracts for pavement maintenance and concrete maintenance should be reallocated from the capital improvement program to the annual operating budget of Street Maintenance upon resolution of the backlog.

6. STREET MAINTENANCE STAFF SHOULD BE MORE EFFECTIVELY UTILIZED FOR STREET AND CONCRETE MAINTENANCE.

The challenge in evaluating the staffing requirements for the Public Works and Transportation Department is the lack of data, including data regarding the inventory maintained by the Department and data regarding the amount and type of work performed by the staff. The Department is taking an important step in resolving this problem with the installation of the Hansen asset management system.

In the absence of that data, the project team evaluated staffing based upon the amount and type of work performed by comparable cities that the project team has previously analyzed such as Palo Alto and Sunnyvale, and developed estimates of inventory based upon the miles of streets in Beverly Hills in comparison to these other cities that have developed inventories of their assets.

The staffing analysis developed by this analysis indicates that the Street Maintenance function in Beverly Hills – including signs and painting – is underutilized. This staff is utilized for small jobs that do not effectively employ the talent and skills of this staff. There is sufficient amount of skilled work that needs to be accomplished in terms of base repair, skin patching, sidewalk replacement, and curb and gutter replacement. At the same time, the amount of staff allocated to traffic sign and painting exceed workload requirements and their allocation to a specialized classification hinders the ability of the Street Maintenance Supervisor to shift this staff to different work activities, as workload requires. The recommendations of the project team to address these challenges are presented below.

(1) Almost Six Staff Should Be Allocated To Pavement Maintenance and Repair Including Pothole Patching, Skin Patching, and Base Repair.

The table below presents the project team’s assessment of workload and staffing requirements for pavement maintenance and repair.

CITY OF BEVERLY HILLS, CALIFORNIA
Organization and Management Analysis of the
Public Works and Transportation Department

Activity Name	Inventory Measure	Units	Annual Quantity		AWQ	ADP	Crew Days	Crew Size	Staff Days
			Per Inventory	Unit					
Pothole Patching	2-lane miles	245	Tons Mix	1.0	252	2.8	90.1	2	180.3
Skin Patching	2-lane miles	245	Square Yards	40.0	9,800	110.0	89.1	4	356.4
Base Repair	2-lane miles	245	Square Yards	6.9	1,691	65.0	26.0	4	104.0
Misc. Street Maintenance	Person Hours	1,500	Person Hours	0.5	761	8.0	95.1	1	95.1
Special Events	Person Hours	1,500	Person Hours	0.3	465	8.0	58.1	1	58.1
Sub-Total									793.9

Important points to note concerning the table are presented below.

- A total of five staff would be required for pavement maintenance and repair on a day-to-day basis.
- These five staff would largely be dedicated to three work activities – pothole patching, base repair, and skin patching.
- The largest proportion of staff would be allocated to pothole patching and to base repair. This largely reflects the absence of a substantive preventive maintenance program for streets in Beverly Hills. Typically, the number of staff would be much lower with an effective preventive maintenance program.
- This proposed annual work plan would result in one (1) pothole patch crew dedicated to patching potholes 92% of the fiscal year. Street maintenance is appropriately equipped for patching potholes.
- Data for special events is estimated based upon the amount of overtime. The data regarding regular hours worked for special events is not available; the project team estimated the regular hours allocated to special events as equivalent to the overtime hours.
- This proposed annual work plan would result in one (1) base repair crew dedicated to base repair 60% of the fiscal year.
- Allowances for turnover and disability must be considered. Turnover and disability or injury leave would require an additional 0.5 full-time equivalent staff in addition to the staff portrayed in the table.
- Altogether, almost six staff would be required on a day-to-day basis for pothole patching, base repair, and skin patching.

Overall, the City has a significant backlog of pavement maintenance and repair work. A mix of in-house staff, contractors for the larger jobs, and an enhanced preventive maintenance program for the City's street system should address this backlog. To address this backlog of base repair, additional equipment will be needed.

This includes the following:

- Reallocate a two-ton dump truck from Water. This truck is equipped for asphalt paving and the use of a paving machine. This is equipment #755.
- Acquire a steel wheel asphalt roller. The City has an asphalt roller - #621 – that is twenty-two years old and needs to be replaced. Two asphalt rollers are needed – one for rough and one for finishing. Base repair will need to be made in lifts with base material removed, replaced, and compacted. When performing a full-depth patch or base repair, inadequate base, sub-base, or subgrade materials would be removed, crushed stone or other suitable base material used to backfill to the top of the subgrade, with these new materials placed in 2- to 3-inch lifts with each lift compacted to the required density. Even if the base material is not removed, removal of the defective pavement always disturbs the base material. Therefore, the base material should always be re-compacted prior to performing the next step. This compaction of the base material requires a rough asphalt roller.
- Acquire a trailer mounted asphalt emulsion unit. Before new asphalt is placed in the street as part of the base repair, a tack coat should be applied to the edges of the pavement and the bottom of the hole. This coating provides a good bond between the old and the new materials. After completing the patch, the final step should consist of sealing the edges of the base repair with joint sealant material.
- Acquire an asphalt paving machine. An asphalt paving machine would receive the asphalt from the dump truck and place the material at the correct thickness and width onto the prepared surface forming a "mat". These machines place a consistently smooth, even finish at the proper depth and provide initial compaction. This mat is then compacted by steel wheel asphalt roller.

Street Maintenance already has a two-ton dump truck (#604), and two backhoes (#636 and #602).

The estimated annual cost for the equipment necessary for enabling in-house staff is presented below.

One-Time Cost Increase		Annual Operating Cost Increase	
Acquire a tandem vibratory roller	\$30,000	Operating and maintenance costs for equipment	\$5,000
Acquire a trailer mounted asphalt emulsion unit	\$40,000		
Acquire a paving machine	\$65,000		
Acquire a trailer for the paving machine	\$15,000		
Acquire an asphalt saw	\$20,000		
Total One-Time Cost Increase	\$170,000	Total Operating Cost Increase	\$5,000

The total one-time cost increase would be \$200,000 and the annual operating cost increase would be \$5,000.

Recommendation: Allocate almost six staff to pavement maintenance and repair including pothole patching, skin patching, and base repair.

(2) A Little More Than Four Staff Would Be Required For Concrete Repair.

The table on the next page presents the project team’s assessment of workload and staffing requirements for concrete maintenance and repair. Important points to note concerning the table are presented below.

- Almost four staff would be required on a day-to-day basis for concrete maintenance and repair. Since a four-person crew would be required, this indicates that this crew would be performing concrete maintenance and repair for approximately 90% of the year.
- Allowances for turnover and disability must be considered. Turnover and disability or injury leave would require an additional 0.5 full-time equivalent staff.
- These staff would be largely dedicated to two activities – temporary repair (sidewalk grinding) and sidewalk replacement.
- Data for special events is estimated based upon the amount of overtime. The data regarding regular hours worked for special events is not available; the project team estimated the regular hours allocated to special events as equivalent to the overtime hours.

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- Allowances for turnover and disability must be considered. Turnover and disability or injury leave would require an additional 0.4 full-time equivalent staff in addition to the staffing requirements portrayed in the table.
- There is sufficient equipment at present – 1 ton dump trucks, air compressors, and backhoes. There would be a need to acquire a stake bed truck, vibratory plate, and miscellaneous forms, stakes, and tools, and there would be waste disposal costs and costs for the concrete itself.

Activity Name	Inventory Measure	Units	Annual Quantity		AWQ	ADP	Crew Days	Crew Size	Staff Days
			Per Inventory	Unit					
Sidewalk Replacement	Square Feet	3,500,000	Square Feet	0.005	17,500	190.0	92.1	4	368.4
Temporary Repair	No. of Locations	660	No. of Locations	1.0	660	6.0	110.0	1	110.0
Curb & Gutter Replace	Linear Feet	1,044	Linear Feet	1.0	1,044	48.0	21.8	4	87.0
Misc. Sidewalk Repair	Person Hours	1,500	Person Hours	0.3	435	8.0	54.4	1	54.4
Sidewalk Inspection	Miles of sidewalks	218	Miles of Sidewalks	0.5	43.6	5	8.7	1	8.7
Special Events	Person Hours	1,500	Person Hours	0.2	392	8.0	49	1	49
Sub-Total									677.5

It should be recognized that an in-house concrete crew is unusual for a city of the population and size of Beverly Hills. For example, in a survey completed of cities in Orange County in 2004, six (6) of the ten (10) responding cities did not have such an in-house crew. This includes Fullerton, Huntington Beach, Santa Ana, Tustin, Westminster, and Costa Mesa. Only four (4) cities had an in-house concrete crew including Fountain Valley (which split the crew between pavement and concrete maintenance and repair), Irvine, Newport Beach, and Orange.

However, the City of Beverly Hills is currently paying a contractor \$25 per square foot to remove and replace a sidewalk. The cost of the concrete itself, delivered, is approximately \$3.30 a cubic foot (assuming a minimum order of 4 cubic yards, that one

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cubic yard is equivalent to 27 square feet, and the cost per cubic yard of concrete delivered ranges between \$80 to \$90). The City, in essence, is paying the contractor almost \$22 per square foot for labor and equipment. The City's costs would be significantly lower as the table below indicates.

Class Title	Number of Staff	Annual Salary	Fringe Benefits @ 35%	Total Compensation Cost / Employee	Grand Total
Street Maintenance Worker III	1	\$49,992	\$17,497	\$67,489	\$67,489.20
Street Maintenance Worker II	3	\$45,252	\$15,838	\$61,090	\$183,270.60
Sub-Total					\$250,759.80
Total Annual Crew Days Available					190
Total Compensation Cost Per Crew Day					\$1,319.79
Equipment Classification					Rental Rate/ Day
Dump Body, 4 cubic yard					\$39.33
Pickup, mini					\$13.78
Air compressor, 185 CFM					\$15.35
Tractor wheel w / backhoe loader					\$36.27
Cargo body, 12' diesel					\$31.79
Trailer, 8 ton 12 ton					\$6.72
Asphalt saw					\$13.15
Vibratory tamper					\$7.89
Jackhammer					\$3.95
Total Equipment Cost Per Crew Day					\$168.23
Total Labor and Equipment Cost Per Crew Day					\$1,488.02

Important points to note regarding the table are noted below.

- A four person crew would be utilized consisting of one (1) Street Maintenance Worker III and three Street Maintenance Worker II's.
- The total annual cost for these four staff at top step amounts to \$250,760 annually.
- This does not include citywide overhead since that overhead would not increase substantively if the City provided this service in-house, nor would it decrease substantively if the City outsources this service.
- Assuming that these crews have 190 crew days available annually for concrete

work (based upon 1,500 available hours annually per employee), the crew would cost \$1,320 per crew day.

- The equipment rental costs are based upon the CalTrans Equipment Rental rates 2005-06, the latest version available with the exception of the concrete saw, vibratory tamper, and jackhammer. These rental rates include depreciation, operating costs, repair costs, equipment overhead, non-expendable depreciation administrative overhead, insurance, etc. The equipment rental cost for the concrete saw, vibratory tamper, and jackhammer are based upon discussions with the Vehicle Maintenance Manager.
- The total equipment rental cost per crew day amounts to \$168.
- The total cost per crew day amounts to \$1,488.
- Based upon an average daily productivity of 190 square feet of concrete removed and replaced per day, the cost per square foot would approximate \$8. This is significantly less than the cost of the current City contract. Excluding the cost of Portland cement concrete for the contractor and for the City.

The City should establish a crew that would perform a mix of asphalt and concrete maintenance and repair, with concrete maintenance and repair requiring approximately 80% of the crew’s available work hours. This will require the addition of equipment and an additional Street Maintenance Worker II. The annual cost impact of the enhancement of resources to deliver this service is presented in the table below.

One-Time Cost Increase		Annual Operating Cost Increase	
Acquire an concrete saw	\$10,000	Authorize three additional Street Maintenance Worker II positions	\$183,300
Acquire a jumping jack tamper	\$2,000	Annual operating and maintenance costs for equipment	\$2,000
Acquire a 175 CFM air compressor	\$16,000	Forms, stakes, tools, etc.	\$1,500
Total One-Time Cost Increase	\$28,000	Total Operating Cost Increase	\$186,800

Recommendation: Establish a crew that would perform a mix of asphalt and concrete maintenance and repair, with concrete maintenance and repair requiring approximately 80% of the crew’s available work hours.

Recommendation: Authorize three additional Street Maintenance Worker II

positions.

Recommendation: Authorize the acquisition of additional equipment for concrete maintenance and repair.

(3) A Little More Than Two Staff Would Be Required For Traffic Sign and Painting.

The table below presents the project team’s assessment of workload and staffing requirements for traffic sign and painting.

Activity Name	Inventory Measure	Units	Annual Quantity		AWQ	ADP	Crew Days	Crew Size	Staff Days
			Per Inventory	Unit					
Pavement Legend Painting	Square Feet	27,400	Square Feet	1	27,400	640	42.8	2	85.6
Parking Lot & Curb Painting	Linear Feet	7,000	Linear Feet	1	7,000	960	7.3	2	14.6
Sign Maintenance & Repair	Sign	800	Sign	1	800	10	80.0	1	80.0
Sign Fabrication	Sign	580	Sign	1	580	8	72.5	1	72.5
Misc. Sign & Paint Repair	Person Hours	1500	Person Hours	0.5	320	8	40.0	1	40.0
Special Events	Person Hours	1500	Person Hours	0.12	185	8	23.1	1	23.1
Sub-Total									315.8

Important points to note regarding the table are noted below.

- A total of 316 staff days would be required. This approximates 1.7 staff-years. Traffic sign and painting is presently allocated three staff: three (3) Traffic Sign and Paint Technicians.
- An estimated 27,000 square feet of pavement legends would be painted annually. This would require 86 staff days annually.
- An estimated 800 signs would require maintenance and repair annually. This would require 80 staff days annually.
- Sign fabrication would require 73 staff days annually for the fabrication of 580 signs.
- Other miscellaneous tasks – painting of parking lot and curbs and miscellaneous sign and paint repair – would require 55 staff days.

- Data for special events is estimated based upon the amount of overtime. The data regarding regular hours worked for special events is not available; the project team estimated the regular hours allocated to special events as equivalent to the overtime hours.
- Allowances for turnover and disability must be considered. Turnover and disability or injury leave would require an additional 0.2 full-time equivalent staff in addition to the staffing requirements portrayed in the table.

Altogether, a little more than two staff years would be required for traffic sign and painting maintenance and repair. This indicates that the three (3) Traffic Sign and Paint Technicians can be more effectively utilized to assist Street Maintenance in pavement maintenance repair and in concrete maintenance and repair. This staff is allocated to a specialized classification – Traffic Sign and Paint Technician. The cross utilization of these staff would require their reclassification to that utilized for Street Maintenance: Street Maintenance Worker II. The salary range for Street Maintenance Worker II is 12% less than the salary range for Traffic Sign and Paint Technician.

Recommendation: Allocate two staff to traffic sign and paint maintenance.

Recommendation: The three (3) Traffic Sign and Paint Technicians should be reclassified as Street Maintenance Worker II's and the classification of Traffic Sign and Paint Technician abolished.

7. THE TRAFFIC SIGN AND PAINT TECHNICIANS SHOULD BE ASSIGNED TO THE SAME SHIFT AND WORK HOURS AS THE OTHER STAFF ASSIGNED TO STREET MAINTENANCE.

At present, the staff allocated to pavement maintenance and to traffic sign and painting maintenance work different hours. The Traffic sign and painting staff work from 4 AM to 1:30 PM, while staff allocated to pavement maintenance work from 6:30 AM to 4 PM.

The reason given to the project team for this early start by the traffic sign and

painting staff was the need to check the reflectivity of signs. Paint and signs do degrade over time. It's difficult to determine the best time to replace reflective markings and signs. Too soon increases maintenance costs; too late compromises safety and driving comfort.

There is, however, hand-held equipment that can be utilized to check the reflectivity of signs and pavement markings at any time of the day from up to 120 feet away. This equipment can be purchased through grant applications with the Office of Traffic Safety.

However, with the installation of the Hansen asset management system, all signs would be included in a computerized database that contains detailed information about the sign and the sign installation. The Hansen asset management system can be utilized to estimate when a sign should reach the end of its service life. The list of signs needing replacement is then used to order / fabricate the necessary signs and perform the replacement. When this method is utilized, it requires the least number of personnel.

With the proposed cross utilization of the traffic sign and painting maintenance staff for pavement maintenance and repair and for concrete maintenance repair, it is essential that all of these staff work the same shift unless unusual circumstances require otherwise.

Recommendation: The work schedule for the staff allocated to traffic sign and painting maintenance should be adjusted to match the same shift for those staff assigned to pavement maintenance and repair.

8. DEVELOP AN INVENTORY OF PAVEMENT, SIGN, STRIPING, AND PAVEMENT LEGEND INFRASTRUCTURE.

Street Maintenance does not have an inventory of the infrastructure that it is responsible for maintaining and repairing.

An asset inventory needs to exist in some basic format in every organization that effectively manages the maintenance of the City's assets. Keeping asset inventory information up-to-date, accessible and understandable is the challenge of management.

The Federal Highway Administration published a report in October 2005 entitled *Roadway Safety Hardware Asset Management Systems – Case Studies*. This included signs, pavement markings and treatments, detectors, etc. The study noted that few State Departments of Transportation had implemented integrated systems to manage these asset categories. The Virginia Department of Transportation, however, envisioned managing its assets through its entire life cycle – condition assessment, planning, alternatives evaluation, project development, and implementation. An initial system module was developed based on an inventory system with a statistical, random sampling using manual data collection. The New Mexico Department of Transportation uses a video system to capture roadway assets and extracts detailed data for each asset from the video image. A feature called “Virtual Drive” allows system users to simulate driving along any roadway in the State system and view clearly and accurately the hardware along the route.

An essential step in the development of this asset management system is the development of an inventory for signs, pavement legends, street striping, curb painting, parking lot striping, streets and sidewalks.

The Public Works and transportation Department should develop this asset inventory to enable effective utilization of the Hansen asset management system.

Recommendation: Street Maintenance should develop a comprehensive asset inventory of signs, pavement legends, street striping, curb painting, parking lot striping, streets and sidewalks.

9. DEVELOP AND INSTALL A FORMAL WORK PLANNING AND SCHEDULING SYSTEM.

Street Maintenance is responsible for the maintenance and repair of aging infrastructure. This requires that the talents and skills of staff be planned and scheduled so that these resources can be effectively utilized to maintain and repair this aging infrastructure.

In addition to identifying potential failures in the street and addressing those failures through reconstruction or overlay, Street Maintenance must also focus its resources given the extensive backlog of repairs. With increasing responsibilities, the efficiency of Street maintenance staff resources easily becomes a first priority. Unless work is effectively planned and scheduled, Street Maintenance will experience a slippery slope as less work is completed, more street failures occur and the time of Street Maintenance staff is spent repairing failures, not on preventing the failure from happening. The only way to break this cycle is a systematic approach maintenance planning and scheduling.

Planning and scheduling for Street Maintenance must be a disciplined approach for utilizing its staff resources. This is accomplished through:

- Prioritizing work;
- Developing the physical steps to complete the job;

- Procuring necessary tools and materials;
- Scheduling the work to be done;
- Completing the work; and
- Identifying any additional work to be completed on the asset.

Street Maintenance should take a number of steps to install a planning and scheduling system. These steps are presented below.

- **Create and utilize work orders for all of the work performed by Street Maintenance staff.** The work order should serve as the basis for identification of requests for services, or work. A work order does basic things for Street Maintenance. First, it alerts the responsible unit (Streets, Concrete, Signs and Markings) of a requirement for services. Second, the work order describes the work or services to be performed. Third, the work order authorizes expenditures for the described work (asphalt, concrete, signs). Finally, an effective work order system will enable tracking of performance in the accomplishment of such work. Street Maintenance is able to know when the work was required, when it was completed, who performed the work, and the cost of performing that work. Thus the work order system is the backbone of a planning and scheduling system. The work order should include date, name of the requestor, location of the work, nature of the work, priority of the work, etc.
- **A three to six month schedule should be prepared.** A three to six month schedule is a process of balancing workload, both current and anticipated workload demand. This is especially important for Street Maintenance given the large backlog of street and concrete repairs. By defining the current workload and anticipating future workloads, the Street Maintenance Supervisor will be able to make an informed decision on the amount of work that can be accomplished given the staff resources available. The Street Maintenance staff resources must be balanced with the workload so that there are enough people and materials to accomplish the work, but not more people and materials than needed or more workload than can be realistically accomplished. This can be accomplished by documenting the available work hours and then documenting work hours required for concrete maintenance repair, street maintenance and repair, and signs and marking maintenance and repair given the backlog, given service requests received via OBC, etc.
- **Develop a weekly schedule.** The weekly schedule for Street Maintenance is the plan for assigning staff resources to specific jobs in the coming week. The weekly schedule is normally developed on a Wednesday or Thursday of the preceding week. The assignment of staff resources is based on several factors:

- Available work hours. This can be affected by planned leave, holidays, attrition, and other factors.
- Available materials and equipment. To accurately schedule, materials planners must communicate realistic delivery dates for necessary materials.
- Rate of success in the current week's schedule.
- Priorities. The overall plan of the master schedule becomes a guide in developing priorities for the weekly schedule.

A weekly schedule does not necessarily define the work of individual staff, but rather the number of hours by a crew to be spent each day on specific work orders.

- **The work should be tracked and reported.** Tracking work progress and reporting on work progress is another important part of the planning and scheduling system. Reporting on work is the process of communicating with management and customers the current progress and the current plans for a concrete repair work, street maintenance repair work, signs and markings repair work. Weekly schedule compliance is an effective method of tracking progress. For instance, how close was the actual weekly execution of the work in relationship to the plan developed in the weekly schedule? How effectively is the backlog of concrete repair work and street maintenance repair work dissipating?

The planning and scheduling system allows the Street Maintenance Supervisor to manage what, when, how, how much, and how well Streets Maintenance performs its work. The system can be complex and computerized, with full scheduling and tracking controls, or more informal, with a minimum of control. Street Maintenance must find the right balance of control to enable it to meet its goals and objectives in supporting the Department's mission.

Recommendation: Street Maintenance should develop and install a formal work planning and scheduling system.

10. THE PUBLIC WORKS AND TRANSPORTATION DEPARTMENT SHOULD UTILIZE THERMOPLASTIC FOR PAVEMENT LEGENDS FOR HIGH TRAFFIC VOLUME STREETS.

Pavement markings or legends provide guidance for traffic and conveys regulations and warnings to drivers. Their effectiveness depends on their visibility. As pavement markings reflective properties diminish, the ability of the pavement marking to provide guidance and safety is reduced.

As the traffic volume on City streets increases, Street Maintenance has been saddled with the need to re-apply pavement markings more frequently.

The City uses solvent-based paint for its pavement legends.

The technology of pavement markings has evolved over the past thirty (30) years to include the placement of glass beads in solvent-based paint, the use of thermoplastics, the use of thermosets, and the use of tape.

Thermoplastic pavement markings are a heavily used pavement marking material in California for a number of reasons, including:

- Material availability;
- Contractor availability;
- Reasonable cost; and
- Good performance.

Thermoplastic pavement marking materials are widely recognized for superior performance on asphalt roadways, and for their longer useful life. The Public Works and Transportation Department should utilize thermoplastic for high volume streets such as Wilshire Boulevard or Santa Monica Boulevard. The application of thermoplastic will need to be outsourced given the specialized equipment required.

The annual cost impact of the enhancement of resources to deliver this service is presented in the table below.

Annual Operating Cost Decrease		Annual Operating Cost Increase	
N / A	\$0	Outsource the application of thermoplastic for high volume streets	\$25,000

Recommendation: The Public Works And Transportation Department should utilize thermoplastic for pavement legends for high traffic volume streets.

7. ANALYSIS OF FACILITIES MAINTENANCE

7. ANALYSIS OF FACILITIES MAINTENANCE

Facilities Maintenance is authorized fifteen staff. This includes the following staff:

- A Facilities Maintenance Manager;
- A Plant Engineer;
- Six (6) General Repair Workers;
- Three (3) Building Maintenance Mechanics;
- Two (2) Senior Facilities Maintenance Mechanics;
- A Building Maintenance Attendant; and
- A Contract Administrator Technician.

Facilities Maintenance also utilizes a number of contractors for custodial maintenance (an annual contract in the amount of \$1,252,863), mechanical maintenance (an annual contract in the amount of \$607,134), and elevator maintenance (an annual contract in the amount of \$221,417).

Facilities Maintenance delivers a mix of services including the following:

- Maintenance and minor repairs on all City buildings and facilities including parks and recreation facilities and playground equipment; parking facilities;
- Specific services include painting, plumbing, minor electrical, furniture moving, meeting set-ups and coordination of meeting room use; and
- The management of contractual building (heating, ventilating, and air conditioning) and custodial maintenance services custodial and HVAC.

The fiscal year 2005-06 comprehensive annual financial report indicated that buildings owned by the City of Beverly Hills have a value of \$268,949,446.

In evaluating Facilities Maintenance, the project team considered a number of aspects for effective maintenance management.

- Identification of facilities and assets – A detailed inventory, by location, of each item needing maintenance including the characteristics affecting the type of maintenance work performed.
- Maintenance task description – each maintenance task or job required for the facilities listed in the inventory of assets should be documented.
- Maintenance task standards – Documentation showing frequency of maintenance, a quality standard to which assets are maintained, method of maintenance, and what labor, materials, and time is usually needed to complete each task.
- Annual maintenance plan – Using data from the first three elements above identifies maintenance needs and calculates financial resources necessary to accomplish the plan.
- Work schedules - Bi-weekly or monthly schedules that identify and prioritize work from the annual plan, plus maintenance tasks from other sources such as a Board or department's request.
- Work orders – A system of documentation that authorizes, assigns, and reports on all routine and emergency maintenance work.
- Management reports – Reports and special analysis generated and provided to management on a regular periodic basis which compares planned tasks versus actual tasks and estimated resources versus actual resources.
- Standard operating procedures – Documented policies and procedures for performing maintenance in all branches.
- Periodic inspections – Managers or supervisors should conduct regularly scheduled inspections of all facilities to observe needed maintenance and inspect work completed.
- Preventive maintenance schedule – More emphasis should be put on routine maintenance tasks aimed at preventing potential problems and repairs.

The overall goal of these maintenance process elements is to plan, organize, direct, monitor, and review maintenance work in a way that promotes efficiency and organization.

The project team had the opportunity during this study to interview customers of

the services provided by Facilities Maintenance, and inspect the facilities maintained and repaired by Facilities Maintenance. The customers, while acknowledging recent improvements in the level of service, believed that a significant improvement in the quality of custodial and facility (electrical, plumbing, heating-ventilating-air conditioning, etc.) maintenance was necessary. The inspection of City facilities by the project team, particularly the Library and the Roxbury Park Community Center, clearly indicated that the level of service at these facilities needs dramatic improvement. The level of service at these facilities does not meet industry standards, let alone the standards that the residents and businesses of Beverly Hills have a right to expect.

The recommendations contained within this chapter are designed to address these challenges.

1. THE PUBLIC WORKS AND TRANSPORTATION DEPARTMENT EMPLOYS A NUMBER OF BEST PRACTICES IN FACILITIES MAINTENANCE.

An organizational and management analysis by its nature focuses on opportunities for improvement. However, there are a number of strengths in Facilities Maintenance. Examples of these strengths are portrayed below.

- Facilities Maintenance maintains an inventory for heating, ventilating, and air conditioning equipment and for fire life safety equipment.
- Facilities Maintenance is administratively centralized.
- Facilities Maintenance has collected inventory data for its heating, ventilating, and air conditioning equipment.
- Facilities Maintenance has taken some steps towards energy efficiency. It has relamped facilities to T-8 lamps and electronic ballasts.
- Facilities Maintenance has outsourced custodial maintenance.

These strengths in Facilities Maintenance provide a sound basis for further enhancements.

2. FACILITIES MAINTENANCE SHOULD CONDUCT A COMPREHENSIVE INVENTORY OF BUILDING ASSETS.

There are a number of reasons why this asset information is important in the cost-effective life cycle management of building assets.

- **A comprehensive asset inventory will provide better information for Beverly Hills to make informed resource allocation decisions.** Facility Maintenance, with a comprehensive asset inventory of building assets, can make sounder decisions regarding how funds should be used, particularly as it concerns funding for renewal and rehabilitation of existing building assets versus the construction of new assets.
- **Beverly Hill's building assets are not being comprehensively preventively maintained.** Facilities Maintenance is not preventively maintaining the City's electrical and plumbing assets, and is not monitoring the preventive maintenance of the heating, ventilation, and air conditioning assets or the elevator assets by contractors.
- **Governmental accounting standards are requiring enhanced and more consistent inventory information.** GASB 34 is a relatively new action that requires enhanced and more consistent information on infrastructure assets than has been required in the past. Local governments require better asset inventory data to meet these standards. While the City is in compliance with GASB 34, a more comprehensive asset information would enable the City to more accurately depict the value of these assets.
- **The Hansen asset management system relies on comprehensive asset inventory data.** With the technological advances in recent years, tools are now available to create an effective asset management system. These systems no longer require large investments of resources or a lengthy education process. These tools can be made accessible to nearly all employees and the public. Automating the once manual system of managing assets does more than increase speed and efficiency of the process; it also ensures that the maintenance and repair of these assets are more effectively managed.

The inventory developed by Facilities Maintenance should include a comprehensive list of building systems and equipment with information such as location, model type,

warranty information, age, and replacement parts.

Recommendation: Facility Maintenance should conduct an inventory of City-owned building assets.

3. FACILITIES MAINTENANCE SHOULD CONDUCT PERIODIC ONGOING CONDITION ASSESSMENTS.

The American Public Works Association, in their Public Works Management Practices Manual, a guide to accreditation of Public Works and Transportation Departments, recommends the condition assessment of assets on an ongoing basis.

For a facility, the condition assessment consists of a visual inspection and recording of observations of buildings and infrastructure systems and components. Examples of the types of information collected are presented below.

- The conditions of roof elements (roof drains, flues, access to roof, etc.);
- The condition of interior rooms (walls, floors, ceilings, doors and door hardware, windows and window coverings, casework, return air grilles, supply air grills, lighting, etc.);
- The condition of corridors / common space (walls, floors, ceilings, doors and door hardware, windows and window coverings, casework, return air grilles, supply air grills, lighting, etc.);
- The condition of restrooms (toilets, toilet partitions, toilet accessories, urinals, water closets, exhaust fans, sinks, drains, walls, floors, ceilings, doors and door hardware, etc.); and
- The condition of emergency systems (emergency signage, emergency lights, fire alarm systems, heat / smoke detectors, etc.).

Information collected during periodic condition assessments should be utilized to:

- Generate work orders for conditions that can be addressed with in-house staff assigned to facility Maintenance;
- Calculate the costs for renovation and rehabilitation projects, utilizing R.S. Means Corporation's published construction and remodeling cost estimating data and format;

- Rank and prioritize all renovation and rehabilitation projects by severity and anticipated life cycle; and
- Create and update a database for maintaining project data, modeling existing data to determine future funding requirements, and monitor ongoing code compliance/plant adaptation issues.

Revealing statistics can be inferred from the facility condition assessment databases documented over the past five years. Consider these statistical averages derived from a sample of 50 million square feet taken from a mix of higher-education institutions across the United States:

- There was an average of one deficiency per 1,500 square feet over the total portfolio;
- The average deficiency correction cost was \$65,000;
- The average building replacement cost was \$152 per square foot; and
- The total deferred maintenance plus capital modernization costs averaged \$45 per square foot. This was in addition to normal operations and maintenance costs.

Facilities Maintenance does not conduct condition assessments on a periodic basis. The lack of ongoing condition assessments limits the ability of Facility Maintenance to identify major deficiencies early when timely repairs will be much less costly and risks to the public are less.

Facilities Maintenance should conduct facility condition assessments to identify the backlog of maintenance projects for City buildings that should be addressed by in-house staff and estimate the amount of funding needed on an ongoing basis to improve the life safety aspects of the building, reduce further deterioration of the building

components, comply with current building and safety codes and ensure that the buildings operate as designed, both structurally and mechanically.

The City should calculate building system renewal over an anticipated facility life of 50 to 100 years, annual capital renewal funding requires about 2.74% of the current facility replacement cost (constant dollars) in addition to normal operations and maintenance spending needed to operate a facility. This should exclude parking facilities.

Recommendation: Facilities Maintenance should conduct facility condition assessments annually to identify the backlog of maintenance projects for City buildings that should be addressed by in-house staff and estimate the amount of funding needed on an ongoing basis to improve the life safety aspects of the building, reduce further deterioration of the building components, comply with current building and safety codes and ensure that the buildings operate as designed, both structurally and mechanically.

Recommendation: The City should calculate building system renewal over an anticipated facility life of 50 to 100 years, annual capital renewal funding requires about 2.74% of the current facility replacement cost (constant dollars).

4. FACILITIES MAINTENANCE SHOULD DEVELOP A FIVE-YEAR MAJOR MAINTENANCE PLAN.

After the facility condition assessment has been completed, Facilities Maintenance should develop a five-year program for ongoing maintenance renewal and replacement of building / equipment replacement criteria. This five-year program should link equipment age, usage, condition and maintenance costs to a plan for replacing equipment during this five-year planning horizon.

There are a number of steps that should be considered in developing this five-year. These steps are portrayed below.

- **Develop a priority-rating system for projects proposed for the five-year major maintenance plan.** This priority rating system should be designed to help

sort out the relative importance of facility renewal and rehabilitation projects. This priority rating system should assign points to each project. Those projects with a greater number of points would have higher priority. The elements that should be considered in the rating would include life-safety and legal compliance (such as ADA), damage or deterioration of facilities as evidenced by the facility condition index and the assessment, cost-effectiveness measures (such as energy conservation), etc. A possible approach to rating these projects is presented below.

- Priority 1 – Life Safety (Immediate). Projects in this category require immediate action to:
 - Return a facility to a safe and functional operation.
 - Stop accelerated deterioration
 - Correct a cited safety hazard

- Priority 2 – Mission Critical (Year One Projects in this category, if not corrected expeditiously, will impact the functionality of the organization within a year). Situations in this category include:
 - Intermittent interruptions to operations
 - Rapid deterioration
 - Potential safety hazards

- Priority 3 - Necessary - Not Yet Critical (Year Two - Five) Projects in this category include conditions requiring appropriate attention to preclude predictable deterioration or potential downtime and the associated damage or higher costs if deferred further.

- Priority 4 - Recommended (Year Six - Ten) Projects in this category include items that represent a sensible improvement to existing conditions. These items are not required for the most basic function of a facility, however, Priority 4 projects will either improve overall usability and/or reduce long term maintenance.

- **Develop replacement guidelines and criteria for assessment of replacement needs in the major maintenance plan.** Facility Maintenance should develop replacement guidelines for facility equipment. Replacement guidelines provide a starting point that can be used as a tool to develop an actual facility equipment replacement plan. Facility Maintenance should develop replacement guidelines that take into consideration the life cycles of facility equipment. In addition to developing replacement guidelines based on the useful life years, Facility Maintenance should use other criteria to determine the equipment needs, as well as replacement priorities. Equipment should be evaluated by three criteria: age, maintenance costs, and condition of various components.

- **The purpose of the major maintenance plan should be rehabilitation and renewal of facility assets.** The development of the major maintenance plan should be based upon an understanding of terminology and definitions that define the purpose of the major maintenance plan. Possible definitions and terminology that could be utilized are presented below.
 - Major Maintenance Plan: Projects required allowing a fixed asset to continue to be used for its intended purpose that meets designated threshold criteria.
 - “Renewal” Maintenance Activities: Activities that meet the following criteria:
 - Repairs, Preventative Maintenance Services, or Replacement of Components valued at greater than \$10,000 per activity, but less than \$50,000 per activity;
 - Repairs, Preventative Maintenance Services, or Replacement of Components valued at greater than \$15,000 per activity but less than \$80,000 per HVAC related activity.
 - Painting Services valued at greater than \$10,000 per activity.
 - “Renovation” Maintenance Activities: Maintenance activities that meet the following criteria:
 - Repairs or Replacement of Components, Sub-systems, or Systems valued at greater than \$50,000 per activity
 - Repairs, Preventative Maintenance Services, or Replacement of Components valued at greater than \$80,000 per HVAC related activity.
 - “Renovation” Projects: Projects that repair, replace in-kind, or upgrade obsolete elements to current standards involving multiple aspects of a fixed asset to allow its continued use for its intended purpose;
 - “Deferred” Maintenance: Maintenance and/or repair activities that have been identified as necessary to maintain current functionality but have been deferred to a future period due to one of the following causes:
 - Lack of available funding
 - Lack of time
 - Unplanned or unforeseen Activity
 - Change in Prioritization of Activity

- Strategic decision to defer maintenance.

Currently there is no list of a deferred maintenance backlog or record of how the Major Maintenance Program has addressed past maintenance deficiencies. Changing the definitions as proposed would allow the development of a more defined Maintenance Strategy that could forecast projects has not been developed comparable to a five year capital improvement program.

These projects would be developed and managed by Facilities Maintenance.

Recommendation: Facility Maintenance should develop a five-year major maintenance plan.

Recommendation: The Facility Maintenance Manager should develop replacement criteria for facility assets.

5. FACILITY MAINTENANCE SHOULD DEVELOP A COMPREHENSIVE ENERGY MANAGEMENT PROGRAM.

Effective energy management ensures that energy use and energy costs are kept as low as possible while standards of comfort and service are maintained or improved. Energy cost savings also provides a source of funds for investment in further energy efficiency opportunities or in City programs. This is not insignificant: the cost of heat, light, water and power approximates \$1.9 million annually for the City as indicated in account number 77020. This includes the City's utilities.

Of the total energy used in the United States, approximately 36% is consumed by the building sector. Within the commercial building sector, typically 42% of the energy is used in the form of electricity for lighting, heating, cooling, and miscellaneous applications. On a nationwide basis, lighting represents approximately 17%, cooling, approximately 14%, and heating, approximately 41% of the source energy used. Although the actual mix of energy varies widely depending on geographical location and type of occupancy (office building, hospital, school, etc.), lighting, heating, and air

conditioning generally represent the largest of the energy-intensive operations in commercial and institutional buildings. Energy conservation and demand-side management projects are quite effective at reducing the utility costs of buildings. Lighting retrofits involving electronic ballasts, reflectors, occupancy sensors, and other forms of lighting controls have gained immense popularity partly because they can be implemented with minimal or no engineering effort and have a high rate of return. Similarly, in the heating, ventilation, and air conditioning (HVAC) area, variable-frequency drives, economizer controls, energy-efficient motors for large HVAC equipment, thermal energy storage, high-efficiency chillers, and direct digital controls have been extensively used to enhance the part-load efficiency and control of HVAC equipment.

The City has taken some steps towards energy efficiency. It has relamped facilities to T-8 lamps and electronic ballasts. The simple payback for this energy efficiency measure is approximately 5.5 years. It has installed a Honeywell HVAC control system that shuts lights and the HVAC system off when not in use.

However, there is much that could be done. Other cities that have installed comprehensive energy management programs are presented below.

- The City of Fairfield used a loan from the California Energy Commission to make improvements to existing HVAC systems, controls, and cogeneration system, and lighting retrofits. The cost of the project was \$2.0 million, but it achieved an annual energy savings of 182,082 therms for natural gas and 1,818,820 kWh for electricity. The annual energy cost savings amounted to \$283,062.
- The City of Santa Rosa used a loan from the California Energy Commission to make improvements to its wastewater treatment plant and pumping plants. The energy savings amount to 1,590,000 kWh annually. The annual energy cost savings amounted to \$193,600. The loan from the California Energy Commission amounted to \$1,578,567.

- The City of San Bernardino used a loan from the California Energy Commission to make improvements to lighting, installing occupancy sensors, replacing the City Hall chiller, installing an energy management system at City Hall, installing a new chilled water system with pumps with variable frequency drives and a new cooling tower with variable frequency drives to control fan speed at City Hall, converting the air distribution system to variable air volume at City Hall, installing devices to automatically shut off printers, etc. The annual energy cost savings amount to almost \$200,000.

The California Energy Commission provides loans as low as 4.1% to local governments and as large as \$3,000,000. These loans can be used for feasibility studies and for installation of energy saving measures. The California Energy Commission will also conduct energy audits, and prepare feasibility studies using experienced engineering and architectural consultants. The California Energy Commission will provide up to \$10,000 for the cost of consultants as part of the Commission's Energy Partnership program. This would require an application by the City to the Commission.

There are a number of opportunities for enhancing the energy efficiency of the City's facilities through the development of an energy management program. The points, which follow, present the key elements that should be included in an energy management program.

- **The Facility Maintenance Manager should develop and implement energy management goals and objectives.** This should include the overall goals and objectives of the energy management program, such as eliminating inefficient energy usage, developing cost effective alternatives, promoting renewal energy resources, etc.
- **The Facility Maintenance Manager should develop and implement energy management performance measures.** This should include benchmarks to document and measure the performance of the energy management program, such as cost of project, facility energy consumption, and energy costs, etc.
- **The Facility Maintenance Manager should conduct a preliminary energy audit of the major buildings owned and operated by the City and of the**

City's water utility. The energy audit includes calculating energy costs and determining which buildings have a higher than normal or higher than desired energy consumption. This step also includes identifying energy conservation opportunities and the associated costs and benefits. Preliminary audits, if using a consultant, cost approximately 1¢ to 3¢ per square foot. Upon completion of the preliminary audit, The Facilities Maintenance Manager should review the findings, conclusions, and recommendations with the top management of the Department and the City, and develop a prioritized list of capital improvement program projects that identify feasible energy conservation measures, and a priority list based on life-cycle cost calculations. The prioritized list should be differentiated into three categories:

- Quick-fix projects handled by changes in operating practices or minor capital outlay including simple adjustments of thermostats, delamping and relamping with energy-efficient fluorescent lamps, and equipment shutdowns as appropriate;
 - Retrofit projects requiring equipment and system modifications for peak energy efficiency; and
 - Major capital outlay energy projects such as computerized energy management systems for scheduling, optimized starts / stops, duty cycling, load rolling and demand control of building HVAC systems, or installation of cogeneration plants.
- **The Facility Maintenance Manager should develop and implement an energy management plan.** This should include energy initiatives to improve the efficiency of systems and equipment that use energy, reduce energy consumption and costs. Such programs can include conversion to energy efficient lighting where opportunities remain in the City, the use of automatic controls (e.g. sensors and timers), the use of variable frequency drives motors, etc. The preliminary audit typically contains a preliminary list of feasible projects providing minimal calculations and supporting analysis, and very rough estimates of energy savings and project costs.
 - **The Facility Maintenance Manager should be charged with developing this program of energy management.** Key responsibilities of the Facility Maintenance Manager as it pertains to energy management should include the following:
 - Develop program goals and objectives for the City's Energy Management Program.
 - Receive, evaluate and process data related to facility energy consumption and costs.

- Assemble and report energy management program goals and accomplishments.
- Develop priority listing of replacement and / or retrofits projects.
- Monitor energy costs at City buildings.
- Populate the “Energy Use Database” to track usage patterns for electric and natural gas use, graphs, and assign costs to accounts, addresses and sites and analyzes utility bills and approves payments, after comparing to last 30-90-365 day usage.
- Manage energy retrofits and capital projects, including audits of City buildings for energy usage, developing energy initiatives to reduce energy consumption, receiving bids and managing the work performed, determining the feasibility of cost savings and performing payback analyses.
- Analyze utility rate structures, perform life cycle costs analysis and feasibility studies, review new construction designs and procure energy efficient building systems.

The Facility Maintenance manager should take an active role in the management of energy and energy costs for the City including its water utility. The consumption of energy is as much a business as the production of energy, and it must be treated and managed in a business-like way.

Recommendation: The Facility Maintenance Manager should develop and implement energy management goals and objectives.

Recommendation: The Facility Maintenance Manager should develop and implement energy management performance measures.

Recommendation: The Facility Maintenance Manager should conduct a preliminary energy audit of the major buildings owned and operated by the City and of the City’s water utility.

Recommendation: The Facility Maintenance Manager should develop and implement an energy management plan.

Recommendation: The Facility Maintenance Manager should be charged with

developing this program of energy management.

6. FACILITY MAINTENANCE SHOULD DEVELOP AND ADOPT SERVICE LEVEL AGREEMENTS WITH ITS MAJOR CUSTOMERS.

A key component to service delivery for internal services such as Fleet Management and Facility Management are service level agreements that stipulate the level of service expected and commits the internal service provider to delivering that standard. Service level agreements are essential to both the department receiving the service and the internal service provider because they spell out the type and the level of service required and any performance related incentives or penalties. A clear understanding of what is expected helps ensure that both the department receiving the service and the internal service provider are satisfied. Developing and implementing service level agreements are complex but necessary processes.

Facility Maintenance should develop service level agreements with its major customers such as the Parks and Recreation Department, Police Department, Fire Department, etc. The agreement should include such categories as the following:

- Plumbing;
- Building Finishes (roofing, exterior/interior walls, ceilings, doors, windows, and flooring);
- Lighting;
- Electrical;
- Heating, Ventilation, and Air Conditioning;
- Custodial Services;
- Lock and Key Systems;
- Facilities Automation and Life Safety systems;

- Parking Lot Maintenance;
- Pest Control Services;
- Electronic Systems Maintenance;
- Identification of the department facilities liaison with Facilities Management;
- Identification of respective roles of the department facilities liaison and the Facilities Management staff; and
- Metrics used to measure performance services delivered by Facilities Maintenance.

Recommendation: Facilities Maintenance should develop service level agreements with its major customers.

7. FACILITIES MAINTENANCE SHOULD DEVELOP A POLICY AND PROCEDURES MANUAL.

Facilities Management should develop a policy and procedures manual. This manual should include a number of topics including the following:

- Acquisition and use of equipment, supplies and materials;
- Personnel staffing and timekeeping;
- The use and management of facilities;
- Filter Maintenance Standards;
- Maintenance Painting Policy;
- Tool Inventory and Control;
- Purchasing/Tracking of Parts/Materials;
- Issuance and Retrieval of Keys;
- Work Order Response Time by Priority;
- Overtime/Standby Policy;

- Work Uniform Standards;
- Preventive and corrective maintenance standards for each of the trades and crafts (plumbing, HVAC, electrical, electronics, locks, welding, etc.);
- Procedures for requesting and performing maintenance and repairs;
- Responsibilities for equipment acquisition, operation, maintenance and repair as well as disposition;
- Dispatch procedures;
- Policies regarding maintenance and repair rate determinations as well as those for capital replacement;
- Installation of non-standard equipment;
- Field purchases of parts; and
- Equipment replacement guidelines.

After completion of these policies and procedures, they should be published to the Facilities Maintenance web site. Facilities Maintenance should update these policies and procedures on an annual basis.

Recommendation: Facilities Maintenance should develop a comprehensive policies and procedures manual.

8. FACILITIES MAINTENANCE SHOULD DEVELOP AND INSTALL A COMPREHENSIVE PREVENTIVE MAINTENANCE PROGRAM.

Many building-industry and facility-management groups, including the American Public Works Association, the Building Owners and Managers Association (BOMA) International, the Association of Physical Plant Administrators (now named the Association of Higher Education Facilities Officers), and the Association of School Business Officers agree on the benefits of well-planned preventive maintenance.

These professional associations cite preventive maintenance for its effects on

improving equipment's operating efficiency, preventing premature replacement of components, and avoiding interruptions for building occupants. Preventive maintenance is widely thought to reduce long-term costs by maximizing the operating capacities of equipment, minimizing downtime, and avoiding breakdowns that would otherwise lead to higher repair costs later. Although the project team found no studies that quantified specific costs and benefits of a comprehensive preventive maintenance program for buildings, some studies demonstrate efficiencies of planned maintenance and others show the relationship between building maintenance and reducing building deterioration. Studies within individual companies show savings in energy costs and repair costs, as well as reductions in equipment breakdowns, due to preventive maintenance. For instance:

- The preventive maintenance tasks of cleaning coils and replacing dirty filters in a heating, ventilation, and air-conditioning (HVAC) system have shown reduced energy costs for running an HVAC of 8% – 10%.
- In one company that adopted preventive maintenance, equipment breakdowns went from being a common occurrence to constituting approximately 1 percent of scheduled operating time over a ten-year period.
- Further, maintenance efficiencies allowed the company to reduce its maintenance workforce from 15 to 8 employees during that time.
- In another instance, by training maintenance workers in preventive maintenance, nine community colleges in California improved the efficiency of HVAC operations and saved an estimated 6 to 19 percent of their total annual energy bills, or \$0.09 to \$0.26 per square foot per year.

Facilities Maintenance is not preventively maintaining the electrical and plumbing components of the City's buildings. A contractor – ABM – is required by its contract to preventively maintain heating, ventilating, and air conditioning systems, sump pumps, sewage pits, motors, motor controls, and also has subcontractors for fire alarm testing

and maintenance, uninterruptible power system maintenance, and fire extinguisher servicing. However, Facilities Maintenance does not monitor compliance with these contractual provisions for preventive maintenance.

Facilities Maintenance should establish and implement a preventive maintenance program. The elements of this preventive maintenance program that should be developed by Facilities Maintenance are presented below.

- **Establish levels of service necessary to preventively maintain the facilities.** In establishing levels of service, Facilities Maintenance should document what maintenance activities are needed to ensure that this particular system/component meets or exceeds its life expectancy. Manufacturer's literature and the experience of Facilities Maintenance staff are some ways to determine both acceptable life-cycles and what preventive maintenance work would result in achieving those life expectancies in the most efficient manner.
- **Prepare an annual work program for preventive maintenance of facilities.** Once the levels of service have been established, setting the tasks into a work plan is the next step. The list of tasks to be performed could be described in detail. The frequency and nature of the work could be clearly stated. The materials to be used are specified in considerable depth and the manner in which the work is to be accomplished must be expressed in simple language.
- **Develop a formal work planning and scheduling system for preventive maintenance of facilities.** The heart of any preventive maintenance program is scheduling and assigning specific preventive maintenance tasks. This is almost always done using a work order system. This element of the preventive maintenance program takes the work items developed for each facility component, such as the quarterly inspection of a rooftop HVAC unit, and assigns them to Facilities Maintenance staff according to the established structure and schedule.
- **Report actual versus planned results of preventive maintenance.** Effective preventive maintenance programs depend on feedback from Facilities Maintenance staff using the work orders and a reporting/tracking system of costs associated with the work order. This information is used to maintain the proper balance between preventive maintenance and renewal and replacement efforts. Through a combination of informal evaluations and formal audits, a reporting system could be established to analyze the Department's maintenance system to achieve cost-effective maintenance.

Many of these elements were identified earlier in the description of the Hansen asset management system. However, Facilities Maintenance should initiate the preventive maintenance of its facilities in the short-term. The installation of the Hansen asset management system will likely take a number of years. The elements necessary for effective preventive maintenance of the City's facilities should not wait until that system is installed. Facilities Maintenance should implement the OBC work order system to bridge the gap until the Hansen asset management system is installed and implemented.

Recommendation: Facilities Maintenance should develop and install a preventive maintenance program for the City's facilities.

9. DEVELOP AND INSTALL A RELIABILITY-CENTERED PROGRAM FOR FACILITY COMPONENTS.

Reliability centered maintenance employs predictive testing and inspection approaches to determine preventive maintenance requirements and frequency. Reliability centered maintenance places great emphasis on improving equipment reliability, principally through the feedback of equipment condition data using primarily non-intrusive testing techniques, visual inspection, and performance data to assess machinery condition. For example, vibration analysis of a generator might be the basis for either accelerating or deferring a scheduled major overhaul, or infrared testing of a roof might indicate the need for small repairs now and avert a major repair project in the future.

The City recently purchased an Infrared thermo-imaging unit. In the past, this service had been contracted. Training needs to be scheduled for the City's staff in the use of the equipment.

The use of predictive testing equipment should be utilized on an ongoing basis to include the techniques enumerated below.

- Vibration analysis should be used to detect, identify, and isolate specific component degradation and its causes prior to serious damage or actual failure. Vibration monitoring helps to determine the condition of rotating equipment, a system's structural stability, and sources of airborne noise.
- Oil analysis should be used to determine the condition of a given oil, fuel, or grease sample by testing for viscosity; particle, fuel, and water contaminants; acidity/alkalinity (pH); breakdown of additives; and oxidation.
- Temperature monitoring devices should be used to detect temperature variances in machines, electrical systems, heat transfer surfaces, and structures and the relative magnitude of those temperature variances. Large changes in temperature often precede equipment failure. Infrared thermography, in particular, is a reliable technique for finding roof leaks and determining the thermal efficiency of heat exchangers, boilers, building envelopes, etc.

Facilities Maintenance should utilize the Infrared thermo-imaging unit recently purchased by the City to initiate a reliability-centered program. Facilities Maintenance should contract, initially, for the employment of oil analysis and vibration analysis on an annual basis. In the mid-term, Facilities Maintenance should selectively acquire this equipment and train its staff in its use. The estimated annual cost of this contract is presented in the table below.

Annual Cost Increase		Annual Cost Decrease	
Authorize funding to retain a contractor to employ predictive testing equipment on an annual basis to include oil analysis and vibration analysis.	\$15,000	NA	\$0
Total Operating Cost Increase	\$15,000	Total Operating Cost Decrease	\$0

Recommendation: Facilities Maintenance should contract, initially, for the employment of this predictive testing equipment on an annual basis. In the mid-term, Facilities Maintenance should selectively acquire this equipment and train its staff in its use.

10. FACILITY EQUIPMENT AND COMPONENTS SHOULD BE STANDARDIZED.

Equipment standardization has been demonstrated to improve on-going reliability of facilities through its direct impact on reliability. Effective equipment standardization programs have been shown to reduce the frequency and number of functional failures that could be attributed to human errors such as improper lubrication, improper maintenance due to training or procedural inadequacies, or the installation of improper parts, just to name a few. Experience has shown that equipment standardization is an often-overlooked topic when it comes to most reliability improvement projects and initiatives. Equipment standardization can provide the City with several key benefits:

- Reduction in spare parts inventory and associated space and carrying costs;
- Reduction in training needs due to consolidation of equipment types and models;
- Reduction in need for specialty tooling;
- Less need for rigorous, multiple maintenance procedures;
- Increase in operating efficiency; and
- Reduction in the amount of maintenance errors, costs, and downtime.

Facilities Maintenance and Project Administration should develop a standardization policy. An example of a possible standardization policy could be: "The City's standard for temperature and energy management control shall be Honeywell. Building temperature, humidity and energy management controls shall be direct digital control (DDC) technology utilizing distributed microprocessor based apparatus. Each building shall be designed to operate in a "stand alone" mode but shall include the necessary features for communication with a remote operator's station. Connection to a remote operator's station must be included at the time of bid and construction. The

inclusion of such shall have no bearing on the environment control system to be provided.”

Facilities Maintenance and Project Administration should develop a formal written facilities equipment standardization policy.

11. THE LEVEL OF STAFFING AND CONTRACTORS ALLOCATED FOR FACILITIES MAINTENANCE IS MORE THAN SUFFICIENT GIVEN THE AMOUNT OF FACILITIES MAINTAINED.

Facility Maintenance is authorized fifteen staff. This includes the following:

- A Facilities Maintenance Manager;
- A Plant Engineer;
- Six (6) General Repair Workers;
- Three (3) Building Maintenance Mechanics;
- Two (2) Senior Facilities Maintenance Mechanics;
- A Building Maintenance Attendant; and
- A Contract Administrator Technician.

Facility Maintenance also utilizes a number of contractors for custodial maintenance (an annual contract in the amount of \$1,252,863), mechanical maintenance (an annual contract in the amount of \$607,134), and elevator maintenance (an annual contract in the amount of \$221,417).

The amount of facility space maintained by these staff and these contractors is presented in the table below.

CITY OF BEVERLY HILLS, CALIFORNIA
Organization and Management Analysis of the
Public Works and Transportation Department

Facility	Sq. Footage
Police Department	92,000
Library	92,000
City hall	68,000
Information technology	4,000
Fire Station Number 1	45,000
Fire Station Number 2	6,300
Fire Station #3	14,000
Graphic Arts Office / Employee Lunch Room	1,733
Fitness Center	4,678
Public Works Water Treatment Facility	32,000
Vehicle / Facilities Maintenance Trailer	1,520
La Cienega Park Community Center / Restrooms	9,400
Roxbury Park Community Center / Restrooms	15,900
La Cienega Tennis Center	11,400
Coldwater Park Day Care Center / Restrooms	1,500
Roxbury Park Clubhouse	3,550
Will Rogers Park	200
Greystone Gatehouse Parks Personnel Trailer, Restrooms, Ranger Station	2,000
Beverly Gardens Park	252
Camden Parking Structure	154,000
N. Beverly Parking Structure, Restrooms, Elevated Stairwells	145,000
Bedford Parking Structure, Restrooms, Elevated Stairwells	205,000
South Beverly Parking Structure	90,500
Rodeo Parking Structure	126,000
Crescent Parking Structure, Restrooms, Elevated Stairwells	247,900
Crescent Parking Structure, Restrooms, Elevated Stairwells	345,120
Civic Center Parking Structure, Restrooms, Elevated Stairwells	216,400
Santa Monica Five Parking Structures	100,000
La Cienega Tennis Garage	129,000
Beverly - Canon Parking Structure	200,000
Tenant Lease Space	4,650
Tenant Lease Space	10,400
TOTAL	2,379,403

Important points to note concerning the table are presented below.

- The total square footage maintained by Facilities Maintenance amounts to 2,379,403.
- Parking garages amount to 82% of the total square footage, or 1,958,920 square feet. These parking garages include eleven (11) restrooms consisting of approximately 1,100 square feet. This does not include stairways, lobbies, storage space, etc.

- The office space maintained by Facilities Maintenance amounts to 405,433 square feet.
- The tenant space maintained by Facilities Maintenance amounts to 15,050 square feet.

As an essential part of the analysis of Facilities Maintenance, the project team benchmarked Facilities Maintenance against other public and private agencies that maintain approximately 500 million square feet of building space. Those benchmark organizations providing a high level of service approximate 35,000 square feet of facilities maintained per full-time employee. The median of these other organizations amounts to approximately 50,000 square feet of facilities maintained per full-time employee. Those organizations providing a lower level of service approximate 75,000 square feet of facilities maintained per full-time employee.

Where an organization should fall within this range needs to consider a number of variables including the age and nature of facilities, the complexity of the facilities, central or local utilities, travel requirements, usage of buildings, shift coverage, degree of automation, and shift coverage variations.

Facilities Maintenance is responsible for the maintenance and repair of approximately 420,483 square feet of office space and tenant space excluding parking garages. There are twelve (12) staff authorized for the maintenance and repair of this space including six (6) General Repair Workers, three (3) Building Maintenance Mechanics, two Senior Facility Maintenance Mechanics, and one (1) Plant Engineer. The ratio of staffing to space amounts to 35,040 gross square feet maintained per full-time employee. This places Facilities Maintenance at the lower end of the range of square feet of facilities maintained per full-time employee.

While this excludes City-owned parking garages, the project team analyzed the available inventory data for heating, ventilating and air conditioning equipment for these facilities. The workload presented by this equipment in the parking garages is not sufficient to change this finding regarding the levels of staffing.

In addition, the project team analyzed available data regarding special events. The staff assigned to Facilities Maintenance charged 549 hours of overtime to special events in fiscal year 2005-06. To document the amount of regular labor hours allocated to meeting set up and take down, data was collected for a sample period during this study. Over a nine workday period from March 5 through March 19, 2007, a total of 64 staff hours were allocated to meeting set and take down in addition to the Building Attendant dedicated to the provision of this service. On an annual basis, this would result in the allocation of one (1) staff year in addition to the Building Attendant dedicated to the provision of this service.

The amount of regular hours allocated to meeting set-up and takedown does not alter the finding of the project team regarding the level of staffing for Facilities Maintenance.

In addition, this does not consider that Facilities Maintenance contracts out all of the mechanical maintenance and repair to ABM Industries (including the City-owned parking garages); this contract has an annual value of \$607,134.

Facilities Maintenance does not require additional staff to provide adequate and effective levels of maintenance and repair services for City facilities. Given the current mix of duties, the type and extent of services that are outsourced, and responsibilities for Facilities Maintenance, the project team recommends the elimination of the Plant

Engineer position. Facilities Maintenance, with the elimination of this employee, would have 38,200 square feet of facilities maintained per full-time employee.

The annual cost impact of the elimination of this position is presented in the table below.

Annual Cost Increase		Annual Cost Decrease	
NA	\$0	Eliminate the Plant Engineer position.	\$119,000
Total Operating Cost Increase	\$0	Total Operating Cost Decrease	\$119,000

Recommendation: The City should not increase the level of authorized positions for the maintenance and repair of the City’s facilities.

Recommendation: Eliminate the Plant Engineer position and reallocate the incumbent to a vacant position in the Department that matches the skills and talents of the incumbent.

12. THE COMPENSATION STRUCTURE AND ALLOCATION OF STAFF AMONG THE CLASSIFICATIONS PREVENT FACILITIES MAINTENANCE FROM DELIVERING RESPONSIVE AND COST EFFECTIVE SERVICES.

Facilities Maintenance is prevented from providing cost effective services in the maintenance of the City’s facilities by the compensation structure and allocation of its staff among the different classifications. There are a number of problems with the classification structure and allocation of its staff as portrayed below.

- Facilities Maintenance only has two (2) skilled facility maintenance staff. The other nine staff – the Building Maintenance Mechanics and General Repair Workers are semi-skilled based upon their classification descriptions.
- Facilities Maintenance has more semi-skilled staff than skilled maintenance staff. There are a total of six (6) General Repair Workers, three (3) Building Maintenance Mechanics, and two (2) Senior Facility Maintenance Mechanics.
 - The General Repair Worker classification is semi-skilled, and the classification description indicates the positions assist skilled personnel in minor carpentry, plumbing and electrical repairs and painting. The classification performs such duties as the following:

- Performs routine preventive maintenance to include painting, minor plumbing, and electrical repair, and carpentry on municipal buildings and facilities;
 - Replaces light bulbs and fluorescent tubes, and maintains light fixtures;
 - Moves and arranges furniture and equipment;
 - Sets up rooms for special meetings or events;
 - Cuts keys, combination locks, stamps codes and installs codes for all City facilities; and
 - Performs minor inspection duties of work performed by contract personnel.
- The Building Maintenance Mechanic is semi-skilled. The classification description indicates that the positions perform semi-skilled maintenance and repair work in the upkeep of City buildings and facilities. This includes such tasks as the following:
- Performs minor repair and routine maintenance on City buildings and facilities including minor electrical, carpentry and plumbing work, preventive maintenance on City-owned systems such as heating and air conditioning, and general maintenance and repair of City furniture;
 - Sets up rooms and provides the necessary equipment for meetings;
 - Receives work orders, sets schedule, and completes work;
 - Maintains shop, equipment, tools and vehicles necessary for tasks; and
 - Stocks, organizes and labels hardware items, shop equipment and tools.
- The Senior Facilities Maintenance Mechanic (Lead) is responsible, according to the classification description, for training, scheduling, assisting, and reviewing the work of skilled and semi-skilled staff in construction, maintenance, and repair of City buildings and facilities.
- In comparison, Fleet Management does not have semi-skilled positions. It is authorized only Equipment Mechanic II's.

- The ratio of semi-skilled to skilled facility maintenance staff does not match the pattern in other cities included in the comparative survey. In Pasadena, for example, semi-skilled staff represents 37% of the total number of facility maintenance staff (excluding custodial staff, clerical, supervisory and management staff). In Glendale, the semi-skilled staff represents 30% of the total facility maintenance staff (excluding custodial staff, clerical, supervisory and management staff). In comparison, 82% of the facility maintenance staff in Beverly Hills are semi-skilled crafts workers.
- The analysis conducted by the project team of the type and quantity of work performed by Facility Maintenance indicates that there is insufficient work for nine (9) semi-skilled positions, but that the amount of skilled maintenance and repair work exceeds the capacity of the two (2) skilled staff available.

The Facilities Maintenance Manager can and should be held accountable for the quality and efficiency of facility maintenance. While the City has provided the right number of staff for this manager to provide these services, it has not provided the right mix. The City should address this challenge through a number of steps.

- **The City should establish skilled trades classifications.** These should include three distinct classifications: Electrician, Plumber, and Heating / Refrigeration Technician. Pasadena, Glendale, Santa Monica, and Culver City use this mix of classifications for skilled trades positions.
- **Consolidate the General Repair Worker classification and the Building Maintenance Mechanic classification.** There is no need for two semi-skilled classifications for the building trades. The General Repair Worker positions should be consolidated into the Building Maintenance Mechanic classification.
- **As General Repair Worker and Building Maintenance Mechanic positions become vacant, reclassify six of these positions to the skilled trades classifications.** This would include two Electricians, one Plumber, and three Heating / Refrigeration Technicians.

The salary range for Electrician, Plumber, and Heating / Refrigeration Technician positions should also be adjusted to assure that the City continues to obtain the talent and skills necessary to perform skilled facility maintenance and repair. A comparison of

the facility maintenance salary ranges to other comparable classifications is presented in the table below.

Class Title	Monthly Salary	
	Beginning of the Range	Top End of the Range
Senior Facility Maintenance Mechanic	\$3,904.00	\$4,836.00
Building Maintenance Mechanic	\$3,137.00	\$3,885.00
General Repair Worker	\$2,954.00	\$3,660.00
Equipment Mechanic II	\$3,827.00	\$4,740.00
Traffic Signal Technician	\$3,789.00	\$4,694.00
Irrigation Specialist	\$3,641.00	\$4,510.00
Parking Meter Technician	\$3,605.00	\$4,466.00
Electrical Technician	\$3,569.00	\$4,422.00
Communication Systems Technician	\$4,716.00	\$5,843.00

Important points to note concerning the data contained in the table and the salary ranges for skilled trades classifications are presented below.

- The salary ranges for the Electrician and Heating / Refrigeration Technician classifications in other cities – Santa Monica, Glendale, and Pasadena – are comparable to Communication Systems Technician at the top end of the range. The salary range for the Plumber classification is comparable to that of Senior Facility Maintenance Technician.
- The top end of the salary range for the Senior Facility Maintenance Mechanic (Lead) – a skilled trades classification - is only 2% more than Equipment Mechanic II, only 2.9% less than Traffic Signal Technician, 7% less than Irrigation Technician, 8% less than Parking Meter Technician, and 9% less than Electrical Technician. The salary range for Communication Systems Technician is 21% higher than Senior Facility Maintenance Mechanic (Lead).
- The salary ranges for these skilled building classifications need to be set in recognition of the increased complexity of the profession including more sophisticated technology in maintenance and in building operation such as integrating facility / maintenance / building control systems (hardware and software), building mold, indoor air quality, etc.

The salary ranges for these three proposed skilled trades classifications should be established based upon a salary survey conducted by the Human Resources Department.

The annual cost impact of consolidating the General Repair Worker classification with the Building Maintenance Mechanic classification is presented in the table below.

Annual Cost Increase		Annual Cost Decrease	
Consolidate six (6) General Repair Worker positions into the Building Maintenance Mechanic classification.	\$21,900	NA	\$0
As General Repair Worker and Building Maintenance Mechanic positions become vacant, reclassify six of these positions to the skilled trades classifications - Electrician, Plumber, and Heating / Refrigeration Technician.	\$85,000		
Total Operating Cost Increase	\$21,900	Total Operating Cost Decrease	\$0

Recommendation: The City should establish skilled trades classifications including three distinct classifications: Electrician, Plumber, and Heating / Refrigeration Technician.

Recommendation: The General Repair Worker classification and the Building Maintenance Mechanic classification should be consolidated into one classification: Building Maintenance Mechanics. Eliminate the General Repair Worker classification.

Recommendation: As General Repair Worker and Building Maintenance Mechanic positions become vacant, reclassify six of these positions to the skilled trades classifications – Electrician, Plumber, and Heating / Refrigeration Technician.

Recommendation: The salary ranges for these three proposed skilled trades classifications should be established based upon a salary survey conducted by the Human Resources Department.

13. THE PUBLIC WORKS AND TRANSPORTATION DEPARTMENT SHOULD CANCEL THE CONTRACT WITH ABM FOR MAINTENANCE AND REPAIR OF BUILDING MECHANICAL COMPONENTS IN EIGHTEEN MONTHS.

Facility Maintenance is authorized eleven staff for maintenance of the City's facilities. This includes the following staff:

- Six (6) General Repair Workers;

- Three (3) Building Maintenance Mechanics;
- Two (2) Senior Facilities Maintenance Mechanics;

Facility Maintenance also utilizes a contractor for mechanical maintenance (an annual contract in the amount of \$607,134). The contractor – ABM - does all the mechanical maintenance and repair services including heating, ventilating, and air conditioning systems, sump pumps, sewage pits, motors, motor controls, and also has subcontractors for fire alarm testing and maintenance, uninterruptible power supply maintenance, fire extinguisher servicing, and generator load testing. ABM provides the City with a “Chief Engineer”, a “Certified Engineer”, and an “apprentice engineer.”

Facilities Maintenance, even with the elimination of the Plant Engineer position through attrition, would have 38,200 square feet of facilities maintained per full-time employee. The project team benchmarked Facilities Maintenance against other public and private agencies. Those organizations providing a high level of service approximate 35,000 square feet of facilities maintained per full-time employee. The median of these other organizations amounts to approximately 50,000 square feet of facilities maintained per full-time employee. Those organizations providing a lower level of service approximate 75,000 square feet of facilities maintained per full-time employee.

Facilities Maintenance has sufficient number of staff to maintain and repair mechanical components. It lacks, however, the staff with the skills and knowledge to maintain and repair these mechanical systems.

The City should authorize two positions – two Heating / Refrigeration Technician positions in fiscal year 2007-08. The City should assign these staff to work with ABM for twelve months to maintain and repair the City’s mechanical systems, including training

for the maintenance and repair of these systems. At the end of that twelve month period, the City should terminate the contract with ABM and assume responsibility for mechanical maintenance and repair services including heating, ventilating, and air conditioning systems, sump pumps, sewage pits, motors, motor controls, and coordinates the subcontractors for fire alarm testing and maintenance, uninterruptible power supply maintenance, fire extinguisher servicing, and generator load testing.

The addition of these two positions may seem inappropriate given the current level of staffing for Facilities Maintenance, but Facilities Maintenance lacks the skills and knowledge within its existing workforce. To compensate for the addition of these two positions, since Facilities Maintenance has sufficient levels of staffing already, two Building Maintenance Mechanic positions should be eliminated through attrition.

The annual cost impact of insourcing this service is presented in the table below.

Cost Increase		Annual Cost Decrease	
Authorize two (2) Heating / Refrigeration Technician positions	\$181,400	Eliminate the contract with ABM for mechanical maintenance.	\$607,134
Authorize two vans for the two (2) Heating / Refrigeration Technician positions (annual operating, maintenance, and depreciation costs)	\$40,000	Eliminate two (2) Building Maintenance Mechanic positions through attrition	\$125,900
Tools (annual replacement cost)	\$6,000		
Contract service	\$50,000		
Parts and supplies	\$84,500		
Total Cost Increase	\$361,900		

As the table indicates, the City would generate savings of approximately \$371,134 annually by insourcing maintenance and repair of the City’s mechanical systems.

Recommendation: The City should authorize– two Heating / Refrigeration Technician positions in fiscal year 2007-08. The City should assign these staff to

work with ABM for twelve months to maintain and repair the City's mechanical systems, including training for the maintenance and repair of these systems.

Recommendation: At the end of that twelve month period, the City should terminate the contract with ABM and assume responsibility for mechanical maintenance and repair services, including heating, ventilating, and air conditioning systems, sump pumps, sewage pits, motors, motor controls, and also the subcontractors for fire alarm testing and maintenance, uninterruptible power supply maintenance, fire extinguisher servicing, and generator load testing.

Recommendation: Eliminate two (2) Building Maintenance Mechanic positions through attrition.

14. AN EXISTING BUILDING MAINTENANCE MECHANIC SHOULD BE UTILIZED FOR CONTRACT ADMINISTRATION AND THE VACANT CONTRACTOR ADMINISTRATOR TECHNICIAN POSITION RECLASSIFIED TO ELECTRICIAN.

Facilities Maintenance was authorized a Contract Administrator Technician position in fiscal year 2006-07. The purpose and intent of the position is to monitor and administer the contracts of the Division. Facility Maintenance also utilizes a number of contractors for custodial maintenance (an annual contract in the amount of \$1,252,863), mechanical maintenance (an annual contract in the amount of \$607,134), and elevator maintenance (an annual contract in the amount of \$221,417).

The project team recommended the insourcing of mechanical maintenance within the next eighteen months. If implemented, this would result in approximately \$1,474,280 in contracts – the custodial contract and the elevator maintenance contract – being monitored by the Contract Administrator Technician. These contracts do require monitoring, but not monitoring for the entire forty-(40) hour work week.

The responsibility should be assigned to a specific Building Maintenance Mechanic. The Building Maintenance Mechanic should be responsible for administering

all Facilities Maintenance contracts that involve the routine, ongoing maintenance of City facilities. This would include, for example, elevator maintenance, custodial maintenance, etc. The Facilities Maintenance Manager should develop systems and instruments to assist this Building Maintenance Mechanic in the monitoring of these contracts.

The vacant Contract Administrator Technician should be reclassified to Electrician and utilized by Facilities Maintenance to establish a preventive maintenance program for electrical components in facilities and repairs of these components. The annual cost of this reclassification is presented in the table below.

Annual Cost Increase		Annual Cost Decrease	
Reclassify the Contract Administrator Technician to Electrician	\$31,400	NA	\$0
Total Operating Cost Increase	\$31,400	Total Operating Cost Decrease	\$0

Recommendation: Reclassify the Contract Administrator Technician to Electrician.

Recommendation: Utilize an existing General Repair Worker or Building Maintenance Mechanic to monitor the custodial contract and the elevator maintenance contract.

15. FACILITIES MAINTENANCE SHOULD TAKE A NUMBER OF STEPS TO IMPROVE THE QUALITY OF CUSTODIAL MAINTENANCE.

In May 2005, the Public Works and Transportation Department executed an agreement with Able Building Maintenance for custodial maintenance. The amount of the contract is \$1,252,863.

An inspection of the City’s facilities indicated that Facilities Maintenance should improve the quality control of the custodial contract. The measures that should be taken to improve the quality control are presented below.

(1) Require Able Building Maintenance To Submit Their Inspection Control Forms, Inspection Reports, and Occupancy Surveys.

Section A.6 of the Scope of Services requires the contractor to submit to the City a formal quality control program including but not limited to scheduled inspections, unscheduled inspections, inspection control forms, inspection reports, and occupancy forms.

Facilities Maintenance should require that Able Building Maintenance submit their inspection control forms, inspection reports, and occupancy forms on an ongoing basis.

Recommendation: Require Able Building Maintenance to submit their inspection control forms, inspection reports, and occupancy surveys.

(2) Require Able Building Maintenance To Conduct Daily Inspections of the City's Buildings That the Firm Cleans.

The contract with Able Building Maintenance indicated that the firm would provide 870 hours of supervision on a monthly basis.

Facilities Maintenance should require the supervisors for Able Building Maintenance to conduct inspections at each City building after completion of custodial services each cleaning day, and complete an inspection form indicating that all elements of services required by the Scope of Services have been properly performed and the building / area is being maintained at a level that meets the quality and performance standards of the Scope of Services. Able Building Maintenance custodial supervisors should be required to initial the inspection form upon completion of service each day, corresponding with the tasks performed that cleaning day.

Recommendation: Require Able Building Maintenance to conduct daily inspections of the City's buildings that the firm cleans, and complete an

inspection form on a daily basis indicating that all elements of services required by the Scope of Services have been properly performed and the building / area is being maintained at a level that meets the quality and performance standards of the Scope of Services.

(3) Require Able Building Maintenance To Complete and Post a Monthly Schedule of Cleaning For Each Building and Post the Schedule in the Building.

Once a month (the first working day) Able Building Maintenance supervisory personnel should be required to post in each building, at a location predetermined by the Facility Maintenance Manager, a custodial cleaning schedule. The custodial schedule shall indicate all services to be performed during the month (daily, weekly, monthly, or quarterly) and space for custodial and supervisory personnel to initial daily to indicate that service was performed that day. Additionally, Able Building Maintenance should provide space for their custodial supervisors to make periodic general comments concerning services performed.

Recommendation: Require Able Building Maintenance to complete and post a monthly schedule of cleaning for each building and post the schedule in the building.

(4) Implement a Custodial Quality Assurance Plan.

Facilities Maintenance should assign responsibility for custodial inspections of the City's buildings to a Building Maintenance Worker assigned as the contract administrator. This Building Maintenance Worker should conduct weekly inspections for routine quality assurance, assessing the performance and compliance with the Scope of Services by Able Building Maintenance. This would include gathering all required data, performing the inspections, completing all documentation required, maintaining the inspection folder and keeping the Facilities Maintenance Manager informed of

significant problems or accomplishments. The Facilities Maintenance Manager should utilize this inspection as the basis for a monthly conference with Able Building Maintenance. The purpose of this conference should be to discuss performance, provide direction to attain compliance with the Scope of Services, and reach mutual solutions for resolution.

To assist with the weekly inspection, the Facilities Maintenance Manager should develop a custodial services inspection form. The Building Maintenance Mechanic would complete the inspection form. After review by the Facilities Maintenance Manager, information on the forms should be input by support staff in the Administration Division of the Public Works and Transportation Department into an Excel Spreadsheet. The Building Maintenance Worker should mainly focus on cleanliness, but any maintenance issue should be noted, and a work order issued.

To facilitate this monitoring of the custodial contract, the Facilities Maintenance Manager should develop a formal written policy and procedure. A possible procedure is presented in the exhibit following this chapter.

The results of the inspections should be provided to the departmental managers on a monthly basis.

Recommendation: Assign responsibility for custodial inspections of the City's buildings to the General Repair Worker or Building Maintenance Mechanic assigned as the contract administrator.

Recommendation: The Facilities Maintenance Manager should develop a custodial services inspection form.

Recommendation: The Building Maintenance Worker, assigned as the contract administrator, should conduct weekly inspections of City buildings for routine quality assurance, assessing the performance and compliance with the Scope of Services by Able Building Maintenance.

Recommendation: The Facilities Maintenance Manager should utilize these inspections as the basis for a monthly conference with Able Building Maintenance. The purpose of this conference should be to discuss performance, provide direction to attain compliance with the Scope of Services, and reach mutual solutions for resolution.

Recommendation: The results of the custodial inspections should be provided to the departmental managers on a monthly basis.

16. A ZONE APPROACH SHOULD BE UTILIZED FOR DELIVERY OF FACILITY MAINTENANCE SERVICES.

The effectiveness of the delivery of facility maintenance from a customers' perspective is dependent to a large extent to its perceived proximity to its customers. A model to keep these staff close the customer is zone maintenance. In zone maintenance, the facility maintenance staff would be divided into conveniently sized zones, with a team of multi-skilled maintenance craftsmen assigned to each zone.

Each of the two Senior Facilities Maintenance Mechanic would supervise each zone, and report the Facilities Maintenance Manager. Team size would vary with the complexity, intensity of use, and size of buildings in the zone. There should be four to five skilled and semi-skilled facility maintenance staff assigned to each zone.

The team would be responsible for all facility maintenance in their zone. All preventive and corrective maintenance work would be assigned to the team in their zone, but the Senior Facilities Maintenance Mechanic may draw on contractual services to complete work beyond the capabilities of the team.

The major strength of zone maintenance is that the team is accountable for all maintenance in their work zone. Departmental managers and other customers who work with Facilities Maintenance would soon learn the names of their zone team. This

enhances customer communication and service levels. The zone team controls maintenance and repair work done by outside contractors. Senior Facilities Maintenance Mechanic is responsible for and should have the authority to supervise maintenance in his zone buildings. Work orders would still be received and dispatched centrally from the Facilities Maintenance Supervisor.

The zone should be structured so that the team consists of one leader and four to five multi-skilled workers at various proficiency levels. A typical five-person zone team would have:

- 3 highly skilled journey mechanics who could perform initial diagnosis and troubleshooting of building systems, include HVAC, electrical and plumbing systems;
- 1 less experienced building mechanic who would be capable of addressing traditional carpentry maintenance problems, such as window and door malfunctions, routine plumbing, electrical, and HVAC problems; and
- 1 semi skilled staff capable of completing routine preventive maintenance work, such as filter changes, equipment lubrication, routine lighting programs, and painting, and would assist other building mechanics as necessary.

This structure provides a career job ladder from entrance level maintenance worker to highly skilled multi-disciplined technician without requiring formal supervisory responsibilities.

Recommendation: Facilities Maintenance should utilize a zone approach to organizing delivery of its services.

17. FACILITIES MAINTENANCE SHOULD ELIMINATE THE SWING SHIFT.

Facilities Maintenance staff work two shifts – a day shift and a swing shift – and work weekends as well. Important points to note concerning the schedule are presented below.

- Seven staff are assigned to the day shift, Monday through Friday.
- Two staff are assigned to the swing shift, Monday through Friday.
- Two staff work the weekend shift.

The result of this shift schedule is that 4% of the shifts are worked on weekends without any supervision and another 4% of the shifts are worked on the swing shift. Given the significant challenges facing Facilities Maintenance, supervision of the staff is essential. This swing shift eliminated to enhance the level of supervision of staff.

Recommendation: Eliminate the swing shift for Facilities Maintenance.

18. THE FACILITIES MAINTENANCE MANAGER SHOULD DEVELOP AND INSTALL A WORK PLANNING AND SCHEDULING SYSTEM.

The work performed by Facilities Maintenance is not planned and scheduled on a routine, ongoing basis.

The Facilities Maintenance Manager should develop and install a formal work planning and scheduling system. The planning and scheduling system should be developed to accomplish the following:

- Reduce the rate of equipment failures;
- Lower maintenance costs;
- Improve planning and scheduling of work;
- Manage resources to improve productivity;
- Define the minimum requirements for preventive maintenance;
- Provide periodic reports to management.

The steps necessary to establish this planning and scheduling system are portrayed below.

(1) Develop and Utilize a Work Order For the Performance of Preventive Maintenance and Corrective Repairs.

The Facilities Maintenance Staff should not perform any work without the assignment of a written work order. This is the same basis for assignment of work to staff in Fleet Management. At a minimum, the work order should include the following components:

- The building;
- The location;
- The date the request for service was made and the date of completion;
- The equipment on which the preventive maintenance or corrective repairs is to be performed;
- Specific work instructions;
- The cost of the service including the hours of labor, amount of materials and supplies, and other costs such as contractors.

This work order should serve as the basis for all assignments to the Facilities Maintenance staff.

Recommendation: Develop a work order for Facilities Maintenance.

Recommendation: The Facilities Maintenance Staff should not perform any work without the assignment of a written work order.

(2) Develop a Planning and Scheduling System.

Planning and scheduling defines how staff resources will be utilized over a period of time and provides the basis for evaluating actual labor hours versus planned. Also it is a means for notifying the customer of milestones and completion dates. Scheduling can be divided into three types: master scheduling, weekly scheduling, and dally scheduling.

- Master scheduling is the broadest, largest range type of scheduling. It looks forward to a horizon that is at least three months. A typical master schedule has the characteristics portrayed below.
 - It has a three to six month horizon.
 - Two schedules would be developed: one for corrective repairs and one for preventive maintenance.
 - Only large jobs or projects are scheduled for the corrective repair schedule. These would typically be anything more than 24 to 32 work hours of labor. No attempt is made to schedule emergency or minor repairs.
 - The time period in the master schedule is typically divided into bi-weekly or monthly schedules.
 - All available capacity is not scheduled for corrective repairs. Typically, only 50% of available labor hours should be scheduled. The remainder is reserved for emergencies, and preventive maintenance.
 - Preventive maintenance should be included in the master schedule and list the equipment and the type of preventive maintenance to be performed.
 - Master schedules are shared with departments.
- Weekly scheduling is fed by the master schedule with jobs that have been anticipated and planned well in advance. The weekly schedule also contains unplanned jobs that arise unexpectedly or result from a shift in priorities. A typical weekly schedule has the characteristics portrayed below.
 - While master schedules contain only 50% to 80% capacity, weekly schedules should attempt to contain 80% to 90% of capacity.
 - Weekly schedules reflect known leave by employees.
 - Jobs are not scheduled until major items of material are available in the warehouse.
- Daily scheduling is the process of converting the weekly schedule into daily assignments through work orders.

The preparation of this scheduling system should be a key responsibility for the

Facilities Maintenance Manager.

Recommendation: The Facilities Maintenance Manager should develop, install, and utilize a work planning and scheduling system.

19. CLARIFY THE RESPONSIBILITY OF PARK MAINTENANCE AND FACILITIES MAINTENANCE IN THE MAINTENANCE AND REPAIR OF PARK ASSETS.

There appears to be confusion regarding the responsibility for maintenance and repair of the City's assets in parks. Facilities Maintenance is being requested to perform maintenance and repairs of assets outside of the building envelope.

The City should clarify this division of responsibility and accountability. Facilities Maintenance should be responsible for the City's assets inside the building envelope in the City's parks. Park maintenance should be responsible for the City's assets outside the building envelope in the City's parks.

This does not suggest that Park maintenance should be authorized their own skilled or semi-skilled building trades staff. Park maintenance should continue to rely on Facilities Maintenance for facilities maintenance. On the exterior of the building envelope, Park maintenance should be authorized to utilize their own staff for semi-skilled repair work such as repair of brick work or painting of trellises, and retain contractors for the performance of skilled work that exceeds the knowledge of their own staff.

Recommendation: Assign responsibility to Facilities Maintenance for the City's assets inside the building envelope in the City's parks.

Recommendation: Assign responsibility to Park Maintenance for the City's assets outside the building envelope in the City's parks.

20. FACILITIES MAINTENANCE SHOULD ENHANCE ITS LEVEL OF CUSTODIAL AND FACILITY MAINTENANCE SERVICE FOR CITY-OWNED COMMERCIAL, RETAIL, AND OFFICE SPACE.

The City has more than 30 commercial, retail and office tenants occupying more than 238,000 square feet of city owned facilities. A majority of these tenants are on the ground floor of parking structures in the Business Triangle with the balance in the Industrial Area. Property Management within the Administrative Services department acts as the liaison with tenants, negotiating, managing, acquiring, reviewing, inspecting, leasing and renting property and sites owned by the City. Property Management is also responsible for coordination of the maintenance and repair of the leased facilities with Facilities Maintenance.

Facilities Maintenance needs improve its level of service for the maintenance and repair of these facilities working with Property Management. This improvement should involve a number of steps as delineated below.

- Define the most critical performance metrics tying incentives and penalties to the performance of Facilities Maintenance. These metrics include timely and effective customer service, for example.
- Define the calculations of each performance metric. Seemingly straightforward metrics such as average handling time could become sources of confusion if the method of measurement is not defined.
- Clearly define incentives and penalties for specified levels of service. Property Management and Facilities Maintenance need to agree on the consequences for less than expected performance.
- Clearly identify the levels of service to be delivered by Facilities Maintenance.
- Require regular reviews of service levels delivered by Facilities Maintenance. There should be mechanisms for regularly reviewing service level performance.
- Build in year-over-year benchmarking provisions in service levels. This could include information provided by BOMA, for example.

Facilities Maintenance and Property Management should define these expectations in a service level agreement. Facilities Maintenance should be held accountable for meeting the service levels contained within the agreement with clear penalties for failure to do so.

Recommendation: Facilities Maintenance and Property Management should define the service level expectations for maintenance and repair of City-owned commercial, retail and office space in a service level agreement.

**Possible Custodial Maintenance
Contract Monitoring Procedures**

1.0 PURPOSE

The procedure in monitoring custodial contracts requires effective coordination and direction to provide consistent effort in monitoring. Prime responsibility for monitoring contracts lies with the Building Maintenance Mechanic assigned as the contract monitor.

2.0 PROCEDURE

2.1 General. Regular inspections and reports shall be provided which identify, in detail, the major and minor maintenance deficiencies and the strengths and weaknesses in the contractor's operation.

2.2 Inspections

- The Building Maintenance Mechanic shall perform weekly inspections of all facilities receiving contract custodial maintenance to verify the contractor's performance. If necessary, based on the Facilities Maintenance Manager's determination, the Contractor may be required to attend these inspections.
- The Facilities Maintenance Manager shall schedule a mandatory monthly meeting with the contractor to review prior weekly inspection reports and to verify completion of work for authorizing payment to the contractor.
- The Facilities Maintenance Manager may be required to perform periodic, as-needed inspections for the purposes of verifying that the contractor is implementing a corrective maintenance program.

3.0 DOCUMENTATION

3.1 The Building Maintenance Mechanic shall document all weekly, monthly and as-needed inspection cycles on an Inspection Form. This form shall indicate maintenance task, frequency and either:

- Completed or uncompleted task, or
- Satisfactory or unsatisfactory performance.

Exhibit 10 (2)

3.2 The Facilities Maintenance Manager shall complete on an annual basis the evaluation of service by contractor form and attach copies of the monthly inspection reports at the end of each year of service provided by the contractor. The forms should be completed within thirty (30) days of the end of said annual period.

3.3 The Facilities Maintenance Manager will be responsible for ensuring that the contractor is rated annually and for keeping documentation of these ratings on file.

4.0 DEDUCTIONS

4.1 Missed Frequencies

- Deduction for missed task frequencies may be based upon contract unit cost per task frequency pro-rated for that portion of the task completed or the total of the task.
- To obtain an exception from a deduction for missed frequency, the contractor must notify the Facilities Maintenance Manager that a specific task will not be complete, and provide justification. The Facilities Maintenance Manager shall identify, in writing, an alternate task or maintenance assignment that the contractor is to substitute.

4.2 Inspection Charges

- The Building Maintenance Mechanic is to inspect the site(s) on the date indicated in the notification letter for correction of said deficiencies. If not completed by this date, Facilities Maintenance will assess inspection charges in the amount set in the contract.

4.3 Completion of Maintenance by Staff

- If deficiencies are not corrected by the date indicated in the notification letter, Building Maintenance Mechanic may, within five (5) days, correct identified deficiencies and deduct costs from invoice.
- Detailed costs shall be recorded to include employees, hourly rate, hours worked, and equipment and departmental overhead rate applied.

5.0 NOTIFICATION OF DEFICIENCIES

5.1 Informal communication with site personnel is to be used for scheduled weekly or monthly inspections to indicate deficiencies. This is discussed with the contractor's supervisor, and the correction of unsatisfactory work to be completed will be indicated. The complete informal field report is to be sent to the contractor.

5.2 Formal Written Communication

5.2.1 First Notification is to be used for scheduled weekly or monthly inspections to indicate deficiencies. A copy of the inspection checklist indicating the amount to be deducted in payment to the contractor on the monthly invoice should be included. Notification shall also include a reasonable date or days in which corrective action is to be completed or the inspection and damages clause will be enforced. If corrective action is not completed by the set date or days, Facilities Maintenance, shall notify the Contractor by written correspondence that inspection and damages are imposed. If deficiencies are not corrected within five (5) days, Facilities Maintenance may correct the deficiencies and deduct the cost from the invoice.

5.2.2 Second Notification is to be used for recurring deficiencies, or a pattern of deficiencies. At this time, inform the contractor, in writing, indicating specific areas of deficiencies. Requires a response by the contractor within ten (10) days, regarding what corrective action will be taken and when implementation of the corrective action will commence.

5.2.3 Third Notification is to be used when a response is not received from the contractor, when persistent deficiencies appear, or when corrective action proves ineffective. Facilities Maintenance shall inform the contractor, in writing, to attend a meeting with the Facilities Maintenance Manager to discuss the deficiencies and corrective action. If, as a result of this meeting, the corrective action is found to be unsatisfactory, the Facilities Maintenance Manager may submit a recommendation to the Public Works and Transportation Director to initiate termination procedures.

6.0 TERMINATION

Upon recommendation by the Facilities Maintenance Manager to terminate the contract due to non-compliance after the Third Notification and approval by the Public Works and Transportation Director, the Facilities Maintenance Manager may initiate formal contract termination. Recommendation to terminate should include sufficient documentation to support such legal action.

8. ANALYSIS OF DRAINAGE MAINTENANCE

8. ANALYSIS OF DRAINAGE MAINTENANCE

This chapter presents an analysis of Drainage Maintenance. Drainage Maintenance, is authorized ten (10) positions including the following:

- A Drainage Systems Supervisor;
- Two (2) Senior Drainage System Supervisors; and
- Seven (7) Drainage System Worker II's. Four of these positions are vacant.

The roles and responsibilities of these staff include the following:

- Provide maintenance and repair of the City's sanitary sewer collection system;
- Respond to emergency events and assist residents and businesses during these events;
- Provide maintenance and repair of the City's storm water collection system; and
- Provide Underground Service Alert (USA) locations for the sanitary sewer system.

There are approximately eight-six (86) miles of improved sanitary sewer collection system, forty-seven miles of improved storm drain system within and adjacent to the boundaries of the City, approximately two-thirds of which is owned and maintained by Beverly Hills. The remaining one-third is under the jurisdiction of the Los Angeles County Department of Public Works and the U.S. Army Corps of Engineers. There are also approximately 625 manholes providing access to the storm drain system, and approximately 1,625 catch basins capturing surface drainage. Of these manholes and catch basins, Beverly Hills owns and maintains approximately 250 manholes and 1,415 catch basins.

1. THE PUBLIC WORKS AND TRANSPORTATION DEPARTMENT EMPLOYS A NUMBER OF BEST PRACTICES IN DRAINAGE MAINTENANCE.

An organizational and management analysis by its nature focuses on opportunities for improvement. However, there are a number of strengths in Drainage Maintenance. Examples of these strengths are portrayed below.

- In FY 2004-05, operating expenses for the wastewater enterprise fund decreased \$858,335 (22.1%), operating income increased \$342,556 (8.6%), non-operating income improved \$249,466 (25.33%) providing a positive increase to net assets of \$3.59 million, an improvement of \$3.0 million (19.74%) from the prior year. Cash and cash equivalents increased by \$179,000.
- All of the catch basins in the City, whether owned by the City or Los Angeles, are inspected annually.
- In 2005-06, the City had 20 sewer backups. This amounts to 21 sewer backups per 100 miles of mains annually. This compares favorably to the benchmark used by the project team of less than 20 backups per 100 miles of wastewater main annually.
- Crew sizes utilized for wastewater collection are appropriate to the work performed
- Drainage provides a high level of service. In 2004, 184 miles of wastewater mains were cleaned. In 2005, approximately 190 miles of mains were cleaned. Excluding the 30 / 60 / 90 days main cleaning, mains are cleaned every 8 to 9 months. There are 98.74 miles of wastewater mains.

These strengths in Drainage Maintenance provide a sound basis for further enhancements.

2. TWO OF THE FOUR VACANT DRAINAGE MAINTENANCE WORKER II POSITIONS SHOULD BE ELIMINATED.

There are approximately eight-six (86) miles of improved sanitary sewer collection system. In calendar year 2004, Drainage Maintenance cleaned 975,921 linear feet of sanitary sewer mains or 184.8 miles. In calendar year 2005, Drainage Maintenance cleaned 1,022,368 linear feet or 193.6 miles. Typically, 18,500 linear feet

of wastewater mains each month or 42 miles of mains are cleaned as part of the 30 day / 60 day / 90 day program. These are typically areas of the City that suffer problems from fats, oil, and grease.

The result is that while an average of 189 miles of sanitary sewer mains are cleaned annually, 147 miles are cleaned excluding the 30 day / 60 day / 90 day program. This indicates that the City is cleaning the sanitary sewer collection system once every seven months. This is a high level of service. In the comparative survey, these cities provided the following level of service:

- Redondo Beach indicated that sanitary sewer mains are cleaned once every two years;
- Pasadena indicated that their sanitary sewer mains are cleaned once a year.
- Santa Barbara indicated that sanitary sewer mains are cleaned at least once per year;
- Santa Monica indicated that sanitary sewer mains are cleaned according to different levels of priorities based on the location and activity of the sewer main: backup and rodding is 9 to 12 times a year, jetting is 6 times a year, regular jetting is 3 to 4 times a year and other mains are cleaned once a year; and
- Burbank indicated that their sanitary sewer mains are cleaned at least once a year.

Redondo Beach indicated that sanitary sewer mains are cleaned once every two years, and Pasadena indicated the sanitary sewer mains are cleaned once a year. Santa Barbara and Burbank indicated that sanitary sewer mains are cleaned at least once a year. Santa Monica indicated that sanitary sewer mains are cleaned according to different levels of priorities, but not less than once a year.

The existing level of service provided by Drainage Maintenance compares favorably with these other cities. It is more frequent than Redondo Beach and

Pasadena. It is at the same level as Burbank and Santa Barbara. The adequacy of this level of service is borne out by the number of sanitary sewer mains backups annually; in 2005-06, the City had 20 sewer backups. This amounts to 21 sewer backups per 100 miles of mains annually. The project team would expect the City to have a sewer backup rate that approximates 20 backups per 100 miles of wastewater main annually.

To maintain this level of service, and provide a similarly effective level of service for cleaning of catch basins, the project team documented the staffing required by Drainage Maintenance. That staffing analysis is presented in the table below.

Activity Name	Inventory Measure	Units	Per Inventory	Unit	AWQ	ADP	Crew Days	Crew Size	Staff Days
Sewer Main Cleaning - Vactor	Miles	86	Miles	1.5	129	0.8	161.3	2	322.5
Sewer Main Cleaning - Rodder	Miles	86	Miles	0.5	43	0.3	143.3	2	286.7
Sewer Main Cleaning - 30 / 60 / 90	Miles	86	Miles	0.5	42	0.8	52.5	2	104.9
Catch Basin Inspection / Hand Cleaning	Units	1,415	Units	1.0	1,415	20.0	70.8	2	141.5
Catch Basin Cleaning - Vactor	Units	1,415	Units	0.1	141.5	4.0	35.4	2	70.8
Sewer Backups	Backups	21	Backups	1.0	21	8	2.6	2	5.3
Misc. Sewer Maintenance	Person Hours	1,500	Person Hours	0.51	770	8	96.3	1	96.3
Special Events	Person Hours	1,500	Person Hours	0.07	106	8	13.3	1	13.3
TOTAL STAFF DAYS									970.4

Important points to note concerning the table are presented below.

- A total of six staff, excluding the Drainage Systems Supervisor, would be required on a day-to-day basis to maintain the sanitary sewer and stormwater collection systems. However, it is impractical to staff three crews with five staff.
- Sewer cleaning – vactor would be provided on a cycle of once every eight months. This is a high level of service. This would require one crew seven months to accomplish. The level of productivity – 0.8 miles of sewer mains per day – is somewhat less than the crew utilized for this purpose actually delivered in the last six months of 2006. This jet vactor can also be equipped with

specialized root cutting and grease cutting tools. Some cities utilize the root cut with the jet nozzle or root cutter saw extensively with the jet vactor trucks (versus jet flush).

- Sewer cleaning – rodder would be provided on a cycle of once every two years and would be utilized selectively for those areas with consistent problems with roots. This would require one crew nine months to accomplish. As will be noted in the next section, the project team recommends an alternative to addressing the problems with roots in sanitary sewer mains other than rodding.
- Sewer cleaning of the 30 / 60 / 90 day sanitary sewer collection mains would require one crew a little more than three months to accomplish. As will be noted in later in this chapter, the project team recommends that the Public Works and Transportation Department address the problems with fats, oil, and grease more proactively.
- Catch basin cleaning would be provided on an annual basis. The project team recommends a two-step approach to cleaning catch basins. The first step is inspecting the catch basins to determine whether these catch basins need to be cleaned, and, if so, whether these can be cleaned using hand tools or whether it requires a jet vactor. A one-person crew should be utilized for this task. The second step is to utilize a jet vactor to clean those catch basins that need to be cleaned and cannot be cleaned using hand tools. This would require the equivalent of one staff nine months in the calendar year to accomplish. For those catch basins that require cleaning of a jet vactor – estimated at 10% of the total number of catch basins – a little more than four months would be required to complete this cleaning annually.
- An estimated five crew days would be required for cleaning of sanitary sewer backups annually.
- One half of a staff year would be allocated to miscellaneous sewer maintenance such as Underground Service Alerts, cleanup after storms, etc.
- Data for special events is estimated based upon the amount of overtime. The data regarding regular hours worked for special events is not available; the project team estimated the regular hours allocated to special events as equivalent to the overtime hours.
- Allowances for turnover and disability must be considered. Turnover and disability or injury leave would require an additional 0.5 full-time equivalent staff in addition to the staff days portrayed in the table.

The project team is still recommending a HIGH level of service for cleaning of sewer mains. The project team proposes that these mains be cleaned twice a year. That is an extremely HIGH level of service relative to other cities. Other cities included in the comparative survey clean their sewer mains less frequently. Redondo Beach cleans their sewer mains once every two years. Pasadena cleans their sewer mains once a year.

Altogether, six staff years would be required with this proposed work program, excluding the Drainage Systems Supervisor. This level of staffing is comparable to the cities included in the comparative survey for sanitary sewer system maintenance.

Two positions – vacant Drainage Maintenance Worker II positions – should be eliminated. The annual cost impact of eliminating these positions is presented in the table below.

Annual Cost Increase		Annual Cost Decrease	
NA	\$0	Eliminate two (2) Drainage Maintenance Worker II positions through attrition.	\$123,400
Total Operating Cost Increase	\$0	Total Operating Cost Decrease	\$123,400

Recommendation: Eliminate two (2) Drainage Maintenance Worker II positions through attrition.

3. THE PUBLIC WORKS AND TRANSPORTATION DEPARTMENT SHOULD CONTRACT FOR THE TELEVISIONING / INSPECTING OF 7% OF ITS SANITARY SEWER MAINS ON AN ANNUAL BASIS.

The Public Works and Transportation Department does not televise its sanitary sewer mains. The purpose of televising of sanitary sewers is to inspect mains for cracks, collapses, and blockages. After inspecting and documenting defects, a

rehabilitation plan would be developed, identifying necessary sewer repairs and replacement. In severe situations, immediate repair may be required.

Closed circuit television inspection will indicate main conditions including breaks and leaks, leaking and protruding laterals, root intrusions and other blockages including the exact locations of all features and problems, and the locations of problems with infiltration and inflow. The tapes provide a visual history of the sewer for future reference and can be put on CDs for integration into a GIS system. Priorities for this inspection should be established based on age of pipe, pipe material, or other factors, which maximize the agency’s resources by identifying areas with a higher probability of problems.

The Department should inspect not less than 7% of the sanitary sewer mains each year or approximately six (6) miles of mains. The Department should expect that this inspection will result in the identification of rehabilitation and replacement needs that will require increased capital funding and projects. This should be outsourced. The technology for closed circuit television is continually evolving. The sanitary sewer system in Beverly Hills is not large enough to warrant the ongoing costs associated with this equipment.

The annual cost impact of televising 7% of the City’s sanitary sewer mains is presented in the table below.

Annual Cost Increase		Annual Cost Decrease	
Contract for the televising of 7% of the City’s sanitary sewer mains on an annual basis.	\$24,000	NA	\$0
Total Operating Cost Increase	\$24,000	Total Operating Cost Decrease	\$0

Recommendation: The Department should contract for the inspection of not less than 7% of the sanitary sewer mains each year or approximately six (6) miles of mains.

4. THE PUBLIC WORKS AND TRANSPORTATION DEPARTMENT SHOULD CONTRACT FOR SEWER CHEMICAL ROOT CONTROL.

Root infestation in sanitary sewer mains causes an estimated 40% to 50% of the spills in the collection system, mainly in small line sewers 6 to 12-inches in diameter. The current mechanical method of clearing root debris by itself is not adequate to address the continuing root problems in the system.

The City should contract for the application of a herbicide registered by the U.S. Environmental Protection Agency (EPA) for controlling nuisance tree roots in sanitary sewer collection systems,. This herbicide has received a classification of “evidence of non-carcinogenicity for humans” (U.S. E.P.A. Diquat R.E.D. Facts, July 1995).

The root treatment program has been very successful for the Los Angeles Bureau of Sanitation: an analysis by the Bureau revealed sewage spills in pipes chemically treated have been reduced by 51%, when compared to the number of spills before treatment. The Bureau is continuing the chemical application to offer a longer-term solution for mitigating root infestation in the collection system

The initial treatment is guaranteed by the vendor for two (2) years, and should be retreated no later than six (6) months after the expiration date. All mains treated upon expiration or within six-months after the expiration date will be guaranteed for an additional three (3) years. From then on, the mains should be treated every three (3) years to keep the sanitary sewer mains under guarantee.

The Department should “pilot” this treatment and evaluate the success of its

application. If successful, the Department should utilize this treatment in those areas that suffer the most significant problems with root infestation.

The annual cost impact of a pilot program involving chemical root treatment of 10% of the City’s sanitary sewer mains is presented in the table below.

Annual Cost Increase		Annual Cost Decrease	
Contract for the chemical root treatment of 10% of the City’s sanitary sewer mains.	\$50,000	NA	\$0
Total Operating Cost Increase	\$50,000	Total Operating Cost Decrease	\$0

Recommendation: The Department should contract for the chemical root treatment of 10% of the City’s sanitary sewer mains as a pilot project.

Recommendation: The Public Works and Transportation Department should procure these services using a cooperative purchase agreement with the Los Angeles Bureau of Sanitation.

5. THE PUBLIC WORKS AND TRANSPORTATION DEPARTMENT SHOULD ENHANCE THE EFFECTIVENESS OF THE FAT, OIL, AND GREASE PROGRAM.

The City contracts with Los Angeles County for inspection of restaurants for enforcement of the requirements regarding the discharge of fat, oil, and grease into sanitary sewer mains.

Fat, oil and grease is the number one cause of blockages and sanitary sewer blockages. In fact, Drainage Maintenance has a program of cleaning some sewer mains on a 30 / 60 / 90 frequency due to problems with fat, oil, and grease. In 2006, an estimated 41.9 miles of sewer mans were cleaned as part of this program. This required an estimated five staff months.

The primary goal of a Fat, Oil and Grease (FOG) enforcement program is to:

- Reduce the number of grease-related sanitary sewer blockages; and

- Reduce the claim costs associated with grease related blockages.

The elements of an effective FOG program include the following:

- **Data collection** - This step includes obtaining and analyzing data. Some key pieces of information include the likely source (single-family residence, multi-family dwelling, food producing facility, combination, etc.) of the FOG, addresses of the structures, and mainline segments and the number of grease related stoppages in the past 3 years.
- **Working collaboratively with various stakeholders** - It is extremely important to involve stakeholders when developing a FOG program to ensure a sound and fair program is being developed and implemented. In addition, the City should discuss the program with and solicit comments from the various jurisdictions in the area that are also responsible for FOG programs, and those stakeholders that may be impacted by the implementation of this program (e.g. food producing facilities, associations, etc.).
- **Developing educational materials for commercial customers** - Educational materials should be developed to help educate residents and food producing facilities.
- **Targeting outreach efforts to problem (high-risk) areas** - By targeting the high-risk areas within the collection system, we will be focusing the City's resources on the sewer users that are causing the problems. This approach will allow the City to use its financial resources more cost-effectively and educate the users that are having a direct impact on the sewer system.
- **Amending the Sewer Ordinance, as appropriate** – The Sewer Ordinance should be reviewed and amended as necessary to ensure the FOG program requirements are easy to find, read, use and can be enforced when needed.
- **FOG Inspection.** The City should inspect food-producing facilities not less than once a year to verify compliance with the requirements of the FOG program. This would include verification that the food producing facility has contracted for removal of grease, the date of last service, the pumping frequency, the maintenance of records by the facility regarding service, that the grease interceptor does not contain greater than 1/3 the depth in grease accumulation, that the grease interceptor is cleaned and maintained regularly, etc.
- **Fee-Based program.** This should be a fee-based program. The cost of its administration should be recovered through annual fees that food-producing facilities are required to obtain from the City.

The County provides this service on behalf of the City. The City, however, does not charge a fee for this service. In addition, the Department is not monitoring the results of this contract, meeting with the County to discuss the problems that have been found and the County’s approach for assuring that restaurants are removing grease using grease traps and not discharging this material into the City’s sanitary sewer mains, etc. Drainage Maintenance is cleaning forty-two (42) miles of sewer mains each year. Drainage Maintenance should not need to provide this level of service if the FOG program was effective at providing inspection services and following up on violations.

The annual cost impact of operating this program as a fee-based program is presented in the table below. As the table indicates, this fee-based program would enhance revenue by approximately \$54,800 annually. The cost per restaurant (estimated at 160 restaurants) would approximate \$340 annually.

Annual Revenue Increase		Annual Cost Decrease	
Utilize a fee-based approach for delivery of the Fat, Oil and Grease program	\$54,800	NA.	\$0
Total Operating Cost Increase	\$54,800	Total Operating Cost Decrease	\$0

Recommendation: The Public Works and Transportation Department should enhance the effectiveness of the monitoring of the County’s enforcement of the Fat, Oil, and Grease program, including assuring that the County includes all of the elements of an effective program in its approach to enforcement.

Recommendation: The Public Works and Transportation Department should propose a fee-based approach for the FOG program for the consideration of the City Council. This should include the annual operating cost of the 30 / 60 / 90 day program delivered by Drainage Maintenance.

Recommendation: The Public Works and Transportation Department should procure these Drainage Maintenance services using a cooperative purchase agreement with the Los Angeles Bureau of Sanitation.

6. THE CITY SHOULD REPLACE TWO OF THE THREE SEWER CLEANING TRUCKS.

Drainage Maintenance is allocated three pieces of equipment for maintenance of the City's sanitary sewer and stormwater collection systems. These include the following:

- #746 – a 2006 mechanical rodder truck;
- #797 – a 1991 mechanical rodder truck; and
- #796 – a 1986 jet rodder or hydro flusher truck.

Drainage Maintenance is not provided with the tools that it needs to be productive. Drainage Maintenance's own data shows that a jet rodder generates much higher output per crew day than a mechanical rodder. The data for the last five (5) months indicates that the crew with the 1986 jet rodder or hydro flusher was cleaning an average of 4,338 linear feet of mains a day, while crews equipped with mechanical rodders were cleaning 1,817 linear feet of 1,817 of mains a day or 42% of the output of the mechanical rodder crews. In fact, in the last five (5) months, with practically half the crew days as the mechanical rodder crews, the hydro flusher crew cleaned 32% more linear feet of mains. Altogether, the one hydro flusher crew cleaned 57% of all linear feet of sewer mains cleaned in the last five months of 2006.

The City should initially replace vehicle #796 – the hydro flusher truck - with a jet vector truck. This truck should be equipped with a diesel engine given the steep hills in some parts of Beverly Hills.

Two front-line pieces of equipment – a jet vector truck and a mechanical rodder truck – should be sufficient. However, the City should also replace #797 – the second

mechanical rodder truck – it should be replaced with a hydro flusher truck and not a jet vector. The velocity of wastewater in sanitary sewer mains north of Sunset Boulevard should make a jet vector truck unnecessary, and the hydro flusher truck should be easier to use north of Sunset Boulevard.

It is important to note that the outdated equipment impacts the productivity of the Drainage Collection crews negatively. The City would be unable to eliminate the two Drainage Maintenance Workers as recommended in this chapter without the replacement of this equipment. The equipment could be replaced in a phased approach, however, beginning with vehicle #797.

Recommendation: Replace vehicle #796 – the hydro flusher truck - with a jet vector truck. This truck should be equipped with a diesel engine given the steep hills in some parts of Beverly Hills.

Recommendation: Replace vehicle #797 – the second mechanical rodder truck with a hydro flusher truck.

7. DRAINAGE MAINTENANCE SHOULD DEVELOP AND INSTALL A FORMAL WORK PLANNING AND SCHEDULING SYSTEM.

The Water Environment Federation published in 2004 “The O & M in CMOM” [Capacity, Management, Operations and Maintenance] Operation and Maintenance – A Reference Guide for Utility Operators.” This publication noted that cleaning, root removal, and pump station service are the most important routine maintenance activities, although a total of twelve (12) key maintenance activities are still necessary for a balanced routine maintenance program.

The guide states that a good preventive maintenance program is one of the best ways to keep a system in good working order and prevent service interruptions and system failures that can result in overflows and/or backups. In addition to preventing

service interruptions and system failures, a preventive maintenance program can protect the capital investment in the collection system. The publication states that preventive maintenance activities should ensure that the agency:

- Routinely inspects the collection system, including pump stations, and addresses defects or other problems.
- Investigates complaints and promptly corrects faulty conditions.
- Provides maintenance records, an adequate workforce and appropriate equipment in working order.
- Maintains and updates a schedule of planned activities.

Drainage Maintenance should develop a formal planning and scheduling system.

This system should include the elements presented below.

- Create and utilize work orders for all of the work performed by Drainage Maintenance staff. The work order describes the work or services to be performed. The work order should include date, name of the requestor, location of the work, nature of the work, priority of the work, etc.
- A three to six month schedule should be prepared. A three to six month schedule is a process of balancing workload both current and anticipated workload demand. This can be accomplished by documenting the available work hours and then documenting work hours required for sewer maintenance, catch basin maintenance and inspection, service requests received via OBC, etc.
- Weekly schedules should be prepared providing the number of staff required, work hours, and job duration information should be prepared by the Drainage Maintenance Supervisor.
- Weekly and daily schedules should be adhered to as closely as possible. Proper priorities must be placed on new work orders to prevent undue interruption of these schedules.
- The Drainage Maintenance Supervisor should develop a one-week schedule for each crew based on work hours available, the forecast that shows job priorities, and information from the three to six month plans.
- The one-week schedule assigns work for every available work hour. The schedule allows for emergencies and high priority, reactive jobs by scheduling a

significant amount of work on easily interrupted tasks.

- The Senior Drainage System Supervisors develop a daily schedule one day in advance using current job progress, the one-week schedule and new high priority, reactive jobs as a guide. The Senior Drainage System Supervisors matches personnel skills and tasks. The Senior Drainage System Supervisors handle the current day's work and problems even to rescheduling the entire crew for emergencies.
- Track and report the work. Tracking work progress and reporting on work progress is another important part of the planning and scheduling system. Weekly schedule compliance is an effective method of tracking progress. For instance, how close was the actual weekly execution of the work in relationship to the plan developed in the weekly schedule?

Schedule compliance is the measure of the effectiveness of managers and supervisors.

Recommendation: Drainage Maintenance should develop and install a formal work planning and scheduling system.

8. THE CITY SHOULD PROCEED WITH IMPLEMENTATION OF RECOMMENDATIONS CONTAINED WITHIN THE SANITARY SEWER MASTER PLAN.

In 1997, the City received the final report regarding the Sanitary Sewer Master Plan. The objectives of this project were to develop a Sewer System Master Plan and Management Program that would incorporate each of the following items:

- A Sewer System Data Base to include a complete inventory of the sewer collection system;
- A Graphics Interface for the Sewer System Data Base enabling City staff to retrieve information about the sewer facilities utilizing a digital pipeline system drawing;
- A temporary flow monitoring study to determine the quantity of wastewater entering the City's sewer system from outside City boundaries;
- A Permanent Flow Monitoring System for accurate billing practices between the City of Los Angeles and the City of Beverly Hills;

- Required capacity in the sewer system through analysis of the demand estimated through the year 2015;
- A capacity correction program to eliminate system overloading; and
- A repair and rehabilitation program to correct system deficiencies created by lack of physical integrity of the sewer system.

The master plan noted a number of challenges with the City's existing sanitary sewer system. These challenges are noted below.

- Over 50% of the total sewer system was more than fifty (50) years old.
- A number of sanitary sewer pipes greater than 15 inches in diameter exceeded their capacity including:
 - Oakhurst Drive between Wilshire Boulevard and Alden Drive;
 - Alden Drive between the alley east of Maple Drive and Oakhurst Drive;
 - The alley east of Maple Drive between Alden Drive and Beverly Boulevard;
 - Coldwater Canyon Drive south of Loma Linda Drive to Shadow Hill Way;
 - Crescent Drive between Sunset Boulevard and Elevado Avenue;
 - Crescent Drive between Santa Monica Boulevard and Santa Monica Boulevard South;
 - Crescent Drive between Brighton Way and Dayton Way;
 - Crescent Drive between Wilshire Boulevard and Charleville Boulevard;
 - Bedford Drive between Sunset Boulevard and Lornitas Avenue;
 - Lasky Drive between Moreno Drive and Charleville Boulevard;
 - Moreno Drive / Spalding Drive between Gregory Way and Olympic Boulevard;
 - Benedict Canyon Drive between the north City boundary **and** Leona Drive;
 - Tower Road between San Ysidro and Benedict Canyon Drive; and

- La Cienega between Gregory Way and the South City boundary.

If a pipe greater than 15 inches in diameter is three quarters full or greater, it is generally considered to be in danger of meeting its capacity limitations. The hydraulic analysis performed by the consulting firm that prepared the master plan indicated that there were pipe segments when modeled under dry weather conditions that exceed the depth to diameter ratio. The depth to diameter ratio is based upon the percentage of wastewater that the pipe was actually carrying versus the wastewater the pipe was actually capable of carrying. The master plan recommended that the pipes indicated above as being capacity deficient be replaced with the proper size pipe.

- The highest priority assigned to capital improvements by the master plan was to rehabilitating or replacing sewers that no longer are capable of providing proper service. These sewers were either completely collapsed or severely cracked allowing flow from outside the pipe into the system and potentially creating a health hazard by allowing wastewater to flow from the pipe.
- The second highest priority was assigned to sewers where the computer model indicated the remaining capacity of the pipe did not meet the design capacity requirement.
- The third priority was assigned to sewers where it was discovered that the pipe had a history of being maintenance intensive and was identified by the review of the video tapes as operating improperly. The improper operation was usually due to excessive grease build up or severe root intrusion through the pipe wall and joints.
- The most severe physical damage to the sewer system, based upon available sanitary sewer videotapes, was in the business triangle bounded by Santa Monica Boulevard, Rexford Drive and Wilshire Boulevard. In this area there were more than 10 sections of collapsed pipe or where portions of the sewer pipes are completely missing; these areas are susceptible to infiltration and inflow. It is the project teams understanding that these problems have been addressed since the submittal of the master plan in 1997.
- It was recommended that the approximately 4,000 linear feet of pipe identified as structurally deficient (completely collapsed or severely cracked) be replaced. The locations of these sewers were as follows:
 - The alley west of Bedford Drive between Santa Monica Boulevard and Brighton Way
 - The alley west of Camden Drive between Santa Monica Boulevard and

Brighton Way

- In the intersection of Camden Drive and Santa Monica Boulevard
 - The alley west of Rodeo Drive between Santa Monica Boulevard and Brighton Way
 - Rodeo Drive between Dayton Way and Wilshire Boulevard
 - The alley west of Beverly Drive between Brighton Way and Santa Monica Boulevard
 - The alley west of Beverly Drive between Dayton Way and Wilshire Boulevard
 - The alley west of Beverly Drive between Park Way and Carmelita Avenue
 - The alley west of Canon Drive between Dayton Way and Wilshire Boulevard
 - The intersection of Canon Drive and Santa Monica Boulevard South Roadway
 - The alley west of Crescent Drive between Park Way and Carrnelita Avenue
 - South of the intersection of Rodeo Drive and Olympic Boulevard
 - Lindacrest Drive at Coldwater Canyon Drive
- As a result of the video inspections commissioned by the City, it was determined that some of the sewer pipe segments were in need of rehabilitation rather than total pipe replacement. The specific segments were detailed in the master plan. The majority of the pipes in need of rehabilitation suffered from minor cracking, root intrusion and grease build up.

While some of the recommended capital improvements contained within the master plan have been implemented such as the business triangle, the project team understands that most of the other recommendations have not been implemented. The City should develop a plan to address the recommendations contained within the master plan including a schedule, source of funding, and managerial accountability.

This should be a collective effort of the Environmental Utilities Manager, Deputy City Engineer, and the Finance Director.

The consulting firm that prepared the master plan estimated the costs in 1997 of the capital program at \$3,700,000 to \$7,000,000 over the next five years. The project team adjusted these costs for inflation, but the costs will need to be reevaluated by Civil Engineering. The cost, as adjusted by the project team, is reflected in the table below.

Annual Cost Increase		Annual Cost Decrease	
The City should proceed with implementation of the sanitary sewer master plan	\$4,300,000 to \$8,300,000	NA.	\$0

Recommendation: The City should proceed with implementation of the recommendations contained within the sanitary sewer master plan.

Recommendation: The Environmental Utilities Manager and the Deputy City Engineer should develop a plan for implementation of the sanitary sewer master plan.

Recommendation: Civil Engineering should adjust the capital costs based upon inflation and based upon the projects that have been completed since submittal of the master plan in 1997.

9. THE CITY SHOULD PROCEED WITH IMPLEMENTATION OF THE STORM DRAIN SYSTEM MASTER PLAN.

In 1999, the City received a Storm Drain System Master Plan. The purpose of this Storm Drain System Master Plan was to identify and inventory existing storm drain facilities, identify those areas with deficiencies, rank their severity, prepare gross cost estimates for system upgrades, and recommend a Capital Improvement Program to initiate the corrections. This study evaluated about 43.6 miles of drainage flow paths, comprising 678 computer model links that could be hydraulically analyzed for deficiencies. The 43.6 miles studies represented slightly less than the entire storm drain

system of 47 miles because the storm drains outside of the City (Hollyhills for example) and a number of very small systems (alley drains for example) inside the City were not included in the model. Of the 678 links analyzed for deficiencies, 553 links (82%), representing 37.7 miles of conduits and streets were found to be sufficient.

However, the hydraulic analysis found 141 of the 678 linkages (20%) were insufficient to convey the runoff for at least one of the design storms (10 or 25-year) and were, therefore, deficient. However, of these 141 deficient links, 16 were included in the Los Angeles County's Hollyhills Drain-Unit 7 project. These 16 were, therefore, not included in the cost estimates of recommended facilities. Another 101 required a 1-foot diameter or less upgrade to the existing pipe size. Although the model identified numerous deficiencies throughout the City of Beverly Hills drainage system, many can be explained.

- Prior to 1980, when many of these drains were constructed, the Los Angeles County Flood Control District designed systems based on the use of a 21% residential impervious factors. The Los Angeles County Department of Public Works has significantly increased this factor to 45%, essentially doubling the runoff flow.
- The Los Angeles County Modified Rational Method of Analysis (MORA) is generally recognized as a conservative model that assumes worst case scenarios and predicts relatively high flows that may only marginally appear during actual events.

This deficiency analysis was then used as the basis for formulation of a Capital Improvement program, and prioritized. Cost estimates of recommended drainage facilities were developed. The total cost estimate for the recommended improvements was \$10.2 million (1999) dollars. The recommended improvement plan included 106 reinforced concrete pipe elements with an estimated combined cost of \$5.2 million and

19 reinforced concrete box elements with an estimated cost of \$5.0 million. The City should develop a plan to address the recommendations contained within the master plan including a schedule, source of funding, and managerial accountability. This should be a collective effort of the Environmental Utilities Manager, Deputy City Engineer, and the Finance Director.

The City’s five-year capital improvement program contains \$100,000 annually for the replacement and upgrading of the storm water utility infrastructure. This is insufficient to address the needs of the storm water infrastructure. The consulting firm that prepared the master plan estimated the costs in 1999 of the capital program at \$10,200,000. The project team adjusted these costs for inflation, but the costs will need to be reevaluated by Civil Engineering. The cost, as adjusted by the project team, is reflected in the table below.

Annual Cost Increase		Annual Cost Decrease	
Proceed with implementation of the storm drain master plan	\$11,600,000	NA.	\$0

Recommendation: The City should proceed with implementation of the recommendations contained within the storm drain master plan.

Recommendation: The Environmental Utilities Manager and the Deputy City Engineer should develop a plan for implementation of the storm drain master plan.

Recommendation: Civil Engineering should adjust the capital costs based upon inflation and based upon the projects that have been completed since submittal of the master plan in 1997.

9. ANALYSIS OF WATER DISTRIBUTION AND PRODUCTION

9. ANALYSIS OF WATER DISTRIBUTION AND PRODUCTION

Water Distribution and Production is authorized twenty-four (24) staff. This includes the following staff:

- A Water Operations Manager;
- Two (2) supervisors – a Water System Operations Supervisor and a Field Supervisor;
- Three (3) Senior Water System Technicians;
- Four (4) Water System Worker III's;
- Eleven (11) Water System Worker I / II's;
- A Water Meter Technician;
- A Water Quality Specialist; and
- A Field Services Representative.

At the time this study was conducted, four of the water System Worker I / II positions were vacant and the Field Service Representative position was vacant. A total of 21% of the authorized positions were vacant.

The roles and responsibilities of this staff include the following:

- Operation, maintenance and repair of the water distribution system;
- Respond to water system emergencies such as water main leaks;
- Monitor water quality;
- Respond to customer service requests;
- Read, test, repair and replace water meters; and
- Provide Underground Service Alert (USA) locates.

Water Distribution and Production serves approximately 11,322 customers or accounts: 89% of these accounts are in Beverly Hills and 11% in West Hollywood. While 76% of the accounts in Beverly Hills are commercial, only 22% in West Hollywood are commercial. Average daily water consumption ranges between 10.4 million gallons per day to 13.7 million gallons a day with a mean of 12.2 million gallons a day.

There are 170.8 miles of water mains. Other pertinent infrastructure in the water distribution system is presented in the table below.

Type of Water Infrastructure	Amount of Water Infrastructure
Air release valve	93
Butterfly Valve	1,496
Blow off valve	32
Gate Valve	2,259
Pressure Reducing Station	9
Fire hydrants	1,305
Pumping station	10
Water storage tanks	10
Water Meter By Size (inches)	
1/2	1
5/8	3,075
3/4	1,360
1	2,659
1 1/2	1,899
2	943
2 1/2	-
3	138
4	225
6	99
8	13
NA	237
Total Number of Water Meters	10,649

The assessment of water Distribution and Production by the project team was made based upon the *Water Distribution System Assessment Workbook* published by the American Water Works Association.

1. THE PUBLIC WORKS AND TRANSPORTATION DEPARTMENT EMPLOYS A NUMBER OF BEST PRACTICES IN WATER DISTRIBUTION AND PRODUCTION.

An organizational and management analysis by its nature focuses on opportunities for improvement. However, there are a number of strengths in Water Distribution and Production. Examples of these strengths are portrayed below.

- Operating expenses for the water enterprise fund decreased \$2.4 million in FY 2004-05 (13.4%), operating income increased \$2.1 million (323.8%), non-operating income improved \$263,497 (104.61%) providing a positive increase to net assets of \$93,869 an improvement of \$319,353 (141.63%) from the prior year. The fund had \$22.5 million in cash and cash equivalents at the end of FY 2004-05.
- The City is in the process of updating the SCADA system that will provide monitoring of unauthorized access to water distribution and production distribution and maintenance.
- The City met California and Federal water quality standards in 2005.
- The City is in the process of upgrading its water storage system that will provide storage capacity sufficient for 7 days during off-peak months.
- Los Angeles County Health Department administers the backflow prevention or cross connection program.
- With two exceptions, all of the staff of Water Distribution and Production possess State licenses for treatment and / or distribution.
- There are 170.78 miles of water mains. There was 29 main breaks in 2005-06 or 17.06 breaks per 100 miles of main. This meets the benchmark used by the project team of 17 breaks or less per 100 miles per year.
- Selected aspects of the City's water infrastructure are well maintained. Dead ends are flushed annually. Water storage tanks are cleaned once annually. Pressure relief valves are checked once every six months. Meters that are 3", 4", and 6" are tested annually. Water pump stations are checked daily by one of the "pumpers."
- The crew sizes utilized for water distribution and production are appropriate to the work performed.

These strengths in Water Distribution and Production provide a sound basis for further enhancements.

2. AN ADDITIONAL WATER SYSTEM WORKER III POSITION IS NECESSARY TO PROVIDE 24 / 7 COVERAGE OF THE CITY'S WATER PRODUCTION AND TO RESPOND TO REQUESTS FOR SERVICE.

Water Distribution and Production is authorized four (4) Water System Worker III positions. The responsibility of these staff is presented below.

- Ensure an adequate supply of potable water in the City's water storage tanks to meet all domestic water demands, fire and emergency service requirements.
- Monitor, plan, schedule, coordinate, record and control imported water deliveries from the Metropolitan Water District.
- Monitor and control treatment plant effluent blending into distribution system.
- Conduct various chemical, physical and biological water quality analyses from reservoirs, wells and distribution system.
- Maintain, clean, disinfect and perform repairs to wells, reservoirs and pumping facilities, as required.
- Routinely maintain, clean, disinfect and perform general repairs to sampling stations.
- Monitor, adjust, calibrates and repair various equipment utilized in the water system as required.
- Inspect, maintain, clean, repair, and/or replace fluoridation system equipment and appurtenances.
- Flush dead end water mains and fire hydrants.
- Maintain, repair and/or replace well head facilities including, but not limited to, pumps, motors, valves, gauges, meters and treatment facilities.
- Test and inspect emergency standby pumps. Check and maintain batteries, engine fluid levels and fuel levels.
- Monitor and adjust as needed the SCADA control system.

- Respond to emergency calls and customer service requests, as required.

These staff work staggered twelve (12) hour shifts throughout the entire seven days of the week.

Water utilities that use groundwater typically utilize water production operators such as the Water System Worker III's. It is unusual for these staff in these water utilities to work 24 / 7, particularly with the advancements of SCADA (supervisory control and data acquisition). This was indicated in the comparative survey. Santa Monica and Pasadena do not staff water production 24 / 7; these cities utilize on-call staff after hours. The on-call staff are equipped with take-home laptop computers that can be connected to the SCADA system to remotely control the water production and distribution system.

However, in Beverly Hills, the Water System Worker III's are more than water production operators. Examples of these types of requests for service include the following:

- Sewer backup requests for service;
- Electrical box cover moved and needs to be replaced;
- Car keys lost in catch basin;
- Turning irrigation systems off for the Police Department's DUI team;
- Fire in trash can; and
- Replace water meter box lid.

While the response to some of these requests for service could potentially be delayed until the next work day, there are a number of requests for service that would likely require a call back of a Water Distribution and Production employee after hours. These

include such examples as the following:

- Lack of water at a home due to a house valve being turned off; and
- Fire hydrants being hit by automobiles.

There are not a lot of these types of emergency calls for service. Examples of these types of emergency calls for service are provided below.

- In the period of October 1 through October 22, 2006, the Water System Worker III's responded to fourteen (14) requests for service that would normally be after hours. Eight (8) of the fourteen (14) calls concerned water leaks at a residence and requests to turn the water off. Four (4) were requests to turn the water on at a residence.
- In the period from October 27, 2006 through November 19, 2006, the Water System Worker III's responded to sixteen (16) requests for service that would normally be after hours. Seven (7) of these requests for service were requests to turn the water off at a residence, a water main, or a fire hydrant that had been hit by an automobile, one (1) was a sewer backup, two (2) were requests to turn the water back on at a residence, three (3) were meter leaks, two (2) were requests for turning off irrigation systems off for the Police Department's DUI team, and once was an uncovered electrical box.

Some of these requests for service could be responded to on a next workday basis. But a significant number would require after hour call outs of the staff of Water Distribution and Production. In addition, this high level and responsive service is an essential point in the "best of breed" service delivery goal of the City.

There does not seem to be a practical opportunity to eliminate the 24 / 7 coverage of water production.

As long as the 24 / 7 coverage is maintained, Water Distribution and Production will require an additional Water System Worker III to provide this coverage. The basis for this conclusion is provided in the table below.

Number of Water System Worker III's per shift	1
Number of 12-hour shifts per day	2
Total Water System Worker III Needed Per Day	2
Number of Staff Hours Required Each Day	24
Hours Required Per Year (24 hours / Day * 365 Days)	8,760 Hours
Hours worked Per Water System Worker II (2080 hours minus leaves used)	1,800
Water System Worker III positions required	4.87

As the table indicates, the number of Water System Worker III positions required amounts to five positions. This is one (1) more position than presently authorized.

Moreover, the workload for these positions can be expected to increase somewhat with the assumption of the responsibility for the operation of the groundwater treatment plant from EarthTek. Based upon the experience of the project team, the existing staff, with the addition of the fifth Water System Worker III position and the use of the newly installed SCADA system, should be able to assume this added responsibility.

The annual cost impact of adding this Water System Worker III position is presented in the table below.

Annual Cost Increase		Annual Cost Decrease	
Authorize an additional Water System Worker III position.	\$78,300	NA	\$0
Total Operating Cost Increase	\$78,300	Total Operating Cost Decrease	\$0

Recommendation: Increase the level of staffing for Water System Worker III's by one position.

3. THE EFFICIENCY OF THE STAFF OF WATER DISTRIBUTION MAINTENANCE NEEDS TO BE ENHANCED.

The project team analyzed the allocation of Water Distribution Maintenance staff for the month of May 2006 - May 4 through May 31. The analysis excluded supervisory

and management staff and the Water System Worker III's. Important points to note concerning the allocation of staff during this month are presented below.

- There were a total of 203 staff days reported during this nineteen (19) workday time period excluding days off. This is an average of almost eleven (11) staff each day.
- Almost fifty-two (actually 51.75) staff days were lost to leave during the month or almost 25% of the total staff days available. This is an average of almost three (actually 2.7) staff being on leave each day. The allocation of this leave by type was sick leave (19%), administrative leave (23%), vacation (18%), compensatory leave (32%), and bereavement leave (9%).
- A total of thirteen (13) staff days were allocated to exercising of gate valves and fire flow testing.
- A total of nine (9) staff days were allocated to draining water storage tanks for cleaning.
- A total of eighteen (18) days were allocated to customer service – including customer turn-ons and offs, water quality complaints, etc. This is equivalent to one person per day in May 2006.
- A total of fourteen (14) days were allocated to meter reading. As the City proceeds forward with automation of meter reading, the amount of staff days currently allocated to meter reading could be reallocated to other tasks such as preventive maintenance.
- A total of thirty-eight (38) crew days were allocated to replacement of water meter batteries or the programming of water meter batteries.
- A total of seven (7) staff days were allocated to the warehouse ordering materials, obtaining quotes, etc., and in the office.
- The balance of the staff days in May 2006 – fifty-four (54) staff days – were allocated to the typical maintenance and repairs for a water distribution system including installing and upgrading water meters, repairing water service leaks, repairing water main leaks, etc.

In reviewing the allocation of time, that activity to which most staff days were allocated was leave. The second greatest proportion of time allocated to an activity was replacement of water meter batteries. Preventive maintenance of the distribution

system, including draining water storage tanks for cleaning, exercising gate valves, and fire flow tests, amounted to twenty-two staff days or 11% of the staff days in the month of May 2006.

The work being performed by this staff is necessary. In most cases, the crew sizes utilized were appropriate to the work performed. However, there appear to be some limited opportunities for enhancing the efficiency of the staff assigned to Water Distribution and Production. Enhancing the efficiency of this staff should be focused on the reallocation of staff to preventive maintenance. The opportunities to improve efficiency are presented below.

- A two-person crew size was utilized for changing water meter batteries in May 2006. A one-person crew should be utilized for this work activity. This would have enabled the reallocation of approximately nineteen (19) staff days.
- The Central Stores Specialists should be assigned responsibility warehouse ordering materials, obtaining quotes, etc. The project team is recommending two staff be allocated in Fleet Services to Central Stores. One of these positions should be allocated to Fleet Services, and the other to ordering supplies and obtaining quotes for Facilities Maintenance and Water Distribution Maintenance and Production. Four (4) staff days were allocated to the warehouse in May 2006 by Water Distribution Maintenance and Production.
- A total of three (3) days were allocated by one of the Senior Water System Workers to “completing the paperwork,” the “office,” and “office reports.” This staff should be allocated to the field maintaining and repairing the water distribution system; the two supervisors should be responsible for the completion of “paper work.”

This would, in May 2006, enable the reallocation of twenty-six (26) staff days to preventive maintenance of the water distribution system. When considered with the thirteen (13) staff days were allocated to exercising of gate valves and fire flow testing, this would have enabled the allocation of two staff in May 2006 to preventive maintenance.

Water Distribution and Production needs to evaluate the use of compensatory time as compensation for overtime. In May 2006, Water Distribution and Production lost sixteen (16) crew days to compensatory leave. The use of compensatory leave should not be utilized when Water Distribution and Production is unable to consistently preventively maintain water infrastructure.

Recommendation: Water Distribution and Production should enhance the efficient use of staff so that the preventive maintenance of water infrastructure can be enhanced.

Recommendation: Water Distribution and Production should not use compensatory time as compensation for overtime unless the water infrastructure is preventively maintained consistently.

4. ESTABLISH A COMPREHENSIVE PREVENTIVE MAINTENANCE PROGRAM FOR THE WATER DISTRIBUTION AND PRODUCTION SYSTEM.

Preventive maintenance involves a planned and managed program of inspection, adjustment, lubrication, replacement of components, and performance testing and analysis on a routine, ongoing, scheduled basis. The objective of preventive maintenance includes:

- Prevention of downtime of critical systems and equipment;
- Extension of the life of facilities and equipment;
- Improvement of equipment reliability;
- Reduction of revenue lost through leaking mains, inaccurate registration of water meters, etc.

Currently the water distribution system is not being comprehensively maintained. The levels of service for preventive maintenance of the City's water distribution system do not meet guidelines established by such organizations as the American Water Works Association as indicated in the table below.

CITY OF BEVERLY HILLS, CALIFORNIA
Organization and Management Analysis of the
Public Works and Transportation Department

Water Infrastructure	Current Frequency	Recommended Frequency
Water distribution system valves – Inspect and exercise valve. Re-pack, maintain as necessary.	There are 2,259 gate valves and 1,496 butterfly valves. Approximately 73 are exercised each month. This is a 4.2-year schedule.	Water distribution valves are inspected and preventively maintained once every two years depending on valve size.
Hydrants – Inspect and exercise hydrant. Repack, maintain as necessary.	The 1,305 fire hydrants have not been preventively maintained for the past four years.	Fire hydrants are inspected and preventively maintained annually.
Water Tanks – Inspect including internal inspection by divers. Maintain/repair based on inspection results.	Water storage tanks are cleaned once annually.	Water storage tanks are checked and preventively maintained every four to five years.
Pressure Regulating Valves (PRV) – Inspect; exercise, rehabilitate, maintain as necessary.	Pressure regulating valves are inspected and preventively maintained once every six months.	Pressure regulating valves are inspected and preventively maintained annually.
Air vacuum / pressure release valves are inspected and valves preventively maintained and rebuilt if necessary.	Air vacuum / pressure release valves are inspected when they break.	Air vacuum / pressure release valves are checked and preventively maintained on a bi-annual basis.
Residential meters are replaced to assure that these meters maintain registration accuracy.	An estimated five residential meters are tested for registration accuracy each month. Multi-family meters are changed out as needed.	Residential meters are replaced on a fifteen to twenty year schedule.
Commercial meters	Commercial meters are tested for registration accuracy every six months.	Commercial meters are tested for registration accuracy once a year.

Important points to note regarding the table are presented below.

- Water Distribution and Production exercises water distribution valves on a 4.2-year schedule. The American Water Works Association recommends that valves be inspected and preventively maintained once every two years depending on valve size.
- Water Distribution and Production has not preventively maintained the City’s 1,305 fire hydrants for the past four years. The American Water Works Association (AWWA) recommends that fire hydrants be preventively maintained once annually.

- Water Distribution and Production cleans the City's water storage tanks once annually. The AWWA Manual M42 (1998) recommends that tanks be drained and inspected at least once every 3 years or as required by state regulatory agencies. The State of California has not adopted regulations concerning the frequency of cleaning. There are some unique challenges facing the City's water storage tanks – mostly relating to their small size and the lack of water circulation in the tanks – that present challenges for a longer cycle. As will be noted later in this chapter, the project team is suggesting a number of alternatives, identified by the management and supervisory team of Water Distribution and Production, to adjust the frequency of cleaning of water storage tanks.
- Water Distribution and Production inspects and preventively maintains the City's pressure regulating valves once every six months. The benchmark used by the project team is an annual frequency for this asset.
- Air release valves are inspected when they break. The benchmark used by the project team is an annual frequency for this asset.
- An estimated five residential meters are tested for registration accuracy each month. Multi-family meters are changed out as needed. This is equivalent to a 1,800 year change out program.
- On the other hand, commercial meters are tested for registration accuracy every six months. The American Water Works Association suggests once annually. The migration to compound meters should facilitate this adjustment in the level of service.

A number of key preventive maintenance tasks – essential to the reliable operation of the water distribution system – are not being performed or not being performed to the standards adopted by the American Water Works Association or those developed by the project team. These include the following:

- **Valve Exercising.** A valve exercising program is required to assure valves are clean and operable, extend their life, and pinpoint problem valves to schedule time for repair or replacement. Valve exercising should occur annually for valves larger than 10 inches and bi-annually for valves smaller than 10 inches. Proper exercising of valves includes the following tasks:
 - Cleaning dirt and debris out of the valve box;
 - Closing and opening the valve until it operates freely;

- Replacing missing or defective operating nuts;
 - Lubricating and greasing gears;
 - Checking the packing and replacing if necessary; and
 - Checking the by-pass valve.
- **Fire Hydrant Maintenance.** A fire hydrant maintenance program is necessary to assure proper operation of the fire hydrant. Hydrant maintenance by a water crew can consist of water-related operations only or can also include such tasks as removing brush from around the hydrant, painting, etc. Hydrant maintenance should occur annually. Water-related tasks include:
 - Flushing the hydrant (often accomplished during non-drought seasons).
 - Lubricating hose, nozzle caps and threads.
 - Replace missing or defective caps or nozzles.
 - Check for leakage and tighten / recaulk nozzles or replace packing or O-rings.
 - Flow test and pressure check.
 - Verification / Recordation of hydrant location.
- **Commercial / Industrial Water Meter Testing and Rebuilding:** The purpose of commercial and industrial water meter testing is to assure accuracy of the meter as commercial and industrial water meters register a much greater water usage, and thus represent a proportionally larger revenue mechanism as compared to residential meters. Commercial and industrial meters are classified as those 3" and greater – the City has 475 of these meters that represents 4.4% of all meters in the City. According to AWWA, meters 1.5" to 2" cannot be field tested per se and thus require removal, shop check, and reinstallation or replacement. Meters larger than 2" are field-tested every one to three years dependent upon size. Generally, 15% to 20% of the commercial and industrial require rebuilding.
- **Residential Meter Exchange Program.** A residential meter exchange program – meters 2" and smaller – is required to replace old substandard meters with meters that provide accurate readings. The schedule for replacement is dependent upon conditions that impact the aging of equipment – weather, quality of the water, etc. These factors vary. However, replacement schedules often incorporate a fifteen to twenty-year schedule.

- **Leak detection program.** The benchmark used by the project team is water loss is less than 4% (in terms of the difference between the volume of water distributed versus the volume of water sold). The water loss for the City of Beverly Hills is 9%. Water loss is especially important given drought conditions.

The management and supervisors of Water Distribution and Production should develop and install a preventive maintenance program to address these deficiencies.

Recommendation: Managers and supervisors of Water Distribution and Production should be held accountable for the consistent preventive maintenance of gate and butterfly valves, fire hydrants, and air vacuum / pressure release valves.

Recommendation: Managers and supervisors of Water Distribution Maintenance and Production should consistently dedicate staff to the preventive maintenance of gate and butterfly valves, fire hydrants, and air release valves.

Recommendation: Preventive maintenance should be accorded the second highest work priority – after emergency repairs – and not an “as time permits” priority.

Recommendation: Water Distribution and Production should allocate not less than sixty (60) staff days annually to leak testing.

Recommendation: The frequency of registration accuracy testing for commercial meters should be adjusted from once every six months to once a year upon replacement of the turbine meters with compound meters.

Recommendation: The frequency for preventive maintenance of pressure regulating stations should be adjusted from once every six months to once annually.

5. THE LEVEL OF AUTHORIZED STAFFING FOR WATER DISTRIBUTION IS SUFFICIENT.

To evaluate the level of staffing, and provide an effective level of service for preventive maintenance of the water distribution system, the project team documented the staffing required by Water Distribution. That staffing analysis is presented in the table below. The staffing analysis is presented in the table below.

CITY OF BEVERLY HILLS, CALIFORNIA
Organization and Management Analysis of the
Public Works and Transportation Department

Work Activity	Units	AWQ	ADP	Annual Crew Days	Crew Size	Annual Staff Days
Water services - replaced	Service	55	1.5	36.7	3	110.0
Water taps	Taps	40	3.0	13.3	3	40.0
Water services - repaired	Service	33	2.8	11.8	3	35.4
Water main repair	Main breaks	29	1.5	19.3	3	58.0
Fire hydrant - repair	Hydrants	28	4.0	7.0	2	14.0
Fire hydrant - replacement	Hydrant	22	1.2	18.3	2	36.7
Fire hydrant - move/relocate/raise	Hydrant	5	4.0	1.3	2	2.5
Valve - repair/replace	Valve	85	1.6	53.1	3	159.4
Air release valve repair	Valve	9	3.0	3.0	1	3.0
Exercise gate valves <10"	Valve	1,876	20.0	93.8	1	93.8
Exercise gate valves >10"	Valve	1,848	13.0	142.2	2	284.3
Fire Hydrant preventive maintenance	Fire Hydrants	1,305	16.0	81.6	1	81.6
Meter Reading	Meters	63,894	332.0	192.5	1	192.5
Pressure Reducing Valve Preventive Maintenance	Valve	9	2.0	4.5	2	9.0
Blow Off Valve Preventive Maintenance	Valve	32	16.0	2.0	2	4.0
Commercial Meter Testing	Meter	475	4.0	118.8	2	237.5
Residential meter replacement	Meter	662	12.0	55.2	1	55.2
Meter maintenance & repair	Meter	190	10.0	19.0	1	19.0
Flush deadends	Deadends	51	16.0	3.2	1	3.2
Clean Water Storage Tanks	Person Hours	360	8.0	45.0	1	45.0
Air Vacuum / Pressure Release Valve Preventive Maintenance	Valve	111	16.0	6.9	1	6.9
Underground Service Alerts	Alerts	900	20.0	45.0	1	45.0
Leak detection	Person Hours	240	8.0	30.0	2	60.0
Replace MXV	MXV's	1,331	18.0	73.9	1	73.9
Special Events	Person Hours	180	8.0	22.5	1	22.5
Miscellaneous Water Maintenance and Repair	Person Hours	1,800	8.0	225.0	1	225.0
Total Staff Days						1,917.3

Important points to note concerning the table are presented below.

- A total of twelve positions would be required for the maintenance and repair of the water distribution system excluding supervisory positions. This does not include the need for a full-time Field Service Representative for customer turn ons and turn offs, responding to water complaints, etc.
- Exercising gate valves would require an estimated 377 staff days annually. This

suggests that a crew of two staff needs to be dedicated to the exercising of distribution valves on a full-time basis.

- Meter reading is a full-time job, given the current state of technology in Beverly Hills. It would require an estimated 192 staff days annually.
- Commercial meter testing should be insourced. It is presently accomplished by contract. This work activity would require an estimated 237 staff days annually.
- Fire hydrant preventive maintenance would require an estimated 82 staff days annually. This work should be insourced. It is presently accomplished by contract. The cost of the contract approximates \$75 per hydrant. On the level of service proposed by Water Distribution and Production, a two-year level of service, the annual cost would approximate \$48,900 annually.
- Valve repair and replacement would require an estimated 159 staff days annually. It should be anticipated that there will be a peak in valve repair and replacement workload once the valve preventive maintenance program begins in earnest given the lack of preventive maintenance of this important asset over the past several years.
- Water service replacement would require an estimated 110 annual staff days.
- A little more than one staff year would be allocated to miscellaneous water distribution maintenance such as cleanup after storms, etc.
- Data for special events is estimated based upon the amount of overtime. The data regarding regular hours worked for special events is not available; the project team estimated the regular hours allocated to special events as equivalent to the overtime hours.
- Allowances for turnover and disability must be considered. Turnover and disability or injury leave would require an additional 1.0 full-time equivalent staff in addition to the staff days portrayed in the table.

Altogether, twelve positions would be required for the maintenance and repair of the water distribution system. This compares to an existing authorized fifteen (15) positions. At the beginning of this study, however, four of the water System Worker I / II positions were vacant and the Field Service Representative position was vacant. This indicates that the actual level of staffing was less than required by Water Distribution

workload – two positions less. In addition, as noted earlier, the efficiencies of some of the work practices in Water Distribution could be enhanced such as crew sizes and the use of compensatory time.

The project team also compared this proposed level of staffing to other cities included in the comparative survey and other cities whose water utility the project team has evaluated previously. The proposed levels of staffing falls within the range of these other cities including Santa Barbara, Santa Monica, Burbank, and Pasadena in terms of the ratio of miles of water mains to total water distribution and production staff excluding managers and supervisors.

The project team does not recommend that three positions be eliminated at this time. Rather, managers and supervisors should be held accountable for delivering a comprehensive preventive maintenance program for the water distribution staff including the insourcing of commercial meter testing and fire hydrant preventive maintenance, and enhancing the efficiency of the work practices of the staff allocated to water production.

Recommendation: The staffing levels for Water Distribution are sufficient to deliver a comprehensive preventive maintenance program.

Recommendation: The staffing levels for Water Distribution should not be increased.

6. DEVELOP AND INSTALL A WORK PLANNING AND SCHEDULING SYSTEM.

Water Distribution and Production established objectives in October 2006 for itself in terms of exercising valves, preventively maintaining air release valves, preventively maintaining fire hydrants, etc. However, in the first month for implementation of these objectives, Water Distribution and Production failed to meet

these objectives, falling far short in most instances.

To enable Water Distribution and Production to meet these objectives, a work planning and scheduling system should be installed. The system should include the elements identified below.

- Develop a weekly work scheduling system. The Water Operations Supervisor and the Field Supervisor should develop a weekly schedule. The schedule should indicate the planned quantity of work and assign the work to specific crews on a specific day and at a specific location. In developing this weekly schedule, the Water Operations Supervisor and the Field Supervisor should make several decisions.
 - Check the previous week’s schedule to determine whether work is being completed on time, what jobs need to be carried over into the next week, and how many days these jobs will take.
 - Document the known leave planned for the week and identify the available staff days for the week.
 - Check the annual work program developed by Water Distribution Maintenance and Production to ascertain the water assets that are to be preventively maintained that month (distribution valves, air release valves, fire hydrants, etc.). Assess monthly progress in meeting these planned objectives, and whether more or less is being done than planned.
 - Review requests for service that need to be scheduled.
 - Complete the weekly schedule identifying the work activity, the location of the activity, the day planned, the crew size, the crew days, and the staff days required.
 - Identify alternate activities. Alternate work activities should be identified in case planned activities cannot be accomplished to possible obstacles such as lack of parts.
 - Assign the work to the crews. The Water Operations Supervisor and the Field Supervisor should complete daily work orders for assigning the work to the crews. This would include the names of employees assigned.
- Develop a daily work reporting system. This document – the work order – should be completed by the crew leaders that indicates the hours required to complete the job, actual amount of work accomplished, the equipment utilized, the

materials utilized, etc.

- Develop a monthly activity status report. The Water Operations Supervisor and the Field Supervisor should generate this report that shows actual progress in meeting the planned objectives identified in the annual work program developed by Water Distribution Maintenance and Production. This monthly activity status report should be designed for management and:
 - Provide a comparison of actual versus planned accomplishments in terms of staff days by work activity; and
 - Provide a comparison showing actual versus planned accomplishments in terms of total work units (such as the number of valves exercised).

This report should be designed to provide management with timely information in a form to quickly identify those areas that are inconsistent with planned objectives in the annual work program.

Recommendation: Water Distribution and Production should develop and install a work planning and scheduling system.

7. WATER DISTRIBUTION AND PRODUCTION SHOULD TAKE A NUMBER OF STEPS TO REDUCE THE EXTENT OF PREVENTIVE MAINTENANCE REQUIRED FOR RESERVOIRS.

As noted previously, Water Distribution and Production cleans the City's water storage tanks once annually. The AWWA Manual M42 (1998) recommends that tanks be drained and inspected at least once every 3 years or as required by state regulatory agencies. The State of California has not adopted regulations concerning the frequency of cleaning. There are, however, some unique challenges facing the City's water storage tanks – mostly relating to their small size and the lack of circulation of the water in the tanks. The size of the City's water storage tanks is presented in the table below.

Reservoir Number	Nominal Volume (Millions of Gallons)
Sunset	6.0
Coldwater	7.3
3A	1.1
Greystone	19.4
4A	2.2
4B	1.0
5	1.0
6	1.0
7	1.2
Woodland	1.5

Of these ten reservoirs, only three are significant in terms of their size: Sunset, Coldwater, and Greystone. The other seven reservoirs or water storage tanks are small in size. Sunset, Coldwater and Greystone should not need annual cleaning, but all of these reservoirs or water storage tanks could benefit from a number of measures proposed by Water Distribution Maintenance and Production to assure the water quality.

These measures are presented below.

- Installation of a circulators in the reservoirs. Circulators significantly improve the mixing and resolve maintenance issues with corrosion. The circulator significantly reduces the amount of chlorine needed. It also reduces thermal stratification maintaining uniform water age, and maintains chlorine residual in these tanks. Automatic recirculation of water through the tank during periods of low use maintains water quality. These circulators would include chemical injection kits that would be tied to the City’s SCADA system and allow chemical injection to maintain water quality.
- Installation of automatic analyzers. These analyzers, when connected to the SCADA system, would enable the Water System Worker III’s to monitor the water quality in the water storage tanks. Automatic analyzers are available to monitor pH, oxidation reduction potential, temperature, free chlorine, mono chloramines, dissolved oxygen, and particle index.

The City, like all local governments, faces increasingly stringent requirements for water quality. The City faces some unique challenges in maintaining water quality in its tanks given their small size. Water Distribution Maintenance and Production is allocating a higher level of effort than other water utilities at cleaning these tanks. The City should

take measures to maintain water quality through automatic circulation, automatic chemical injection as necessary, and automatic analysis of water quality in these tanks.

The estimated one time cost of this equipment is presented in the table below.

One-Time Cost Increase		Annual Cost Decrease	
Install automatic circulators at ten water storage tanks	\$1,000,000	NA.	\$0
Install automatic analyzers at ten water storage tanks	\$77,000		
Total Operating Cost Increase	\$970,000	Total Operating Cost Decrease	\$0

Recommendation: Install automatic circulators at ten water storage tanks.

Recommendation: Install automatic analyzers at ten water storage tanks.

8. THE CITY SHOULD CONTINUE TO IMPLEMENT THE WATER SYSTEM MASTER PLAN.

In 2002, the City received the water system master plan. This evaluation included a distribution system analysis that concluded the following:

- The Coldwater Canyon Reservoir should be replaced with a new 9.1 million gallon reservoir;
- A new 1.8 million gallon reservoir should be constructed at the nearby booster station number 2;
- As recommended in the 1985 master plan, new mains with hydrants should be installed in street rights-of-way for those water lines currently located in alleys;
- Pumps at three reservoirs should be replaced;
- Various improvements should be made at pumping stations and valves;
- Replace 15.2 miles of water mains; and
- Make various other improvements to the water system.

The implementation of the water system master plan will not be inexpensive. The consulting firm that prepared the master plan in 2002 developed a cost estimate of

\$46,448,700 with inflation (as identified on page 10-5 of the master plan), and noted that rate adjustments would be necessary to implement the plan. These costs were allocated over two phases; phase 1 was to occur over the time period 2003 through 2007, and phase 2 from 2008 to 2012.

The City has begun to implement some of the master plan; replacement of the Coldwater Canyon reservoir is budgeted, replacement of water mains and hydrants, and repair and replacement of portions of Greystone Reservoir.

However, other portions of the water system master plan have not been addressed. The City should develop a plan to address the recommendations contained within the master plan including a schedule, source of funding, and managerial accountability. This should be a collective effort of the Environmental Utilities Manager, Deputy City Engineer, and the Finance Director.

Recommendation: Proceed with implementation of the water system master plan.

Recommendation: The Environmental Utilities Manager and the Deputy City Engineer should develop a plan for implementation of the sanitary sewer master plan.

9. WATER DISTRIBUTION AND PRODUCTION SHOULD INITIATE A LEAK DETECTION PROGRAM.

A detailed water audit and leak detection program of forty-seven California water utilities found an average loss of 10 percent and a range of 30% to less than 5% of the total water supplied by the utilities.

Leaks in distribution systems can occur in different components: transmission pipes, distribution pipes, service connection pipes, joints, valves, and fire hydrants. Causes of leaks include corrosion, material defects, faulty installation, excessive water

pressure, water hammer, ground movement due to drought or freezing, and excessive loads and vibration from road traffic.

Leaks waste both money and a precious natural resource, and create a public health risk. The primary economic loss is the cost of raw water, its treatment, and its transportation. Leakage leads to additional economic loss in the form of damage to the pipe network itself, e.g., erosion of pipe bedding and pipe breaks, and to the foundations of streets. Risk to public health can be caused by contaminants entering the pipe through leak openings if water pressure in the distribution system is lost.

Evolving technology is aiding leak detection. While leak detection surveys can be expensive and labor intensive, leak noise correlators can be utilized to mitigate this expense. These are portable microprocessor-based devices that pinpoint leaks automatically based on the cross-correlation method. In this method, acoustic leak signals are measured with vibration sensors or hydrophones at two pipe contact points (usually fire hydrants or valves) that bracket the location of a suspected leak. Leak signals are transmitted from the sensors to the correlator wirelessly. The leak is in most cases located asymmetrically between measurement points and consequently there is a time lag between the measured leak signals. The time lag is found from the cross-correlation function of the leak signals. In the presence of a leak, the cross correlation function has a distinct peak at the time shift between leak signals. The location of the leak is calculated based on an algebraic relationship between the time lag, the sensor-to-sensor distance, and the propagation velocity of sound waves in the pipe. The distance between sensors is measured on site or read from distribution system maps.

Recommendation: Water Distribution and Production should initiate a leak

detection program using leak noise correlators.

10. WATER DISTRIBUTION AND PRODUCTION SHOULD EVALUATE OPPORTUNITIES TO ENHANCE ENERGY CONSERVATION.

Nationwide, at least 21,000 actual gigawatt hours are used to convey, treat, and distribute water based upon data from 2000. This amounts to 8% of electricity use nationwide. Most of this electrical energy is required for sources and conveyance (80%), with only 17% required for distribution and 3% for water treatment.

Energy management in a water distribution system requires the understanding, control, and optimization of water pumping systems to manage electrical energy cost. The energy costs for the City's Water Distribution and Production is not insignificant. In fiscal year 2005-06, the Water Distribution and Production expended \$1,153,627 for utilities, largely for electricity.

The Water Distribution and Production is beginning to address some of the challenges associated with energy conservation. It is expanding its water storage. This will reduce the extent of pumping required at peak hours. Additionally, Southern California Edison tested the efficiency of the water pumps in 2004 and will test their efficiency again in 2007.

There are a number of challenges that Water Distribution and Production faces in energy conservation. These challenges are noted below.

(1) The Water Pumps Do Not Use Variable Frequency Drives.

A variable-frequency drive is an electronic controller that adjusts the speed of an electric motor by adjusting the power being delivered. Variable-frequency drives matching motor speed to the demands of the work being performed. Variable-frequency

drives are enjoying rapidly increasing popularity in water utilities. The greatest energy draw comes from pumping – an application particularly suited to variable-frequency drives.

The existing water pumps used by Water Distribution and Production are either on or off and operate at a constant speed. This process uses excessive energy and may create punishing conditions for the mechanical equipment involved.

Variable-frequency drives enable pumps to accommodate fluctuating demand, running pumps at lower speeds and drawing less energy while still meeting pumping needs. Energy savings from variable-frequency drives can be significant. A variable-frequency drive controlling a pump motor that usually runs less than full speed can substantially reduce energy consumption over a motor running at constant speed for the same period. For a 25 horsepower motor running 23 hours per day (2 hours at 100% speed; 8 hours at 75%; 8 hours at 67%; and 5 hours at 50%) a variable-frequency drives can reduce energy use by 45%.

Initial costs for variable-frequency drives are relatively expensive. Installed drives range from about \$45,000 for a custom-engineered 300 horsepower motor and more for larger versions. Variable-frequency drive installation can take from 10 to over 70 labor-hours, depending on system size and complexity. However, payback period for these drives can range to three years for a 250-horsepower model. The motors used by Water Distribution and Production are both smaller and larger than these motors ranging from 10 hp to 250 horsepower.

Many electric utilities offer financial incentives that can reduce the installed costs of variable-frequency drive.

The water system master plan already proposed replacement of a number of pumps in the City's system. This includes the following:

- Greystone pumping station with proposed upgrading of one of the 1150 gallons per minute pumping units to 2100 gallons per minute at a cost of \$40,000; and
- Pumping station number 5 with proposed replacement of one of the 800 gallons per minute pumping units to 100 gallons per minute at a cost of \$28,000.

The City has ten pumping stations with twenty-seven pumping units. The power of these units range from 10 hp to 250 hp. One-half of these pumping units are 100 hp or less.

Civil Engineering and Water Distribution and Production should evaluate the costs of replacing these motors, the energy savings that would be gained, and the payback period. If the payback period is favorable, a capital project should be developed for their replacement. Any of the pumping units that are replaced should be replaced with variable frequency drives with programmable logic controllers and energy efficient motors. As Water Distribution and Production moves forward with the efficiency tests of these pumping units by Southern California Edison, the evaluation should be expanded to include replacement with variable frequency drive energy efficient units.

Recommendation: Civil Engineering and Water Distribution and Production should evaluate the costs of replacing the twenty-seven water pumping units with variable frequency drive energy efficient motors, the energy savings that would be gained, and the payback period. If the payback period is favorable, a capital project should be developed for their replacement.

Recommendation: As Water Distribution and Production moves forward with the efficiency tests of these pumping units by Southern California Edison, the evaluation should be expanded to include replacement with variable frequency drive energy efficient units.

(2) Water Distribution and Production Should Utilize the Newly Installed SCADA System To Expand the Extent of Off Peak Pumping.

Supervisory Control and Data Acquisition (SCADA) system controls the entire

plant and has recently been replaced.

The SCADA should be utilized to expand the extent of off peak pumping and filling of the water tanks to take advantage of cost and energy savings. The SCADA system allows Water System Worker III's to control operations by time of day, by water tank level, or by a combination of both to reflect the needs of the City, which allows Water Distribution and Production to operate as efficiently as possible. The SCADA system should be programmed to conduct the majority of pumping during off peak hours to take advantage of off-peak energy usage.

Recommendation: Water Distribution and Production should expand the extent of off-peak pumping using the SCADA system.

11. DEVELOP AND INSTALL A RELIABILITY-CENTERED PROGRAM FOR WATER UTILITY PUMPS AND MOTORS.

Water utilities employ predictive testing and inspection approaches to determine preventive maintenance requirements and frequency. Water utilities, by the nature of the service provided, must place great emphasis on equipment reliability. Reliability-centered programs achieve this principally through the use of non-intrusive testing techniques and performance data to assess machinery condition. For example, vibration analysis of a motor might be the basis for either accelerating or deferring a scheduled major overhaul, or infrared testing of electrical equipment might indicate the need for small repairs now and avert a major repair project in the future.

The City recently purchased an infrared thermo-imaging unit. In the past, this service had been contracted. Training needs to be scheduled for the City's staff in the use of the equipment.

Water Distribution and Production should use predictive testing equipment on an ongoing basis to include the techniques enumerated below.

- Vibration analysis should be used to detect, identify, and isolate specific component degradation and its causes prior to serious damage or actual failure. Vibration monitoring helps to determine the condition of rotating equipment, a system's structural stability, and sources of airborne noise.
- Oil analysis should be used to determine the condition of a given oil, fuel, or grease sample by testing for viscosity; particle, fuel, and water contaminants; acidity/alkalinity (pH); breakdown of additives; and oxidation.
- Temperature monitoring devices should be used to detect temperature variances in machines, electrical systems, heat transfer surfaces, and structures and the relative magnitude of those temperature variances. Large changes in temperature often precede equipment failure. Infrared thermography, in particular, is a reliable technique for finding roof leaks and determining the thermal efficiency of heat exchangers, boilers, building envelopes, etc.

Water Distribution and Production should utilize the infrared thermo-imaging unit it recently purchased to initiate a reliability-centered program, and utilize contractors for oil analysis and vibration analysis. The estimated annual cost of this contract is presented in the table below.

Annual Cost Increase		Annual Cost Decrease	
Authorize funding to retain a contractor to employ predictive testing equipment on an annual basis to include oil analysis and vibration analysis.	\$15,000	NA	\$0
Total Operating Cost Increase	\$15,000	Total Operating Cost Decrease	\$0

Recommendation: Water Distribution and Production should utilize the Infrared thermo-imaging unit it recently purchased to initiate a reliability-centered program, and utilize contractors for oil analysis and vibration analysis on an annual basis.

12. WATER DISTRIBUTION AND PRODUCTION SHOULD IDENTIFY AND BRING ON-LINE ADDITIONAL SOURCES OF GROUNDWATER.

Treated surface water is not inexpensive. These costs include energy, water treatment, transmission and maintenance, administrative costs. Groundwater, on the other hand, is a “hidden resource” and tends to be undervalued to a greater degree than surface water. The cost-benefit analysis of ground water vs. surface water strongly favors the former over the latter in most cases. Ground-water supplies are less costly to develop than surface water and are less susceptible to contamination than surface water. Groundwater may be more valuable than surface water for several reasons. It is usually a stable supply source, as it does not react to droughts as fast as surface water. It has been stored underground, in a natural way and does not require the construction of large storage reservoirs.

At present, the Department operates a groundwater treatment plant under a contract with EarthTek. However, this plant is operating at only one-half its design capacity. The Department should identify and bring on-line additional sources of groundwater. This should be focused on increasing the cost-effective operation of the groundwater treatment plant, but also reducing to a minor extent the City’s reliance on the Metropolitan Water District as its supplier for treated water.

Recommendation: Water Distribution and Production should identify and bring on-line additional sources of groundwater.

13. WATER DISTRIBUTION AND PRODUCTION SHOULD EVALUATE OPPORTUNITIES TO INCREASE WATER PRESSURE IN GREEN ACRES.

At present, the water pressure in flow at Green Acres is only 30 pounds per square inch. This can generate problems with fire flow.

Water Distribution and Production should evaluate opportunities to increase pressure more than the 30 pounds per square inch at Green Acres.

Recommendation: Water Distribution and Production should evaluate opportunities to increase pressure more than the 30 pounds per square inch at Green Acres.

14. THE FIELD SERVICES SUPERVISOR SHOULD BE UPGRADED TO A WATER SYSTEM OPERATIONS SUPERVISOR UPON OBTAINING THE REQUIRED CERTIFICATIONS.

At present, Water Distribution and Production has two supervisors – each classified differently. One is classified as a Field Services Supervisor, and the other as a Water System Operations Supervisor.

The responsibilities of these two supervisory positions are much the same. However, the Water System Operations Supervisor classification requires a T-3 Water Treatment Operator Certificate and a D-2 Water Distribution Operator Certificate. The Field Supervisor classification requires a Grade II, Water Treatment or Water Distribution certification.

Once the incumbent of the Field Services Supervisor position meets the certification requirements of the Water System Operations Supervisor classification, and the other requirements of that classification, the Field Services Supervisor should be reclassified as a Water System Operations Supervisor. This will strengthen the supervision in Water Distribution and Production.

The estimated annual cost of this contract is presented in the table below.

Annual Operating Cost Increase		Annual Operating Cost Decrease	
Once the incumbent of the Field Services Supervisor position meets the certification requirements of the Water System Operations Supervisor classification, and the other requirements of that classification, the Field Services Supervisor should be reclassified as a Water System Operations Supervisor.	\$7,600	NA	\$0
Total Operating Cost Increase	\$15,000	Total Operating Cost Decrease	\$0

Recommendation: Once the incumbent of the Field Services Supervisor position meets the certification requirements of the Water System Operations Supervisor classification, and the other requirements of that classification, the Field Services Supervisor should be reclassified as a Water System Operations Supervisor.

15. WATER PRODUCTION AND DISTRIBUTION SHOULD “SQUARE CUT” AND USE HOT MIX FOR THE UTILITY CUTS MADE BY ITS STAFF.

Water Production and Distribution makes utility cuts for repairs to the water distribution system such as water main leaks. Water Production and Distribution staff does not have the expertise of Street Maintenance in repairing the street or alley after these repairs to the water distribution system have been made. However, these staff should be expected to square cut the utility cuts. In addition, Street Maintenance should replace the cold mix temporary repair made by Water Production and Distribution, with the expense of this repair by Street Maintenance charged to the water utility fund.

Recommendation: Water Production And Distribution should “square cut” utility cuts and use hot mix for the utility cuts made by its staff.

10. ANALYSIS OF SOLID WASTE

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Solid Waste is authorized thirty-six (36) staff. Of these thirty-six (36) staff, five (5) are allocated to street sweeping, seventeen (17) are allocated to solid waste collection, twelve (12) are allocated to environmental maintenance, and two (2) to management and supervision. The specific allocation of this staff include the following:

- A Solid Waste Manager;
- A Solid Waste Operations Supervisor;
- Two (2) Solid Waste Inspectors;
- Fifteen (15) Solid Waste Equipment Operators;
- Two (2) Environmental Program Inspectors;
- A Senior Street Sweeper Operator and four (4) Street Sweeper Operators;
- Ten (10) Environmental Maintenance Workers.

In fiscal year 2005-06, Solid Waste collected 33,043 tons of refuse. Of this amount:

- 53% or 17,417 tons was residential refuse;
- 14% or 4,447 tons was residential recycling;
- 31% or 10,385 tons was residential green waste;
- 2% or 796 tons was street sweeping refuse.

This excludes the commercial tonnage collected by the City's contractor.

In 2002, the California Integrated Waste Management Board reported that Beverly Hills diverted 57% of its waste stream. This complies with the requirements of AB 939.

1. THE PUBLIC WORKS AND TRANSPORTATION DEPARTMENT EMPLOYS A NUMBER OF BEST PRACTICES IN SOLID WASTE.

An organizational and management analysis by its nature focuses on opportunities for improvement. However, there are a number of strengths in Solid Waste. Examples of these strengths are portrayed below.

- Solid Waste utilizes automated solid waste collection trucks for residential solid waste collection that enables the use of one-person crews.
- The City complies with the requirements of AB 939, more than meeting the 50% diversion goal.
- In fiscal year 2004-05, cash and cash equivalents for the Solid Waste Enterprise Fund increased by \$630,211.
- Solid Waste provides a high level of service for street sweeping, sweeping residential streets once a week and commercial and arterial streets seven days a week.
- Solid Waste provides a high level of service in pressure washing the sidewalks in the business triangle, and scrubbing the sidewalks along La Cienega Boulevard, Wilshire Boulevard, and portions of Santa Monica Boulevard. The comparative survey conducted by the project team found that few cities provide this service.
- Solid Waste provides a high level of service in removing bulk waste from the City's alleys providing a bi-weekly level of service.

These strengths in Solid Waste provide a sound basis for further enhancements.

2. THE CITY FACES A CHALLENGE NOT FACED BY MANY OTHER CITIES IN TRANSPORTING SOLID WASTE COLLECTED IN THE CITY TO A MATERIAL RECOVERY FACILITY OR A LANDFILL.

In 1996, Solid Waste commissioned a study by a consulting firm to analyze the City's transfer station. The purpose of the study was to compare the City's costs of collection, hauling, and transfer system to alternative methods. These alternative methods included direct haul of solid waste collected in the City to a landfill, direct haul using tractors with dual trailers, construction of a new top loading transfer station,

transfer at the City of Culver's transfer station, and transfer at the City of Santa Monica's transfer station. The analysis indicated that the City would reduce its costs by exploring other alternatives to its existing transfer station. These alternatives and their estimated cost savings (1996) are presented in the table below.

	Existing System	Direct Haul	Transfer LA's Refuse	Dual Trailers	New Top Loading Transfer Station	Culver City Transfer Station	Santa Monica Transfer Station
Refuse / Yard Waste	\$1,298,000	\$2,000,000	\$1,298,000	\$1,436,000	\$1,298,000	\$1,499,000	\$1,620,000
Transfer Costs	\$707,000	\$-	\$990,000	\$402,000	\$729,000	\$650,000	\$780,000
Land Rent	\$361,000	\$100,000	\$361,000	\$172,000	\$361,000	\$100,000	\$100,000
Other Services	\$1,312,000	\$1,338,000	\$1,312,000	\$1,338,000	\$1,312,000	\$1,338,000	\$1,338,000
Fixed Costs	\$1,528,000	\$1,528,000	\$1,528,000	\$1,528,000	\$1,528,000	\$1,528,000	\$1,528,000
Less Revenue	\$-	\$-	\$(520,000)	\$-	\$-	\$-	\$-
Total	\$5,206,000	\$4,966,000	\$4,969,000	\$4,876,000	\$5,228,000	\$5,115,000	\$5,366,000
Cost Savings	\$-	\$240,000	\$237,000	\$330,000	\$(22,000)	\$91,000	\$(160,000)
% Savings	0%	4.6%	4.8%	6.6%	-0.5%	1.7%	-3.1%

As the table indicates, four of these six alternatives were estimated to reduce the City's annual operating costs in comparison to the City's use of its own transfer station at that time. One of the six alternatives – use of dual trailers and retaining the use of the City's transfer station was estimated to generate the most significant amount of annual cost savings. The alternative that would have generated the second highest amount of cost savings was to transfer some of the solid waste collected by the City of Los Angeles at the City's transfer station (the City's transfer station, after the City contracted for commercial refuse collection, was underutilized).

Solid Waste commissioned the same consulting firm to evaluate the residential

solid waste collection program in 1999. The firm concluded that closing the City's transfer station and direct hauling to area disposal facilities or the Culver City transfer station would reduce costs by \$195,000 to \$389,000, but would limit future flexibility should longer hauls eventually be required. Proposed rail haul projects would increase the City's costs. The firm concluded that the alternative that provides the greatest savings was to direct haul refuse and yard waste to the Culver City transfer station, and direct haul recyclables to Sun Valley Paper Fiber.

The City, however, chose another alternative: closing the transfer station and direct hauling solid waste to the Material Recovery Facility in Sun Valley.

The selection of this alternative has placed the City in a difficult position compared to other surrounding cities as identified below.

- Santa Monica owns and operates its own solid waste transfer station.
- Culver City owns and operates its own transfer station.
- Burbank owns the Scholl landfill, and transports the solid waste directly to that landfill.
- Glendale does not utilize a transfer station; it transports its solid waste directly to the Scholl landfill.

The City of Beverly Hills' residential solid waste collection rates are higher than each of these other cities.

The impact of direct haul to the Material Recovery Facility on the City's solid waste operations is not insignificant.

- A Street Sweeper Operator, during the non-leaf season, makes one (1) trip to the Southern California Disposal facility in Santa Monica each workday. This staff loses one (1) one and one-half (1.5) hours each day transporting the material to Southern California Disposal. This reduces the ability of these staff to sweep streets by approximately 4.5 curb miles a day or 15% of the expected average

daily productivity.

- During the leaf season, the City rents a drop box and Street Sweeper Operators dump one (1) load to the Southern California Disposal facility in Santa Monica and one (1) load in the drop box each day. The three-month cost of the drop box approximates \$120,000.
- Solid Waste Equipment Operators make two (2) trips to the Crown Disposal Material Recovery Facility each day in San Fernando valley. This staff loses one and one-half hours to two hours each day transporting the material to the Material Recovery Facility. This reduces the available work hours available to these staff for solid waste collection by one-half.

The loss of the City's transfer station has significantly impacted the productivity of its staff.

In the longer-term however, the problem is likely to be more significant than the lost time of City staff in direct hauling waste to the Material Recovery Facility or to the Southern California Disposal facility in Santa Monica. There are a number of challenges that the Los Angeles region will face in terms of landfill closures, waste hauling by rail, and the volatility of the recycling market. The City should evaluate its options to both address these future challenges and to reduce the impact of the lost time associated with direct haul. This could include teaming with other local cities such as Culver City, Santa Monica, or Los Angeles in the development of a transfer station in closer proximity to Beverly Hills or a regional Material Recovery Facility in closer proximity to Beverly Hills or expansion of an existing transfer station in closer proximity to Beverly Hills.

Recommendation: The City should evaluate options to both address these future challenges of landfill closures, waste hauling by rail, and the volatility of the recycling market and to reduce the impact of the lost time associated with direct haul of solid waste to the Crown Disposal Material Recovery Facility in San Fernando and the Southern California Disposal facility in Santa Monica.

3. FIVE STAFF ARE REQUIRED FOR STREET SWEEPING TO DELIVER THE PRESENT LEVELS OF SERVICE.

At present, the City allocates five (5) staff to street sweeping. The City provides a high level of service in sweeping its streets. The commercial areas of the City and its arterials are swept five times a week, while residential areas (alleys and streets) are swept once a week. This staff works a 4 / 10 schedule.

The staffing required to deliver this level of service is presented in the table below.

Activity Name	Inventory Measure	Units	Per Inventory	Annual Freq.	AWQ	ADP	Crew Days	Crew Size	Staff Days
Commercial Street Sweeping	Curb Miles	58	Curb Miles	247	14,326	27.5	520.9	1	520.9
Residential Street Sweeping	Curb Miles	184	Curb Miles	52	9,568	27.5	347.9	1	347.9
Alley Curb Sweeping	Curb Miles	54	Curb Miles	52	2,808	27.5	102.1	1	102.1
TOTAL									971.0

Important points to note concerning the table are presented below.

- There are an estimated 242 curb miles to be swept in the City. This includes an estimated 58 curb miles in the commercial area or arterial streets, 184 curb miles in the residential area, and 54 curb miles of alleys.
- The commercial streets will be swept a total of 247 times annually reflecting daily sweeping seven days a week excluding holidays.
- The residential and alley street miles will be swept fifty two times a year reflecting weekly sweeping.
- The annual work quantity for delivery of these levels of service amounts to 14,326 commercial curb miles swept, 9,568 residential curb miles swept, and 2,808 alley curb miles swept. The total commercial, residential, and alley curb miles swept amounts to 26,702 curb miles.
- The Street Sweeper Operators and Senior Street Sweeper Operator, in a ten-hour shift, should be capable of sweeping 27.5 curb miles a day. This presumes

that problems will occur with lost time required in the dumping of collected sweeper debris as a result of the loss of the City's solid waste transfer station.

- A total of 971 staff days are required annually to deliver these levels of service. A total of five (5) staff are required to deliver this level of service.
- The level of staffing is impacted by the amount of travel time required to dump sweeping loads that amounts to an estimated one and one-half to two hours during the day and one to one and one-half hours during the night. This is a significant amount of unproductive work hours and results from the loss of the City's solid waste transfer station.

Overall, four (4) Street Sweeper Operator positions and a Senior Street Sweeper Operator position should be capable of delivering the levels of service.

Recommendation: Do not modify the authorized level of staffing for street sweeping.

4. AUTHORIZED LEVELS OF STAFFING FOR SOLID WASTE COLLECTION SHOULD BE INCREASED BY TWO POSITIONS.

Solid Waste has a number of routes that it must cover each week. These routes are presented below.

- Monday has eight (8) solid waste collection routes – two (2) single family and six (6) multi-family;
- Tuesday has nine (9) routes – all single family;
- Wednesday has eight (8) routes – seven (7) single family and one (1) multi-family;
- Thursday has nine (9) routes – all single family;
- Friday has eight (8) routes – four (4) multi-family and four single family;
- Each day of the week, two alley bulk waste crews are staffed – one for the north and one for the south.

There are a total of forty-two solid waste collection routes on a weekly basis. In addition, there are two bulk waste collection crews assigned to the alleys. These crews are split

into north and south with responsibility for collecting bulk waste. The bulk waste includes white goods such as refrigerators, brush, etc.

The peak staffing requirements – Tuesday and Thursday – require a total of thirteen staff. However, to staff these routes on a day-to-day basis requires more than these thirteen staff as portrayed below.

Solid Waste Route Staffing Required for Routes (Peak)	13
Number of Work Days Per Year	257
Number of Shifts Per year	3,341
Length of (Hours)	8
Hours Required Per Year	26,728
Lost Time (Leave, not including turnover)	7,611
Solid Waste Equipment Operators Required	16.5

As the table indicates, the number of Solid Waste Equipment Operator positions required amounts to almost seventeen (17). This is two (2) more positions than presently authorized. It should be noted that this does not include leave resulting from turnover so this is a conservative estimate of the staffing requirements for the staffing necessary for collection of solid waste.

The staffing required for solid waste collection is impacted by the amount of travel time required to dump sweeping loads that amounts to an estimated one and one-half to two hours during the day. This is a significant amount of unproductive work hours and results from the loss of the City's solid waste transfer station.

The annual cost impact of the addition of these two positions is presented in the table below.

Annual Cost Increase		Annual Cost Decrease	
Authorize two additional Solid Waste Equipment Operator positions	\$156,700	NA	\$0
Total Operating Cost Increase	\$156,700	Total Operating Cost Increase	\$0

Recommendation: Authorize two additional Solid Waste Equipment Operator positions.

5. INCREASE THE EXTENT OF AUTOMATION FOR ALLEY BULK WASTE COLLECTION.

Solid Waste just received delivery of a rear loader collection truck for use in alley bulk waste collection. In the past, the two crews assigned to alley bulk waste collection have used dump trucks. The dump trucks do not have the capacity for compacting waste. As a result, the crews had frequent requirements to transport bulk waste and dump this waste.

Acquisition of a second rear loader will enhance the productivity of the second crew since it will reduce the number of trips required to transport bulk waste and dump this waste. The tractor used by the crew can dump the bulk waste directly in the hopper of the rear loader.

A second rear loader collection truck should be acquired for bulk waste collection. The one-time capital outlay cost and the annual operating and maintenance cost impact of the acquisition of this rear loader is presented in the table below.

One-Time Capital Outlay		Annual Cost Increase	
Acquire a 2 nd rear loader collection truck for bulk solid waste collection	\$180,330	Operating, maintenance, and replacement costs	\$28,000
Total Operating Cost Increase	\$180,330	Total Operating Cost Increase	\$28,000

Recommendation: Acquire a second rear loader collection truck for collection of bulk waste.

6. SOLID WASTE SHOULD EVALUATE THE SIZE OF COLLECTION CONTAINERS UTILIZED IN ALLEYS.

In interviews with staff assigned to Solid Waste, a significant amount of concern was expressed regarding collection of solid waste in alleys. The staff expressed concern regarding the following:

- Backing the automated side loader refuse equipment in alleys and the possibility of hitting gas lines; and
- The hopper in the automated side loader refuse equipment is not designed for the 300-gallon containers utilized in alleys, and a significant amount of time is lost compacting the waste dumped from these containers into the hoppers.

The perception by this staff was that downsizing to smaller containers would not result in reductions in productivity given the tradeoff between the amount of lost time compacting the loads from the 300-gallon containers versus the smaller size of 90 gallon or 150-gallon containers.

Solid Waste should evaluate alternatively sized containers and their impact on the productivity and safety of the staff assigned to collection of solid waste in alleys.

This analysis should occur using the following approach:

- A task force consisting of a mix of selected solid waste collection staff, the Solid Waste Operations Supervisor, and the Management Analyst, should be utilized to evaluate alternatives to the use of 300-gallon containers for collection of solid waste in alleys;
- The task force should contact other cities that collect solid waste in alleys using automated solid waste collection vehicles such as Long Beach and Santa Monica to determine the size of container and collection vehicles utilized and the impact on route sizes and crew productivity, and report their findings to management of the Public Works and Transportation Department;
- If the evaluation indicates that smaller containers would not likely reduce the productivity of the crews that collect solid waste in alleys, a pilot test should be conducted with the use of 90-gallon or 150-gallon containers in alleys in a

selected neighborhood working with the residents of this neighborhood in the conversion to these sized containers; and

- If the pilot test is successful, Solid Waste should convert the collection of solid waste in alleys from 300-gallon containers to 90-gallon or 150-gallon containers.

Customers and staff of the Division should be included in the process to re-evaluate the size of receptacles used in the alleys. The existing containers have a warranty until 209 or beyond.

Recommendation: A task force consisting of a mix of selected solid waste collection staff, the Solid Waste Operations Supervisor, residents, and the Management Analyst should be utilized to evaluate alternatives to the use of 300-gallon containers for collection of solid waste in alleys.

7. THE NUMBER OF AUTOMATED SIDE LOADERS SHOULD BE INCREASED BY ONE TO PROVIDE SUFFICIENT SPARES.

At present, Solid Waste is allocated ten (10) automated side loaders (Sterling Condors). All of these vehicles are a 2005 model year. Solid Waste has as many as nine (9) solid waste collection routes that must be covered each day. These routes are presented below.

- Monday has eight (8) solid waste collection routes;
- Tuesday has nine (9) routes;
- Wednesday has eight (8) routes;
- Thursday has nine (9) routes; and
- Friday has eight (8) routes;

With nine (9) routes on Tuesday and Thursday, Solid Waste has only one (1) spare. This is an insufficient number of spares, amounting to only an 11% spare rate. While this may be sufficient at present, as the entire fleet ages at the same rate since all of the equipment is the same model year, the extent of downtime will only increase.

The project team recommends not less than a 20% spare rate. This would require the addition of another automated side loader truck. The one-time capital outlay cost and the annual operating and maintenance cost impact of the acquisition of this automated side loader collection truck is presented in the table below.

One-Time Capital Outlay		Annual Cost Increase	
Acquire another automated side loader collection truck.	\$210,000	Operating, maintenance, and replacement costs	\$43,000
Total Operating Cost Increase	\$210,000	Total Operating Cost Increase	\$43,000

Recommendation: Acquire an eleventh automated side loader collection truck.

8. GAS AND WATER METERS SHOULD BE MARKED IN ALLEYS FOR SOLID WASTE COLLECTION VEHICLES INSTALLED

The bulk waste collection staff indicated that often times it is difficult to identify the location of gas and water meters in alleys, that often times these meters are blocked by the brush or other bulk waste items collected by the crews. The concerns expressed by the crews indicated that in collecting the bulk waste, the crews could hit the meter and break the service connection for a water or gas meter.

Solid Waste should mitigate this risk by marking the location of water and gas meters in alleys.

Recommendation: Solid Waste should mark the locations of gas and water meters in alleys.

9. THE CITY SHOULD CHARGE A FEE FOR THE NPDES INSPECTION OF RESTAURANTS, AND RETAIL GAS STATIONS.

At present, the Public Works and Transportation Department is authorized two (2) Environmental Program Inspectors. One of the responsibilities of these two staff is to inspect construction sites, retail gas stations (4), and restaurants (estimated at 60 to 80)

for compliance with National Pollutant Discharge Elimination System (NPDES) requirements, among other roles and responsibilities.

On December 13, 2001, the Los Angeles Regional Water Quality Control Board (LARWQCB) adopted the National Pollutant Discharge Elimination System (NPDES) Municipal Separate Storm Sewer System (MS4) Permit No. CAS004001. One of the requirements of the permit is to conduct at least two stormwater inspections for all restaurants, automotive service facilities, retail gas outlets, and other required industrial/commercial facilities prior to the expiration date of the permit on December 13, 2006. The first of these inspections was required to be completed by August 1, 2004.

The City does not charge a fee for the inspection of restaurants for compliance with NPDES. Manhattan Beach, when confronted with this NPDES workload, contracted with the Los Angeles County Department of Health to conduct this inspection. Manhattan Beach adopted a fee of \$85 per restaurant per year to conduct this inspection.

The project team recommends that Beverly Hills charge each inspected restaurant and retail gas station a separate NPDES inspection fee. The establishment of an NPDES inspection fee would place the cost appropriately on the businesses required to be inspected. The City's inspection fee for restaurants should be designed to cover the cost of the inspection and City administrative costs only. Administrative costs will include processing of field reports, invoicing, reporting for NPDES purposes, follow-up notices and outreach for certain facilities, and site visits as necessary. Any costs related to future enforcement action would be recovered from individual subject restaurants.

These restaurants and gas stations should be inspected once annually, and re-inspected, if necessary, to bring the restaurant or gas station into compliance with NPDES requirements. The annual revenue generated by this fee is presented in the table below.

Revenue Increase		Cost Decrease	
Charge an NPDES fee for inspection of restaurants and retail gas stations	\$6,300	NA	\$0
Annual Cost Increase	\$6,300	Annual Cost Decrease	

Recommendation: The City should charge an annual fee for inspection of restaurants and gas stations.

10. THE PUBLIC WORKS AND TRANSPORTATION DEPARTMENT SHOULD MODIFY ITS APPROACH TO ENFORCEMENT OF NATIONAL POLLUTANT DISCHARGE ELIMINATION SYSTEM REQUIREMENTS AND ELIMINATE THE TWO ENVIRONMENTAL PROGRAM INSPECTOR POSITIONS THROUGH ATTRITION.

Based upon the requirements of the Clean Water Act, the Los Angeles Regional Water Quality Control Board (Regional Board) issued a municipal 5-year National Pollutant Discharge Elimination System (NPDES) permit to Los Angeles County and municipalities within the County that lays out pollution prevention programs that must be implemented. The first 5-year NPDES permit for the Los Angeles Region was issued in 1991. Beverly Hills is currently under the 2001 NPDES permit, which expired in December 2006. The Regional Board will likely not issue a renewed permit until the summer or fall of 2007. Until that time, Beverly Hills will need to continue to implement the programs required under the 2001 NPDES permit. The 2001 NPDES programs fall under 6 main categories: (1) Public Education and Outreach, (2) Commercial Inspections, (3) Development Planning, (4) Construction Requirements, (5) Public Agency Good House Keeping Practices, and (6) Illicit Discharge Elimination Programs.

As noted previously, the Public Works Department is authorized two (2) Environmental Program Inspectors. The roles and responsibilities of these two positions are presented below.

- Inspect construction sites, gas stations (4), and restaurants (estimated at 60 to 80) for compliance with National Pollutant Discharge Elimination System (NPDES) requirements;
- Write notices of violations for failure to comply with NPDES requirements;
- Conduct sidewalk inspections for tripping hazards inspecting all sidewalks in the City on a nine-month cycle;
- Inspect and verify the installation of low flow toilets for rebates from the water utility; and
- Inspect the key thirty-five (35) catch basins within the City on a monthly basis and all catch basins in the City once a year.

The Department should modify its approach to NPDES enforcement. The approach recommended by the project team for NPDES enforcement is presented below.

(1) The Public Works Inspector II's in Civil Engineering Should Be Responsible For Inspection of Construction Sites For Compliance With NPDES.

The Public Works Inspectors should inspect public and private construction sites and grading operations to ensure that contractors and developers are complying with the requirements of their NPDES general construction permit and grading ordinance. Construction activities should be inspected against stormwater pollution prevention plans to assure proper implementation of appropriate best management practices. Stormwater inspections should be conducted according to the project's assigned priority and before and after rain events. The inspections should be documented with an NPDES compliance report checklist contained within OBC, logged into the OBC

database, and filed for follow up action. Enforcement action should include verbal and written notification of violations.

The Public Works Inspectors are already inspecting these sites for compliance with the City's standard specifications. The assignment of responsibility for inspection for NPDES compliance will reduce confusion on the part of the contractors and enhance accountability.

This approach is the norm for many other cities in Los Angeles County such as Culver City, Glendale, Pasadena, and Burbank. The basis for this approach in these other cities is as follows:

- The public works inspectors are already at the construction site conducting inspections for compliance with the City's standard specifications and permit requirements;
- Using one public works inspector to conduct these inspections rather than two inspectors reduces unproductive travel time;
- The inspection for compliance with NPDES requirements is a logical extension of the responsibilities of the public works inspectors; and
- The NPDES requirements are typically imposed by the engineering division in these cities in the plan checking of building permit plans and grading plans.

Recommendation: The Public Works Inspectors in the Civil Engineering Division should be responsible for conducting inspections of public and private construction sites for compliance with NPDES including those associated with capital improvement projects.

(2) The Public Works and Transportation Department Should Contract With Los Angeles County For Monitoring of Restaurants and Retail Gas Stations with NPDES Requirements.

The Public Works and Transportation Department already contracts with Los Angeles County for inspection of restaurants for enforcement of the requirements regarding the discharge of fat, oil, and grease into sanitary sewer mains.

The Department should expand the application of this contract to include the inspection of restaurants for compliance with NPDES and inspection of retail gas stations for compliance with NPDES. This should be a fee-based program as recommended previously.

The use of Los Angeles County Health Department for the inspection of the restaurants for enforcement of the requirements regarding the discharge of fat, oil, and grease into sanitary sewer mains and for NPDES will reduce confusion on the part of the restaurants regarding inspections and enhance efficiency.

Recommendation: The Public Works and Transportation Department should contract with Los Angeles County for monitoring of restaurants and retail gas stations with NPDES requirements.

(3) Drainage Maintenance Should Be Responsible For Annual Inspection of Catch Basins.

As previously noted in the chapter regarding Drainage Maintenance, the project team recommends that Drainage Maintenance be assigned responsibility for the annual inspection of catch basins.

The project team recommended that a one-person crew in Drainage Maintenance be assigned responsibility for inspection and hand cleaning of these catch basins. The project team recommended that 141 staff days be allocated to this responsibility; this is equivalent to 0.75 full time equivalent staff.

Recommendation: Drainage Maintenance should be assigned responsibility for annual inspection of catch basins.

(4) Street Maintenance Should Be Responsible For Sidewalk Inspection.

As previously noted in the chapter regarding Street Maintenance, the project team recommends that Street Maintenance be assigned responsibility for the inspection

of sidewalks for trip and fall hazards.

The project team recommended that a one-person crew in Street Maintenance be assigned responsibility for inspection sidewalks for trip hazards. The project team recommended that 9 staff days be allocated to this responsibility with an expectation that this staff should be able to inspect five (5) miles of sidewalks per day, and that the sidewalks should be inspected on a two year cycle (versus the current nine-month cycle.)

Recommendation: Street Maintenance should be assigned responsibility for inspection of sidewalks.

(5) The Field Services Representative In Water Distribution And Production Should Inspect Verify The Installation Of Low Flow Toilets For Rebates From The Water Utility.

The two (2) Environmental Program Inspectors are responsible for the Inspect and verify the installation of low flow toilets for rebates from the water utility. This responsibility should be reassigned to the Field Services Representative in Water Distribution and Production. The workload associated with these inspections is minimal.

Recommendation: The Field Services Representative In Water Distribution And Production should inspect verify the installation of low flow toilets for rebates from the water utility.

* * * * *

As noted in the subsequent chapter, the project team is recommending the addition of a Project Civil Engineer within Civil Engineering to develop and install a comprehensive program for NPDES in the City.

However, the two Environmental Program Inspector positions, with the proposed reallocation of responsibilities, should be eliminated through attrition.

The annual cost impact of the elimination of these two positions is presented in the table below.

Annual Cost Increase		Annual Cost Decrease	
NA	\$0	Eliminate two (2) Environmental Program Inspector positions through attrition	\$189,300
Total Operating Cost Increase	\$0	Total Operating Cost Increase	\$189,300

Recommendation: Eliminate two Environmental Program Inspector positions through attrition.

11. A MANAGED COMPETITION PROCESS SHOULD BE UTILIZED TO EVALUATE ENVIRONMENTAL MAINTENANCE.

Solid Waste is authorized ten (10) Environmental Maintenance Workers. The work performed by the Environmental Maintenance Workers is variable. It includes the following:

- For approximately one-half of a workday, 2 two-person crews are assigned to pressure wash sidewalks in the business triangle with this service delivered five (5) days a week;
- For approximately one-half of a workday, three staff are assigned to conducting a litter patrol of the business triangle with this service delivered four (4) days a week;
- For approximately one-half of a workday, one staff is assigned to emptying trash receptacles in the business triangle with this service delivered seven (7) days a week;
- For approximately one-half of a workday, one staff is assigned to machine scrubbing sidewalks along Wilshire Boulevard, La Cienega Boulevard, and some of Santa Monica Boulevard; and
- On Thursday, these staff are dedicated, in part, to pulling out and replacing solid waste containers to and from the curb for collection.

For those staff assigned work for a half workday to pressure wash sidewalks, machine scrub sidewalks, conduct litter patrol, etc., the balance of the day is allocated to patrol of alleys, weed abatement, graffiti abatement, etc.

The work performed by these staff is highly variable with a focus on working in the business triangle until the late morning, and then working elsewhere in the City. While the work performed to maintain the cleanliness of the business triangle and the City's major arterials is essential, the work performed in the balance of the days is less essential and does not require ten staff to accomplish this work.

The City should utilize a managed competition process to assess opportunities to reduce the costs for delivery of these services while maintaining an excellent level of service. This would require preparation of a request for proposal, the solicitation of proposals from both contractors and City staff, and the evaluation of that alternative that provides the most favorable balance of costs versus level of service. Should a private sector firm be awarded the contract, the City should reallocate the Environmental Maintenance Workers to other positions in the City's workforce.

Recommendation: Utilize a managed competition process for the work performed by the Environmental Maintenance Workers to solicit proposals from both contractors and City staff, and the evaluation of that alternative that provides the most favorable balance of costs versus level of service.

11. ANALYSIS OF CIVIL ENGINEERING

11. ANALYSIS OF CIVIL ENGINEERING

The Civil Engineering Division has four primary functions: capital improvement program management, engineering permit issuance, plan checking of development project submittals, and traffic engineering. The Division is authorized fourteen (14) staff including the following:

- Deputy City Engineer;
- Engineering Aide;
- Four (4) Project Civil Engineers;
- An Engineering Permit Coordinator;
- A Customer Service Representative;
- A Traffic Engineer;
- A Supervising Public Works Inspector; and
- Four (4) Public Works Inspectors.

The roles and responsibilities of these staff are portrayed below.

- Provide project management for capital projects. This includes preparation of the request for proposal, bid document development, bid evaluation, contractor selection, coordination of inspections, approval of payment requests, ensuring of conformance to design specifications, monitoring of project budgets and schedules, close out, and other services.
- Inspection of construction in public rights of way by contractors for conformance to Standard Specifications, design and construction standards, specifications, etc.
- Inspection of construction of capital projects for conformance to Standard Specifications.
- Plan checking of development plans for conformance to engineering design standards, specifications, etc.

- Issuance of engineering permits such as excavation permits, utility cut permits, right-of-way use permits, heavy haul permits, moving van in the right-of-way permits, etc.
- Responding to citizen requests regarding traffic and parking.
- Reviewing of traffic mitigation studies prepared by consulting engineers on behalf of developers.
- Conducting traffic studies such as speed surveys, traffic counts, traffic movement studies, etc.

1. THE PUBLIC WORKS AND TRANSPORTATION DEPARTMENT EMPLOYS A NUMBER OF BEST PRACTICES IN CIVIL ENGINEERING.

An organizational and management analysis by its nature focuses on opportunities for improvement. However, there are a number of strengths in Civil Engineering. Examples of these strengths are portrayed below.

- A five-year capital improvement program has been developed and adopted by the City Council.
- Civil Engineering outsources the design of capital improvement projects.
- Project managers can have access to Pentamation through Cognos to monitor construction costs for capital projects.
- Project managers are responsible for capital improvement projects from “cradle to grave.”
- An automated permit issuance and tracking information system is utilized for the issuance of engineering permits– the OBC (Online Business Center).
- Based upon the FY 2006-07 budget, it would appear that Engineering more than recovers its costs for two programs: Permit Counter / General Public Services and Private Development Project Services.
- The City follows the Manual on Uniform Traffic Control Devices and CalTrans modifications.
- A computer forecasting model was developed by Parsons Engineering in 2004. It is utilized in the development review process to assess traffic mitigation.

These strengths in Civil Engineering provide a sound basis for further enhancements.

2. A PROJECT CIVIL ENGINEER SHOULD BE AUTHORIZED FOR THE ENHANCEMENT OF THE CITY'S NPDES PROGRAM.

The Clean Water Act was adopted in 1972. The Act established the basic structure for regulating discharges of pollutants into the waters of the United States. It gave the United States Environmental Protection Agency the authority to implement pollution control programs such as setting wastewater standards for industry. The Clean Water Act also continued requirements to set water quality standards for all contaminants in surface waters. The Act made it unlawful for any person to discharge any pollutant from a point source into navigable waters, unless a permit was obtained under its provisions. It also recognized the need for planning to address the critical problems posed by non-point source pollution.

As authorized by the Clean Water Act, the National Pollutant Discharge Elimination System (NPDES) permit program controls water pollution by regulating point sources that discharge pollutants into waters of the United States. The State has delegated the authority to implement the NPDES in Los Angeles County to the County. The first permit was issued in 1991, and re-issued in 1996 and 2001. It is presently undergoing re-issuance. The City is a party to that permit.

In December 1997, the Natural Resources Defense Council (NRDC), acting as legal representative for Heal the Bay, Inc., and Santa Monica BayKeeper, Inc., filed a Notice of Intent to sue the United States Environmental Protection Agency (EPA) over failure of the Regional Water Quality Control Board, Los Angeles (RWQCB), to adequately implement the 303(d)/TMDL (Total Maximum Daily Loads) Program. In

December 1998, NRDC and BayKeeper entered into a Federal Consent Decree with EPA. The Consent Decree established 92 TMDL analytical units, which are water quality limited segments and associated pollutants for which TMDLs must be developed. The TDML limits will be developed through the County's NPDES permit, which includes the City of Beverly Hills.

The NPDES permit requires six minimum controls as portrayed below.

- **Public information and participation to heighten awareness of the problem among media, businesses and government, and the public.** These programs have laid a foundation to make the transition from basic education to a call-to-action that motivates and allows for behavior changes. The information and participation includes tools such as advertisements, media relations, public service announcements, preparation and distribution of "how to" materials to business and the public, forming partnerships with the schools, corporations and businesses, environmental organizations and the entertainment industry to reach audiences, sponsoring and participating in special events, etc. The project Civil Engineer could develop the content of the program for delivery by other staff in the Department such as the Management Analyst and the Staff Assistants.
- **Development plan checking to plan check development permits to minimize the impact from storm water and urban runoff on natural drainage systems and water bodies.** This requires that the City address the potential water quality impacts of storm water discharges associated with development activities in development projects by determining the kind of water quality controls (or best management practices) are needed, identifying where the controls should be implemented, and determining how much control is enough.
- **Development construction to control pollution from runoff from construction activities.** Development construction projects covered under this program include any action proposed by a property owner/developer which requires the issuance of a building or grading permit and includes construction activities, except projects determined to be exempt. Development construction projects are required to comply with best management practices including sediment control, erosion control, site management and materials and waste management. The City would determine compliance by conducting inspections to assure compliance is being achieved.
- **Illicit connection / illicit discharge elimination.** The City must identify and

eliminate illicit connections and illicit discharges to the City's storm water system. This requirement must be met by the City with the following actions:

- Developing and maintaining a listing of all permitted connections to the storm water system;
- Map all illicit connections and discharges;
- Field screen storm water mains for illicit connections;
- Report to the County on the mains that have been screened and the status of suspected, confirmed, and terminated illicit connections;
- Complete a review of all permitted connections to confirm compliance with the permit;
- Initiate an investigation of reported suspected illicit investigations; and
- Terminate illicit connections.

To meet this statutory objective, the City must implement a comprehensive program and best management practices to detect and remove illicit discharges and improper disposal into the storm water system.

- **Industrial / Commercial facilities control.** This control requires that the City maintain a list of industrial/commercial facilities to be inspected, inspect/visit industrial waste facilities, enforce implementation of best management practices from an approved list of best management practices and report quarterly on the facilities visited. These facilities include auto dealerships, restaurants, automotive service facilities, and retail gasoline facilities.
- **Public Agency program.** This control impacts the City and all other public agencies in Beverly Hills. It requires a number of measures such as:
 - Public construction activities management (appropriate permanent best management practices are incorporated into the planning and design of public facility projects with the potential for having a significant effect on storm water quality when completed by virtue of their size, nature of on site activities, or other factors);
 - Vehicle maintenance pollution prevention plans for public vehicle maintenance / material storage facilities and corporation yards, development and installation of best management practices, and implementation of measures to prevent discharge of pollutants into storm water systems.

There are other activities of local governments that are affected including landscape and recreational facilities, storm water operation and management, street maintenance, parking facilities management, etc.

The City is at risk. The City's stormwater system discharges into Ballona Creek estuary. Ballona Creek flows slightly over 10 miles from Los Angeles (South of Hancock Park) through Culver City, reaching the ocean at Playa del Rey. Except for the estuary of Ballona Creek, Ballona Creek is entirely lined in concrete and extends into a complex underground network of storm drains which reaches to Beverly Hills and West Hollywood, draining 130 square miles of highly developed land. Tributaries of Ballona Creek include Centinela Creek, Sepulveda Canyon Channel, Benedict Canyon Channel, and numerous other storm drains. Cities on this small coastal watershed are Culver City, Beverly Hills, West Hollywood, parts of Santa Monica, parts of Inglewood, parts of Los Angeles, and some unincorporated areas of Los Angeles County. The Ballona Creek estuary comprises 81,980 acres. Cost sharing for addressing the storm water problems associated with this estuary will be allocated proportional to geographic size. The City will be responsible for 4.4%. Preliminary estimates for addressing the TMDL for bacteria in Ballona Creek place the capital costs at an estimated \$375 million (the City's share would approximate \$16.5 million) and annual operating and maintenance costs of approximately \$12.5 million (the City's share would approximate \$550,000). This is just for the first implementation measure – the preferred strategy, which integrates TMDL compliance with multiple non-structural and structural bacteria source controls, cisterns, or sand filters. The second implementation cost estimate is for an Alternative Strategy that focuses on urban runoff treatment plants and non-

structural controls, with an estimated capital cost of \$917 million and annual operations and maintenance costs of \$6.7 million per year. The compliance deadline is 2014 to 2020.

The City has considerable financial exposure. The City should authorize a Project Civil Engineer to enable the City to begin to comprehensively address the six controls and to represent the City with Los Angeles County, the County's Water Control Board, and the State Water Resources Control Board. The responsibility of this position should include the following:

- Prepare long term capital investment planning in alignment with the various master plans – Water, Wastewater, Stormwater, and Pavement;
- Update various master plans on a periodic basis;
- Update the Urban Water Management Plan;
- Coordinates with Metropolitan Water District, City of Los Angeles and Integrated Regional Watershed Management Plans on capital improvements that affect water, wastewater and recycled water;
- Responsible for annual groundwater report to the Groundwater Management Plan Technical Committee;
- Completes the Annual NPDES report;
- Updates the inspectors on construction best management practices related to NPDES;
- Develops with the Community Development Department the best management practice guidelines for new construction and remodels;
- Completes private and public plan reviews and EIR Comments regarding NPDES, water infrastructure, wastewater infrastructure, storm drain infrastructure and conservation efforts;
- Serves as a liaison with the Environmental Utilities Division in financial planning;
- Serves as a program manager for the Asset Management System;

- Analyzes data available from Asset Management System to enhance capital planning;
- Manage timely updates of as-builts for the City’s infrastructure to be completed and distributed to field staff;
- Investigate the need for infrastructure models and then implement and maintain if decided valuable, which includes training to key operations personnel; and
- Prepares quarterly updates for Capital projects to the Commission and City Council.

As this list of duties indicates, this position should be used on an expansive basis beyond NPDES, but its primary focus should be NPDES. Until the program is well established.

The annual cost impact of the addition of a Project Civil Engineer is presented in the table below.

Annual Cost Increase		Annual Cost Decrease	
Authorize a Project Civil Engineer position to enhance the City’s NPDES program.	\$132,800	NA	\$0
Total Operating Cost Increase	\$132,800	Total Operating Cost Increase	\$0

Recommendation: Authorize a Project Civil Engineer to enable the City to begin to comprehensively address the six controls and to represent the City with Los Angeles County, the County’s Water Control Board, and the State Water Resources Control Board.

3. THE CIVIL ENGINEERING DIVISION SHOULD CHARGE A PAVEMENT RESTORATION FEE FOR UTILITY CUTS.

Public rights-of-way are essential to the economical vitality of the City. The City grants utility and telecommunication companies reasonable access to the public right-of-way to provide services to the community. However, in order for utility and telecommunications companies to maintain or upgrade their services, they need to

access the pavement structure and this, in turn, affects pavement performance. In cities such as the City of Beverly Hills, hundreds of utility cuts are made every year. These cuts are made to install, inspect or repair buried facilities.

The impact of utility company activity on pavement performance has been a concern of public agencies for many years. Studies undertaken for the cities of Austin, Kansas City, Burlington, Cincinnati, Phoenix, San Francisco, Sacramento, and Los Angeles have concluded that excavations in paved streets degrade and shorten the life of the surface of the streets, and this degradation increases the frequency and cost to the public of necessary resurfacing, maintenance and repair. The studies performed by the cities of Los Angeles and San Francisco concluded that pavement degradation occurs no matter how well the excavation is restored.

Findings from studies funded by utility companies and public agencies are often contradictory. The results of studies conducted by public agencies show that the presence of utility cuts lower measured pavement condition scores (indexes) compared to pavements of the same age with no utility cuts. The link between the presence of utility cuts and accelerated pavement deterioration is clear. The process of opening the trench causes sagging or slumping of the trench sides as the lateral support of the soil is removed. The degree of sagging is determined in part by the soil type, moisture content of the soil, and depth of the trench. Quantifying the extent of sagging is very complex, but regardless of the extent, the adjacent pavement is adversely affected.

This zone of weakened pavement adjacent to the utility cut can fail more rapidly than other parts of the pavement. This can be observed in the field by the presence of fatigue (alligator) cracking occurring around the edges of the cut, or spalling around the

cut edges. In addition, the introduction of cuts is much like the introduction of cracks on the pavement. If improperly sealed, water intrusion can occur, resulting in loss of fine materials from the underlying base and sub-grade and consequently, loss of pavement strength. This can occur even with the best patching or backfill practices if the edges of the cut are not properly sealed. The more cuts on a pavement, the higher the possibility of water intrusion and subsequent loss of strength. Studies show that trenching operations reduce pavement strength in a zone from 3 to 6 feet on either side of the centerline of the trench. By implication, these zones of weaker pavement require more costly rehabilitation and maintenance activity.

The Civil Engineering Division should take a number of actions to address this problem. This should include charging a pavement restoration fee for utility cuts, and adoption of an ordinance imposing a moratorium on utility cuts on newly renovated streets for three (3) years after filing of a notice of completion or acceptance of a new street or structural overlay of an entire street except as follows:

- Emergency which endangers life or property.
- Repair or modification to prevent interruption of essential utility service.
- Relocation work that is mandated by County, State or Federal legislation.
- Service for buildings where no other reasonable means of providing service exists, as determined by the Director.
- In a City street that the City has scheduled for resurfacing either during the fiscal year (July 1- June 30) when the excavation permit is issued or during the immediately following fiscal year and the work takes place prior to the resurfacing.
- For potholing to verify utility depth or location.

- Trenchless excavations greater than three feet in depth of cover over the utility facility not requiring a significant surface incision greater than industry bore pit standards may be allowed at the discretion of the Director.

Recommendation: The Civil Engineering Division should develop a utility cut ordinance for consideration of the City Council.

Recommendation: The Civil Engineering Division should develop and impose a pavement restoration fee upon utilities making and benefiting from excavations in public streets, including the City's water and sewer utility.

Recommendation: Funds that are collected as pavement restoration fees should be expended for the rehabilitation and resurfacing of streets, and deposited in a special revenue fund established for that purpose. The funds deposited in the special revenue fund should include interdepartmental budget transfers for City water and sewer operations utility cuts, and fund transfers at the time of construction contract award for City water and sewer capital improvement projects.

Recommendation: The Civil Engineering Division should require utility companies to submit five-year plans for major facility installation to coordinate excavations with the City's resurfacing and the recommended slurry seal program.

Recommendation: The Civil Engineering Division should provide an incentive for joint trenching when two or more utility excavators trench by processing a permit as one application saving the utility company costs for permit, plan check, and inspection fees.

4. THE ROLES AND RESPONSIBILITIES FOR MANAGEMENT OF CAPITAL IMPROVEMENT PROGRAM NEED TO BE CLARIFIED.

The responsibility for managing the streets, sanitary sewer, and storm water collection system capital projects should be clearly defined as belonging to the Civil Engineering Division. However, the expectations associated with the management of the projects should be clarified. These requirements are described in the text below and in the exhibit following this page.

Exhibit 11 (1)

Management Requirements For
Capital Projects

Component of the Capital Improvement Process	Requirement	Responsibility
Planning and Organizing the CIP Upon Council Approval	Preparation of a design authorization form for each CIP project to define the financing, description, scope, design considerations, and the necessary coordination with outside agencies (e.g., CalTrans, etc.). This process should also include an indication of whether an environmental assessment and right of way is required, as well as a determination of staffing requirements based on application of percent of construction guidelines, or others as developed by the Division.	Project Civil Engineers
	Preparation of a network schedule using Microsoft Project for each project, including duration time for each task, and earliest and latest start and finish times.	
	Preparation of bar chart schedules for the entire CIP for a 2-year period showing projected timing of planned projects by major project component (e.g., design, bid, award, construction, etc.).	Senior Project Civil Engineer, Deputy City Engineer
	Projection of staffing requirements to handle planned, prioritized projects for next fiscal year, including workload loading on a monthly basis.	
	Leveling of resources to enable the development of schedules based on available staffing.	
Project Monitoring and Reporting	Reporting via the time accounting system of actual staff-hours by skill level and position type on CIP projects to provide the basis for: <ul style="list-style-type: none"> • Monitoring of staff and contractor performance against guidelines during each phase of the process. • Monitoring actual versus projected staff needs. • Development of a database to utilize in refining project workload estimates. Time accounting system includes an hourly rate that accounts for indirect time and division-wide overhead.	Project Civil Engineers, Public Works Inspector
	Reporting of the project status on a monthly basis, including status of staff hours planned vs. actual.	Project Civil Engineers

Exhibit 11 (2)

Component of the Capital Improvement Process	Requirement	Responsibility
Project Monitoring and Reporting	Reporting of financial status of each project showing expenditures to-date versus the plan.	Supervising Project Civil Engineer, Supervising Public Works Inspector
Management of the CIP Project Resources	Recommending within the monthly status report steps that can be taken to enable completion of projects on schedule.	Deputy City Engineer, Supervising Project Civil Engineer, Supervising Public Works Inspector
	Communication to top management, within the monthly status report, of CIP projects that will not be completed on schedule and within budget, along with estimated completion dates for each of these projects.	Deputy City Engineer

- **Planning and Organizing the Capital Improvement Program.** Planning of the capital projects is essential to the completion of these projects on schedule and within budget. Key requirements include: the definition of each capital improvement project through the completion of a design authorization form including project budget; preparation of a detailed schedule for each project; preparation of a two-year Gantt chart schedule for the Capital Improvement Program assigned to the Civil Engineering Division; projection of staff requirements; and the “leveling” of these staffing requirements to assure work does not exceed staff capacity.
- **Project Monitoring and Reporting.** The Project Civil Engineers should be required to assess and report the financial and scheduling status of each project on a monthly basis. The Project Civil Engineers should report meaningful information in these status reports. Variances from the planned budget and schedule should be reported via this report as well.
- **Management of Capital Improvement Program Resources.** Management of the Capital Improvement Program process is as much concerned with keeping the project moving after it has started as it is with planning. Management of resources proceeds directly out of the variances identified in the monitoring and reporting phase, and the Project Civil Engineers are concerned with correcting these variances. Key system requirements include defining within the monthly report the steps that need to be taken to restore projects back to schedule, and alerting top management when projects will not be completed on schedule.

Although the specific duties and responsibilities are defined in the exhibit, the responsibilities of the managers and supervisors within the Civil Engineering Division are presented below.

- The Deputy City Engineer, and their management and supervisory team of the Civil Engineering Division should be held accountable for delivering capital improvement program projects on schedule and within budget, and for managing the Capital Improvement Program process, including planning and scoping of all capital improvement projects and keeping clients informed regarding their projects on a routine ongoing basis. The Project Civil Engineers, however, should be held accountable for the effectiveness of the day-to-day delivery of capital projects on time and on budget.
- The Project Civil Engineer’s Division should be held accountable for the effectiveness of the project management of capital projects to which they have been assigned – both design and during construction. Further, they should be held accountable for monitoring the planned versus actual schedule and budget for their assigned projects, including:

- Implementing initiatives to accomplish capital improvement program projects on schedule and within budget;
- Working with management to define and secure the staff resources needed for the project;
- Assuring that all project plans and schedules are defined as part of the planning and scoping of a capital project prior to commencement of design;
- Monitoring and reporting progress and problems in meeting capital project plans and schedules; and
- Managing and coordinating interfaces between various staff of the Division and other divisions in the Transportation and Environmental Services Department.

The Project Civil Engineers should be responsible for managing the capital improvement project from the beginning of the project to its final construction and acceptance and should fulfill the responsibilities listed above. This is the concept of cradle-to-grave project management.

- The Civil Engineering Division should be responsible for planning and scoping of the capital improvement project. This would be accomplished through a design authorization form as noted within the next section of this chapter.

The day-to-day responsibility for managing capital projects needs to be pushed down to the project Civil Engineers within the Civil Engineering Division. All of the responsibility should not lie with the Deputy City Engineer in the Civil Engineering Division that is responsible for capital improvement program management.

Recommendation: The roles and responsibilities of the staff of the Civil Engineering Division for management of capital improvement projects should be clarified in a policy and procedure.

5. MANAGEMENT OF CAPITAL PROJECTS SHOULD BE IMPROVED.

The Matrix Consulting Group identified several project management principles that should be applied to each phase of the capital improvement project. These

standards include the following eight steps that comprise the core project management process:

- Preparation of a project budget;
- Definition of the project, including its scope, staff resources required, project costs, and project priority;
- Establishment of plans and schedules for each capital improvement project to determine what tasks are to be performed internally and by private contractors, as well as the start, end and milestone dates;
- Monitoring and reporting the progress against each element of the schedule for each project;
- Maintenance of the financial control systems necessary to ensure timely reports on current expenditures of funds for each line item of the project;
- Development of a system to alert top management to cost, schedule, legal and other difficulties, and unusual circumstances encountered during the course of the project;
- Management of the staff and consulting resources involved in the project in order to adjust to changes in priorities and project mixes as well as to enable completion of the project on schedule and within budget; and
- Management and coordination of the interfaces needed to complete the project.

Underlying all of these principals is management accountability within the Civil Engineering Division to ensure it is accomplished on schedule and within budget.

The review of the practices utilized by the Civil Engineering Division has identified a number of issues associated with how well the Division applies these eight capital project management principles. These issues are presented in the following paragraphs.

- A two-year Gantt chart has not been prepared.
- Staffing requirements for capital improvement projects have not been defined.

- Costs of construction guidelines are not utilized to determine the design, inspection and construction management staffing requirements for capital improvement projects.
- Staffing resources are not leveled to fit the design, construction inspection, and construction management workload to the available staff resources.
- The project / time accounting module within Pentamation is not utilized to record the allocation of staff hours for the design, construction inspection, and construction management by the staff of the Civil Engineering Division.
- Utilization targets have not been set for engineering staff for the design, inspection and construction management of capital improvement projects (what proportion of their time should be charged to capital projects versus training, leave, administration, etc.).
- The monthly capital improvement program status reports generated do not provide important information regarding capital projects.
- Capital projects are not fully scoped before commencement of design.
- Feedback mechanisms (e.g., final reports) have not been developed for quality assurance purposes.
- Mechanisms are not routinely employed to maintain effective communication with clients.

A number of steps need to be taken by the Civil Engineering Division to improve the management of capital projects. These recommended steps are presented below.

(1) A Design Authorization Form Should Be Completed Before Commencement of Design.

Design of a project should not be initiated until the resources required (staff hours, consulting engineers, and construction funding) for completing the project have been identified using a design authorization form. The design authorization form should include the components enumerated below.

- The project title including the phase of the project, if relevant.

- A general project description, including a narrative summary description of the project, specific physical improvements included, the location of the project, and the relationship to master plans.
- The capital project number (as noted in the six-year capital improvement program).
- The financing and the cost, including the source of funds, and the appropriation status.
- A budget covering the project management or design staffing, survey staffing, construction inspection staffing, appropriate consultants, property acquisition, utility relocation, etc., by major expenditure component.
- The responsibility for completing the various components of the capital project, including the following:
 - Design by in-house staff or by consulting engineer;
 - Construction inspection by in-house staff or by consulting engineer;
 - Design survey and construction staking by in-house staff or consulting engineer;
 - Environmental assessment required;
 - Right-of-way acquisition required and, if so, the number of parcels and their locations and assessor parcel numbers;
 - Utilities that need to be relocated, problems with relocation and timing issues; and
 - Other key responsibilities that need to be assigned and/or accomplished.
- The extent of coordination necessary, listing the inter-agency coordination by division, department, or outside agency with whom coordination will be required in the design and construction of the capital project, the nature of the coordination, and the key contacts;
- The preliminary schedule for completing the design and construction of the capital project, including the schedule for design, bid package preparation, advertise/award, right-of-way acquisition, environmental impact reports, and construction; and including the dates of important events such as approval of the award of construction contract by the City Council;

- A document control procedure and record-keeping system including contract documents;
- A change order procedure that includes a documented, systematic approach to the handling of construction change orders;
- Organizational structures, management skills, and staffing levels required throughout the design and construction phase, including the estimated staffing required in terms of person hours required for design and construction inspection utilizing the cost of construction guidelines;
- Quality control and quality assurance functions, procedures, and responsibilities for design and construction;
- Materials testing policies and procedures;
- Design and construction reporting requirements, including cost and schedule control procedures;
- Design considerations or issues related to the capital project such as complexities of the design; and
- Community relations and public information requirements, including public hearings or meetings and how the public will be informed and involved in the preliminary design and informed about the progress of the design and construction.

A design authorization form should be completed before commencement of design. It should be reviewed with the client department prior to the commencement of design.

Recommendation: A design authorization form should be completed by the Project Civil Engineer Civil Engineering Division assigned as project manager before the commencement of design for each capital improvement project.

(2) Costs of Construction Guidelines Should Be Utilized to Document Resource Requirements for the Design and Inspection of Capital Improvement Projects.

The exhibit that follows this page presents an example of guidelines for the design and inspection of capital improvement projects as a percentage of construction.

Exhibit 12

**Allocation of Staff Resources for
Design and Inspection as a Median
Percentage of Net Construction Costs**

Type of Project	Street Construction				Street Reconstruction				Water/Wastewater/Storm water				Traffic Control	
	Above Average		Average		Above Average		Average		Above Average		Average		Average	
Level of Complexity	\$0.25 million	\$1 million	\$0.25 million	\$1 million	\$0.25 million	\$1 million	\$0.25 million	\$1 million	\$0.25 million	\$1 million	\$0.25 million	\$1 million	\$0.25 million	\$1 million
Construction Cost (+/-)														
Planning and Scoping	0.5%	0.5%	0.5%	0.5%	0.5%	0.5%	0.5%	0.5%	0.5%	0.5%	0.5%	0.5%	0.5%	0.5%
Design Development	10%	8%	9%	7%	13%	11%	10%	8%	9%	8%	8%	6%	8%	6%
Design Survey	1 ½%	1%	1 ½%	1%	1 ½%	1%	1%	½%	1%	½%	1%	½%	1 ½%	½%
Design Administration	2%	2%	1 ½%	1 ½%	2%	2%	1 ½%	1 ½%	1½%	1½%	1 ½%	1 ½%	1 ½%	1 ½%
Construction Survey	3%	2 ½%	2 ½%	2%	2%	1 ½%	1 ½%	1%	2½%	2%	2½%	2%	0.1%	0.1%
Construction Inspection	5%	5%	4%	4%	5%	5%	4%	4%	4%	4%	4%	4%	3%	3%
Construction Management	3%	3%	2%	2%	3%	3%	1 ½%	1 ½%	3%	3%	2%	2%	2%	2%
Project Closure	0.4%	0.1%	0.4%	0.1%	0.4%	0.1%	0.4%	0.1%	0.4%	0.1%	0.4%	0.1%	0.4%	0.1%
Total	25.4%	22.1%	21.4%	18.1%	27.4%	24.1%	20.4%	17.1%	21.9%	19.6%	19.9%	16.6%	17%	13.7%

These guidelines have been developed based upon data developed by the American Society of Civil Engineers (ASCE) in their publication entitled, *Consulting Engineering: A Guide for the Engagement of Engineering Services*. The ASCE stated that the percentage of construction cost “has been widely used for determining the compensation of consulting engineers on assignments where the principal responsibility is the design of various works, and the preparation of drawings, specifications, and other contract documents as necessary.” The following points should be noted concerning this cost of construction guideline.

- Two different levels of complexity are noted: average and above average. An above average level of complexity should be based upon the need to deal with other agencies (e.g., CalTrans), the design complexities of the project, or problems with planning and construction determining the compensation of consulting engineers on assignments where the principal responsibility is the design of various works, and the preparation of drawings, specifications, and other contract documents as necessary.
- These guidelines are customized to fit the different types of construction jobs such as street construction, street reconstruction, sanitary sewer, etc.
- These guidelines were developed to fit the different types of work activities in each capital project. These include planning and scoping, design development, design survey, design administration, construction survey, construction inspection, construction management, and project closure.
- The guidelines are expressed as a percentage of construction (e.g., the cost of staffing as a percentage of construction). To determine the number of staff hours required, divide the cost of the work activity based upon the cost of construction guidelines by the current hourly cost of a consulting engineer for engineering work activities. Use of the hourly cost for a consulting engineer will level the playing field and ensure that the City’s staff is every bit as productive and held as accountable as consulting engineers.
- The guidelines identify resource requirements for each work activity associated with a project. These include design development, design survey, design administration, etc.

- If a consulting engineer is accomplishing the design, the project manager in the Engineering and Design Division would utilize the guideline for design administration, and not design development.
- The Project Civil Engineers within the Division should utilize these guidelines to determine the staffing requirements for each project in terms of person hours required for design and construction inspection utilizing the cost of construction guidelines.
- The Deputy City Engineer should customize these costs of construction guidelines. The cost of construction guidelines should not be blindly utilized. These guidelines are just guidelines. The guidelines will need to be adjusted to local circumstances.

Recommendation: The Civil Engineering Division should utilize cost of construction guidelines to document resource requirements for the design and inspection of capital projects.

(3) Modify the Monthly Capital Project Status Report.

The current reports that are developed are without sufficient detail for certain important managerial decisions to be made. These reports are not routinely provided to clients (other divisions departments) so that the current status of projects is known. With the additional information developed and gathered as a result of the recommendations contained in the previous section, more comprehensive and useful project reports can be developed. The Civil Engineering Division should modify the monthly status report that it currently publishes.

The monthly report should be expanded and the following information should be included in this status report.

- The capital project number (based upon the number assigned in the capital improvement program);
- The capital project name;
- The project manager or construction inspector assigned to the project (or the consulting engineer);

- A comparison of actual project costs to date versus planned, including:
 - Design budget;
 - Design expenditures to date, separately identifying staff expenditures from consulting expenditures;
 - Construction management expenditures to date, separately identifying contract administration, construction inspection, and consulting engineering expenses;
 - Construction cost as budgeted; and
 - Current construction cost as estimated by the project manager responsible for construction management.

These project costs should be based upon a fully loaded hourly rate that includes indirect costs.

- A comparison of actual project schedule to-date versus planned, including:
 - The date the design was scheduled to begin and actually begun;
 - The date the design was scheduled to finish and actually finished;
 - The date the City Council was scheduled to award a contract for the construction versus the actual (or new estimated date);
 - The date the construction was scheduled to begin and actually begun; and
 - The date the construction was scheduled to finish and actually finished.
 - The current status of the capital project, containing explanations such as 30% design complete.

This should be a simple report. The report should be published monthly, online on the Internet. After e-mail distribution of this status report, it should be the basis of a monthly meeting by the Project Civil Engineers, Deputy City Engineer, and the client departments or divisions.

Recommendation: The information provided by the monthly capital project status report should be expanded.

(4) The Civil Engineering Division Should Utilize the Project Accounting Module In Pentamation to Track the Costs Associated with Design, Inspection and Construction of Capital Projects.

The City's financial system – Pentamation - is capable of payroll time reporting which charges by project or task. This would enable the Civil Engineering Division to track the salary and benefit costs by project or task worked by an employee on any given day.

The information that the division should maintain within the City's financial system should include:

- Project account number;
- Funds control, including the budget for the project, source of funds, etc.;
- Purchase orders approved and pending, including account numbers;
- Contracts, amendments, and change orders including the dates and the amounts;
- Key dates within the project, such as award of contract;
- Invoice payments, including the dates of the payments;
- Project close-out.

Access to the information contained within this system should be provided on the City's Intranet.

Recommendation: The Civil Engineering Division should utilize the project accounting module within Pentamation to track the costs associated with the design and inspection of capital projects. Access to the information contained within the system should be provided on the City's Intranet.

(5) A Final Report Should Be Prepared Upon Completion of a Capital Project.

Without a formal analysis and distribution for review, the mistakes and weaknesses of one project will almost certainly be repeated on others. The final report should focus on analyzing the good and bad aspects of the completed project, transmitting that information to the staff of the Civil Engineering Division, and providing a convenient summary of the project.

At the completion of the project, the project manager assigned to the project should complete a final report, including:

- Project name, project number, and a description of the project. Construction costs – planned versus actual with an identification of all of the change orders and the reasons for those change orders;
- The staff hours allocated to the project – planned versus actual;
- The schedule for completion of the project – planned versus actual, including whether drawings, specifications, schedules, and cost estimates were prepared consistently according to schedule;
- The design costs for the project – planned and actual, including cost per sheet;
- Construction management costs – planned versus actual;
- Whether as-built plans have been completed;
- Comments and discussion regarding the project as necessary, including unusual conditions encountered during the project such as contractor deficiency, quantity difference, scope change, etc. This should include feedback from the project owner / client to assess their perspectives regarding the project.

This report should be circulated to the Project Civil Engineer, Supervising Public Works Inspector, and Deputy City Engineer. After distribution of this status report, it should be the basis of a meeting with the client department or division.

Recommendation: A final report should be prepared for capital projects upon completion of construction and acceptance of the improvements.

(6) Billability Targets Should Be Established for the Civil Engineering Division Staff.

To assure the staff of the Civil Engineering Division is efficiently utilized, the Deputy City Engineer should set billability targets for staff, including the Project Civil Engineers, the Supervising Public Works Inspector and Public Works Inspectors. These targets would represent that proportion of their work time that these staff would be billable to capital projects.

The project accounting system should be utilized to monitor the performance of these staff against these targets.

Recommendation: Billability targets should be established for staff of the Civil Engineering Division.

(7) Maintain a Summarized Twenty-Four Month Bar Chart Schedule for All of the Capital Projects That Will Be Designed and Inspected by the Civil Engineering Division.

This schedule should portray start and finish dates for each capital project by simple activity descriptions for design, bid package preparation, advertise/award, right-of-way acquisition, environmental assessment, and construction. This schedule should be prepared for all capital projects that will be assigned to the Civil Engineering Division during the next twenty-four months.

This bar chart should be updated on a monthly basis using Microsoft Project.

Recommendation: The Civil Engineering Division should develop a 24-month bar chart schedule for the design and construction of all capital projects, and update that chart monthly.

(8) A Design Report Should Be Completed When the Design Is No More Than 10% Complete.

The Project Civil Engineer assigned to the capital project should be responsible for preparing a design report (project evaluation and alternatives study). If a consulting engineer is completing the design of the project, then the consulting engineer would prepare this design report. This should be completed for significant and complicated capital projects such as the seismic retrofit and upgrade of water storage tanks or the replacement of Coldwater Canyon reservoir, and not routine projects such as street resurfacing.

The design report should be prepared when the design is not more than 10% complete. The purpose of the design report is to serve as a preliminary design review to enable the project manager to review and approve the proposed design approach. More specifically, the design report should:

- Briefly identify the capital project and describe the project.
- Provide a background to the project including project history, whether the project has any outside support or opposition, and whether any commitments regarding the project have been made.
- Define the problem the capital project is intended to solve and the alternatives considered that could possibly solve all or a portion of the problem.
- Outline the detailed scope of the project and the reasoning behind the selection of the alternative utilized for the design and other engineering decisions.
- Outline in detail the design criteria used for the capital project and the rationale for those criteria.
- Set forth the detailed construction costs for the capital project based upon a detailed review of expected problems and the completion of 10% design, and the sources of funding.

Upon completion of the design report, the Project Civil Engineer assigned to the project should schedule a preliminary design review meeting. The Project Civil Engineer, Deputy City Engineer, and Supervising Public Works Inspector should attend this meeting.

At this meeting, the Project Civil Engineer assigned to the project should briefly review the project, the alternatives selected, the selected alternative and why this alternative was selected, the design and construction cost estimate, special problems not resolved, the project schedule, and the staffing requirements (or consulting engineer) needed to complete the design and construction management.

Recommendation: A design report should be completed for each significant and complicated capital project when the design is no more than 10% complete.

(9) A Rating System Should Be Developed and Utilized to Evaluate the Performance of Each Consulting Engineer Utilized on City Construction Projects.

The Civil Engineering Division should develop a formal evaluation mechanism that rates each consulting engineer's performance as part of the close-out of each construction project. The consulting engineer's performance should be evaluated on factors such as:

- Ability to complete the project on schedule;
- Ability to complete the project within the established budget;
- Whether as-built documentation is provided and is accurate and thorough;
- Timeliness of communications to staff, including periodic status reports and early identification of potential issues that would impact the projects completion on time or within budget;
- Ability of engineer of record to perform the assigned duties within the budget agreed upon for professional services fees; and

- Quality of documentation provided on projects.

A simple rating scale should be applied to each factor rated, such as exceeded expectations, met expectations, and below expectations. An overall rating should be applied. Any consulting engineer's performance that receives an overall rating of below expectations should not be utilized for future projects.

Recommendation: The Civil Engineering Division should implement a consulting engineer evaluation system and utilize this system as part of the final project close-out.

(10) A Project Management Manual Should Be Developed, and Staff Should Be Trained in Its Application.

At the present time, a project management manual is not in place within the Civil Engineering Division. A project management manual is designed to provide guidance and policies to those individuals assigned to oversee capital projects and assist them in the performance of their duties. A project management manual should address the following duties of the project manager:

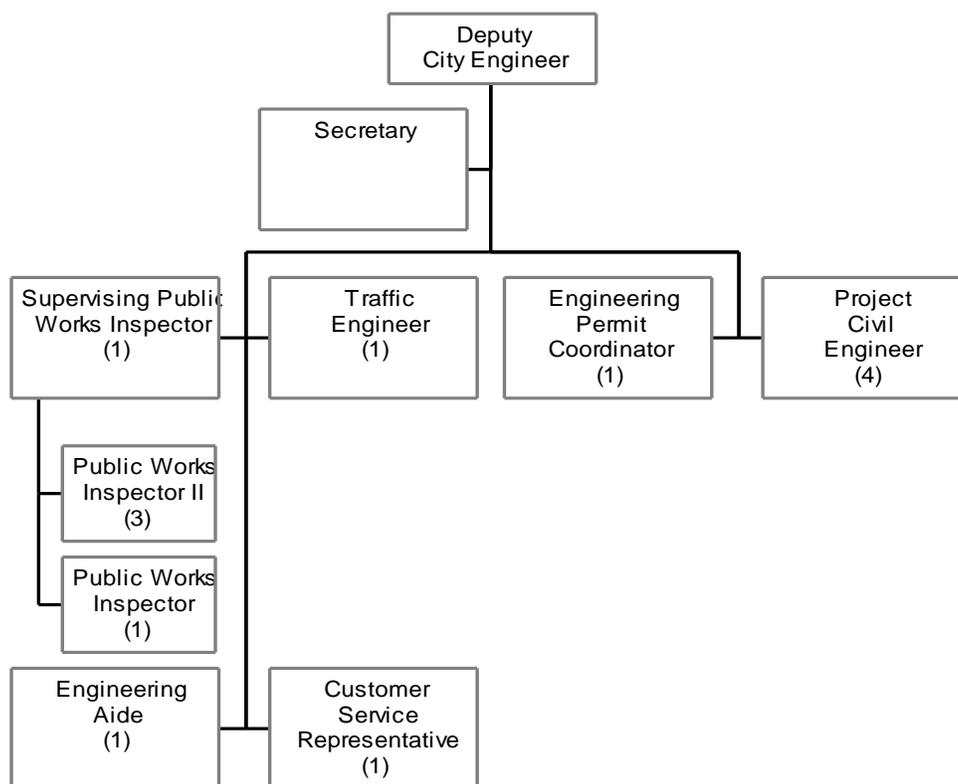
- Planning the work;
- Estimating resources;
- Organizing the work;
- Acquiring resources (personnel and materials);
- Assigning tasks;
- Directing activities;
- Controlling project execution;
- Reporting progress; and
- Project close-out.

Each of these sections should include a detailed expectation of the Project Civil Engineer for this task and any applicable policies and procedures. The value of a project management manual is not only to provide a resource for project managers to review established policies and procedures; but it assists in ensuring consistency by the Project Civil Engineer. Additionally, it is a useful educational tool for employees and those clients who are working with the Project Civil Engineer on a capital project.

Recommendation: The Civil Engineering Division should develop a project management manual and train all Project Civil Engineers and Public Works Inspectors in its use and application.

6. THE PLAN OF ORGANIZATION FOR THE CIVIL ENGINEERING DIVISION SHOULD BE MODIFIED.

The existing plan of organization for the Civil Engineering Division is presented below.



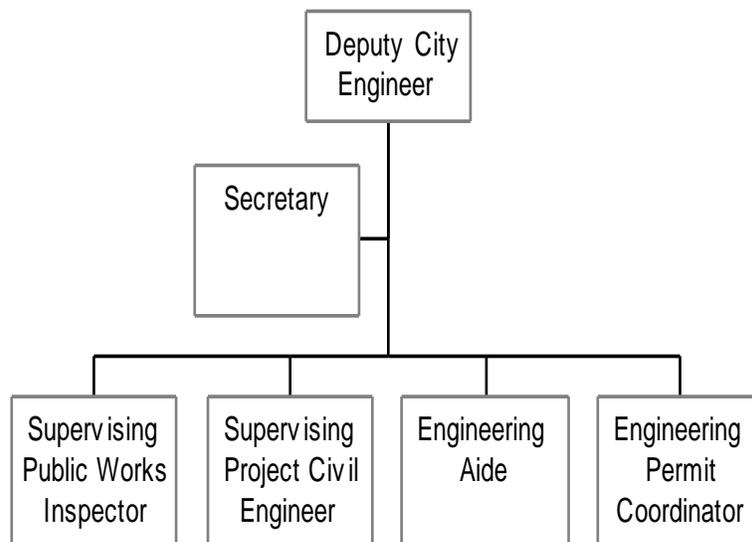
Important points to note concerning the plan of organization are presented below.

- The Deputy City Engineer has a span of control of eight, excluding the Secretary.
- The positions that report to the Deputy City Engineer include the Supervising Public Works Inspector, Traffic Engineer, Engineering Permit Coordinator, four Project Civil Engineers, and an Engineering Aide.
- The lack of a lead worker for civil engineering results in the Deputy City Engineer providing day-to-day supervision of the design and project management of capital projects.
- The provision of the day-to-day supervision of the design and project management of capital projects detracts from the ability of the Deputy City Engineer to focus on important engineering challenges such as the development of a pavement management program, assuring the implementation of the water, storm water, and wastewater master plans, meeting with client departments and divisions to discuss the status of projects and project delivery alternatives, etc.
- Traffic engineering is included within the Civil Engineering Division. However, the Deputy Director / Transportation is responsible for a number of activities that are directly related to traffic engineering including the following:
 - Support of the Traffic and Parking Commission including permit-parking zone, parking meter (e.g., valet and customer loading zones), overnight parking and neighborhood traffic management policies;
 - Monitor and evaluate regional transportation proposals and support advocacy efforts for the Westside Subway Extension;
 - Support development of the General Plan circulation element and Santa Monica Blvd. improvements;
 - Provision of senior and disabled transportation programs including Dial-A-Ride, Taxi Coupon and MTA Bus pass sales, and operation of the Beverly Hills Trolley and a parking shuttle;
 - Issuance of Valet parking permits for special events or for operations servicing permanent business locations including the review of applications for driving route, parking location and adequate event staffing. Staff also issues valet attendant identification cards; and
 - Issuance of preferential and overnight parking permit programs. Issues approximately 9,000 preferential and 4,000 overnight parking permits per

year to Beverly Hills residents.

The work of the Traffic Engineer in the Civil Engineering Division has a direct bearing on many of these services.

The project team recommends that the plan of organization for the Civil Engineering Division be revised as proposed below.



Important points to note concerning the proposed plan of organization are presented below.

- The Traffic Engineer should be transferred to the Transportation Division and report directly to the Deputy Director of Transportation.
- The Customer Service Representative should receive day-to-day supervision from the Engineering Permit Coordinator.
- The vacant Project Civil Engineer position should be upgraded to Supervising Project Civil Engineer and assigned responsibility, as a lead worker, for the day-to-day supervision of the three (3) Project Civil Engineers and the management of the design of capital projects. The Supervising project Civil Engineer position would be a new classification.

This would reduce the span of control of the Deputy City Engineer to four.

The annual cost impact of this plan of organization is presented in the table

below.

Annual Cost Increase		Annual Cost Decrease	
Upgrade the vacant Project Civil Engineer position to a new classification of Supervising Project Civil Engineer.	\$19,900	NA.	\$0
Total Operating Cost Increase	\$19,900	Total Operating Cost Decrease	\$0

Recommendation: Upgrade the vacant Project Civil Engineer position to a new classification of Supervising Project Civil Engineer.

7. THE TRAFFIC ENGINEER POSITION SHOULD BE MORE EFFECTIVELY UTILIZED.

The roles and responsibilities of the Traffic Engineer are presented below.

- Allocates approximately 45% of his time in responding to citizen requests such as requests for stop signs, speed bumps, traffic enforcement, etc.
- Allocates approximately 25% of his time to reviewing and quality controlling traffic mitigation studies, and field investigations of requests for curb cuts (driveway approaches, driveway modifications, etc.).
- Allocates approximately 15% of his time to ongoing studies of speed, traffic counts, signal design and operation, traffic movement, etc.
- Allocates approximately 15% of his time to traffic capital projects such as signals including supervision of consulting engineers.

The Traffic Engineer is a professional engineer. The incumbent has a masters degree in traffic engineering, and is a registered traffic engineer. The incumbent is being utilized for tasks that should be performed by a traffic technician. Indeed, an estimated 60% of his time is allocated to tasks that should be performed by a traffic technician. In fact, the Community Development Department is utilizing traffic engineering consultant firms, at a monthly cost of approximately \$12,000 to \$15,000 primarily for reviewing development applications.

The Traffic Engineer is not performing the types of tasks that a traffic engineer

should be performing. These include such tasks as the following:

- Development and installation on an annual ongoing basis of a traffic safety program to proactively identify high accident intersections and develop mitigation measures;
- Development and installation on an annual ongoing basis of a traffic improvement program to proactively design and implement traffic system management measures that reduce traffic congestion and travel time delay;
- Review of traffic signal timing every three (3) to five (5) years to assess changes in traffic flows;
- Development and review of citywide or corridor timing, traffic signal optimization software is utilized (for example—Synchro), simulation of optimized timing, field installation, observation and fine-tuning;
- Plan checking of development plans and traffic impact studies to assure conformance with City standards and mitigation of the additional trips generated by development; and
- Coordination of signal timing across jurisdictional boundaries in support of corridor operations.

The effective use of this position should enable the City to substantially reduce the reliance on traffic engineering consultants by the Community Development Department. The annual cost impact of the enhanced utilization of this position is presented in the table below.

Annual Cost Increase		Annual Cost Decrease	
NA.	\$0	Enhance the effective use of the Traffic Engineer and Engineering Aide for traffic engineering and reduce reliance on traffic engineering consultants.	\$108,000
Total Operating Cost Increase	\$0	Total Operating Cost Decrease	\$108,000

Recommendation: The Traffic Engineer should be reclassified to Senior Traffic Engineer to more accurately depict the responsibilities of the position.

Recommendation: The Traffic Engineer should be utilized to perform professional traffic engineering responsibilities such as development and installation on an

annual ongoing basis of a traffic safety program, development and installation on an annual ongoing basis of a traffic improvement program, review and adjustment of traffic signal timing, plan checking of development plans and review of traffic impact studies, etc.

8. the engineering aide position should be more effectively utilized.

The Engineering Aide in the Civil Engineering Division is underutilized. The roles and responsibilities of this position are presented below.

- Administers the Underground Service Alert (USA) program. Processes the request for a USA by forwarding to the appropriate department. The Engineering Aide indicated, however that he is not confirming that the responsible party in the City has marked the USA anymore; rather, he is just forwarding the USA to the responsible division.
- Serves as the records manager for the Engineering Division in terms of archiving, microfilming, etc.
- Distributes construction bid documents to contractors.
- Receives, logs in an Excel spreadsheet, and routes citizens requests for service to the appropriate division.
- Updates and maintains GIS databases such as the crime location database for the Police Department.

The incumbent of this position allocates approximately one-half of his time on a daily basis to updating and maintaining GIS databases. In addition, with the proposed reallocation of Civil Engineering to the City's facility on 345 Foothill Road, this workload can be shifted to support staff. There is sufficient support staff available to provide this service at that facility.

The Engineering Aide position can be utilized more effectively for support of the Project Civil Engineers, relieving the Project Civil Engineers of those tasks that should be performed by a paraprofessional.

Recommendation: The utilization of the Engineering Aide position should be enhanced.

9. THE CIVIL ENGINEERING DIVISION SHOULD DEVELOP AND INSTALL A PAVEMENT MANAGEMENT SYSTEM.

The Civil Engineering Division should develop a more systematic and data based approach to the identification of the City's needs for preventive maintenance of the streets. The steps that should be taken by the Division to accomplish this important objective are presented below.

(1) The Division Should Acquire A Pavement Management Software Program.

A pavement management software program is designed to enable the Division to utilize a systematic, objective, and consistent approach to evaluate existing and future pavement conditions of the City's streets, and a means to help the City manage the pavement maintenance expenditures cost-effectively. A pavement management software program uses a pavement rating system, called a pavement condition index, as the basis from which current and future pavement preventive maintenance needs can be evaluated. Based upon the pavement condition evaluation, multiple budget and maintenance scenarios can be run using the software to determine the most cost-effective solution for the City in terms of expenditures for slurry seal, conventional and rubber overlay, and reconstruction.

A pavement management system consists of three major components:

- A system to regularly collect pavement condition data;
- A computer database to sort and store the collected data (e.g., American Public Works Association's MicroPAVER); and
- An analysis of repair or preservation strategies and suggestions of cost-effective approaches to maintain pavement conditions.

Implementation of the pavement management software will require the Division to take the following steps:

- **Data collection and pavement network definition.** This data collection would include the construction records for the street system. This data includes the age, surfacing thicknesses, and surfacing types for all sections. Good age data is essential to the performance of computerized pavement management models that generally rely on age as the basis for performance prediction curves.
- **Pavement condition assessment.** This step involves visually inspecting the pavement based on set procedures to establish the pavement condition index for the pavement.
- **Pavement condition prediction.** This step involves utilizing the pavement management software to calculate the current pavement condition as well as predicting what the future pavement condition will be through the use of a family of performance prediction curves.
- **Formulation of maintenance policies.** This step involves the development of treatment alternatives (i.e., slurry seal, microsurfacing, overlay, etc.), and the development of “trigger scores” for each surface treatment alternative. A “trigger score” is the set of conditions as defined by the condition indices, the performance curves, and any other pertinent data items under which a particular treatment would be feasible. For example, streets with a pavement condition index of 40 or less (out of a possible 100) would be a “trigger score” for reconstruction.
- **Budget formulation and scenario development.** In this step, multiple budget and maintenance scenarios would be developed that would model the amount of money that can be spent in any particular year of the analysis and its impact on the pavement condition index. The model uses the allocated money to optimize the pavement condition index. That is, a single strategy is selected for each of the analysis sections based on the overall benefit to the street system as a whole and on the available money.

The output from the pavement management software is a list of candidate streets with the appropriate surface treatment based on the input parameters, the input condition data, and the input budget. These candidate streets can be provided to the Finance Department as input to the five-year capital improvement program.

The pavement management system needs continual updating and improvement in the form of adjustments to the performance curves, updated treatment costs, and changes in the condition indices. In addition to the list of recommended candidate streets, recommendations must be made as to overall funding levels required to meet the pavement preservation goals of the City. Running the model with a variety of budget scenarios would accomplish this.

The cost of publicly developed software, such as the American Public Works Association's MicroPAVER, approximates \$1,050 in one-time capital outlay for member organizations.

Recommendation: The Civil Engineering Division should purchase and fully utilize a pavement management system to provide a systematic approach to the repair and maintenance of the City's streets.

(2) The Civil Engineering Division Should Utilize a Mix of Engineers and Staff from Street Maintenance to Evaluate the Pavement Condition of the City's Streets and Identify the Pavement Condition Indices.

The condition of the City's street system should be evaluated over a three-year cycle using two two-person crews. A two-person crew should be capable of evaluating the condition of two to three centerline miles of streets each day. Approximately one staff month will be required each year to evaluate the condition of the pavement. In addition, the City should retain a consultant to provide initial training to these staff. A mix of engineers from the Civil Engineering Division and staff from the Street Maintenance should be trained to conduct these pavement evaluations, and then be utilized each year to assess one-third of the City's street system.

It is recommended that the City utilize the pavement condition evaluation methodology developed by the American Public Works Association MicroPAVER. Micro

PAVER's Pavement Condition Index (PCI) methodology recently received the American Society for Testing and Materials (ASTM) standard D6433-99. MicroPAVER is the only pavement management system to have received an ASTM standard designation. Standard D6433-99 is the only pavement rating methodology recognized for rating streets and parking lot pavements.

Recommendation: The Civil Engineering Division should evaluate the pavement condition of the City's streets on a three-year cycle, with 33% of the streets being evaluated each year.

(3) The Civil Engineering Division Should Utilize Non-Structural Overlays In Addition To Overlays as Preventive Maintenance for the City's Streets.

When used properly as preventive maintenance, non-structural overlays prevent future cracking by delaying the aging process of the pavement. They can also correct minor flaws such as rutting, raveling, minor cracks, and reduced pavement friction. Certain products, because of their structure, can only be used on low volume traffic roads and the friction aggregate requirements for these treatments reflect this limitation. At present, the City relies on overlays.

The Department should consider a wider range of preventive maintenance than overlay. Other cities, comparable to Beverly Hills, utilize slurry seal. Cities such as Belvedere, Newport Beach, Palos Verdes Estates, Atherton, and Menlo Park, for example, use slurry seal. The wider range of preventive maintenance that should be considered by the Department are presented below.

- **Slurry Seal.** Quick-set slurry is a mixture of asphalt emulsion, aggregate, mineral filler and water. The slurry is continuously mixed and applied to the pavement in a single lift with specialized equipment. There are two aggregate gradations that the Department should consider: Type II and Type III. No compaction is required for quick-set slurry, but the emulsion must be allowed to cure before opening to traffic, usually 2-3 hours. Quick-set slurry will seal the pavement, reducing

oxidation and weathering of the surface. The reduction in oxidation will allow the pavement to remain resilient to fatigue and low temperature cracking. Minor surface distresses such as raveling may also be corrected or prevented. The expected surface life for quick-set slurry is 3 to 5 years. It should be used for low volume traffic streets. Type III should be used for streets with higher levels of distress. Generally, slurry seal is approximately 20% to 30% of the cost of a overlay.

- **Micro-surfacing.** Micro-surfacing is a mixture of polymer modified asphalt emulsion, aggregate, mineral filler, and water, that has a slurry consistency during mixing and application. The micro-surfacing is continuously mixed and applied with specialized equipment. There are two mix types available based on aggregate gradation: Type II micro-surfacing and Type III micro-surfacing. Micro-surfacing overlays are always applied in two passes. No compaction is required, however, the emulsion must be allowed to cure before traffic is applied. Micro-surfacing will accept traffic within 1 hour after application under most conditions. Micro-surfacing will seal the pavement, reducing oxidation and weathering of the surface. Minor surface distresses such as raveling may also be prevented or corrected. The expected surface life for micro-surfacing is 5 to 7 years. It can be used for high volume traffic streets.

Menlo Park, in proposing a mix of slurry seal and cape seal for their City Council's consideration, recommended the use of a latex-modified slurry seal mix design and volcanic black aggregate. The specifics of this recommendation made by staff in Menlo park, and the cost advantages noted by staff in the use and application of slurry seal, are noted below.

The cost for a typical-size Menlo Park asphalt concrete overlay project is approximately \$8.50 per square yard, compared to \$1.50 per square yard for slurry seal and \$3.50 for cape seal. Because of the significant cost difference between asphalt concrete on one hand, and the slurry seal and cape seal on the other, staff attempts to use the slurry seal and cape seal as much as possible. Staff has found that the combination of the cape seal or slurry seal with pavement section repairs by digging out localized failures and patching with asphalt concrete is a cost-effective alternative to asphalt concrete overlay in many situations. The exception is where there are extensive area-wide failures that require most of the pavement area to be removed and repaved. In order to increase public acceptance and be able to use the slurry seal and cape seal throughout the City, it is important that the look of the pavement surface treated with slurry seal be improved to make it comparable to streets newly paved with asphalt

concrete

In the past the City's slurry seal mix design used an emulsion with ordinary aggregates that tended to ravel, leaving loose aggregates on the pavement surface. Over time the surface of the slurry seal that used the ordinary aggregates changed color to a rusty brown as minerals in the aggregates oxidized. To control the raveling problem, staff modified the slurry mix design with latex and has been using a latex-modified slurry seal mix design for the past 10 years. This has improved the raveling problem. The rusty brown look, however, has remained, and some residents have complained. The use of volcanic black aggregate is gaining increased acceptance and application in Bay Area agencies as a preferred slurry seal aggregate. The volcanic black aggregate with latex-modified slurry emulsion has been found by many agencies to solve the issue about the rusty brown look of ordinary aggregate slurry seal. It also provides a high-quality preventive maintenance treatment for the pavement. Volcanic black aggregate meets or exceeds all the technical requirements of the CalTrans Standard Specifications for slurry seal. The agencies currently using the volcanic black aggregate slurry seal include the City of San Jose, City of Los Altos, City of Redwood City, City of Foster City, City of Campbell, City of Santa Clara, City of Palo Alto, and Santa Clara County.

The cost of volcanic black aggregate is 4% to 7% higher over the typical cost of \$1.50 per square yard for slurry seal can be justified when compared to \$8.50 per square yard for asphalt concrete, especially if the superior look of the volcanic black aggregate will help accelerate public acceptance of the slurry seal treatment method and expand the use of slurry seal throughout the City.

In expanding the types of non-structural overlays utilized, the Civil Engineering Division should develop strategies to assure the effective use of these alternatives.

Important points to note include the following:

- The alternative treatment approaches should consider the different traffic volume, with lower volume streets receiving longer cycles between surface treatments (e.g., slurry seal) and pavement overlays;
- The Division should notify the community prior to the project, and emphasis should be placed on traffic control during the course of the project;
- During the course of the project, after project completion, and throughout the contractor's guarantee period, staff from the Division should ensure the contract specifications are met;

- These alternative strategies should only be utilized on sound pavements or else an alternative treatment like asphalt rubber seal should be applied before the slurry seal; and
- The cycle chosen needs to be grounded upon the development of strategies that are tied to the pavement condition index for the street.

The estimated annual cost for use and application of slurry seal on the City’s streets is presented in the table below.

Annual Cost Increase		Annual Cost Decrease	
Use and apply slurry seal on the City’s streets.	\$333,200	NA.	\$0
Total Operating Cost Increase	\$333,200	Total Operating Cost Decrease	\$0

Recommendation: The Civil Engineering Division should expand the set of non-structural overlays that it utilizes for preventive maintenance of the City’s streets beyond overlay to include slurry seal and micro-surfacing.

Recommendation: The Civil Engineering Division should develop strategies to assure the effective use and application of these alternative non-structural overlays.

10. THE CIVIL ENGINEERING DIVISION SHOULD PREPARE A REPORT FOR CONSIDERATION OF THE CITY COUNCIL REGARDING THE IMPLEMENTATION OF THE WATER, WASTEWATER, AND STORM WATER MASTER PLANS.

The Public Works and Transportation Department has commissioned three (3) master plans: one for the water utility, another for the wastewater utility, and the third for the storm water utility.

The water system master plan, prepared in August 2002, recommended a capital improvement program through 2012 to provide the required capacity and reliability to meet projected water demands. The recommended improvements were broken down into two fiscal year construction periods: phase 1 from 2003 through 2007 and phase 2 from 2008 to 2012. The probable capital costs for the improvements were \$25.6 million

for phase 1 and \$16.1 million for phase 2 (in 2002 dollars). These improvements consisted of pumping station and storage reservoir improvements, water system facility inspection improvements, valve improvements, distribution main improvements, and miscellaneous improvements.

The wastewater system master plan, prepared in June 1997, recommended a five-year capital improvement program that would, at that time, have required capital improvement program expenditures of \$3.7 million to \$7.0 million (in 1997 dollars). The projects included replacing and relining sanitary sewer mains, the physical inspection of nine (9) basins contributing the most infiltration and inflow, and pipe replacement to eliminate projected wet weather deficiencies.

The Storm Drain Master Plan was prepared in November 1999. The purpose of this master plan was to perform a preliminary screening of the entire storm water system, identify those areas where deficiencies appear, rank their severity, prepare gross cost “opinions” for system upgrades, and recommend a capital improvement program to initiate corrections. The master plan found that 20% of the storm water systems (or 141 systems) that were analyzed were insufficient to convey the runoff for at least one of the design storms (10 or 25-year) and were deficient; 16 of these links were in the Los Angeles County Hollyhills Drain, and were excluded, and another 101 required a 1-foot diameter upgrade or less to the existing pipe size. The master plan recommended 106 reinforced concrete pipe elements and 19 reinforced concrete box elements. The total cost for the recommended capital improvement program amounted to \$15.2 million dollars (in 1999 dollars).

The Civil Engineering Division should prepare a report for consideration of the City Council regarding the status of the implementation of the three master plans, and recommendations to implement those projects that have not been implemented including proposed sequencing.

Recommendation: The Civil Engineering Division should prepare a report for consideration of the City Council regarding the status of the implementation of water system, the wastewater system, and stormwater master plans, and recommendations to implement those projects proposed in the master plans that have not been implemented including proposed sequencing.

11. THE ONLINE BUSINESS CENTER SHOULD BE MODIFIED TO BETTER MEET THE NEEDS OF THE CIVIL ENGINEERING DIVISION.

The Online Business Center (OBC) has a number of limitations that inhibit the effective use of this system by the Civil Engineering Division. Examples of these limitations are presented below.

- The engineering permit staff are unable to enter conditions of approval for utility cut permits or other engineering permits into OBC;
- Public Works inspectors are unable to use the Interactive Voice response system and inspection data must be manually entered into OBC;
- The proof of insurance screen can generate numerous records of the same applicant;
- The right-of-way permit screen does not automatically populate fields where data for the applicant is already in the system; and
- There isn't a GIS connection from OBC for sewer locations, tract maps, utility structure locations, etc.

The Deputy City Engineer should meet with Information Technology to discuss these limitations. Information Technology should develop a plan for consideration of the Deputy City Engineer to address these limitations.

Recommendation: The Deputy City Engineer should meet with Information Technology to discuss these limitations of OBC from the perspective of the Civil Engineering Division.

Recommendation: Information Technology should develop a plan for consideration of the Deputy City Engineer to address the limitations of OBC.

12. CONSTRUCTION MANAGEMENT AND CONSTRUCTION INSPECTION WORKLOAD EXCEEDS THE CAPACITY OF CIVIL ENGINEERING GIVEN THE CAPITAL PROJECTS CONTAINED IN THE FISCAL YEAR 2006-07 AND ONGOING CAPITAL PROJECTS.

In order to analyze the staffing requirements necessary for Civil Engineering to manage the design and construction of capital projects, the project team utilized cost of construction guidelines. These guidelines have been assembled based upon data developed by the American Society of Civil Engineers (ASCE) in their publication entitled *Consulting Engineering: A Guide for the Engagement of Engineering Services* and the experience of Berryman & Henigar. The following points should be noted concerning these guidelines.

- Two different levels of complexity are noted: average and above average. An above average level of complexity should be based upon the need to deal with other agencies (e.g., CalTrans), the design complexities of the project, or problems with planning and construction.
- These guidelines are customized to fit the different types of construction jobs such as street reconstruction, traffic control, water and sewer, etc.
- These guidelines were developed to “fit” the different types of work activities in each capital project. These include planning and scoping, design development, design survey, design administration, construction survey, construction inspection, construction management, and project closure.

The exhibit following this page presents the capital project management workload for Civil Engineering as of the beginning of December 2006.

Exhibit 13 (1)

**Civil Engineering Design and
Construction Workload Assessment**

1. Project Title	Install Traffic Signal	Replace Water Mains and Hydrants 06-07	Replace Coldwater Canyon Reservoir	Santa Monica Boulevard Corridor	Street Resurfacing 07-08	Replace Water Mains and Hydrants 07-08	Seismic Retrofit of Existing Water Tanks
2. CIP #	367	387	576	889	195	387	796
3. Project Status	0% Design	90% Design	100% Design	0% Design	0% Design	0% Design	0% Design
4. Construction Cost:	\$639,000	\$2,450,000	\$18,500,000	\$1,353,460	\$1,600,000	\$2,250,000	\$4,500,000
5. Complexity:	Average	Average	Complex	Complex	Average	Average	Average
6. In-House/Consultant Design	Consultant	Consultant	Consultant	Consultant	Consultant	Consultant	Consultant
7. Cost of Construction Guidelines:							
• Planning and Scoping	0.5%	0.5%	0.5%	0.5%	0.5%	0.5%	0.5%
• Design Development	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
• Design Administration	1.5%	1.5%	1.5%	2.0%	1.5%	1.5%	1.5%
• Construction Management	2.0%	2.0%	3.0%	3.0%	1.5%	2.0%	2.0%
• Construction Inspection	3.0%	4.0%	4.0%	5.0%	4.0%	4.0%	4.0%
• Project Closure	10.0%	0.1%	0.1%	0.1%	0.1%	0.1%	0.1%
8. Staff Hours Required							
• Planning and Scoping	21	8	-	45	53	75	150
• Design Development	-	-	-	-	-	-	-
• Design Administration	64	25	-	180	160	225	450
• Construction Management	85	327	3,700	271	160	300	600
• Construction Inspection	274	1,400	10,571	967	914	1,286	2,571
• Project Closure	9	35	264	19	23	32	64

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TOTAL STAFF HOURS REQUIRED	453	1,794	14,536	1,482	1,310	1,918	3,836
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Exhibit 13 (2)

1. Project Title	Street Resurfacing 06-07	Santa Monica Blvd. Interim Repairs	Street Light Master Plan	Repairs to Sewer System	Storm Drain and Compliance With TMDL's	Street Sign Replacement	Granite Sidewalks
2. CIP #	195	195	629	66	553	NA	NA
3. Project Status	100% design	100% Design	0% Design	0% Design	15% Design	0% Design	0% Design
4. Construction Cost:	\$1,600,000	\$400,000 Above	\$8,821,532	\$2,200,000	\$50,000	\$250,000	\$100,000 Above
5. Complexity:	Average	Average	Average	Average	Average	Average	Average
6. In-House/Consultant Design	Consultant	Consultant	Consultant	Consultant	Consultant	Consultant	Consultant
7. Cost of Construction Guidelines:							
• Planning and Scoping	0.5%	0.5%	0.5%	0.5%	0.5%	0.5%	0.5%
• Design Development	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
• Design Administration	1.5%	2.0%	1.5%	2.0%	1.5%	1.5%	2.0%
• Construction Management	1.5%	3.0%	2.0%	2.0%	2.0%	2.0%	3.0%
• Construction Inspection	4.0%	5.0%	3.0%	4.0%	4.0%	3.0%	5.0%
• Project Closure	0.1%	0.4%	0.1%	0.1%	0.4%	0.4%	0.4%
8. Staff Hours Required							
• Planning and Scoping	-	-	294	73	2	8	3
• Design Development	-	-	-	-	-	-	-
• Design Administration	-	-	882	293	5	25	13
• Construction Management	160	80	1,176	293	7	33	20
• Construction Inspection	914	286	3,781	1,257	29	107	71
• Project Closure	23	23	126	31	3	14	6
TOTAL STAFF HOURS REQUIRED	1,097	389	6,259	1,949	45	188	114

- The guidelines are expressed as a percentage of construction (e.g., the cost of staffing as a percentage of construction). To determine the number of staff hours required, divide the cost of the work activity based upon the cost of construction guidelines by the current hourly cost of a consulting engineer for engineering work activities. Use of the hourly cost for a consulting engineer or consulting construction inspector will level the playing field and ensure that the City's staff are every bit as productive and held accountable as consulting engineers or consulting construction inspectors.
- The guidelines identify resource requirements for each work activity associated with a project. These include design development, design administration, construction management, construction inspection, project closure, etc.

Important points to note about these projects are presented below.

- Based upon feedback from Civil Engineering, it is assumed that the design of all of these projects will be accomplished by consulting engineer.
- Cost of construction guidelines were applied to these projects and an hourly rate of \$150 for engineering staff and an hourly rate of \$70 for construction inspection staff utilized to determine the number of hours required for the staff of Civil Engineering. These hourly rates have been utilized by the project team in urbanized areas and represent the estimated equivalent costs for consulting engineers or consulting construction inspectors.
- These cost of construction guidelines were developed by Berryman and Henigar, and have been utilized by the project team in numerous management studies of engineering services.
- The design workload for these projects amounts to an estimated 2,999 staff hours or the equivalent of two staff years. This includes design planning and scoping and design administration. The most significant workload consists of the following:
 - Street light master plan with an estimated 1,176 staff hours required for design planning and scoping and design administration;
 - Seismic retrofit with an estimated 600 staff hours required for design planning and scoping and design administration;
 - The 2007-08 CIP project for replacement of water mains and hydrants with an estimated 525 staff hours required for design planning and scoping and design administration; and

- Repairs to the sewer system with an estimated 366 staff hours required for design planning and scoping and design administration.
- The largest proportion of workload that appears to be facing Civil Engineering is construction management and inspection resulting from several large and complicated construction projects. The total demands amount to an estimated 32,023 staff hours. Some of these projects – such as replacing Coldwater Canyon Reservoir – will take more than two years to accomplish, and all of the required staff hours are required in the previous total. Nonetheless, the workload would appear significant. The most significant workload consists of the following:
 - Replacing Coldwater Canyon reservoir with a construction cost of \$18,500,000 and an estimated 14,535 staff hours required for construction management, construction inspection, and project closure - the construction for this project estimated to require approximately two years;
 - Street light master plan with a construction cost of \$8,821,532 and an estimated 5,083 staff hours required for construction management, construction inspection, and project closure;
 - Seismic retrofit of existing water tanks with a construction cost of \$4,500,000 and an estimated 3,235 staff hours required for construction management, construction inspection, and project closure;
 - Replacement of water mains and hydrants in 2006-07 with a construction cost of \$2,450,000 and an estimated 1,762 staff hours required for construction management, construction inspection, and project closure;
 - Replacement of water mains and hydrants in 2007-08 with a construction cost of \$2,250,000 and an estimated 1,618 staff hours required for construction management, construction inspection, and project closure; and
 - Repairs to the sewer system with a construction cost of \$2,200,000 and an estimated 1,581 staff hours required for construction management, construction inspection, and project closure;

While the design workload is not significant relative to the staff resources available to Civil Engineering, the construction inspection, construction management, and project closure workload will far exceed the staff resources available to Civil Engineering.

Overall, the workload analysis indicates that the design workload is not sufficient to support four (4) Project Civil Engineers, but that combined with the construction

inspection, construction management, and project closure workload, the total design and construction management workload will far exceed the total staff resources available to Civil Engineering including the four (4) Project Civil Engineers, the Supervising Public Works Inspector, and four Public Works Inspectors.

The project team recommends that the Civil Engineering should utilize a consulting engineering firm for construction inspection and management of the larger capital projects such as replacement of the Coldwater Canyon reservoir and the street light master plan, and phase the construction of other capital projects to fit the workload capacity of Civil Engineering.

Recommendation: Civil Engineering should utilize consulting engineering firms for construction inspection and management of the larger capital projects such as replacement of the Coldwater Canyon reservoir and the street light master plan, and phase the construction of other capital projects to fit the workload capacity of Civil Engineering.

13. WATER DISTRIBUTION AND PRODUCTION SHOULD BE TRAINED IN THE USE OF THE CITY'S WATER DISTRIBUTION HYDRAULIC MODEL.

The City has developed computer models for its storm water system, its sanitary sewer system, and its water distribution system.

Computer modeling is based upon the collection of crucial information about the pipe network (pipe diameter, length, type, and network connectivity) and hydraulic operation (flow rates, pressures, tank levels, and pump operation). This information, when combined with modeling software, can be used to develop a calibrated distribution system model, and analyze potential design and operation changes and, in advanced use, to optimize hydraulic operation on a day-to-day or seasonal basis.

Civil Engineering has the knowledge regarding how to utilize these computer

models. However, the knowledge is restricted to one or two staff. Civil Engineering should expand the knowledge among its own staff regarding how to use these computer models, and at the same time provide training to operations staff such as the Water Utilities Manager.

Recommendation: Civil Engineering should expand the knowledge among its own staff regarding how to use the stormwater, sanitary sewer, and water distribution computer models developed as part of the master plans, and at the same time provide training to operations staff such as the Water Utilities Manager.

14. THE CLASSIFICATION TITLE FOR PROJECT CIVIL ENGINEER SHOULD BE MODIFIED.

At present, there is only one classification for the civil engineering series: Project Civil Engineer. The project team is recommending the addition of a supervisory classification for this series: Supervising Project Civil Engineer.

As part of the addition of this supervisory classification, the Project Civil Engineer series should be modified. The classification should eliminate the use of the word “project” and refer to the positions as Civil Engineer and Supervising Civil Engineer.

Recommendation: The classification structure for the Project Civil Engineer series should be modified.

15. FIVE COMPACT PICKUP TRUCKS SHOULD BE ACQUIRED FOR THE SUPERVISING PUBLIC WORKS INSPECTOR AND PUBLIC WORKS INSPECTORS.

At present, the Supervising Public Works Inspector and the four Public Works Inspectors utilize their own personal vehicles to conduct their business. This is an unusual practice.

The Supervising Public Works Inspector and the four Public Works Inspectors should be provided with compact pickup trucks to provide construction inspection and

management services. It is not a common practice in local governments for construction inspectors to utilize their own personal vehicles for the tasks performed by these staff, particularly given the types of demands placed on these vehicles.

The estimated annual cost for acquisition, operating and maintenance costs, and replacement costs are presented in the table below.

One-Time Capital Outlay Cost		Annual Cost Increase	
Acquire five (5) compact pickup trucks for the Supervising Public Works Inspector and the four Public Works Inspectors	\$100,000	Operating and maintenance costs and replacement costs for five (5) compact pickup trucks	\$15,000
Total One-Time Capital Outlay Cost	\$100,000	Total Operating Cost Increase	\$15,000

Recommendation: The Supervising Public Works Inspector and the four Public Works Inspectors should be provided with compact pickup trucks to provide construction inspection and management services.

16. THE PARTNERSHIP BETWEEN CIVIL ENGINEERING AND ITS CUSTOMERS SHOULD BE ENHANCED.

The delivery of water, wastewater, streets, or other capital projects that can be cost effectively maintained requires a partnership between the owner of the asset, those responsible for designing and constructing the asset, and those responsible for maintaining the asset when it is placed in service. This partnership should begin when a client identifies a need and continues through the design, construction and commissioning of the asset. Maximizing the input of the staff responsible for maintenance of the asset in the design and construction processes inevitably leads to water, wastewater, streets and other assets that cost less to maintain.

The management of design and construction management and water, wastewater, and streets maintenance are organizationally divided in the City. Civil Engineering is responsible for design and construction activities while other

organizational units in the Department are responsible for the maintenance of these assets once they have been placed into service. There a number of challenges in the partnership between Civil Engineering and the organizational units responsible for the maintenance of these assets as noted below.

- Obtaining the input of the organizational units responsible for maintenance at 30%, 60%, and 90% completion of plans, specifications and estimates.
- Providing the organizational units responsible for maintenance with project scoping agreements.
- Providing the organizational units responsible for maintenance with the Gantt charts developed by Civil Engineering.
- Inviting the organizational units responsible for maintenance to the punch list inspection of new and renovated assets.
- Requesting that the organizational units responsible for maintenance provide input regarding the type of hardware proposed by Civil Engineering (pumps, motors, etc.), and consulting these units about the impacts of these hardware (type, specifications) in terms of on-going maintenance costs as well as replacement cycles.
- Providing the organizational units responsible for maintenance with the opportunity to conduct project evaluations with Civil Engineering annually for a 1- to 5-year period after completion of a capital project to gather information about operation and performance features that would enable Civil Engineering to mitigate maintenance needs and costs in future design and construction projects.

These are challenges not only for Civil Engineering, but also for the organizational units responsible for maintenance to consistently participate in the design process and consistently provide feedback to Civil Engineering regarding the design of buildings.

To strengthen this partnership, Civil Engineering and the organizational units responsible for maintenance should develop a service level agreement that establishes parameters for an effective working relationship. The elements of the service level agreement are presented below.

- Civil Engineering and the organizational units responsible for maintenance of these assets (water, wastewater, streets, etc.) should form a project team whenever a new and significant project is scoped and initiated. The team should include, at a minimum, the Civil Engineering project manager and representatives of the organizational units responsible for maintenance. This participation should continue throughout the design and construction process.
- The Civil Engineering project manager should advise all project team members of their participation and provide meeting and milestone schedules. Meeting notes and correspondence should be distributed to all team members to facilitate project tracking.
- Team members should be included in the design process and meetings and receive copies of meeting minutes. Attendance on an as-needed basis should be the responsibility of each team member unless specifically requested by the Project Administration project manager.
- The Civil Engineering project manager should schedule punch-list walkthroughs in accordance with the construction contract and ensure that team members are invited to and informed of the focus of all walk-throughs.
- The Civil Engineering project manager should be responsible for compiling a list of discrepancies/deficiencies, as noted by the design contractor, Civil Engineering and the organizational units responsible for maintenance. These discrepancies should be reviewed by the Civil Engineering project manager and included in the corrections punch-list.
- The contractor, upon the completion of the punch-list corrections, should prepare a written report containing an itemized explanation of corrections and the actions taken. The Civil Engineering project manager should distribute the report to the project team.
- Upon final completion of construction, the Civil Engineering project manager should collect all operation and maintenance manuals, training material, as-built drawings of record and warranties. Copies of this information should be sent to the organizational units responsible for maintenance. The organizational units responsible for maintenance should maintain a complete set of all operation and maintenance manuals, as-built drawings and warranty documents.
- The Civil Engineering project manager should schedule and coordinate the training and demonstrations needed to successfully hand the building over to the owner and to organizational units responsible for maintenance of these assets (water, wastewater, streets, etc.) for use and on-going maintenance.

It should be noted that this partnership is a two-way street. Both organizational units -

Civil Engineering and organizational units responsible for maintenance of these assets (water, wastewater, streets, etc.) – need to cooperate equally for this partnership to function effectively. Civil Engineering should not be expected to carry this responsibility alone.

Recommendation: Civil Engineering and the organizational units responsible for maintenance of these assets (water, wastewater, streets, etc.) should take a number of steps to improve their partnership in the design and construction of new or rehabilitated assets.

Recommendation: Civil Engineering and the organizational units responsible for maintenance of these assets (water, wastewater, streets, etc.) should develop and adopt a service level agreement that establishes parameters for an effective working relationship.

Recommendation: Both Civil Engineering and the organizational units responsible for maintenance of these assets (water, wastewater, streets, etc.) need to cooperate equally for this partnership to function effectively. Project Administration should not be expected to carry this responsibility alone.

12. ANALYSIS OF PROJECT ADMINISTRATION

12. ANALYSIS OF PROJECT ADMINISTRATION

Project Administration is authorized four (4) positions, and is allocated another position temporarily assigned from Administration. These positions include the following:

- Project Administration Director;
- Project Manager;
- Two (2) Project Administrators; and
- A Customer Services Representative temporarily assigned from Administration.

The roles and responsibilities of these staff are presented below.

- Provide project management for facility capital projects. This includes development of request for proposals, bid document development, bid evaluation, contractor selection, coordination of inspections, approval of payment requests, ensuring of conformance to design specifications, monitoring of project budgets and schedules, close out, and other services.
- Inspects construction in City buildings by contractors to ensure conformance of CIP construction to design and construction standards, specifications, etc.

Project Administration is administering capital projects with an estimated construction value of \$59.8 million. This includes such projects as the Vehicle Shop Replacement (\$10,000,000), Greystone Mansion MEP (\$1,000,000), Parking Revenue Equipment (\$2,750,000), the City Hall Lobby Floor Remodel (\$3,500,000), the Foothill and Third Office Building (\$22,000,000), and the Public Works Parking Garage (\$12,000,000).

1. THE PUBLIC WORKS AND TRANSPORTATION DEPARTMENT EMPLOYS A NUMBER OF BEST PRACTICES IN PROJECT ADMINISTRATION.

An organizational and management analysis by its nature focuses on opportunities for improvement. However, there are a number of strengths in Project Administration. Examples of these strengths are portrayed below.

- A five-year capital improvement program has been developed and adopted by the City Council.
- Project Administration outsources the design of capital improvement projects.
- Project managers can have access to Pentamotion through Cognos to monitor construction costs for capital projects.
- Project managers are responsible for capital improvement projects from “cradle to grave.”
- Gantt charts have been developed for Project Administration capital projects.
- Project status reports are prepared by Project Administration that report the project, its assignment, the status of the project, in terms of the design and construction contract and general action milestones (e.g., demolition and removals in progress.)
- Customers of Project Administration are provided with project status reports on a monthly basis.
- Project Administration has begun scoping and cost estimating capital projects before design using a consulting architect and a professional cost estimator.

These strengths in Project Administration provide a sound basis for further enhancements.

2. THE PARTNERSHIP BETWEEN PROJECT ADMINISTRATION AND FACILITIES MAINTENANCE SHOULD BE ENHANCED.

The delivery of new or renovated buildings that can be cost effectively maintained requires a partnership between the owner of the building, those responsible for designing and constructing the building, and those responsible for maintaining the

building when it is placed in service. This partnership should begin when a client identifies a need and continues through the design, construction and commissioning of a building. Maximizing the input of the buildings owner and building maintenance representatives in the design and construction processes inevitably leads to buildings that cost less to maintain.

The management of design and construction management and building maintenance are organizationally divided in the City. Project Administration is responsible for building design and construction activities while Facilities Maintenance is responsible for the maintenance of buildings once they have been placed into service. There a number of challenges in the partnership between Project Administration and Facilities Maintenance as noted below.

- Obtaining the input of Facilities Maintenance at 30%, 60%, and 90% completion of plans, specifications and estimates for new or remodeled buildings.
- Providing Facilities Maintenance with project scoping agreements.
- Providing Facilities Maintenance with a Gantt chart for capital projects developed by Project Administration.
- Inviting Facilities Maintenance to the punch list inspection of new and renovated buildings.
- Requesting Facilities Maintenance provide input regarding the type of building hardware proposed by Project Administration (HVAC, electrical, plumbing), and consulting Facilities Maintenance about building hardware (type, specifications) impacts on-going maintenance costs as well as replacement cycles.
- Requesting input from Facilities Maintenance is not obtained regarding life cycle costs for the medium and large capital improvement projects that might lead to a reduction in overall life-cycle costs.
- Providing Facilities Maintenance with as-built documents.

- Providing Facilities Maintenance with the opportunity to conduct facility project evaluations with Project Administration annually for a 1- to 5-year period after a major renovation or completion of a new facility to gather information about the facility operation and performance features that would enable Project Administrators to mitigate maintenance needs and costs in future design and construction projects.

These are challenges not only for Project Administration, but also for Facilities Maintenance to consistently participate in the design process and consistently provide feedback to Project Administration regarding the design of buildings.

To strengthen this partnership, Project Administration and Facilities Maintenance should develop a service level agreement that establishes parameters for an effective working relationship. The elements of the service level agreement are presented below.

- Project Administration and the Facilities Maintenance should form a project team whenever a new project is scoped and initiated. The team should include, at a minimum, the Project Administration project manager and representatives of the client department or division and Facilities Maintenance. This participation should continue throughout the design and construction process.
- The Project Administration project manager should advise all project team members of their participation and provide meeting and milestone schedules. Meeting notes and correspondence should be distributed to all team members to facilitate project tracking.
- Team members should be included in the design process and meetings and receive copies of meeting minutes. Attendance on an as-needed basis should be the responsibility of each team member unless specifically requested by the Project Administration project manager.
- The Project Administration project manager should schedule punch-list walkthroughs in accordance with the construction contract and ensure that team members are invited to and informed of the focus of all walk-throughs.
- The Project Administration project manager should be responsible for compiling a list of discrepancies/deficiencies, as noted by the design contractor, Project Administration, the client department or division and a representative from Facilities Maintenance. These discrepancies should be reviewed by the Project Administration project manager and included in the corrections punch-list.

- The contractor, upon the completion of the punch-list corrections, should prepare a written report containing an itemized explanation of corrections and the actions taken. The Project Administration project manager should distribute the report to the project team.
- Upon final completion of construction, the Project Administration project manager should collect all operation and maintenance manuals, training material, as-built drawings of record and warranties. Copies of this information should be sent to Facilities Maintenance and to the client department or division. Facilities Maintenance should maintain a complete set of all operation and maintenance manuals, as-built drawings and warranty documents.
- The Project Administration project manager should schedule and coordinate the training and demonstrations needed to successfully hand the building over to the owner and to Facilities Maintenance for use and on-going maintenance.

It should be noted that this partnership is a two-way street. Both organizational units - Project Administration and Facilities Maintenance – need to cooperate equally for this partnership to function effectively. Project Administration should not be expected to carry this responsibility alone.

Recommendation: Project Administration and Facilities Maintenance should take a number of steps to improve the partnership between the two units.

Recommendation: Project Administration and Facilities Maintenance should develop and adopt a service level agreement that establishes parameters for an effective working relationship.

Recommendation: Both Project Administration and Facilities Maintenance need to cooperate equally for this partnership to function effectively. Project Administration should not be expected to carry this responsibility alone.

3. PROJECT ADMINISTRATION SHOULD ENHANCE ITS PRACTICES FOR MANAGEMENT OF CAPITAL PROJECTS.

There are a number of positive aspects to the manner that Project Administration utilizes to manage its capital projects. The Project Administration Director continues to enhance those practices over time. The project team believes that there are other

project management practices utilized by Project Administration that could be enhanced. These recommended enhancements are provided below.

- Staffing requirements for project managers and project officers have not been fully defined.
- Costs of construction guidelines are not utilized to determine the project managers and project administrator staffing requirements for capital improvement projects.
- Staffing resources are not “leveled” to fit the design and construction management workload to the available staff resources.
- A project accounting system is not utilized to record the allocation of staff hours for the design and construction management by staff.
- The monthly capital improvement program status reports generated do not provide important information regarding facility capital projects.
- Capital projects are not fully scoped before commencement of design.
- Facility Maintenance is not reviewing plans and specifications at 30%, 60%, and 90% completion.
- Feedback mechanisms (e.g., final reports) have not been developed for quality assurance purposes.

A number of steps need to be taken by Project Administration to improve the management of capital projects. These recommended steps are presented below.

(1) A Design Authorization Form Should Be Completed Before Commencement Of Building Design.

Project Administration does complete a project scoping agreement prior to the initiation of a capital project.

The project scoping agreement should be expanded and additional information included. Design of a project should not be initiated until the resources required (project management staff hours) for completing the project have been identified using the

design authorization form. The design authorization form should include the components enumerated below.

- The project title including the phase of the project, if relevant.
- A general project description including a narrative summary description of the project, specific physical improvements, the location of the project, and the relationship to master plans.
- The capital project number (as noted in the five year capital improvement program).
- The financing and the cost including the source of funds, and the appropriation status.
- A budget covering the project management or design staffing, construction management staffing, appropriate consultants, property acquisition, utility relocation, etc., by major expenditure component.
- The responsibility for completing the various components of the capital project including the following:
 - Design by in-house staff or by consulting architect;
 - Construction inspection by in-house staff or by consulting architect;
 - Environmental assessment required;
 - Property acquisition required and, if so, the number of parcels and their locations and assessor parcel numbers;
 - Utility relocations that need to be relocated, problems with relocation and timing issues; and
 - Other key responsibilities that need to be assigned and/or accomplished.
- The extent of coordination necessary, listing the inter-agency coordination by division, department, or outside agency with whom coordination will be required in the design and construction of the capital project, the nature of the coordination, and the key contacts;
- The preliminary schedule for completing the design and construction of the capital project including the schedule for design, bid package preparation, advertise/award, property acquisition, environmental reports, and construction

and including the dates of important events such as approval of the award of construction contract;

- A document control procedure and record-keeping system including contract documents;
- A change order procedure that includes a documented, systematic approach to the handling of construction change orders;
- Organizational structures, management skills, and staffing levels required throughout the design and construction phase, including the estimated staffing required in terms of person hours required for design and construction inspection utilizing the cost of construction guidelines;
- Quality control and quality assurance functions, procedures, and responsibilities for design and construction;
- Materials testing policies and procedures;
- Design and construction reporting requirements, including cost and schedule control procedures;
- Design considerations or issues related to the capital project such as complexities of the design; and
- Community relations and public information requirements including public hearings or meetings and how the public will be informed and involved in the preliminary design and informed about the progress of the design and construction.

A design authorization form should be completed before commencement of design. The client department or division and Facilities Maintenance should review the design authorization form prior to the commencement of design.

Recommendation: A design authorization form should be completed before commencement of design. The client department or division and Facilities Maintenance should review the design authorization form prior to the commencement of design.

(2) Cost Of Construction Guidelines Should Be Developed And Utilized To Document Project Management and Project Administrator Staffing Requirements For The Design and Construction Management Of Facility Capital Improvement Projects.

The use of cost of construction guidelines is commonplace in the architectural profession. These guidelines have been developed based upon the experience of architects in their profession. The following points should be noted concerning this cost of construction guideline:

- Two different levels of complexity should be utilized: average and above average. An above average level of complexity should be based upon the need to deal with other agencies, the design complexities of the project, or problems with planning and construction determining the compensation of consulting engineers on assignments where the principal responsibility is the design of various works, and the preparation of drawings, specifications, and other contract documents as necessary.
- These guidelines should be developed to fit the different types of construction jobs such as remodeling, new construction, expansion, etc.
- These guidelines should be developed to fit the different types of work activities in each capital project. These include planning and scoping, design development, design administration, construction inspection, construction management, and project closure.
- The guidelines should be expressed as a percentage of construction (e.g., the cost of staffing as a percentage of construction). Using these guidelines, to determine the number of staff hours required, Project Administration would divide the cost of the work activity (e.g., design administration) based upon the cost of construction guidelines by the current hourly cost of a consulting architect. Use of the hourly cost for a consulting architect will level the playing field and ensure that Project Administration's staff are every bit as productive and held accountable as consulting architects.
- The guidelines identify resource requirements for each work activity associated with a project. These include design administration, construction management, etc.
- The project managers and project administrators within Project Administration should utilize these guidelines to determine the project management and project officer staffing requirements for each project in terms of person hours required for

design administration and construction management utilizing the cost of construction guidelines.

Recommendation: Project Administration should develop and utilize cost of construction guidelines to document project management and project administrator staffing requirements for the design and construction management of facility capital improvement projects.

(3) Facilities Maintenance Should Be Provided With the Opportunity For Input and Critique Of Plans and Specifications Developed by Project Administration At 30%, 60% and 90% Completion.

Project Administration should distribute the preliminary architectural plans and specifications to Facilities Maintenance at 30%, 60% and 90% completion for comment and critique. Project Administration should compile a list of discrepancies, as noted by Facilities Maintenance to be reviewed and included in the plans and specifications for correction.

Once the architect has completed corrections to the plans and specifications, the Project Administration should send an itemized explanation of corrections taken, amended, or deleted in response to corrections noted by Facilities Maintenance.

Recommendation: Facilities Maintenance should be provided with the opportunity for input and critique of plans and specifications developed by Project Administration at 30%, 60% and 90% completion.

(4) Modify the Monthly Capital Project Status Report.

Project Administration uses project management software (Microsoft Project). Monthly status reports are generated by Project Administration that identify the project schedule.

Project Administration should modify these monthly status reports. The monthly report should be expanded and the following information should be included in this status report.

- The capital project number (based upon the number assigned in the five year capital improvement program);
- The capital project name;
- The project manager or project administrator assigned to the project (or the consulting engineer);
- A comparison of actual project costs to date versus planned including:
 - Design budget;
 - Design expenditures to date separately identifying staff expenditures from consulting expenditures;
 - Construction management expenditures to date separately identifying contract administration, construction inspection, and consulting architect expenses;
 - Construction cost as budgeted; and
 - Current construction cost as estimated by the project manager responsible for construction management.

These project costs should be based upon a fully loaded hourly rate that includes indirect costs.

- A comparison of actual project schedule to date versus planned including:
 - The date the design was scheduled to begin and actually begun;
 - The date the design was scheduled to finish and actually finished;
 - The date the City Council was scheduled to award a contract for the construction versus the actual (or new estimated date);
 - The date the construction was scheduled to begin and actually begun; and
 - The date the construction was scheduled to finish and actually finished.
 - The current status of the capital project containing explanations such as 30% design complete.

This should be a simple report. The report should be published monthly, online on the Internet. After e-mail distribution of this status report, it should be the basis of a monthly meeting by the project managers, project administrators, and the Project Administration Director, Facilities Maintenance, and the client department or division.

Recommendation: Modify the monthly capital project status report.

(5) Project Administration Should Utilize the Pentamation Project Accounting Software To Track the Costs Associated With Design Administration and Construction Of Facility Capital Projects.

Project Administration should utilize the project accounting capacity of Pentamation to track the actual time expended for each project by its staff. The information required within the system should include:

- Project account number;
- Funds control including the budget for the project, source of funds, etc.;
- Purchase orders approved and pending including account numbers;
- Contracts, amendments, and change orders including the dates and the amounts;
- Key dates within the project such as award of contract by the City Council;
- Invoice payments including the dates of the payments; and
- Project closeout.

Access to the information contained within this system should be provided on Intranet.

Recommendation: Project Administration should utilize the Pentamation project accounting software to track the costs associated with design administration and construction of facility capital projects.

(6) A Design Report Should Be Completed by Project Administration When the Design Is No More Than 10% Complete.

The project manager or project administrator assigned to the facility capital project should be responsible for preparing a design report (project evaluation and alternatives study). If a consulting architect is completing the design of the project, then the consulting architect would prepare this design report.

The design report should be selectively prepared for complicated or significant projects.

The design report should be prepared when the design is not more than 10% complete. The purpose of the design report is to serve as a preliminary design review to enable the project manager or project administrator to review and approve the proposed design approach. More specifically, the design report should:

- Briefly identify the capital project and describe the project;
- Provide a background to the project including project history, whether the project has any outside support or opposition, and whether any commitments regarding the project have been made;
- Define the problem the capital project is intended to solve and the alternatives considered that could possibly solve all or a portion of the problem;
- Outline the detailed scope of the project and the reasoning behind the selection of the alternative utilized for the design and other architectural decisions;
- Outline in detail the design criteria used for the capital project and the rationale for those criteria; and
- Set forth the detailed construction costs for the capital project based upon a detailed review of expected problems and the completion of 10% design, and the sources of funding.

Upon completion of the design report, the project manager or project administrator assigned to the project should schedule a preliminary design review

meeting. The project manager or project administrator assigned to this project, the Facilities Maintenance Manager, and a representative of client department or division should attend this meeting.

At this meeting, the project manager or project administrator should review the project, the alternative selected, why this alternative was selected, the design and construction cost estimate, special problems not resolved, the schedule, and staffing requirements (or consulting architects) needed to complete the design and construction management, etc.

Recommendation: Project Administration should complete a design report when the design is no more than 10% complete for those projects that are complex or significant.

(7) A Final Report Should Be Prepared Upon Completion of a Building Capital Project.

Without a formal analysis and distribution for review, the mistakes and weaknesses of one project will almost certainly be repeated on others. The final report should focus on analyzing the good and bad aspects of the completed project, transmitting that information to the staff of Project Administration, and providing a convenient summary of the project.

At the completion of the project, the project manager or project administrator assigned to the project should complete a final report including:

- Project name, project number, a description of the project, construction costs – planned versus actual with an identification of all of the change orders and the reasons for those change orders;
- The staff hours allocated to the project - planned versus actual;

- The schedule for completion of the project - planned versus actual including whether drawings, specifications, schedules, and cost estimates were prepared consistently according to schedule;
- The design costs for the project - planned and actual including cost per sheet;
- Construction management costs - planned versus actual;
- Whether as-built plans have been completed and a copy forwarded to the Facilities Maintenance;
- Whether the project at completion met the value expectations of the client including a customer satisfaction survey completed by the client that identifies such issues as construction cost versus value, responsiveness to the client, ease of maintenance, usability, and the like; and
- Comments and discussion regarding the project as necessary including unusual conditions encountered during the project such as contractor deficiency, quantity difference, scope change, etc.

This report should be circulated to the other project managers and project administrators, the Project Administration Director, Facilities Maintenance, and the client department(s). After distribution of this status report, it should be the basis of a meeting with the client department(s) Facilities Maintenance, and Project Administration.

Recommendation: A final report should be prepared upon completion of a facility capital project.

4. THE MIX OF STAFF WITHIN PROJECT ADMINISTRATION SHOULD BE ADJUSTED AND THE DESIGN AND CONSTRUCTION WORK WILL NEED TO BE PHASED GIVEN THE WORKLOAD AND THE STAFF AVAILABLE.

Project Administration allocates three staff to project management of capital project design and construction management. These positions are presented below.

- Project Manager; and
- Two (2) Project Administrators.

Project Administration clearly has a number of large projects on the immediate

horizon. These include the following:

- The Public Works parking garage with an estimated construction cost of \$12,000,000);
- The Foothill and Third Office building with an estimated construction value of \$22,000,000;
- The City Hall Lobby Floor remodel with an estimated construction cost of \$3,500,000; and
- The Greystone Mansion MEP with an estimated construction cost of \$1,000,000.

The existing capital project workload is significant, even with exclusive reliance on consulting architects for these projects. These projects, in terms of the assignments, are presented below.

Class Title	Number of Assigned Projects	% of Total Projects
Project Administration Director	6	15.4%
Project Manager	9	23.1%
Project Administrator #1	14	35.9%
Project Administrator #2	7	17.9%
Customer Service Representative	3	7.7%

Important points to note concerning the table are presented below.

- The Project Manager is assigned all of the significant projects identified previously with the exception of Greystone Mansion MEP.
- There is an imbalance in workload among the two Project Administrators. One of the project Administrators is assigned fourteen (14) projects, while the other is assigned seven (7) projects. The Project Administrator assigned seven (7) projects does provide secondary support for the Project Manager on four (4) projects, however, the nature of this secondary support could be accomplished by support staff within Administration such as a Staff Assistant.
- The Customer Service Representative is shown as being assigned three (3) projects.

The project team recommended, in a previous chapter of this report, that a Staff Assistant be utilized for support of Project Administration. This position, as noted in a previous chapter, should be part of the Support Services “pool” in Administration. The

classification title of this position indicates a number of duties that would better serve the needs of Project Administration than that of a Customer Service Representative.

These include, in part, the following:

- Provide administrative, technical and clerical support for administrative staff;
- Conduct research, data collection and analysis for special projects resulting in written reports including options and recommendations;
- Maintain project files and reports; and
- Prepare correspondence, agenda statements, resolutions, revisions of procedural manuals, rules and regulations, etc.

The classification description indicates that these positions function as paraprofessionals. The Staff Assistant assigned to the support of Project Administration could be utilized as a project administrator for smaller capital projects such as the following:

- The terra cotta Wilshire fountain;
- The Fitness Center acoustic sound study;
- The Will Rogers park pathway upgrades;
- The Library Auditorium study (already assigned to the Customer Services Representative);
- The Library space planning study (already assigned to the Customer Services Representative);
- Kelly's Coffee Shop tenant improvement in the Library;

The position is already being utilized for administration of smaller projects. It should continue to be utilized in that role, albeit an expanded role.

In order to analyze the staffing requirements necessary for Project Administration to manage the design and construction of capital projects, the project team utilized cost

of construction guidelines. These guidelines have been assembled based upon data developed by the project team. Architectural firms utilize the use of a percentage of construction cost. The following points should be noted concerning these guidelines.

- Two different levels of complexity are noted: average and above average. An above average level of complexity should be based upon the design complexities of the project, or problems with planning and construction.
- These guidelines were developed to “fit” the different types of work activities in each capital project. These include planning and scoping, design administration, construction inspection, construction management, and project closure.

The exhibit following this page presents the capital project management workload for Project Administration as of the beginning of January 2007. The following points should be noted regarding the application of these guidelines to Project Administration and the associated workload analysis.

- The guidelines are expressed as a percentage of construction (e.g., the cost of staffing as a percentage of construction). To determine the number of staff hours required, divide the cost of the work activity based upon the cost of construction guidelines by the current hourly cost of a consulting architect. Use of the hourly cost for a consulting architect will level the playing field and ensure that the City’s staff is every bit as productive and held accountable as consulting engineers or consulting construction inspectors.
- The guidelines identify resource requirements for each work activity associated with a project. These include design administration, construction management, construction inspection, project closure, etc.
- Based upon feedback from Project Administration Director, it is assumed that the design of all of these projects will be accomplished by a consulting architect.

Exhibit 14 (1)

**Project Administration Design and
Construction Workload Assessment**

1. Project Title	Beverly Hills Sign	Terra Cotta Wilshire Fountain	Anza Park Renovation	Beverly Fountain Rehabilitation Arden Arbors / Fountain Rehabilitation	Will Rogers Park Pathway Upgrades	Greystone Mansion MEP
2. Project Status	85% Design	15% Construction	0% Design	0% Design	0% Design	35% Design
3. Construction Cost:	\$150,000	\$30,000	\$385,000	\$90,000	\$40,000	\$1,000,000
4. In-House/Consultant Design	Consultant	Consultant	Consultant	Consultant	Consultant	Consultant
5. Cost of Construction Guidelines:						
• Planning and Scoping	0.5%	0.5%	0.5%	0.5%	0.5%	0.5%
• Design Development	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
• Design Administration	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%
• Construction Management	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%
• Construction Inspection	4.0%	4.0%	4.0%	4.0%	4.0%	4.0%
• Project Closure	0.1%	0.1%	0.1%	0.1%	0.1%	0.1%
6. Staff Hours Required						
• Planning and Scoping	1	-	16	4	2	27
• Design Development	-	-	-	-	-	-
• Design Administration	4	-	64	15	7	108
• Construction Management	25	4	64	15	7	167
• Construction Inspection	50	9	128	30	13	333
• Project Closure	1	0.2	3	1	0	8
TOTAL STAFF HOURS	81	13	276	65	29	644

Exhibit 14 (2)

1. Project Title	Greystone Firehouse Rehabilitation	Greystone Site Maintenance	La Cienaga Tennis Courts Resurfacing	FSHQ-HVAC System Upgrades	Fire Station #3 Remodel	Irrigation Upgrades
2. Project Status	0% Design	0% Design	0% Design	15% Construction	0% Design	90% Construction
3. Construction Cost:	\$50,000	\$100,000	\$105,000	\$179,600	\$650,000	\$235,000
4. In-House/Consultant Design	Consultant	Consultant	Consultant	Consultant	Consultant	Consultant
5. Cost of Construction Guidelines:						
• Planning and Scoping	0.5%	0.5%	0.5%	0.5%	0.5%	0.5%
• Design Development	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
• Design Administration	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%
• Construction Management	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%
• Construction Inspection	4.0%	4.0%	4.0%	4.0%	4.0%	4.0%
• Project Closure	0.1%	0.1%	0.1%	0.1%	0.1%	0.1%
6. Staff Hours Required						
• Planning and Scoping	2	4	4	-	27	10
• Design Development	-	-	-	-	-	-
• Design Administration	8	17	18	-	108	39
• Construction Management	8	17	18	25	108	39
• Construction Inspection	17	33	35	51	217	78
• Project Closure	0	1	1	1	5	2
TOTAL STAFF HOURS	36	72	75	66	466	168

Exhibit 14 (3)

1. Project Title	Police Department Jail Reconfiguration	Parking Structure Painting	City Hall Access Control Replacement	Library Security Upgrades	Water Sites Security Upgrades	Access Control Upgrade Replacement - Police and Library
2. Project Status	0% Design	0% Design	20% Construction	95% Design	90% Design	0% Design
3. Construction Cost:	\$550,000	\$400,000	\$319,633	\$140,000	\$600,000	\$215,000
4. In-House/Consultant Design	Consultant	Consultant	Consultant	Consultant	Consultant	Consultant
5. Cost of Construction Guidelines:						
• Planning and Scoping	0.5%	0.5%	0.5%	0.5%	0.5%	0.5%
• Design Development	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
• Design Administration	2.0%	1.0%	2.0%	2.0%	2.0%	2.0%
• Construction Management	2.0%	1.0%	2.0%	2.0%	2.0%	2.0%
• Construction Inspection	4.0%	1.0%	4.0%	4.0%	4.0%	4.0%
• Project Closure	0.1%	0.1%	0.1%	0.1%	0.1%	0.1%
6. Staff Hours Required						
• Planning and Scoping	23	17	-	0	3	9
• Design Development	-	-	-	-	-	-
• Design Administration	92	33	-	1	10	36
• Construction Management	92	33	43	23	100	36
• Construction Inspection	183	33	85	47	200	72
• Project Closure	5	3	2	1	5	2
TOTAL STAFF HOURS	394	120	130	73	318	154

Exhibit 14 (4)

1. Project Title	Parking Revenue Control Equipment	Parking Facilities Upgrade	Vehicle Shop Replacement	Central Plant Cooling Tower and Chiller	Relocate Print Shop and Graphics	Kelly's Coffee Shop
2. Project Status	0% Construction	0% Design	95% Design	0% Design	40% Construction	35% Construction
3. Construction Cost:	\$2,750,000	\$500,000	\$10,000,000	\$365,000	\$440,344	\$50,000
4. In-House/Consultant Design	Consultant	Consultant	Consultant	Consultant	Consultant	Consultant
5. Cost of Construction Guidelines:						
• Planning and Scoping	0.5%	0.5%	0.5%	0.5%	0.5%	0.5%
• Design Development	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
• Design Administration	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%
• Construction Management	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%
• Construction Inspection	4.0%	4.0%	4.0%	4.0%	4.0%	4.0%
• Project Closure	0.1%	0.1%	0.1%	0.1%	0.1%	0.1%
6. Staff Hours Required						
• Planning and Scoping	-	21	21	15	-	-
• Design Development	-	-	-	-	-	-
• Design Administration	-	83	83	61	-	-
• Construction Management	458	83	1,667	61	44	5
• Construction Inspection	917	167	3,333	122	88	11
• Project Closure	23	4	83	3	2	0
TOTAL STAFF HOURS	1,398	358	5,188	262	134	17

Exhibit 14 (5)

1. Project Title	Develop T-Lot Montage	City Hall Lobby Floor Remodel	Temp. Trailers Relocation	Admin. Services / HR Remodel	CC Plaza / New Police Exit ramp	Foothill & Third Office Building	Public Works 2nd Floor Remodel
2. Project Status	15% Construction	80% Design	85% Design	75% Design	98% Construction	0% Design	95% Design
3. Construction Cost:	\$400,000	\$3,500,000	\$750,000	\$75,000	\$995,150	\$22,000,000	\$150,000
4. In-House/Consultant Design	Consultant	Consultant	Consultant	Consultant	Consultant	Consultant	Consultant
5. Cost of Construction Guidelines:							
• Planning and Scoping	0.5%	0.5%	0.5%	0.5%	0.5%	0.5%	0.5%
• Design Development	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
• Design Administration	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%
• Construction Management	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%
• Construction Inspection	4.0%	4.0%	4.0%	4.0%	4.0%	4.0%	4.0%
• Project Closure	0.1%	0.1%	0.1%	0.1%	0.1%	0.1%	0.1%
6. Staff Hours Required							
• Planning and Scoping	-	29	5	1	-	917	0
• Design Development	-	-	-	-	-	-	-
• Design Administration	-	117	19	3	-	3,667	1
• Construction Management	57	583	125	13	3	3,667	25
• Construction Inspection	113	1,167	250	25	7	7,333	50
• Project Closure	3	29	6	1	0	183	1
TOTAL STAFF HOURS	173	1,925	405	42	10	15,767	78

Exhibit 14 (6)

1. Project Title	Public Works Parking Garage
2. Project Status	0% Design
3. Construction Cost:	\$12,000,000
4. In-House/Consultant Design	Consultant
5. Cost of Construction Guidelines:	
• Planning and Scoping	0.5%
• Design Development	0.0%
• Design Administration	2.0%
• Construction Management	2.0%
• Construction Inspection	4.0%
• Project Closure	0.1%
6. Staff Hours Required	
• Planning and Scoping	500
• Design Development	-
• Design Administration	2,000
• Construction Management	2,000
• Construction Inspection	4,000
• Project Closure	100
TOTAL STAFF HOURS	8,600

- Cost of construction guidelines were applied to these projects and an hourly rate of \$120 for project manager and project administrator to determine the number of hours required for the staff of Project Administration. These hourly rates have been utilized by the project team in urbanized areas and represent the estimated equivalent costs for consulting architects.
- Not all of these projects will or can occur at the same time due to the sequencing of design and construction. The portrayed workload represents more than one fiscal year as a consequence.
- The design workload for these projects amounts to an estimated 8,251 staff hours or the equivalent of almost six staff years. This includes design planning and scoping and design administration. The most significant workload consists of the following:
 - Foothill and Third office building with an estimated 4,584 staff hours (or three staff years) required for design planning and scoping and design administration; and
 - Public Works parking garage with an estimated 2,500 staff hours (or almost two staff years) required for design planning and scoping and design administration.
- The largest proportion of workload that appears to be facing Project Administration is construction management and inspection resulting from several large and complicated construction projects. The total demands amount to an estimated 29,294 staff hours. The most significant workload consists of the following:
 - Public Works parking garage, with a construction cost of \$12,000,000, requires an estimated 6,100 staff hours for construction management, construction inspection, and project closure;
 - Foothill and Third office building, with a construction cost of \$22,000,000, requires an estimated 11,183 staff hours for construction management, construction inspection, and project closure;
 - City Hall lobby remodel, with a construction cost of \$3,500,000, requires an estimated 1,779 staff hours for construction management, construction inspection, and project closure;
 - Vehicle shop replacement, with a construction cost of \$10,000,000, requires an estimated 5,083 staff hours for construction management, construction inspection, and project closure; and

- Parking revenue control equipment, with a construction cost of \$2,750,000, requires an estimated 988 staff hours for construction management, construction inspection, and project closure.
- This does not include concept development of projects such as the Community Recreation Center study that will also require the time and effort of Project Administration to manage.

Both the design workload and the construction inspection, construction management, and project closure workload will far exceed the staff resources available to project Administration.

Overall, the workload analysis indicates that the design, construction inspection, construction management, and project closure workload exceeds the capacity of Project Administration. This is due, in large measure, to several large projects including the Foothill and Third office building, the Public Works parking garage, the City Hall remodel, the Vehicle Shop replacement, and the parking revenue control equipment.

The project team recommends that Project Administration should continue to utilize consulting architectural firms for construction inspection and management of the larger capital projects, and phase the construction of other capital projects to fit the workload capacity of Project Administration.

The City should immediately authorize a Project Manager position as an “overhire” – given the large capital projects in the near term future – and given the skills required to manage these projects. Through turnover, one of the Project Administrator positions should be eliminated through attrition. The net cost of upgrading this position is presented in the table below.

Annual Cost Increase		Annual Cost Decrease	
Upgrade a Project Administrator position as it becomes vacant to a Project Manager position	\$33,600	NA	\$0
Total Annual Cost Increase	\$33,600	Total Annual Cost Decrease	\$0

Recommendation: Project Administration should continue to utilize consulting architects for design administration, construction management, and construction inspection and project closure of capital projects.

Recommendation: Given the large capital projects in the near-term future and the skills required to manage these projects, the City should immediately authorize a second Project Manager position as an “overhire”, and eliminate a Project Administrator position through attrition.

13. ANALYSIS OF PARKING OPERATIONS

13. ANALYSIS OF PARKING OPERATIONS

Parking Operations is responsible for the management of the City's eleven (11) parking facilities and five (5) parking decks, the collection of revenue from and the maintenance of the City's 3,145 parking meters, and the collection of revenue from and the maintenance of the City of West Hollywood's 2,100 meters. Parking Operations uses a mix of ten (10) full-time and approximately seventy-five (75) part-time or temporary employees. Important points to note concerning the staffing are presented below.

- Six (6) full-time staff are allocated to parking meter maintenance and revenue collection including a Parking Meter Supervisor, a Senior Parking Meter Technician, a Parking Meter Technician, and three (3) Revenue Collectors.
- Only two (2) full-time staff are allocated to Parking Operations: two Parking Supervisors. These staff are responsible for supervising hourly and regular part-time parking attendants.
- Two (2) staff are allocated to administration: the Director of Parking Operations and the Parking Operations Manager.

Parking Operations recently contracted for the completion of a *Parking System Staffing Assessment and Parking Management Best Practices Review*. The recommendations contained within this chapter are, in some cases, based upon that assessment.

1. THE PUBLIC WORKS AND TRANSPORTATION DEPARTMENT EMPLOYS A NUMBER OF BEST PRACTICES IN PARKING OPERATIONS.

An organizational and management analysis by its nature focuses on opportunities for improvement. However, there are a number of strengths in Parking Operations. Examples of these strengths are portrayed below.

- The parking enterprise fund had \$5.449 million in cash and cash equivalents at the end of FY 2004-05.

- Parking Operations provides management of 16 parking structures with 4,500 spaces.
- Most parking facilities were well lit and in generally sound condition. Minimal trash and debris were noted.
- Most parking equipment and booths appear to be in good condition
- The City is currently upgrading its parking facilities to automate the payment process.
- Segregation of duties between coin collectors and supervisors who prepare the bank transfers for the armored car service provide for a strong level of internal controls. Revenue collectors work in groups reducing the likelihood of theft.

These strengths in Parking Operations provide a sound basis for further enhancements.

2. THE RESPONSIBILITY FOR MAINTENANCE AND REPAIR OF PARKING FACILITIES SHOULD BE CLARIFIED AND MAINTENANCE AND SAFETY ISSUES ADDRESSED.

The *Parking System Staffing Assessment and Parking Management Best Practices Review* raised a number of issues regarding the City's parking facilities and the adequacy of the maintenance of these facilities. The analysis noted that the City-owned parking facilities were in a generally usable condition, although some problems with cleanliness and structural systems were present. The analysis regarding the issues below as significant based upon a walk-through of these facilities by the consultant.

- Stall lines on the top levels of most facilities were faded or obscured by sealants applied to the parking surfaces. Fading stall lines were also noticed on other levels of each facility as well.
- Some cracking was noticed in facility walls and in parking surfaces. Some previous surface repairs are failing, exposing older damage. Also, several areas of exposed rebar and tensioning cables were noted in parking surfaces. Water intrusion was also noted in some facilities. A comprehensive structural review of each parking facility was recommended.

- Loose and/or broken wheel stops were noticed in several facilities. Damaged wheel stops can create a significant tripping hazard for pedestrians in the facility.
- Serious damage caused by vehicles was noted in facility walls (La Cienega facility) and ceilings (Beverly-Canon facility). These areas should be repaired as soon as possible.
- Parking surfaces and facility walls were stained and dirty in most facilities. Pressure washing would help remove the stains and dirt, and create a more inviting parking environment. Pressure washing should be performed at least once per year. Also, additional attention should be paid to daily trash/debris pick-up.
- Facility lighting was acceptable in most areas, although a few facilities had inadequate transitional lighting at entry. The light fixtures at some locations did not appear to be functioning properly, and some fixtures were missing.
- Several facilities had railings and light poles that needing repainting.
- Many facilities did not have clearance warning signs/bars hanging over facility entrance lanes.
- The entrance signage to some facilities needs to be repaired and/or repainted. Some sign lettering is peeling badly and needs to be replaced.
- Some facilities did not have adequate level identification signage, and some facilities did not utilize a color coding scheme for level identification.
- The facilities did not have signage identifying the location of the facility or the facility name. For example, the 216 South Beverly Drive facility does not have a sign identifying the facility as the “216 South Beverly Drive Garage”. Identifying each facility with a unique name could assist parking patrons in finding their vehicles after visiting downtown.
- Some air conditioning/heating units were not functioning properly in attendant booths.
- Some entry/exit parking gate arms were not long enough to prevent vehicles from driving around them. Gate arms should be periodically reviewed to ensure arm lengths are adequate.
- A number of safety issues were raised including the following:
 - Missing fire extinguisher on Level B-1 (#14) in the 345 N. Beverly Drive facility.

- Broken rail on Level 3 of the 345 N. Beverly Drive facility.
- The entry/exit configuration in the 216 S. Beverly Drive lot is poorly designed. Vehicle movement is difficult, creating the possibility of vehicular accidents.
- The top level stairwell door in the 9510 Brighton Way facility was locked and could only be opened from the inside. This door would not be available for emergency exit from the parking area.
- Some facilities have hiding places beneath stairwells, in unlocked storage areas, etc. These areas should be secured with fencing and/or properly locked.
- Some lighted exit signs need to be repaired or replaced:
 - 216 S. Beverly Drive – Level 2
 - 438 N. Beverly Drive-439 N. Canon Drive – Level P-2 (Canon side)
 - 321 S. La Cienega Boulevard – North side of facility

The responsibility for maintenance and repair of these parking facilities should be clarified in a written agreement between Facilities Maintenance and Parking Operations. The structure of this proposed agreement is presented below.

- Parking Operations should be authorized to perform routine, ongoing maintenance of the parking facilities utilizing contractors. This would include such tasks as the following:
 - Repainting of parking stall lines;
 - Replacement of loose and/or broken wheel stops;
 - Pressure washing of parking surfaces and facility walls;
 - Maintenance and repair of parking control systems and support equipment;
 - Provision of parking facility level identification signage, and a color coding scheme for level identification;
 - Installation of clearance warning signs/bars over facility entrance lanes; and

- Signage identifying the location of the facility or the facility name.

The Parking Operations Director should have expenditure authority within the Parking Operations annual operating budget to address the routine, ongoing maintenance of the parking facilities.

- Facilities Maintenance should address the skilled journey-level repair needs associated with these parking facilities. Several were noted in this inspection including the following:
 - Cracking in facility walls and in parking surfaces, previous surface repairs failing, exposed rebar and tensioning cables in parking surfaces, and water intrusion;
 - Damage caused by vehicles in facility walls and ceilings;
 - Repair of light fixtures at some locations, and replacement of missing fixtures;
 - Painting of parking rails and light poles; and
 - Addressing safety issues in parking facilities.

Facilities Maintenance should continue to administer the custodial contract for the parking facilities.

The Parking Operations Director and the Facilities Maintenance Manager should meet quickly to discuss the safety issues that were identified in this inspection, the issues associated with cracking in facility walls and in parking surfaces, previous surface repairs failing, exposed rebar and tensioning cables in parking surfaces, and water intrusion. The Facilities Maintenance Manager should develop a schedule within thirty (30) calendar days subsequent to this meeting to address these issues. The safety issues and the facility exhaust fan system not appearing to be functioning at the 221 N. Crescent parking facility should be addressed as soon as possible.

Recommendation: The responsibility for maintenance and repair of these parking facilities should be clarified in a written agreement between Facilities

Maintenance and Parking Operations. Parking Operations should be authorized to perform routine, ongoing maintenance of the parking facilities. Facilities Maintenance should address the skilled repair needs associated with these parking facilities.

Recommendation: The Parking Operations Director and the Facilities Maintenance Manager should meet quickly to discuss the identified safety issues, cracking in facility walls and in parking surfaces, previous surface repairs failing, exposed rebar and tensioning cables in parking surfaces, and water intrusion,.

Recommendation: The Facilities Maintenance Manager should develop a schedule within the thirty (30) calendar days subsequent to this meeting to address these issues.

Recommendation: The safety issues should be addressed as soon as possible.

3. AN ON - STREET AND OFF - STREET PARKING MASTER PLAN SHOULD BE PREPARED.

The consultant that prepared the *Parking System Staffing Assessment and Parking Management Best Practices Review* noted that during field reviews, some City parking locations experienced a high level of parking demand. The consultant observed some parking facilities closing due to being full. Parking staff placed “Lot Full” signs in entry lanes, and at times attempted to direct patrons to other parking locations. The on-street parking in these areas was also heavily utilized (effectively full). This caused a great deal of parking patron confusion and frustration.

The City should address this issue by preparing a parking master plan for on / street and off / street parking. The parking master plan for on - street and off - street parking should address such issues as the following:

- The existing parking conditions, inventory, and demand (such as average daily occupancy of the existing garages);
- The current parking policies and standards;
- Paid parking options (such as on - street parking, off-street parking, etc.);

- Procedures and strategies for managing the supply of on-street parking and off-street parking;
- Potential locations and prototypes of parking garages or for expansion of existing parking garages; and
- Funding strategies.

The preparation of this parking master plan for on - street and off - street parking would require specialized transportation planning consulting expertise. Parking Operations does not have available staff resources with the available time or expertise to prepare such a plan. The estimated one-time cost to prepare such a master plan is presented in the table below.

One-Time Cost Increase		Annual Cost Decrease	
Retain a transportation planning consulting firm to prepare a parking structure master plan.	\$150,000	NA.	\$0
Total Operating Cost Increase	\$150,000	Total Operating Cost Decrease	\$0

Recommendation: Parking Operations should develop a parking master plan for on - street and off - street parking.

4. PARKING OPERATIONS AND TRANSPORTATION SHOULD DEVELOP AN ON-STREET AND OFF-STREET PARKING RATE POLICY FOR CONSIDERATION OF THE CITY COUNCIL.

In the past, rates for on-street and off-street parking have been set through separate processes. Policies directing the rates have been unclear. As an indication of these separate policies, in some instances, it costs less to park on-street than it does off-street in the City’s parking structures.

To increase priority of use and efficiency, the first step in the process of integrated rate setting is establishing policies on the relationship of off-street and on-

street parking—especially identifying target customers. For example, a possible policy might be as follows:

“The highest priority for City-owned parking facilities will be long-term parking (over four hours) for visitors, customers, and businesses. Because of its widespread dispersion, the highest priority for on-street parking in meter districts will be short-term parking.”

Such a policy would imply that the target customer for on-street parking is short-term, visitor/customer/business parking. If that, indeed, were the City’s highest priority, a consistent short-term parking rate (under four hours) for all City off-street attended facilities would be adopted. The objective would be to encourage the use of City-owned parking structures for long-term parking and reserve on-street parking for short-term parking.

To integrate off-street with on-street, the policy should be to price off-street publicly owned facilities at a lower rate than on-street meter rates as a means to encourage a “seamless” transition for customers between short-term stays on-street and longer term “customer” trips into off-street locations. For example, short-term rates in City off-street facilities should be consistent with meter rates through the initial hours to encourage stays of up to four hours in available off-street supply in public facilities. Over time (utilizing occupancy data) rates for on-street parking should be increased to ensure continued access for short-term customers. Having the off-street short-term hourly rate less than the rate per hour for on-street parking would encourage customers to use the proximate and available supply in public off-street resources.

Recommendation: Parking Operations and Transportation should develop an off-street and on-street parking rate policy for consideration of the City Council.

5. PARKING OPERATIONS SHOULD ADDRESS PARKING METER TAMPERING AND VANDALISM THROUGH THE USE OF PAY STATIONS.

In some areas of the City such as Santa Monica Five, there are frequent instances of vandalism of parking meters. This both increases costs to the City for the ongoing repair of these meters and decreases revenue.

Parking Operation should take steps to address this vandalism.

In other cities, pay stations have contributed to increased revenue, better data, lower down time for repairs due to electronic reporting, and enhanced enforcement.

With pay stations, parkers cannot use the time-honored excuses:

- “The meter just expired.” (The expiration time is on the posted receipt.)
- “I didn’t have enough change.” (Pay stations take credit cards.)
- “The meter was broken.” (Parker would be required to buy a receipt on another block face.)

Pay Stations are typically located approximately in the middle of the block and serve eight to 12 on-street parking stalls. There are two types of pay stations: pay-and-display, and pay-by-space. The City of San Francisco, California acquired 250 pay-by-space meters for approximately 1,300 parking spaces, or an average of one machine per every five to six parking spaces. Similarly, the City of Berkeley, California has installed a pay station for every 6 parking spaces, on average, on major corridors. The City of Aspen, Colorado manages about 13 parking spaces per pay station. The City of Toronto, Ontario has pay stations that control eight to 12 parking spaces each depending on the location. There are other local examples of these pay stations including Santa Monica and West Hollywood.

In terms of pricing adjustability, pay stations can be programmed with as many pricing options as the City deems appropriate. In addition, users have the convenience of choosing one of several payment methods. Pay-by-space stations also offer the ability to be modified to alert enforcement officers of a parking violation through visual signals on top of the pay stations.

Signs indicating "PAY TO PARK" with directional arrows would need to be posted along each block with a pay station. One convenient factor about pay-and-display machines is that for an area (e.g. Santa Monica Five) if one machine breaks, the user only needs to locate another machine and obtain a ticket from there, minimizing revenue loss when machine failure occurs.

Recommendation: Parking Operations should utilize pay stations in selected areas to address problems with vandalism.

6. AN ADDITIONAL PARKING SUPERVISOR POSITION SHOULD BE AUTHORIZED.

Parking Operations is authorized two (2) Parking Supervisors. These two positions have a number of roles and responsibilities including the following:

- Responsible for the daily operations of the City's eleven (11) parking facilities including the scheduling of approximately fifty (50) regular part-time staff in these thirteen structures and between thirty (30) to fifty (50) hourly part-time positions;
- Coordination of parking facilities repairs and upgrades;
- One Parking Supervisor is assigned to day shift and the other is assigned to the swing shift; and
- Assists in the collection process of the daily shift deposits, which are reconciled by an Account Clerk II in Administration.

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These two Supervisors supervise approximately fifty-nine (59) regular part-time staff in these structures and approximately thirty-seven (37) hourly part-time positions. The hours of operation of these parking structures are presented in the table below.

Parking Structure	Weekdays		Saturday		Sunday	
	Hours of Operation	Total Daily Hours	Hours of Operation	Total daily Hours	Hours of Operation	Total daily Hours
South Beverly	6 a.m. to midnight	18 hours	6 a.m. to midnight	18 hours	6 a.m. to midnight	18 hours
North Beverly Upper	7 a.m. to 6 p.m.	11 hours	7 a.m. to 11 p.m.	16 hours	9 a.m. to 10 p.m.	13 hours
North Beverly Lower	9 a.m. to 9 p.m.	12 hours	11 a.m. to 8 p.m.	9 hours	11 a.m. to 6 p.m.	7 hours
Beverly Canon	6 a.m. to 6 p.m.	12 hours	8 a.m. to midnight	16 hours	8 a.m. to 6 p.m.	10 hours
Brighton	8 a.m. to 9 p.m.	13 hours	8 a.m. to 9 p.m.	13 hours	11 a.m. to 8 p.m.	9 hours
Camden	6 a.m. to 11 p.m.	17 hours	7 a.m. to 11 p.m.	16 hours	8 a.m. to 5 p.m.	9 hours
Bedford	6 a.m. to 10 p.m.	16 hours	6 a.m. to midnight	18 hours	Closed	Closed
Dayton	6 a.m. to 10 p.m.	16 hours	6 a.m. to 10 p.m.	16 hours	9 a.m. to 6 p.m.	9 hours
333 North Crescent	6 a.m. to 10 p.m.	16 hours	6 a.m. to midnight	18 hours	6 a.m. to midnight	18 hours
221 North Crescent	5:30 a.m. to midnight	18.5 hours	6 a.m. to midnight	18 hours	6 a.m. to midnight	18 hours
Rexford	Open 24 hours	24 hours	Open 24 hours	24 hours	Open 24 hours	24 hours
La Cienega	6 a.m. to 11 p.m.	17 hours	Open, but not staffed			
Civic Center	6 a.m. to 11 p.m.	17 hours	Open, but not staffed			

Important points to note concerning the parking structures operating hours are presented below.

- Some of these facilities – South Beverly and North Beverly Upper and Rexford and Civic Center – actually operate as one facility. There are a total of eleven (11) parking facilities.
- Nine (9) of the eleven (11) facilities are open not less than sixteen hours a day Monday through Friday;
- The other facilities are open from eleven (11) to thirteen (13) hours a day;
- On Saturday, a number of the facilities are open not less than sixteen (16) hours (excluding the two facilities that are not staffed, but open sixteen hours); and
- On Sunday, some of the facilities are open not less than sixteen hours.

The project team recommends the addition of a third Parking Supervisor. The basis for this recommendation is presented in the table below.

Number of parking structure shifts to cover per week	14
Number of Weeks Per Year	52
Number of Shifts Per year	728
Length of (Hours)	8
Hours Required Per Year	5,825
Lost Time (Leave, not including turnover)	720
Total	6,545

Each of these three supervisors should be assigned responsibility for specific parking structures with responsibility for monitoring the cleanliness and operation of these parking structures, and working with Facilities Maintenance to address deficiencies.

To provide supervisory coverage seven days a week, fifty-two weeks a year, Parking Operations would require 6,545 staff hours annually. This would require a little more than three Parking Supervisors or one more than currently authorized.

With the addition of a third supervisor, each should be assigned responsibility for specific parking structures with responsibility for monitoring the cleanliness and

operation of these parking structures, and working with Facilities Maintenance to address deficiencies. This responsibility would be in addition to their supervision of parking operations staff on assigned shifts.

The estimated cost for the addition of the third Parking Supervisor position is presented in the table below. The additional position should be able to use an existing vehicle for transportation given the differences in shift coverage.

One-Time Cost Increase		Annual Cost Decrease	
Authorize a third Parking Supervisor position.	\$72,300	NA.	\$0
Total Operating Cost Increase	\$72,300	Total Operating Cost Decrease	\$0

Recommendation: Authorize a third Parking Supervisor position.

7. AUTHORIZE TEN ADDITIONAL REGULAR PART-TIME PARKING ATTENDANT POSITIONS.

Parking Operations relies extensively on part-time and temporary Parking Attendants for the operation of parking structures. As noted previously, there is approximately fifty-nine (59) regular part-time staff in these parking structures and approximately thirty-seven (37) hourly part-time positions.

The schedule utilized by Parking Operations for these parking structures requires a total of 2,149 Parking Attendant hours per week. Of this amount, 1,698 hours are scheduled from Monday through Friday with the regular Parking Attendant positions working five to six hours per week resulting in fifty-seven (57) positions working approximately twenty-five hours per week (see the table below).

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Hours Per Week From Monday Through Friday	1,698
Average Hours Per Shift Per Parking Attendant	5.6
Number of Shifts Per Week	303
Number of Days Worked From Monday through Friday	5
Number of Parking Attendants Required	60

Parking Operations is currently authorized fifty (50) regular part-time Parking Attendant positions. This current level of staffing was authorized prior to the opening of the Beverly / Canon parking facility, and prior to the addition of traffic attendant positions for directing traffic inside high volume parking facilities. The opening of Beverly / Canon parking structure required the addition of seven (7) regular part-time shifts to the schedule presented previously.

The memorandum of understanding for the Part-Time Unit defines a regular part-time employee as an employee that works a regular shift that is scheduled for more than twenty-five hours or more a week.

The existing schedule would require a minimum of ten additional Parking Attendant positions. The annual cost for these positions is presented in the table below.

One-Time Cost Increase		Annual Cost Decrease	
Authorize ten (10) additional regular part-time and hourly part-time Parking Attendant positions.	\$365,300	NA.	\$0
Total Operating Cost Increase	\$365,300	Total Operating Cost Decrease	\$0

Recommendation: Authorize ten (10) additional regular part-time Parking Attendant positions.

8. THE CITY SHOULD USE A MANAGED COMPETITION PROCESS FOR PARKING METER MAINTENANCE AND COLLECTION.

Parking Operations is authorized two staff for maintenance of parking meters: a Parking Meter Supervisor and a Parking Meter Technician. The annual salary and benefit cost for those two positions amounts to approximately \$163,300. These two staff are responsible for the maintenance and repair of 3,148 parking meters. The cost of the maintenance and repair of these meters, excluding parts, approximates \$52 per meter per year.

The City of West Hollywood contracts with the City of Glendale for the maintenance of their parking meters. The City of West Hollywood pay Glendale a total of \$52,500 in 2006-07 for the maintenance of approximately 2,000 parking meters or \$26.25 per meter per year or one-half of the cost incurred by Parking Operations. This contract with Glendale provides compensation for labor and benefits only; the cost of parts are in addition to this cost. This provides for on-site maintenance twice per week.

Parking Operations should utilize a managed competition process to assess the costs and the benefits of alternatives to its current approach to service delivery. This would require preparation of a request for proposal, the solicitation of proposals from both contractors such as the City of Glendale and City staff, and the evaluation of that alternative that provides the most favorable balance of costs versus level of service. Should a private sector firm be awarded the contract, the City should reallocate the existing two staff to other positions in the City's workforce.

The project team is not recommending that parking meter maintenance and collection services be outsourced. The project team is recommending that the

Department use a managed competition process to assess costs and the benefits of alternatives to its current approach to service delivery.

Recommendation: Utilize a managed competition process for parking meter maintenance and parking meter collection to solicit proposals from both contractors and City staff, and the evaluation of that alternative that provides the most favorable balance of costs versus level of service.

9. PARKING OPERATIONS SHOULD CONTINUE TO PROVIDE PARKING METER COLLECTION SERVICES TO THE CITY OF WEST HOLLYWOOD.

Three (3) Revenue Collectors are dedicated to revenue collection.

This staff not only collects parking meter revenue from parking meters in Beverly Hills, it also collects revenue from West Hollywood under a contract with that City. Beverly Hills meter staff also collect revenue from West Hollywood on-street and lot-based meters. They also change batteries as required. For this service, the City is paid \$157,000 per year. West Hollywood has approximately 2,100 meters, while Beverly Hills has 3,148. Of the total number of meters for both cities, Beverly Hills has 61% of the total.

The fiscal year 2006 expenditures for parking meters amounted to \$756,048. This includes the costs of the six staff assigned to parking meters including a Parking Meter Supervisor, a Senior Parking Meter Technician, a Parking Meter Technician, and three (3) Revenue Collectors. Since one-half of the staff assigned to parking meters are allocated to revenue collection, one-half of the costs of this cost center could be allocated to collection including the citywide overhead. This would result in a cost of \$378,024.

Beverly Hills has 61% of the total parking meters (the total of West Hollywood and Beverly Hills parking meters), and the City pays 60.3% of the cost of collections.

The contract with the City of West Hollywood reimburses the City for the remaining costs.

The City should not cancel the contract with West Hollywood. The contract with the City of West Hollywood enables coverage of much of the citywide overhead charges allocated to parking meters. 30% of the costs in the fiscal year 2006 expenditures for parking meters were citywide overhead: a total of \$230,727 excluding vehicle and equipment charges. The overhead exceeded the annual salary and fringe benefits for the three (3) Revenue Collectors. In essence, the contract with the City of West Hollywood covers the annual salary and fringe benefit costs for the three (3) Revenue Collector positions.

Recommendation: Parking Operations should continue to provide collection services to the City of West Hollywood.

10. THE THREE REVENUE COLLECTOR POSITIONS SHOULD BE TRANSITIONED TO THE PARKING METER TECHNICIAN CLASSIFICATION.

The Revenue Collector classification, according to the classification description for the position, is responsible for performing a variety of unskilled manual labor assignments in the collection of parking meter revenue. This includes the following tasks:

- Collect and transport revenue from City parking meters, following an assigned route;
- Sort, bag and label parking meter revenue in preparation for transport and deposit;
- Operate a light truck, van or other small vehicle while performing assigned duties;
- Report damaged, inoperative or malfunctioning parking meters observed on assigned routes; and

- Installs parking meter identification numbers on post and signs when necessary.

There are a total of three Revenue Collector positions.

Another classification – Parking Meter Technician – is responsible for repair of parking meters. The classification description for the position performs skilled work in the repair, maintenance, calibration, cleaning, and servicing of municipal parking meters, removes coins from municipal parking meters, counts and transports collected monies following proper security procedures. This includes the following tasks:

- Performs technical work in the installation, repair, cleaning, and testing of parking meters;
- Disassembles, cleans, tests, and repairs the internal parts of parking meters using specialized tools, electrical devices, and calibration equipment;
- Collects, transports, and counts money from assigned route;
- Sorts and bags money for transport;
- Modifies meters when rate changes;
- Maintains appropriate records, logs, and reports;
- Responds to public inquiries regarding problems with parking meters on assigned route; and
- Operates a light truck or other vehicle in performing assigned field work.

There are a total of two positions authorized for parking meter maintenance: A Senior Parking Meter technician and a Parking Meter Technician.

There are a number of reasons for transitioning the Revenue Collectors to Parking Meter Technician. These are presented below.

- With a small workforce, it is important that the Department utilize a “generalist” approach to delivery of services. Managers and supervisors need to be able to cross-utilize staff

- In addition, the efficiency of services by Parking Operations can be improved with the cross-utilization of staff. The Revenue Collectors observe parking meters during collection of revenue. These staff, if classified as Parking Meter Technicians, can repair the meters during collection, rather than reporting the need for repair. This will provide a more responsive repair than possible under current conditions.

The Revenue Collector positions should be transitioned to the Parking Meter Technician classification based upon the qualifications of the incumbents and as turnover occurs. The annual cost for the adjustment of these positions is presented in the table below.

Annual Operating Cost Increase		Annual Operating Cost Decrease	
Transition the Revenue Collector positions to the Parking Meter Technician classification based upon the qualifications of the incumbents and as turnover occurs.	\$47,800	NA.	\$0
Total Operating Cost Increase	\$47,800	Total Operating Cost Decrease	\$0

Recommendation: The Revenue Collector positions should be transitioned to the Parking Meter Technician classification based upon the qualifications of the incumbents and as turnover occurs.

11. THE FINANCE DEPARTMENT SHOULD CONDUCT “SPOT” AUDITS OF THE REVENUE COLLECTION PROCEDURES EMPLOYED BY PARKING OPERATIONS.

Parking Operations has developed informal written procedures for collection of revenue from parking structures and parking meters. However, Parking Operations has not yet segregated duties for the reconciliation of the daily cash receipts related to this revenue. This includes the auditing of daily paperwork and month end reports for parking facilities. An Account Clerk II is assigned responsibility for these tasks. The utilization of a “pool” concept for support staff and the rotation of duties in Administration should resolve this weakness.

However, given the amount of revenue collected by Parking Operations, the Finance Department should conduct periodic “spot” audits of the revenue collection procedures employed by Parking Operations to assure the adequacy of internal controls. These “spot” audits should be conducted not less than twice a year.

Recommendation: The Finance Department should conduct “spot” audits of the revenue collection procedures employed by Parking Operations to assure the adequacy of internal controls not less than twice a year.

12. PARKING OPERATIONS SHOULD TAKE STEPS TO IMPROVE THE INTERNAL CONTROLS FOR PARKING METER REVENUE COLLECTION.

Parking meters receipts are approximately \$48,000 per week or \$2.5 million annually. This is a significant amount of revenue. Internal controls for the collection of this revenue are essential. “Spot” audits are an important step in the development of more rigorous internal controls.

However, the City also needs to take a number of other steps to improve internal control. These steps are presented in the paragraphs below.

(1) Parking Operations Should Use A “Closed” Collection System.

At present, Parking Operations uses an “open” collection system. The coins from parking meters are in an open container in the parking meter.

Parking Operations should convert its parking meters to a “closed” collection system. In a “closed” collection system, parking meter coin containers are fully "sealed", eliminating access to the money collected.

Recommendation: Parking Operations should convert the parking meters to a “closed” collection system with parking meter coin containers fully "sealed."

(2) Parking Operations Should Convert the Parking Meter Locks To High Security Locks.

The City uses outdated keys that easy to reproduce. The parking meter industry high-security electronic locks. These electronic locks offer the following features:

- The key can be replaced only by the vendor, eliminating the fear of unauthorized duplications;
- Lock technology features hardened steel pins to prevent anyone from drilling or prying the lock open;
- Lock tolerances are tight reducing the likelihood of being picked or opened by lock decoding;
- The electronic key records operational data including times and locations of all transactions, operator activity, and any unauthorized attempts to open;
- Key includes a special identification badge reader for additional security; and
- LED on key handle flashes red and green signals to alert the user when data is being transferred.

Recommendation: Parking Operations should convert the parking meter locks to high security locks.

(3) Parking Operations Should Acquire the MeterTrax 6.0 Software From Duncan.

MeterTrax 6.0 is a parking management software application. This software can be utilized for a number of essential management functions. These are presented below.

- Track individual meter mechanism by serial number, location, collection route, and maintenance route.
- Use the handheld device to automatically update programming options in Duncan electronic meters. Use rate program tools within MeterTrax 6.0 to create rate programs, which can be transmitted via infrared to Duncan electronic mechanisms.
- Audit the revenue passing through parking meters using the audit feature. Use

the handheld to audit the meters at any time to generate a record of revenue. Run reports based on spaces, routes or other criteria.

To fully utilize the capacity of this software, Parking Operations would also have to acquire a handheld computer for use in the field. The handheld computer uses a snap-on infrared communications system to electronically transfer information to and from Duncan electronic meters.

Recommendation: Parking Operations should acquire MeterTrax 6.0 Software From Duncan and a handheld computer device for use in the field.

The one-time cost for the capital associated with these recommendations is presented in the table below.

One-Time Cost Increase		Annual Operating Cost Decrease	
Convert the parking meters to a "closed" collection system with parking meter coin containers fully "sealed."	\$90,300	NA.	\$0
Convert the parking meter locks to high security locks	\$186,000		
Acquire MeterTrax 6.0 Software From Duncan and a handheld computer device for use in the field.	\$30,000		
Total One-Time Cost Increase	\$306,300	Total Operating Cost Decrease	\$0

14. ANALYSIS OF TRANSPORTATION

14. ANALYSIS OF TRANSPORTATION

This chapter presents an analysis of the Transportation Division. The Transportation Division is authorized thirty-four full-time (34) positions. Twenty-five (25) of these positions are allocated to parking enforcement. The positions assigned to the Transportation Division are noted below.

- The Deputy Director of Transportation;
- An Operations Manager;
- * Three (3) Parking Enforcement Supervisors;
- Nineteen (19) Parking Enforcement Officers;
- Three (3) Parking Control Officers;
- A Transportation Planning Analyst;
- A Planning Technician;
- A Customer Services Supervisor and three (3) Customer Service representatives; and
- An Administrative Secretary.

The parking system in Beverly Hills is not a simple or inexpensive system to administer. The Transportation Division, for example, is responsible for administering a residential permit program with 77 designated permit zones. These permits are issued on an annual basis, with the permits expiring on September 30 of each year.

1. THE PUBLIC WORKS AND TRANSPORTATION DEPARTMENT EMPLOYS A NUMBER OF BEST PRACTICES IN TRANSPORTATION.

An organizational and management analysis by its nature focuses on opportunities for improvement. However, there are a number of strengths in Transportation. Examples of these strengths are portrayed below.

- Transportation monitors and has taken measures to minimize delinquent fine collections. The Radix handhelds contain a scofflaw file that searches for vehicles with more than 6 violations. Once a vehicle is flagged by the system, a vehicle can then be towed.
- The number of citations issued has increased in the last three years from 120,850 in FY 2004 to 109,188 in FY 2005 to 132,549 in FY 2006..
- The payment rate for parking citations - 85% to 87% - is comparable to or better than other cities on the west coast such as Seattle, San Francisco, San Diego, and Los Angeles.
- The parking enforcement program generated approximately \$5.6 million in revenues in FY 2006 versus expenses of \$3.5 million.

These strengths in Parking Operations provide a sound basis for further enhancements.

2. THREE ADDITIONAL PARKING ENFORCEMENT OFFICERS SHOULD BE AUTHORIZED AND ASSIGNED TO THE DAY SHIFT.

The Parking Enforcement Unit is authorized twenty-five (25) staff including three Parking Enforcement Supervisors, nineteen (19) Parking Enforcement Officers, and three Parking Control Officers. In August 2006, the actual (not authorized) Parking Enforcement Officers were deployed in three shifts as follows:

- Day shift (7:30 am-5:30 pm) - one Parking Enforcement Supervisor and eight Parking Enforcement Officers;
- Swing shift (2:00 pm-Midnight) - one Parking Enforcement Supervisor and four Parking Enforcement Officers; and
- Graveyard shift (11:00 pm - 9:00 am) - one Parking Enforcement Supervisor and five Parking Enforcement Officers.

In August 2006, the City had two (2) vacant Parking Enforcement Officer positions.

The staff cover twelve (12) enforcement routes that vary significantly in size and degree of restrictions, from a large - Route twelve north of Santa Monica Boulevard, with few restrictions other than two hour time restrictions - to Routes eight and nine covering the "Business Triangle" (bounded by Wilshire Boulevard, Crescent Drive and Santa Monica Boulevard) with most curb space regulated by meters and loading zones.

Parking Enforcement Officers issue citations and identify scofflaw vehicles (six or more open citations) using twenty-two (22) Radix 500 handheld ticket issuance devices provided by the Department's citation processing vendor, Affiliated Computer Services, Inc.

The Parking Enforcement Unit has a broad range of responsibilities. These responsibilities are presented below.

- Enforcement of On-street Regulations. The area north of Santa Monica Boulevard only has one (1) permit district and limited timed restrictions. However, south of Santa Monica is much more complicated from a parking enforcement perspective. This area includes a mix of meters, loading zones, permit-parking districts, and time restricted block faces that must be patrolled during the daytime. At night, enforcement generally involves enforcing residential permit districts and the citywide ban on overnight parking. However, as noted above, overnight parking is allowed in multiple family areas, so Parking Enforcement Officers must be more careful enforcing in these areas.
- Garages. Parking Enforcement Officers are responsible for limited enforcement in City parking structures. Parking Enforcement Officers patrol the City Hall structure that has both permit-only levels for City employees and levels with varying time restrictions. In addition, Parking Enforcement Officers also enforce in the low-rise metered structures along Santa Monica Boulevard adjacent to the "Business Triangle" called the Santa Monica Five.
- Scofflaw Enforcement. The Radix handhelds used by Parking Enforcement Officers contain a scofflaw file. Each time a plate is entered, the handheld software searches the scofflaw list and alerts the Parking Enforcement Officer if

there is a "hit." The Parking Enforcement Officer can then arrange for the vehicle to be towed. Parking Enforcement Officers are not permitted to authorize a tow. Therefore, the Police must send a traffic control officer to complete the California Vehicle Code-mandated tow form before the vehicle can actually be towed.

- Prevention of Disabled Placard Abuse. Parking Enforcement Officers are also involved in enforcing the regulations governing use of disabled placards.

The Parking Enforcement Unit has increased the number of parking citations over the past three years. In the last three fiscal years, the number of parking citations ranged from 120,850 in fiscal year 2004, to 109,188 in fiscal year 2005, to 132,549 in fiscal year 2006. Payment rates (85% to 87%) and closure rates (90% to 91%) are good by industry standards.

The project team does not believe that the number of Parking Enforcement Officers is adequate. There are a number of factors that suggest that additional parking Enforcement Officers are necessary. These factors are presented below.

- 30% of the Parking Enforcement Officers are largely dedicated to enforcement of residential parking restrictions. During the graveyard shift, parking enforcement generally involves enforcing residential permit districts and the citywide ban on overnight parking. In August 2006, this involved a Parking Enforcement Supervisor and five (5) Parking Enforcement Officers.
- The ratio of paid parking stalls per Parking Enforcement Officer in Beverly Hills appears to be less than other cities. This comparison is presented in the table below.

City	Number of Paid Parking Stalls	Number of Parking Enforcement Officers	Ratio of Stalls to Officers
Beverly Hills	3,148	19	166
Sacramento	5,383	39	138
Seattle	8,500	62	145
Portland	8,400	50	168
Median (Excluding Beverly Hills)			145

As the table indicates, the number of paid stalls per parking enforcement officer amounts to a median of 145. The City of Beverly Hills has 166 paid stalls per parking enforcement officer or 14% higher than the median. For the City to meet

the median, an additional three (3) Parking Enforcement Officers would be required.

- The day shift lacks sufficient Parking Enforcement Officers. The day shift has a maximum of only nine (9) Parking Enforcement Officers to cover 12 beats, and some of these beats cannot be covered fully in a single day; on an average day, only five (5) Parking Enforcement Officers are on duty.
- The number of parking citations issued per paid parking stall is 21% less than other cities. Parking Enforcement Officers in Beverly Hills issued 132,549 parking citations in fiscal year 2006. The City has 3,148 parking stalls. This approximates 42 citations per parking stall per year. Comparisons with other cities indicate that this is less than the median. The median in other cities surveyed by the project team was 51 citations per paid parking stall or 21% more than Beverly Hills. This would indicate that Beverly Hills would issue 160,500 citations to approximate the median.

The project team recommends that the City authorize three (3) additional Parking Enforcement Officers, and assign these Parking Enforcement Officers to the day shift. The addition of these three (3) Parking Enforcement Officers, if filled consistently, should result in an increase of approximately 21,000 parking citations annually and an additional \$670,000 in citation revenue.

The addition of these three (3) additional Parking Enforcement Officers will create supervisory challenges. There are three Parking Enforcement Supervisors. Each of these supervisors is assigned to a different shift: day, swing, and graveyard. The day shift supervisor already supervises eleven (11) Parking Enforcement / Control Officers, while the swing shift supervisor supervises seven (7) Parking Enforcement / Control Officers and the graveyard supervisor supervises (4) Parking Enforcement / Control Officers. The overall span of control per Parking Enforcement Supervisor for the day shift will exceed falls acceptable ranges (of ten to twelve staff for this type of service), particularly with the addition of three (3) parking Enforcement Officers. An additional

Parking Enforcement Supervisor position should be authorized. There are sufficient existing vehicles for the addition of these staff.

The annual cost impact of the addition of these three Parking Enforcement Officers and an additional Parking Enforcement Supervisor position for the day shift is presented in the table below. In addition to the annual costs and revenues reflected in the table below, an additional \$15,000 would be required for supplies for these three (3) additional Parking Enforcement Officers.

Annual Operating Cost Increase		Annual Operating Revenue Increase	
Authorize three (3) additional Parking Enforcement Officers	\$182,400	Increase in parking citation revenue	\$670,000
Authorize a Parking Enforcement Supervisor position	\$70,000		
Total Operating Cost Increase	\$252,400	Total Annual Revenue Increase	\$670,000

Recommendation: Authorize three (3) additional Parking Enforcement Officers and assign these additional Parking Enforcement Officers to the day shift.

Recommendation: Authorize an additional Parking Enforcement Supervisor position for the day shift.

3. THE TRANSPORTATION DIVISION SHOULD ENHANCE COST RECOVERY FOR THE PARKING PERMIT PROGRAM.

On an annual basis, the Transportation Division issues approximately 3,500 annual overnight permits, 10,500 preferential parking permits, 75,000 overnight exemptions, and 36,000 daytime exemptions. The exemptions are issued at no cost.

In fiscal year 2005-06, the parking permit program (preferential, overnight, valet, and taxi) collected approximately \$698,578 in annual revenue, at a direct and indirect expense (salaries, fringe benefits, contractual services, internal service fund charges,

and other contractual services) of \$744,000. The general fund is subsidizing the parking permit program by approximately \$46,000 annually.

The project team recommends that the City Council adopt a policy of full cost recovery for the parking permit program and that existing fees be increased to fully recover the costs of the program. The specific recommendations of the project team are presented below.

- **The City should charge \$2 for each overnight parking permit exemption.** The City of Pasadena already charges such a fee. The City of Pasadena charges \$3 per night per vehicle for each temporary parking exemption. The City requires that these temporary overnight parking exemptions be purchased at kiosks or at City Hall and clearly displayed on the vehicle. The City issues approximately 75,000 overnight exemptions.
- **The City should charge \$2 for each daytime parking exemption.** The City issues approximately 36,000 daytime exemptions.

The issuance of these exemptions by the Transportation Division does have a cost attached to them. The City should adopt a fee for issuance of the exemption. The City should anticipate that charging this fee should reduce the number of exemption requests.

The annual cost impact of the addition of these three Parking Enforcement Officers is presented in the table below.

Annual Cost Increase		Annual Revenue Increase	
NA	\$0	Increase in parking permit revenue	\$118,000
Total Operating Cost Increase	\$0	Total Annual Revenue Increase	\$118,000

Recommendation: The Deputy Director of Transportation should propose for the consideration of the City Council a full cost recovery policy for the parking permit program.

Recommendation: The City should adopt a \$2 fee for the processing of overnight and daytime exemptions.

4. THE PROCESS FOR ISSUANCE OF PARKING EXEMPTIONS SHOULD BE AUTOMATED USING THE ONLINE BUSINESS CENTER AND THE PROCESS FOR GRANTING PERMIT EXEMPTIONS FORMALIZED.

The Transportation Division issues one-day exemptions from permit parking regulations. These are issued over the phone on a call in basis, with the customer given a code number that is written on a piece of paper by the customer and placed on the dashboard.

This program was originally started in the late 1990's as a way of allowing guests to visit residents in permit districts. It has now grown to the point where exemptions are granted to residents outside of permit areas, as a de facto override of prevailing two-hour restrictions. In addition, some residents of permit zones make a habit of calling in for exemptions on a daily basis rather than spend \$17.90 per year.

This creeping accommodation of resident abuses results in a labor intensive process for Transportation Division staff and erodes the intended impact of permit restrictions.

The Transportation Division should formalize this process. Information Technology should modify the Online Business Center so that parking exemptions can be granted using this automated permit information system. This system should be developed so that permit exemptions can be granted on-line using the City's Internet site. If the resident does not have access to the Internet, the resident should be required to come to City hall to obtain the permit. The resident should be required to display the parking exemption form on their vehicle, either by printing the exemption at their residence after obtaining the permit over the Internet or by coming to City Hall to obtain the exemption permit.

However, the Transportation Division should develop a formal process for issuance of these permits that establishes criteria and restrictions in obtaining the permit. For example, the resident could be restricted to six parking exemption permits annually.

Recommendation: Information Technology should modify the Online Business Center so that parking exemptions can be granted using this automated permit information system. This system should be developed so that permit exemptions can be granted on-line using the City's Internet site.

Recommendation: If the resident does not have access to the Internet, the resident should be required to come to City hall to obtain the permit.

Recommendation: The resident should be required to display the parking exemption form on their vehicle, either by printing the exemption at their residence after obtaining the permit over the Internet or by coming to City Hall to obtain the exemption permit.

Recommendation: The Transportation Division should develop a formal process for issuance of the exemption permits that establishes criteria and restrictions.

5. A TRANSPORTATION PLANNING ADMINISTRATOR SHOULD BE AUTHORIZED TO ENHANCE THE CITY'S TRANSPORTATION AND TRANSIT PLANNING.

The City faces significant transportation planning challenges over the next twenty years. These challenges are portrayed below.

- **Population growth in the Los Angeles area.** The Southern California Association of Governments estimates that the population of Los Angeles County will increase by approximately 35% by 2025. This means an additional 3.5 million people will either move to or be born in Los Angeles County over the next 25 years. This will change County population from 9.6 million to approximately 13.1 million in 2025.
- **Increased traffic congestion on major commuter streets such as Santa Monica Boulevard and Wilshire Boulevard.** Along with this growth in population will come increasing demand on streets, highways, buses and trains. The current peak "rush hours" already extend from 6 a.m. to 9 a.m. and from 3 p.m. to 7 p.m., a period of seven hours daily. With an even larger population trying to use the same thoroughfares, congestion will last nearly all day long.

- **Meeting future transportation needs is made even more complex by the multi-directional nature of daily travel patterns.** The predominant suburb to downtown commute that most cities experience does not exist. Instead, people commute from everywhere to everywhere, and as soon as patterns emerge, they shift. While this means that demand is spread throughout the County rather than concentrated on a few corridors, it also means that improvements, and therefore additional resources, are needed everywhere including Beverly Hills.
- **Insufficient financial resources to meet travel demand.** One of the first steps in determining how many transportation improvements can be implemented over the next twenty-five years is to determine how much money will be available. Because most funding decisions are made years ahead (either by the voters or legislators), an estimated \$106 billion will be available through 2025. However \$94.8 billion of this sum is already committed. Only \$11.2 billion will be available for new transportation projects through 2025. While that is a significant sum, it is not enough to meet the challenge. It is essential that Beverly Hills protect its own interests in the allocation of these funds for meeting transportation needs

The neighboring city – West Hollywood, allocates a significant number of staff to transportation and transit planning. These include a Transportation / Transit Manager, Transportation / Transit Supervisor, Transportation Planner, Transportation Specialist, and Neighborhood Traffic Manager Specialist.

The Transportation Division lacks the staff and capacity to accomplish a number of essential best practices for transportation planning. These include the following:

- Development of improved transport options such as strategies for improving cycling, developing light rail transit in cooperation with Metro, redesign of the bus routes to significantly improve service quality and cost efficiency, strategies for ridesharing, etc.;
- Developing incentives to use alternative modes and reduce driving such as commuter financial incentives, congestion pricing, high occupant vehicle priorities, parking pricing, etc.;
- Consideration of land use and parking and its impact on transportation planning such as mixed use activity centers, transit oriented development, etc.
- The development and administration of a transportation demand management program.

The Transportation Division lacks the ability to substantively meet these best practices with the current staffing allocation. To enhance the Division’s ability, a Transportation Planning Administrator position should be authorized. This position should report directly to the Deputy Director of Transportation, and supervise the Transportation Planning Analyst. The annual cost impact of the Planning Administrator is presented in the table below.

Annual Cost Increase		Annual Cost Decrease	
Authorize a Transportation Planning Administrator position.	\$119,000	NA	\$0
Total Operating Cost Increase	\$119,000	Total Annual Cost Decrease	\$0

Recommendation: Authorize a Transportation Planning Administrator position.

6. THE PLANNING TECHNICIAN POSITION SHOULD BE RECLASSIFIED TO TRAFFIC TECHNICIAN AND SUPPORT THE SENIOR TRAFFIC ENGINEER.

Civil Engineering is authorized a Traffic Engineer. The roles and responsibilities of the Traffic Engineer are presented below.

- Allocates approximately 45% of his time in responding to citizen requests such as requests for stop signs, speed bumps, traffic enforcement, etc.
- Allocates approximately 25% of his time to reviewing and quality controlling traffic mitigation studies, and field investigations of requests for curb cuts (driveway approaches, driveway modifications, etc.).
- Allocates approximately 15% of his time to ongoing studies of speed, traffic counts, signal design and operation, traffic movement, etc.
- Allocates approximately 15% of his time to traffic capital projects such as signals including supervision of consulting engineers.

The Traffic Engineer is a professional engineer. The incumbent has a master’s degree in traffic engineering, and is a registered traffic engineer. The incumbent is being utilized for tasks that should be performed by a traffic technician. Indeed, an estimated

60% of his time is allocated to tasks that should be performed by a traffic technician.

The project team previously recommended that the Traffic Engineer position be reallocated to Transportation. To enable more effective utilization of the Traffic Engineer position, the Planning Technician position should be reclassified as a Traffic Technician, report to the Traffic Engineer, and be utilized to support the Traffic Engineer through the performance of paraprofessional tasks such as responding to citizen requests for stop signs, speed bumps, traffic enforcement, etc.

The salary range for Traffic Technician should approximate that of the Planning Technician.

Recommendation: Reclassify the Planning Technician as a Traffic Technician.

7. THE OPERATIONS MANAGER CLASSIFICATION SHOULD BE REVISED AND THE COMPENSATION FOR THE POSITION ADJUSTED GIVEN THE EXPANDED RESPONSIBILITIES.

The Operations Manager is responsible for the supervision of parking enforcement, customer services, and the taxi program. There are twenty-nine full-time employees (four supervisors, three permit technicians, and twenty-five enforcement staff) and six part-time employees. Gross annual revenues collected by these employees total \$5 million from parking citations and \$700,000 from parking, valet and taxi permit fees. The responsibilities of the position include the following:

- Providing direct supervision of the parking enforcement/control functions of the division;
- Providing direct supervision of the customer service function related to permit parking issuance; and
- Responsible for administrative functions related to statistical analysis, revenue reports, personnel actions and scheduling.

The classification description for the position includes only responsibility for managing the customer service function, and not parking enforcement. The description of the position, in the classification description, states as follows:

Manages staff and all aspects of the Department of Transportation customer services, including permit parking programs and valet and taxi operations; enforces municipal code provisions pertaining to these programs; responsible for development of business operations; makes presentations and prepares reports.

The responsibilities of this position have changed significantly with the addition of responsibility for management of parking enforcement. The classification description and the classification title for the position should be revised to reflect this responsibility. In addition, the salary for the classification should be adjusted to reflect this new responsibility as well. In looking at comparable classifications within the City, the responsibilities of the classification would appear to be comparable to other positions including:

- Parking Operations Manager; and
- Solid Waste Manager.

The annual cost impact of the salary and benefit adjustment of this position is presented in the table below.

Annual Cost Increase		Annual Cost Decrease	
Adjust the classification and compensation of the Operations Manager classification to reflect the additional responsibilities of the position.	\$16,400	NA	\$0
Total Operating Cost Increase	\$16,400	Total Annual Cost Decrease	\$0

Recommendation: Revise the classification title and description for the Operations Manager to reflect the additional responsibility for management of parking enforcement.

Recommendation: The salary range for the classification should be adjusted to reflect the additional responsibilities for supervising parking enforcement.

7. A SENIOR CUSTOMER SERVICES REPRESENTATIVE POSITION SHOULD BE ESTABLISHED IN TRANSPORTATION.

Transportation has designated a Customer Service Representative to perform a function that is more complex and responsible than other Customer Service Representatives. This position allocates 75% of its time conducting an administrative review of parking citations, which requires extensive knowledge of the California Vehicle Code and Municipal Code, and makes decisions based on submitted evidence. The other 25% of time is spent administering the City's long-term valet program that includes application review, development of permit conditions and coordination with valet companies and enforcement.

The position should be reclassified as Senior Customer Service Representative. This position should be responsible for administrative review of parking citations, administering the City's long-term valet program, and leading and participating in the work of the Customer Service Representatives. The annual cost impact of the salary and benefit adjustment of this position is presented in the table below.

Annual Cost Increase		Annual Cost Decrease	
Reclassify a Customer Service Representative to Senior Customer Representative	\$10,000	NA	\$0
Total Operating Cost Increase	\$10,000	Total Annual Cost Decrease	\$0

Recommendation: Reclassify a Customer Service Representative to Senior Customer Service Representative to reflect its responsibility for administrative review of parking citations and administering the City's long-term valet program.

Recommendation: Create a new classification of Senior Customer Service Representative.

8. ADMINISTRATION SHOULD PROVIDE ANALYTICAL SUPPORT TO TRANSPORTATION.

Transportation needs enhanced support from the Management Analyst positions in the Department. Transportation believes the enhanced level of support is necessary in a number of areas as portrayed below.

- Identify parking citations issued per hour, benchmark to other comparable cities, analyze the issuance of parking citations in business areas versus residential areas, and evaluate the efficiency of parking enforcement.
- Provide analytical support to the overnight and preferential permit program including:
 - Replacing “hang tags” with vehicle specific permits for more efficient enforcement, customer service, and to reduce the abuse of the permit system;
 - Provide “guest” permits in addition to vehicle specific permits to reduce call-in exemptions;
 - Eliminate call-in exemption line with on-line exemptions and / or permits; and
 - Develop a program to allow permit renewals over the Internet.

Recommendation: Administration should provide enhanced analytical support to Transportation.

9. TRANSPORTATION SHOULD ENHANCE ADMINISTRATION OF THE TAXI PROGRAM.

Throughout the Los Angeles region, most cities have municipal code sections to license and regulate taxicab services. Many of these cities have taxicab licensing programs that provide a range of services that vary from charging a taxicab licensing fees only with no city follow-up or enforcement programs, to a full-blown program such as the City of West Hollywood, which has enormous parking issues.

The City of West Hollywood maintains a Transportation Manager and a full-time

employee whose only function is to deal with taxicabs, licensing and enforcement. Also, a Transportation Committee reviews licensing applications and hears revocation hearings. Revocation hearings on taxicab licenses can be a very expensive legal review process. West Hollywood pays for its taxicab program by offsetting revenue estimated at \$200,000 a year.

There are a number of opportunities to enhance the administration of the taxicab program in Beverly Hills. These opportunities are portrayed below.

- **The City should consider taxicab franchising.** Taxicab franchising is a means of control in order to limit the demands placed on the City by limiting the amount of taxicab companies or independents that may wish to operate in the City. This would reduce the competition for service providers to only those that can afford to acquire insurance bonds, pay for City fees and maintain driver permits as stipulated. Franchising would reduce independent, illegal taxicab operators by identifying the legal operators with a highly visible sticker affixed to the cab and then enforced by the City. The sticker system along with the City's name painted on the sides of the cab are the most common means employed by other cities in identifying legal operators.
- **Enhance the administration of taxicab licensees operating in Beverly Hills.** There are a number of measures that the City should consider to enhance taxicab service in the City and address issues such as complaints, service quality, and insurance. These include the following:
 - Produce a simple, user friendly guide to the City's taxicab regulations for taxicab drivers;
 - Provide discounted or no-cost permits for accessible taxicabs;
 - Require posting of a passenger "Bill of Rights;"
 - Review insurance requirements of licensed taxicab companies on an annual basis; and
 - Establish trip log requirements.

Overall, transportation should enhance enforcement of the City's taxicab program. The cost of this enhancement should be accomplished through enhanced

fees. The City's fees are lower than some cities such as West Hollywood. The fees are presented below.

- Taxicab Operator's Permit (per application):
 - Police review fee (paid at time of application) - \$18.40
 - Permit (paid at time of application and annually on renewal date) - \$53.00

- Vehicle Permit:
 - Per vehicle/year - \$762.80
 - Replacement of permit (per vehicle) - \$36.00
 - Re-inspection Fee for Failed Inspection - \$35.00

Recommendation: Transportation should enhance the administration of the taxicab program.

Recommendation: The additional costs associated with administration of the taxicab program should be offset through additional revenues. The specific fees should be evaluated as part of the City's fee study.

10. THE PROCESS FOR ISSUANCE OF VALET PERMITS SHOULD BE AUTOMATED USING THE ONLINE BUSINESS CENTER.

The Transportation Division issues valet permits. These permits are issued to the valet company that is authorized to work in the City of Beverly Hills. The valet company is required to obtain a valet parking permit on behalf of the resident or business.

Information Technology should modify the Online Business Center so that valet permits can be granted using this automated permit information system.

Recommendation: Information Technology should modify the Online Business Center so that valet permits can be granted using this automated permit information system.

11. AN ADDITIONAL CUSTOMER SERVICE REPRESENTATIVE POSITION SHOULD BE AUTHORIZED FOR PARKING PERMITS.

At present, Transportation is authorized three (3) Customer Service

Representatives. One of these positions allocates 75% of its time conducting an administrative review of parking citations. The remaining two (2) positions provide front counter customer service related to parking permit issuance, parking violation citations and appeals, and temporary overnight parking call-in program, answer customer inquiries and complaints from public, and assist in answering the phones. In addition, Transportation is authorized a Customer Services Supervisor. This position leads and participates in the delivery of front counter customer services related to parking permit issuance, parking violation citations and appeals, and temporary overnight parking call-in program, answers customer inquiries and complaints from public, and assists in answering phones as needed.

In addition, Transportation had \$58,275 budgeted for part-time exemption line staff (or the full-time equivalent of 0.87 Customer Service Representative). During working hours, the part-time exemption line staff receives phone calls and answer basic questions.

To evaluate the staffing requirements for the Customer Service Representatives for Transportation, the project team utilized an Erlang C Calculator program. To analyze the staffing requirements, the project team first utilized the average number of 16,000 incoming calls per year or 65 per day based upon the volume for fiscal year 2005 - 06, and the 16,000 front counter visits per year.

The project team then utilized an average duration of 180 seconds for each call, and counter visit and a 30 second wrap up. Finally, the project team used an average answering delay of 20 seconds that Transportation should be prepared to tolerate for incoming calls.

If too many Customer Service Representatives are provided, Transportation would obviously be wasting valuable resources. However, if Transportation provides too few Customer Service Representatives, Transportation runs the risk of imposing unacceptably long ring times on customers, or even worse, suffering from abandoned calls or lack of capacity to handle customer requests at the front counter.

The formula utilized by the project team is based on the Erlang C traffic model which is an established model for predicting call center performance under situations in which offered calls are queued. Even though the Department does not utilize a traditional “queuing” system, the methodology still applies given that the number of calls ending in voicemail is minimal, and voicemail messages are checked and acted upon immediately after indication of a message is received.

The Erlang C Traffic model was developed by A.K. Erlang, a Danish scientist who was responsible for much of the early work in telephone traffic theory. As such, it can be applied to the design and analysis of inbound call centers similar to the Public Works and Transportation Department. The model makes the following assumptions:

- Service times are exponential;
- Callers are answered in the order in which they arrived; and
- Callers are directed towards the first available Customer Service Representative.

It is important to understand that there is a bare minimum number of Customer Service Representatives Transportation will need, regardless of the call answering delays and counter delays it is prepared to tolerate. For instance, if during an hour, Transportation receives a total of 10 calls, Transportation must, at the very minimum, provide two Customer Service Representatives for answering these calls. If

Transportation fails to provide this number of Customer Service Representatives, the call queue will constantly increase and incoming calls will be abandoned. However, if the number of calls doubles to 20 calls per hour, the number of Customer Service Representatives required only increases to three.

By providing more than the minimum number of Customer Service Representatives, Transportation regains control of the queue of incoming calls that results in a stable and predictable situation. The Erlang C Calculator will never return a number of Customer Service representatives that is lower than this bare minimum.

Based upon Erlang C Traffic model, Transportation will require not less than three (3) full-time Customer Service Representatives for phone calls and counter visits. The Transportation is already authorized three Customer Service Representatives. However, one of these positions has been allocated to administrative review of parking citations and administering the City's long-term valet program. The Customer Service Supervisor is available only half-time. A full-time Customer Service representative position should be authorized, and the funds budgeted for part-time exemption line staff eliminated.

The annual cost impact of this recommendation is presented in the table below.

Annual Operating Cost Increase		Annual Operating Cost Decrease	
Authorize a Customer Service Representative position.	\$66,800	Eliminate the budgeted part-time exemption line staff hours.	\$58,275
Total Operating Cost Increase	\$66,800	Total Annual Cost Decrease	\$58,275

Recommendation: Authorize a Customer Service representative position,

Recommendation: Eliminate the budgeted part-time exemption line staff hours.

15. ANALYSIS OF THE PLAN OF ORGANIZATION

15. ANALYSIS OF THE PLAN OF ORGANIZATION

This chapter presents an analysis of the plan of organization of the Public Works and Transportation Department. The focus of the chapter includes the elements listed below.

- Levels of management;
- Spans of control;
- Workload and responsibility of each manager;
- The efficiency and effectiveness of the organizational structure; and
- The impact of the lines of authority, spans of control, and workload/responsibilities on management positions ability to ensure quality control and performance.

1. IN EVALUATING THE PLAN OF ORGANIZATION OF THE PUBLIC WORKS AND TRANSPORTATION DEPARTMENT, A NUMBER OF PRINCIPLES SHOULD BE CONSIDERED.

In evaluating the plan of organization for the Public Works and Transportation Department, the Matrix Consulting Group utilized a number of principles for organizational structure. These principles are presented in the paragraphs below.

- **The Public Works and Transportation Department should be organized on a ‘form follows function’ basis** with a clear, distinct and comprehensive sense of purpose or mission for each division. Functions are grouped consistent with their periodic interaction, management systems, delivery of services that are linked in some way, etc., resulting in functional cohesion.
- **The Department’s organizational structure should foster accountability.** The organizational structure fosters accountability among management and supervisory staff.
- **The plan of organization should enhance communication and coordination.** The number of handoffs/exchanges required among different divisions providing service to the public is minimized. The structure enhances shared knowledge

and understanding among divisions. The channels of communication are clear and consistent.

- **Staff resources should be utilized efficiently.** The plan of organization minimizes administrative overhead. Workload can be distributed/shared to maximize the productivity of staff through peaks and valleys and offer cross-functional capabilities. Processes can be standardized to enhance the efficiency and customer responsiveness of services (e.g., the maintenance management process).
- **The potential of human capital should be maximized.** The plan of organization enhances career development opportunities, training, and recruitment and retention.
- **The services provided to customers should be responsive.** The plan of organization enables staff to provide better service to the public. Customers are the hub – with the Public Works and Transportation Department designed around them.
- **Each division in the Public Works and Transportation Department should be placed at a level in accordance with its importance in achieving departmental goals.** Divisions have not been placed too high in the departmental structure or too low relative to their importance.
- **The span of control for any manager or supervisor should not exceed the number which can be feasibly and effectively supervised.** The trend is to widen span of control.
- **The number of layers of management should not result in a tall, narrow configuration for the Public Works and Transportation Department.** Organizations with many layers are associated with centralized decision-making. Flatter organizations tend to have decentralized decision-making, as authority for making decisions is given to the front line employees.
- **The plan of organization should enhance the effectiveness of the Public Works and Transportation Director.** The organizational structure limits the span of control of the Public Works and Transportation Department Director, provides analytical support to develop goals, objectives, and performance measures, and provides resources to build and connect with the communities in Beverly Hills.

Reorganization efforts that ignore these principles could create new, unintended and unfortunate consequences for the future.

2. THESE PRINCIPLES FOCUSED THE ANALYSIS OF ALTERNATIVES FOR THE PUBLIC WORKS AND TRANSPORTATION DEPARTMENT ORGANIZATIONAL STRUCTURE.

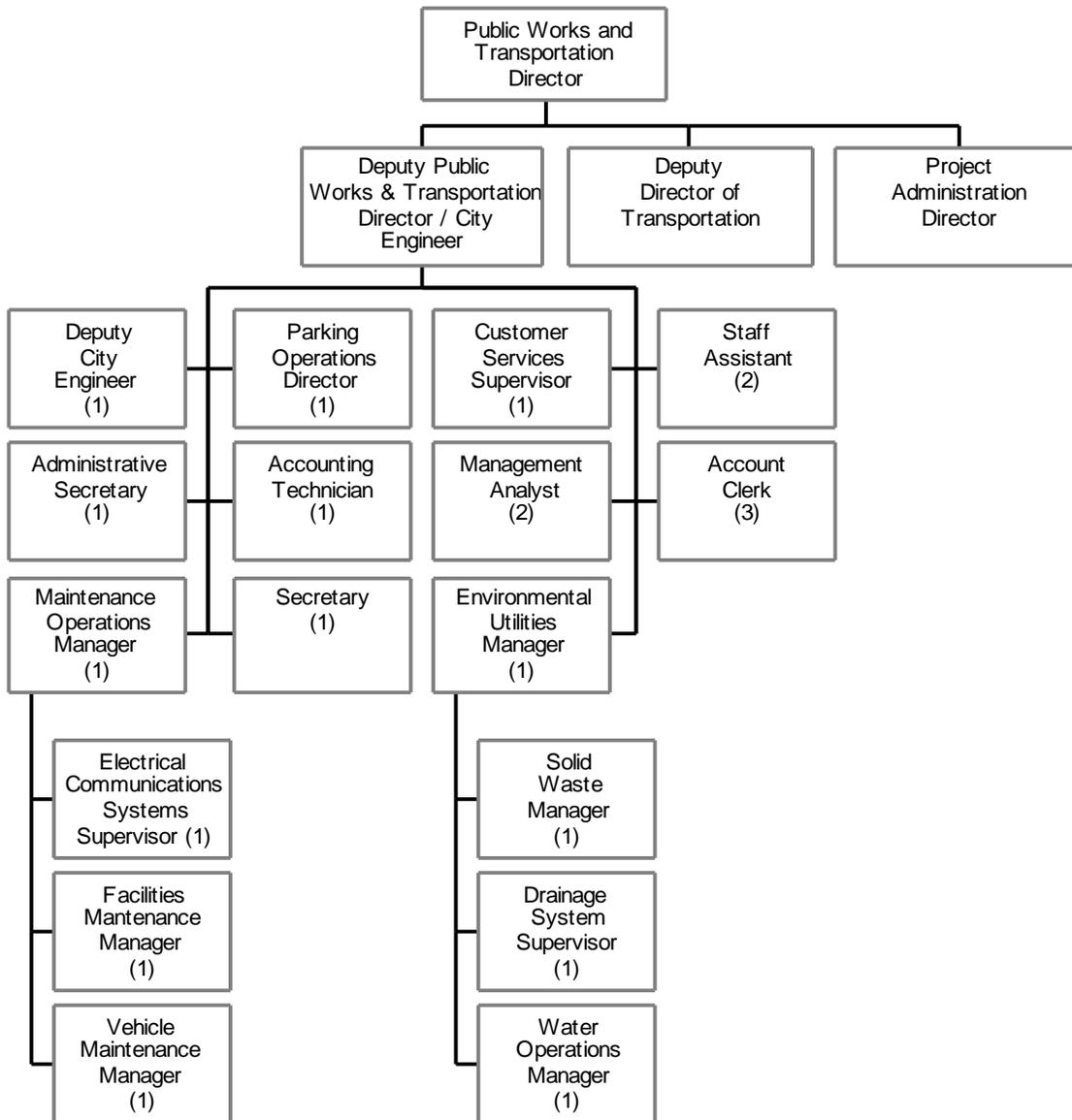
The principles described in the previous section were converted into a matrix to enable an evaluation of the current plan of organizational structure as well as each organizational alternative for the Public Works and Transportation Department. The primary purpose of the matrix was to focus the project team on the alternatives and to evaluate each of those alternatives using these criteria. This matrix is presented below.

CRITERIA
Organization and Structure
• Clear lines of accountability
• Spans of control/number of management layers
• Functional cohesion
Communication and Cohesion
• Hand-offs/exchanges (internal/external)
• Physical/virtual proximity
• Shared knowledge/understanding
Resource Utilization (Cost)
• Administrative overhead
• Workload management (even distribution)
• Process efficiency/standardization
• Resource sharing
Human Capital
• Career development
• Training
• Recruitment and retention
Agility and Flexibility of the Organization
• Scalability (ability to manage peaks and valleys)
• Adaptability (cross functional capability)
Service Quality and Responsiveness
• Customer service
• Performance management
• Quality control checks and balances
• Consistency of policy/procedure application

From the analysis of each of the alternatives using these criteria, a set of arguments for and against each alternative was constructed, leading to a recommendation of a preferred alternative.

3. THE CURRENT PLAN OF ORGANIZATION FOR THE PUBLIC WORKS AND TRANSPORTATION DEPARTMENT HAS A NUMBER OF ADVANTAGES AND DISADVANTAGES.

The chart presented below presents the current administrative plan of organization for the Public Works and Transportation Department.



The advantages and disadvantages to the current plan of organization are presented in the table below.

CITY OF BEVERLY HILLS, CALIFORNIA
Organization and Management Analysis of the
Public Works and Transportation Department

Advantages	Disadvantages
<ul style="list-style-type: none"> • The consolidation of the City's infrastructure management services within the Public Works and Transportation Department aids process efficiency and standardization of those services and management accountability. • The current structure promotes responsive customer service. • The Department is authorized two Management Analysts to provide analytical support to management. 	<ul style="list-style-type: none"> • The current plan of the Department's organization has not fully integrated what once was two separate departments. • The current plan of organization has three managers reporting to the Director: a Deputy Director of Transportation, a Deputy Director / City Engineer and a Director of Project Administration. This is a clear imbalance of managerial workload. • The span of control for the Deputy Director of Public Works / City Engineer is too broad at fifteen (15) managers and support staff. • The role of Deputy Director of Public Works / City Engineer is unclear. • Each division in the Public Works and Transportation Department is not placed at a level in accordance with its importance in achieving departmental goals. The Deputy Director of Public Works / City Engineer supervises account clerks, but not essential asset management services such as street maintenance or facilities maintenance. • The lines of accountability and functional cohesion are unclear in regards to the provision of traffic and transportation services. There are two managers responsible for this service: the Deputy Director for Transportation and the Parking Operations Director. • The spans of control are too wide in some instances and too narrow in others. • The current structure impedes sharing of knowledge and resources in delivery of capital projects. Different managers are responsible for different aspects of the capital improvement program: the Deputy City Engineer and the Project Administration Director. • The Department's organizational structure increases administrative overhead given the number of managers. • There are unnecessary management layers in the plan of organization.

The current plan of organization clearly offers a number of disadvantages. The current plan of organization has worked for the Department and the Department has received high levels of satisfaction from its customers. However, the current plan of organization has a number of issues associated with it.

The Matrix Consulting Group does not recommend that the Department maintain its current plan of organization given these issues. It is recommended that the Department modify its plan of organization in two steps. The first step is a short-term plan of organization that is built around the existing managerial incumbents. The second step – a longer-term plan of organization – reflects adjustments to the plan that should occur as retirements of managers and managerial turnover occurs. Each of these proposed plans of organization are presented below.

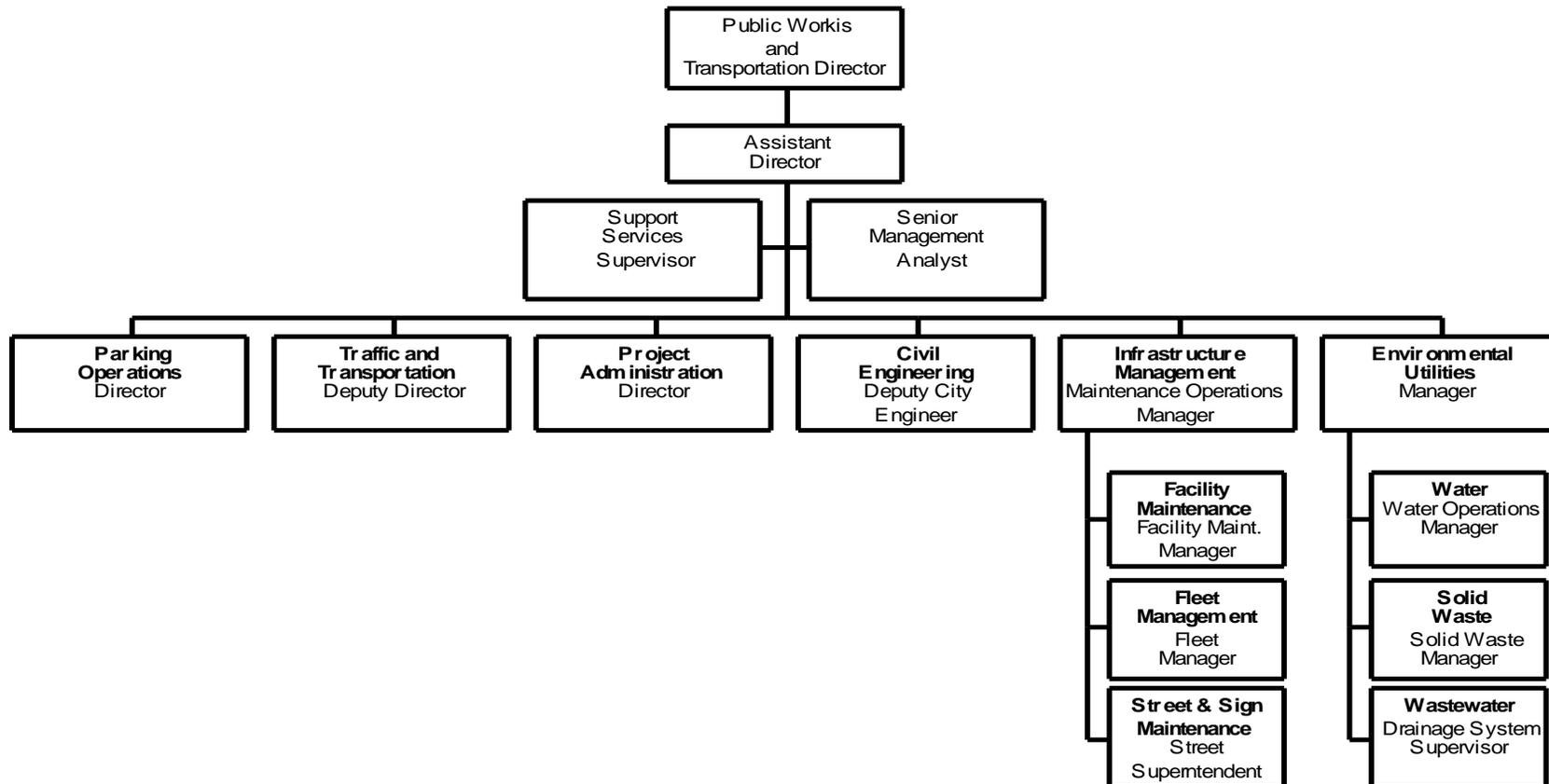
4. THE SHORT-TERM PLAN OF ORGANIZATION FOR THE PUBLIC WORKS AND TRANSPORTATION DEPARTMENT ONLY PROVIDES MINOR MODIFICATIONS TO THE PRESENT PLAN OF ORGANIZATION.

The proposed short-term plan of organization is presented on the following page.

Important points to note concerning this proposed plan are presented below.

- The position of Deputy Director of Public Works and Transportation / City Engineer would be adjusted as the Assistant Director of Public Works and Transportation. This position would operate as the Department's chief operating officer with responsibility for the day-to-day management of the Department.
- The management position of Maintenance Operations Manager would be filled.
- The position of Vehicle Maintenance Manager should be reclassified to Fleet Manager and report to the Maintenance Operations Manager.
- A new management position – a Street and Sign Superintendent – would be established and report to the Maintenance Operations Manager. The position would be responsible for the management of signal and light maintenance, street and sign maintenance, and street sweeping. The span of control for the position would be three supervisors or lead workers, and the total number of positions the position would manage would amount to a little over twenty (20).

Proposed Short-Term Plan of Administrative Organization



- The Deputy Director of Transportation would report to the Assistant Director of Public Works and Transportation, and not the Public Works and Transportation Director.
- As noted in the second chapter of this report, the support staff in the Administration Division should report to a position of Support Services Supervisor.

The project team is recommending the movement of street sweeping from Solid Waste to Street Maintenance. This is because the span of control for the Solid Waste Supervisor is too broad in terms of the number of staff and programs and is continuing to broaden, and also because that without the transfer the span of control for the Street Superintendent would be too narrow. This should not impact the funding for this program: it should continue to be funded by the Solid Waste enterprise fund.

The annual cost impact of this proposed plan of organization is presented in the table below.

Annual Cost Increase		Annual Cost Decrease	
Authorize a Street Superintendent position.	\$126,300	NA	\$0
Total Operating Cost Increase	\$126,300	Total Operating Cost Decrease	\$0

Recommendation: Reclassify the Deputy Director of Public Works and Transportation / City Engineer to Assistant Director of Public Works and Transportation.

Recommendation: Authorize a Street Superintendent position. The position would be responsible for the management of signal and light maintenance, street and sign maintenance, and street sweeping.

Recommendation: Reclassify the Vehicle Maintenance Manager to Fleet Manager.

5. THE LONG-TERM PLAN OF ORGANIZATION FOR THE PUBLIC WORKS AND TRANSPORTATION DEPARTMENT IS DESIGNED TO FURTHER CLARIFY ACCOUNTABILITY.

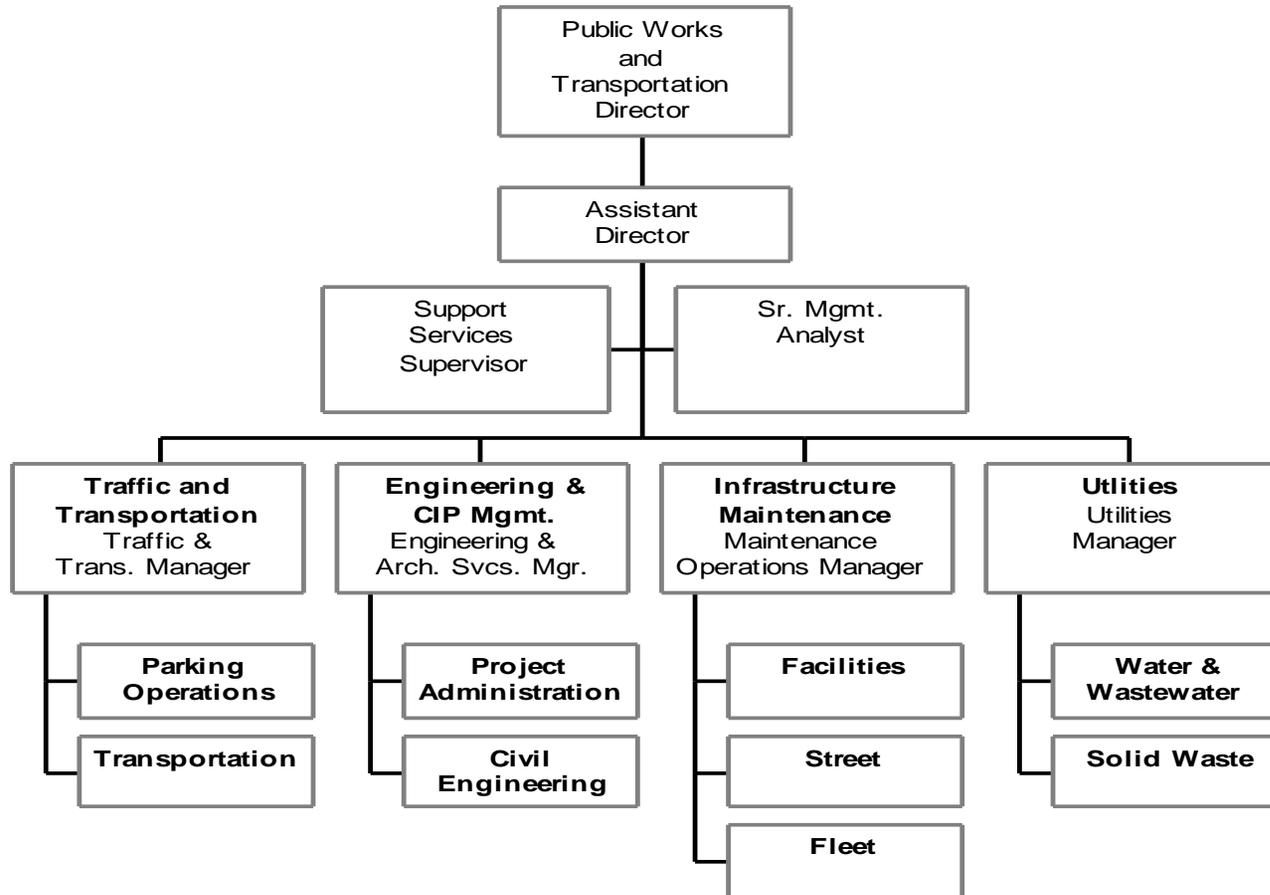
The proposed long-term plan of organization for the Department is presented on the following page. Important points to note regarding the proposed plan are presented below.

- The responsibility for management of the water and the wastewater utility would be consolidated with a Utility Manager – a reclassified Water Operations Manager position.
- The responsibility for managing all capital improvement projects would be consolidated under an Engineering and Architectural Services Manager position – an adjustment from an existing managerial position –either the Deputy City Engineer or the Project Administration Director position.
- Parking Operations and Transportation would be consolidated under a Traffic and Transportation Manager position. This would consolidate two managerial positions - the Deputy Director of Transportation and the Director of Parking Operations – into one managerial position.
- Solid Waste would report directly to the Assistant Director of the Public Works and Transportation Department.

This longer-term plan of organization, achieved through turnover, would eliminate a net of one managerial position. The annual cost impact of this proposed plan of organization is presented in the table below.

Annual Cost Increase		Annual Cost Decrease	
Authorize a Traffic and Transportation Manager position	\$145,300	Eliminate the Parking Operations Director position	\$145,300
		Eliminate the Deputy Director of Transportation position	\$145,300
Total Operating Cost Increase	\$145,300	Total Operating Cost Decrease	\$290,600

Proposed Long-Term Plan of Administrative Organization



Recommendation: In the long-term, consolidate responsibility for management of parking operations and transportation under a Traffic and Transportation Manager position. Assign responsibility for managing the City's transportation and parking operations to the Traffic and Transportation Manager. Eliminate the Parking Operations Director position and the Deputy Director of Transportation position through attrition. The Traffic and Transportation Manager should report directly to the Assistant Director of the Public Works and Transportation Department.

Recommendation: In the long-term, consolidate responsibility for capital project management under an Engineering and Architectural Services Manager position. Reclassify the Project Administration Director as City Architect.

6. THE ROLE AND RESPONSIBILITY OF THE DEPUTY DIRECTOR OF PUBLIC WORKS AND TRANSPORTATION / ASSISTANT CITY ENGINEER SHOULD BE CLARIFIED.

The role and responsibility of the Deputy Director of Public Works and Transportation / City Engineer should be clarified to make clear the accountability of the position. The position should be defined as a senior executive level classification that reports directly to the Director of Public Works and Transportation and acts for the Director in his absence. The incumbent assists the Director of Public Works and Transportation in providing administrative oversight and policy direction to the various divisions and organizational units of the Department.

The project team recommends that this position be assigned responsibility for the tasks presented below.

- Participating in the senior leadership team of Public Works and Transportation Department to enhance operational efficiency, continually improve Department services, and build the capability of the staff through workforce development programs.
- Providing supervision of the Senior Management Analyst.
- Providing the day-to-day management of the Department. Plans, organizes, administers, coordinates, reviews and evaluates day-to-day activities of the Department through multiple levels of management and supervision.

- Directly supervising the Parking Operations Director, Project Administration Director, Deputy City Engineer, Street Maintenance Manager, Vehicle Maintenance Manager, Facilities Maintenance Manager, and the Environmental Utilities Manager.
- Assisting in identifying long and short-range Department service needs and resource requirements, and developing policies and programs to assess and meet the needs of the community.
- Reviewing and evaluating the effectiveness of program and service delivery in the Department and recommends improvements to ensure “best of breed” service delivery within available resources. Prioritizes and allocates available resources for the divisions.
- Administering the Department’s financial systems implementing a system of internal fiscal management, revenue optimization, reporting and controls.
- Directing the conduct of analytical, financial and management studies and evaluates merits of reports of findings, alternatives and recommendations.
- Coordinating the preparation and administration of the annual operating and capital budget for the Department. Reviews Department funding needs, formulates budget guidelines, and controls Department service delivery within budgetary limits or policies.
- Establishing, implementing and managing the Department goals and specific objectives for the delivery of services and the internal management of the Department.
- Planning and directing the selection, professional development, supervision, review and evaluation of Department executives, managers and first-line supervisors.

These represent the day-to-day tasks that should be performed by the Deputy Director of Public Works and Transportation / City Engineer.

Recommendation: The roles and responsibilities of the Deputy Director of Public Works and Transportation / City Engineer should be clarified in a written policy.

7. OTHER ORGANIZATIONAL ALTERNATIVES ARE NOT RECOMMENDED.

Another organizational alternative was raised during this study process. The project team does not recommend this alternative.

. Civil Engineering is authorized two staff that are dedicated to the issuance of engineering permits such as excavation permits, utility cut permits, etc. These staff will be based in the Customer Service Center. The reallocation of these staff to the Community Development Department provides no added value to the City.

- A customer will not care who the City's staff work for as long as these staff provide excellent customer service. As long as these engineering staff work well together with other departments in the development review process, their organizational placement is irrelevant.
- The permits issued by these two staff have an important connection to the infrastructure maintained by these two staff.
- The inspection of these permits for compliance with conditions of approval are provided by Public Works Inspectors assigned to Civil Engineering.

Reorganization is not a panacea to all of an organization's ills. It should only be utilized to address serious deficiencies such as excessive administrative overhead or excessive spans of control.

Recommendation: The engineering permitting staff in the Public Works and Transportation Department should not be reallocated to the Community Development Department.

16. PERFORMANCE MEASURES

16. PERFORMANCE MEASURES

This chapter presents the proposed performance measures for the Public Works and Transportation Department. The information presented represents the City's first phase of performance measures – service indicators. As defined in the City's budget manual, service indicators represent inputs and outputs. These were to be developed for each program. Departments were expected to generate up to five service indicators for each program.

In the *Performance Measurement Training Manual* developed by the project team, an input was defined as the value of resources used to produce an output. This would be, for example, the dollars budgeted or the staff hours used. An output measure was defined in the *Performance Measurement Training Manual* as the quantity or number of units produced. Outputs are activity-oriented, measurable, and usually under managerial control. Examples of outputs include the number of tons of solid waste collected, the number of water distribution valves exercised, the number of fleet management work orders, etc.

The Public Works and Transportation Department has forty-seven programs. The proposed input and output measures recommended by the project team are presented in the exhibit on the following pages.

Exhibit 15 (1)

Proposed Input and Output Measures
For the Public Works and Transportation Department

	Program	Input	Output
1	Central Stores - Automotive Inventory	Annual labor hours allocated to Central Stores - Automotive Inventory Annual dollar value of parts purchased	Number of parts purchase orders initiated Number of work orders filled
2	Central Stores - Facilities Inventory	Annual labor hours allocated to Central Stores - Facilities Inventory Annual dollar value of parts purchased	Number of facilities parts purchase orders initiated Number of work orders filled
3	Central Stores - Fuel Inventory	Annual labor hours allocated to Central Stores - Fuel Inventory Annual dollar value of fuel purchased Volume of fuel purchased	Number of fuel purchase orders initiated Number of work orders filled Volume of fuel dispensed
4	Central Stores - General Inventory	Annual labor hours allocated to Central Stores – General Inventory Annual dollar value of parts purchased	Number of general inventory parts purchase orders initiated Number of work orders filled
5	Central Stores - Water Inventory	Annual labor hours allocated to Central Stores – Water Inventory Annual dollar value of parts purchased	Number of water inventory parts purchase orders initiated Number of work orders filled
6	Civil Engineering - CIP Management and Inspection	Annual labor hours allocated to CIP Management and Inspection	Number of CIP projects completed Construction expenditures for completed CIP projects Number of CIP projects under design at beginning of FY Number of CIP projects under construction at beginning of FY
7	Civil Engineering - Permit Counter and General Public Services	Annual labor hours allocated to Permit Counter and General Public Services	Number of customers served Number of permits issued by type

Exhibit 15 (2)

	Program	Input	Output
7	Civil Engineering - Permit Counter and General Public Services	Annual labor hours allocated to Permit Counter and General Public Services	Number of customers served Number of permits issued by type
8	Civil Engineering - Private Development Project	Annual labor hours allocated to Private Development Projects	Number of private development permits processed by type Number of inspections
9	Civil Engineering - Traffic Engineering Services and Operations	Annual labor hours allocated to Traffic Engineering Services and Operations	Number of work orders prepared Number of studies conducted Number of traffic calming device applications processed Number of requests processed for transit routes and expansions, stops and benches Number of funding applications processed
10	Customer Services - Residential Parking Permits	Annual labor hours allocated to residential parking permits	Number of residential preferential parking permits issued Number of residential overnight parking permits issued Number of customers served
11	Customer Services - Taxi Permits	Annual labor hours allocated to taxi permits	Number of taxi operator permits issued Number of taxi driver exams conducted Number of taxis inspected Number of complaints received
12	Customer Services - Valet Permits	Annual labor hours allocated to valet permits	Number of valet parking permit applications received Number of valet permits issued Number of valet attendant identification cards issued Number of customers served
13	Facilities Services - Capital Improvements	Annual labor hours allocated to capital improvements Annual dollar value of capital improvements / major maintenance projects	Number of work orders completed for capital improvements / major maintenance projects

Exhibit 15 (3)

	Program	Input	Output
14	Facilities Services - Facilities Maintenance	Annual labor hours allocated to facilities maintenance by trade Annual dollar value of contracts administered by type of contract	Number of work orders completed Square footage of facilities maintained by custodial contractor Square footage of facilities maintained by Facilities Maintenance
15	Facilities Services - Meeting Support	Annual labor hours allocated to meeting support Dollar value of materials purchased in support of meetings	Number of work orders issued for meetings Number of work orders completed For meeting support
16	Facilities Services - Tenant Support	Annual labor hours allocated to tenant support Annual dollar value of contracts administered for tenant support by type of contract	Square footage of tenant space Number of work orders completed for tenant support space
16	Fleet Services - Vehicle Maintenance	Annual labor hours allocated to vehicle maintenance Number of vehicles in the fleet by class	Number of PM work orders Number of scheduled maintenance work orders Number of unscheduled maintenance work orders
17	Fleet Services - Vehicle Replacement	Annual labor hours allocated to Vehicle replacement Dollars expended on vehicle replacement	Number of vehicles replaced by class Number of vehicles that exceed replacement schedule by class
18	Parking Enforcement	Annual labor hours allocated to parking enforcement Number of metered spaces	Number of parking citations issued Annual parking citation revenue Parking citations issued per authorized Parking Enforcement Officer Number of vehicles towed
19	Parking Services - Parking Meters	Annual labor hours allocated to maintenance of parking meters Number of hours allocated to parking meter revenue collection Number of parking meters	Number of parking meters repaired Amount of parking meter revenue collected

Exhibit 15 (4)

	Program	Input	Output
20	Parking Services - Parking Operations	Annual labor hours allocated to parking operations Annual cost of parking operations Number of parking structures Number of parking stalls	Annual number of vehicles that parked in parking structures by parking structure Parking operation revenue
21	Project Administration	Annual labor hours allocated to project administration	Number of CIP projects completed Construction expenditures for completed CIP projects Number of CIP projects under design at beginning of FY Number of CIP projects under construction at beginning of F
22	Solid Waste - Alley Maintenance	Annual labor hours allocated to alley maintenance	Number of tons of solid waste collected from alleys Number of complaints /service requests received regarding alleys
23	Solid Waste - Commercial	Annual labor hours allocated to administration of commercial contract Number of commercial business customers served by contractor Annual cost of commercial solid waste contract	Diversion rate for commercial solid waste collected Tons of material delivered to the MRF Number of tons of commercial solid waste collected Number of complaints received regarding commercial solid waste collection
24	Solid Waste - Conservation	Annual labor hours allocated to solid waste conservation	Number of outreach and special events attended to promote conservation
25	Solid Waste - Residential	Annual labor hours allocated to residential solid waste collection Number of residential customers served	Diversion rate for residential solid waste collected Tons of material delivered to the MRF Number of tons of residential solid waste collected Number of complaints received regarding residential solid waste collection

Exhibit 15 (5)

	Program	Input	Output
26	Solid Waste – Street Sweeping	Annual labor hours allocated to street sweeping Curb miles – residential Curb miles – commercial	Curb miles swept – commercial Curb miles swept – residential Number of street sweeping complaints received Tons of material removed – commercial Tons of material removed –residential
27	Stormwater – Conservation	Annual labor hours allocated to stormwater conservation	Number of outreach and special events attended to promote conservation
28	Stormwater Inspections	Annual labor hours allocated to inspections Number of facilities that require inspection by type of facility	Number of inspections by type of facility Number of Notices of Violation issued
29	Stormwater – Maintenance	Annual labor hours allocated to storm water maintenance Number of catch basins Miles of sidewalks (that are cleaned)	Tons of trash and debris collected Number of catch basins cleaned Miles of sidewalks cleaned Number of work orders completed Number of PM work orders Number of scheduled maintenance work orders Number of unscheduled maintenance work orders Number of stormwater trouble calls
30	Street Maintenance – Infrastructure Maintenance	Annual labor hours allocated to street maintenance Miles of streets Miles of alleys Miles of sidewalks	Number of work orders completed by type (street, alley, sidewalk, etc.) Number of potholes repaired Square yards of surface repairs Square yards of concrete repair and construction
31	Street Maintenance – Paint and Signs	Annual labor hours allocated to paint and sign maintenance Number of signs Number of traffic markings by type Miles of sidewalks	Number of work orders completed by type (signs, traffic markings, etc.) Number of signs repaired or replaced Number of miles of street striped Number of traffic markings painted by type (parking stalls, crosswalks, legends, etc.)

Exhibit 15 (6)

	Program	Input	Output
32	Street Maintenance – Signals and Lights	Annual labor hours allocated to traffic signal maintenance and repair Number of signalized intersections Number of street lights	Number of signalized intersections that were preventively maintained Number of signals repaired Number of signal trouble calls Number of street light trouble calls Number of PM work orders Number of scheduled maintenance work orders Number of unscheduled maintenance work orders
33	Transportation Planning and Administration	Annual labor hours allocated to Transportation Planning and Administration	Number of Traffic and Parking Commission meetings
34	Transportation Planning – Senior Transit – Proposition C Fund	Annual labor hours allocated to Transportation Planning – Senior Transit – Proposition C Fund	Amount of – Senior Transit – Proposition C Fund received Number of disabled trips by type (dial a ride, taxi coupons, etc).
35	Transportation Services – Trolley / Senior Transit – Proposition A	Annual labor hours allocated to Transportation Services – Trolley / Senior Transit – Proposition A	Amount of Trolley / Senior Transit – Proposition A Number of disabled trips by type (dial a ride, taxi coupons, etc).
36	Wastewater Disposal Services – Blockages	Annual labor hours allocated to wastewater disposal – blockages Miles of wastewater mains	Number of main blockages Number of sewage spills Number of sewer trouble calls
37	Wastewater Disposal Services – Conservation	Annual labor hours allocated to wastewater conservation	Number of outreach and special events attended to promote conservation

Exhibit 15 (7)

	Program	Input	Output
38	Wastewater Disposal Services - Maintenance	Annual labor hours allocated to Wastewater maintenance Miles of sewer mains	Miles of sewer mains televised Miles of sewer mains cleaned (excluding 30-60-90 day) Miles of sewer mains cleaned for 30-60-90 day cleaning Number of PM work orders Number of scheduled maintenance work orders Number of unscheduled maintenance work orders
39	Wastewater Disposal Services - Treatment	Annual labor hours allocated to wastewater treatment contract monitoring	Millions of gallons treated
40	Water Supply and Distribution - Conservation	Annual labor hours allocated to water conservation	Number of customers participating in water conservation activities Number of water audits conducted Number of rebates provided % of Unaccounted for water Number of public information programs Number of school education programs
41	Water Supply and Distribution - Fire Suppression	Annual labor hours allocated to Fire hydrant maintenance Number of fire hydrants	Number of PM work orders Number of scheduled maintenance work orders Number of unscheduled maintenance work orders
42	Water Supply and Distribution - Groundwater	Annual labor hours allocated to groundwater supply	Average million gallons per day of groundwater produced Total number of gallons of groundwater produced

Exhibit 15 (8)

	Program	Input	Output
43	Water Supply and Distribution - Maintenance and Repair	Annual labor hours allocated to water distribution maintenance and repair Miles of water mains Number of water meters by size Number of distribution valves	Number of PM work orders Number of scheduled maintenance work orders Number of unscheduled maintenance work orders Number of valves exercised Number of water main leaks Number of water distribution trouble calls
44	Water Supply and Distribution - New Services / Installations	Annual labor hours allocated to new services and installation work orders	Number of new services and installation work orders
45	Water Supply and Distribution - Water Quality	Annual labor hours allocated to water quality Number of state and federal water rules and regulations monitored	Number of state and federal water rules and regulations violated
46	Water Supply and Distribution - Water Sales	Annual labor hours allocated to water sales Amount of water purchased	Number of meters read Number of customer service Number of commercial meters tested Number of residential water meters replaced