Carson City

Fleet Management Efficiency Study
Final Report

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I. EXECUTIVE SUMMARY

As part of the Carson City's effort to continually improve the economy, efficiency, and effectiveness of operations, the City's Internal Auditor conducted an efficiency study of the Fleet Services Division. Through the study, a number of fleet and equipment management practices were identified that could improve the functionality of the City's maintenance efforts. Many of the recommendations reflect a basic transition of fleet management from its historical, informal roots to a more formal structure, which incorporates industry best practices. The operational recommendations address the following major issues:

- **A lack of consistent and comparable fleet and equipment maintenance data from the fleet operation.** The City has not established and implemented a performance measurement system and consequently, does not have associated data. This missing information includes measures such as downtime, repeat repairs, mechanic performance, labor costs, and vehicle miles per gallon, all of which are helpful in evaluating agency performance against industry standards. The City's plan to replace the current Fleet Services information system with a more adequate and comprehensive system should help with these issues.
- **The inability of the current operational structure and staffing to support the fleet.** The number of fleet units overdue for replacement (64 of 338 rolling units), coupled with the lack of available mechanics, has placed a significant burden on the workload of Fleet Services. Several fleet customers stated that spare vehicles are a necessity because of the poor turnaround time when their units are in the shop for repairs. A new staffing plan addresses the organizational issues reflected in this study and recommends adding fleet personnel and creating a second shift at the shop.
- **A lack of awareness of costs relative to the marketplace.** We calculated a fully burdened shop labor rate of $248/hour, which is nearly four times the current labor rate used by Fleet Services. This is primarily due to Fleet Services being understaffed and the low productivity (wrenching hours) of its mechanics.
- **A financial and management information system that is not configured to effectively manage costs or encourage efficiencies.** The City's current fleet operations financial planning process does not encourage positive behavior of fleet customers in terms of minimizing fleet size and an efficient vehicle support system. Development and implementation of a chargeback system to track and recover the costs associated with fleet maintenance is critical to addressing this issue.
- **The lack of a comprehensive fleet transportation policy that applies to officials and employees when conducting official business.** All fleet related functions should be under the full control and management of the Fleet Services. The policy should establish guidelines relating to vehicle assignment criteria, standby and take home usage, and use of personal vehicles. It should also include performance measures that effectively monitor and manage the fleet services function.

A complete list of recommendations is provided in Appendix B of this report. The estimated net impact of the recommendations is an annual decrease of approximately $174,000 (See Appendix C), which reflects the annual maintenance and operational costs savings associated with a reduction in fleet size that would likely result from conducting a fleet utilization study.

In order to facilitate the implementation of recommendations contained in this report, it will be important to sequence actions in a logical and financially feasible manner. While many of the recommendations focus on improving efficiency and effectiveness, only a few have the potential to reduce costs since a number of recommendations will require an investment to improve efficiency and/or effectiveness. The opportunities for reducing costs focus on fleet utilization, parts procurement, and vendor service procurement. However, hiring a Fleet Manager is viewed as a prerequisite to some of the cost savings activities.

A key to making the finances work is conducting a fleet utilization study, since this type of study is typically the best way to achieve costs savings. A fleet utilization study should pay for a Fleet Manager, who is needed to achieve parts and commercial work procurement efficiency gains. Procurement efficiency gains should pay for a Storekeeper. Similarly, commercial repair efficiency gains and the additional of mechanics and part-time service attendants should enable commercial work to be brought in house to realize associated expenditure reductions. The general timing of key recommendations is estimated below.

1.	Conduct Utilization Study	months 1-3
2.	Hire Fleet Manager	months 3-5
3.	Achieve parts and commercial work efficiency gains	months 6-8
4.	Add storekeeper, mechanics, and service attendants	months 7-10
5.	Bring select commercial work in-house	months 8-12

Another critical success factor is the implementation of key performance metrics to support the evaluation of operational efficiency and effectiveness and informed budget decision making. Key performance measures and relevant industry best practices include:

- Fleet Availability Rate: measures the degree to which fleet units are available to fleet customers (95% for the entire fleet and 85% to 98% for specific types of units)
- Fleet Repair Time: measures how quickly vehicles are returned to service (70% within 24 hours and 90% within 72 hours)
- Return Rate: measures fleet customer returns to the shop for the same problem within a specific period of time (less than 1%)
- Billable Hour Percentage: measures productivity (wrenching hours) of technicians by the percentage of shop labor hours charged to work orders (70%)
- Preventive Maintenance Performance Rate: measures the percentage of preventive maintenance activities performed on or before the scheduled date (95%)

The Carson City Board of Supervisors and Audit Committee should expect an implementation plan to be prepared and submitted by the Public Works Department that defines how the recommendations contained in this report will be addressed.

II. BACKGROUND, OBJECTIVES, SCOPE, AND METHODOLOGY

A. BACKGROUND

The Fleet Services Division, located within the Operations Division of Carson City's Public Works Department, is responsible for fleet administration, asset management, preventive maintenance, and repair work for all vehicles, including police, fire, public works, and public transit. The Division is comprised of five Mechanic IIIs who report to the Fleet Services Supervisor. The Fleet Services Supervisor reports to a part-time Fleet Manager who in turn reports to the Public Works Operations Manager. Carson City's fleet includes 356 motorized vehicles and more than 100 pieces of trailers and related equipment, with a current replacement value of approximately $32 million.

The Fleet Services Division serves all 17 City departments. Within the Public Works Department, which supports its fleet via an enterprise fund, there are 143 vehicles with an estimated replacement value of approximately $13 million. The remaining 213 vehicles in the City's fleet are financed through the General Fund, with an estimated replacement value of approximately $19 million. The largest users of the General Fund financed fleet include the Sheriff's Department, with 75 vehicles; the Parks Department, with 48 vehicles; and the Fire Department, with 39 vehicles.

B. OBJECTIVES AND SCOPE

The objective of this study is to determine whether the fleet management group could operate more efficiently. Periodically examining fleet assets and the operation that supports them to ensure efficient management of the investment is a best practice in local government and generally consists of two major components: 1) a Fleet Services assessment, and 2) a utilization review. The study assesses the Fleet Services operation and identifies opportunities for improvement. It is intended to provide the City with an overall review of Fleet Services, with a specific focus on the use of maintenance staff responsibilities, fleet policy, and use of performance metrics.

Moss Adams LLP teamed with Municipal Fleet Consultants to conduct a fleet management efficiency study. This study is not a financial audit. It is not intended to be an assessment of internal controls, compensation, or compliance with regulations, policies, or procedures.

C. METHODOLOGY

Interviews

We conducted a series of interviews and walkthroughs with Fleet Services staff in April and May 2013. A site visit of the fleet maintenance facility was conducted to observe day-to-day operations, gather information, and assess existing equipment and tools. The largest fleet customers within the City, the Fire, Sheriff, and Parks Departments, were also interviewed to obtain a customer perspective of fleet maintenance and operations.

Document Review

We reviewed financial, program, and policy documents, including inventory records, budgets, maintenance contracts, and policies and procedures. To the extent available, performance and workload indicators were also reviewed.

Analysis

Fleet Services' operations, policies, and procedures were evaluated against best practices associated with highly efficient and effective fleet maintenance operations. Opportunities for improvements were identified and cost savings were estimated where applicable.

Results

The results of the study are conveyed through the findings and recommendations provided in this report.

III. FINDINGS AND RECOMMENDATIONS

A. ORGANIZATION AND FACILITIES

1. Finding: The Fleet Services facility could be organized more efficiently.

Fleet Services operates one central maintenance facility located at the Carson City Corporation Yard, where all maintenance and repair work is performed to serve all City departments. The facility is open Monday through Thursday from 7:00 AM to 5:30 PM. In addition to the main shop, which consists of five bays, there is a separate auxiliary shop dedicated to maintaining the Sheriff's fleet, including motorcycles. An additional bay, located in a standalone building adjacent to the main shop is used to perform tire repairs.

The number of bays in the main shop is not sufficient to support the current compliment of mechanics. In addition, there are no drive-through bays. Consequently, mechanics are forced to back large fire engines and construction-type equipment out of bays, instead of being able to pull forward to exit the shop. There are plans to add two additional bays this year, and funds have been set aside for this project.

The parts room is located at the northwest end of the shop and serves as a break room and reference material library. The parts room is not secure, and there is nobody designated to be responsible for its contents. Mechanics access this area on a regular basis to retrieve parts needed to maintain and repair the fleet units they work on. Another room located at the southwest end of the shop contains oil and lube tanks, as well as infrequently used spare parts. Hazardous liquids and batteries are also stored here, as well as some shop equipment and tools. Fabrication work is performed in the first bay, adjacent to the parts and break room.

The auxiliary shop, where the Sheriff's units are maintained, consists of two service bays and one wash bay. One mechanic is assigned to this shop. There is one side-by-side lift and platform to perform motorcycle maintenance. Because this shop is separated from the main shop, police customers are in the habit of bypassing the Shop Supervisor with their requests for repair work and communicating with the lone mechanic who is stationed there. This interrupts his productivity and concentration on tasks.

An ongoing problem reported during facility walkthroughs is that customers frequently interact with working mechanics. Fleet Services customers have a tendency to approach mechanics with their requests for repair work, instead of going through the Shop Supervisor. This interrupts the workflow process and presents a liability when non-fleet personnel subject themselves to the numerous dangers inherent to repair shops. The design of the shop encourages these interactions, because customers must access the Shop Supervisor by walking through one of the existing repair bays where work is being performed.

Recommendation: Redesign the main shop to support better workflow, provide supervision oversight, and restrict customer access to work areas.

As part of the planned Fleet Services facility additions, the City should redesign the facility to support more efficient operations. In particular, the City should consider the following changes to the facility design:

- Relocating the parts room to a more central area in the shop when the two bays are added to the west wing. This will reduce the distance for mechanics to access parts.
- Inventorying the spare parts and surplusing those that are not needed.
- Contracting the tire service to a third-party vendor and utilizing the bay for fabrication work, or moving the fabrication equipment into this bay along with the tire equipment.
- Relocating the Shop Supervisor's office to an area that all customers are required to access in order to obtain service. Install proper signage that informs customers not to access the shop area and directs them to the Supervisor's office. Install chains across the entrance to each repair bay to discourage customer access to the shop area.

B. SERVICE DELIVERY

Maintenance and Repair Program

2. Finding: Fleet Services' preventive maintenance program is underdeveloped.

A typical municipal fleet services department spends 60% to 70% of its time on preventive maintenance and 30% to 40% on repairs. Fleet personnel were unable to define the shop's ratio of preventive maintenance to repairs. A backlog of preventive maintenance also exists. According to staff, there is a backlog of preventive maintenance services for Police units of about 30%. The rest of the fleet is backlogged 10%. For example, there are 30 preventive maintenance services scheduled for May that will need to be moved to June for servicing.

Fleet Services does not plan for its yearly preventive maintenance workload. Instead, a schedule of PM servicing is developed every month and customers are notified in advance when to bring their fleet units in for service.

Recommendation: Schedule the preventive maintenance workload for the entire year.

The centerpiece of any vehicle maintenance program is its preventive maintenance program. A good preventive maintenance program should minimize breakdowns and unscheduled repairs, allowing for vehicles and equipment to remain in service without interrupting the daily tasks of customers.

The advantage of mapping out an entire year's worth of scheduled maintenance is to determine if the City has sufficient staffing to cover the workload and, if not, what work will be contracted out to commercial vendors. It can also be used to determine the number and types of parts that will be needed.

3. Finding: The preventive maintenance checklists used by Fleet Services are too general.

There are separate checklists for automotive, trucks, and small miscellaneous equipment, but there are no class-specific checklists. As a result, manufacturer-recommended inspections unique to individual classes are not reflected in the checklists.

The checklists contain multiple echelons of progressive services (e.g., A-Service, B-Service, and C-Service, with C-Service being the most comprehensive). However, staff reports that the A-Service has been eliminated and only the B and C-Services are being followed. As a result, Fleet Services may be spending more time and effort than what is necessary by performing all the tasks that a "B-Service" dictates when only an "A-Service" is required.

In addition, Fleet Services does not incorporate a progressive, systematic inspection process that mechanics are required to follow, which results in less than optimal maintenance efficiency.

Recommendation: Redesign preventive maintenance checklists to reflect appropriate (manufacturer) inspections that are applicable to various classes of vehicles and equipment, as well as a progressive inspection process.

The preventive maintenance checklists need to be redesigned not only to address class types, but also to include such items as recording tire air pressure, tire tread depth, brake lining thickness, and appropriate actions (i.e., inspected and ok, adjustments made, repair required). In addition, there should be a place for the mechanic's signature, verifying that the inspection was completed satisfactorily. As part of reengineering the preventive maintenance program, Fleet Services should consider making this a core part of the process. (See Appendix E for examples of preventive maintenance checklists.)

4. Finding: Most scheduled service intervals are too frequent.

The preventive maintenance service intervals that Fleet Services utilizes for its A, B, and C Services are based primarily on a 90-day schedule, except for a few units, like ambulances, which are scheduled on a 3,000-mile interval, and miscellaneous equipment that is inspected once every year. The 90-day interval used by Fleet Services to perform preventive maintenance servicing is too frequent for most fleet units, unless those units spend a lot of time idling. The 3,000-mile interval used to perform oil changes is, again, too frequent for most applications, as most manufacturers do not recommend changing oil until mileage approaches 4,000 to 4,500 miles. A more realistic interval for ambulances might be a combination of time and mileage (or engine hours), since they travel greater distances and also sit idling for long periods.

Recommendation: Base service intervals according to vehicle manufacturer recommendations.

Preventive maintenance services should generally be conducted according to manufacturer requirements, unless Fleet Services has historical data that might override the manufacturer's recommendation. In addition, most vehicles and equipment should be serviced on a mile or hour criteria, and only on a time standard if it does not meet the mileage or hour standard. Most government fleet operations require that each unit be inspected once or twice per year, regardless of the miles or hours traveled. Fleet Services should also develop an optional time standard interval for scheduling preventive maintenance inspections for those fleet units that do not meet minimum mileage or hour criteria.

5. Finding: The current service request form is inadequate.

Fleet Services requires fleet customers to fill out a service request form when reporting vehicle and equipment malfunctions. In Carson City, this form doubles as a work order form that the mechanics use to document work performed, including labor and parts information. Most governmental fleet agencies use separate forms to differentiate between service requests and the work actually performed. This combined form used by Fleet Services leaves out several important elements that need to be captured. For example, it does not document the time the unit was reported to Fleet Services, the estimated time that the customer can expect the vehicle or piece of equipment to be ready for pickup, and the actual time the unit was available to be picked up. The time promised compared to the actual time the unit is ready to be released is a standard fleet performance measure that is typically tracked and monitored by well-run fleet operations.

Work orders are commonly generated by the Shop Supervisor or directly by the mechanic through the SunGard HTE Fleet Module part of the City's broader software system. These computer-generated forms rely on alpha and numeric codes rather than written descriptions to indicate failure codes, which are system codes that represent what systems were worked on (i.e., electrical, air conditioning, power train, transmission, brakes, and preventive maintenance), action taken codes (i.e., replace, repair, adjust, routine), and parts replacement information. Fleet Services has plans to replace the current fleet management information system with a more comprehensive system.

Recommendation: Develop a dedicated service request form that states time reported, estimated time to repair, and actual completed time.

Over time, the information collected with the improved service request forms will help Fleet Services to review its unscheduled repair activities for trends such as brakes, cooling, and charging failures and the reason for failures. These are the first steps in determining the appropriate actions to prevent a reoccurrence of failures. Failures may be caused by a number of factors, such as part defects, improper repair methods, lack of mechanic training, operator misuse, and/or not being identified on the preventive maintenance program. For example, using an oil-sampling program for heavy equipment to help determine the optimum intervals to change oil is an important best practice not currently employed by Carson City, with the exception of heavy equipment used at the landfill.

Parts Program

6. Finding: Fleet Services does not have a parts person to support the needs of mechanics.

The fleet parts program is an integral function that supports the maintenance program. Elements of the program include procuring parts, managing and controlling inventory, warehousing, and disbursing. In Carson City, the parts program is part of the City's larger stores function, which is the responsibility of the Finance Department's Purchasing program. The Shop Supervisor is responsible for ordering and warehousing parts for the shop. The parts room is generally well organized. One vendor is responsible for stocking nuts and bolts and another for supplying filters and wiper blades. All other auto parts are stocked by fleet personnel.

Fleet Services does not have a parts person to support the needs of mechanics. Instead, mechanics retrieve their own parts from the parts room as needed, and record the part description and price on each work order generated. It is unusual that a fleet operation the size of Carson City's does not employ a parts person to oversee the parts program. As a result, mechanics spend an inordinate amount of time ordering, picking up, stocking, and retrieving parts. Time spent on these parts-related tasks take away time from performing maintenance and repair tasks.

Recommendation: Hire a full-time Storekeeper to perform all parts-related duties.

A dedicated Storekeeper will free up mechanics to focus on their highest and best use, which is performing maintenance and repair duties.

7. **Finding: Parts are procured through ongoing purchase orders with several local vendors, and expenditures are expected to exceed budget by 22% this year.**

According to data supplied by the City, the current auto stores inventory value is $303,728. This represents 913 items and 50 to 100 line items. The parts inventory turnover rate (cost of parts sold divided by average inventory of parts on hand) meets the industry standard.

The City does not specifically budget for parts or for commercial work. Instead, parts and commercial work are combined into one line item, Property Services-Vehicle Repair & Maintenance (Element Object .04-35). This line item can be found in the Fleet Services budget, amounting to $300,000, and it is designed to cover the costs of parts and commercial work for routine maintenance. Fleet Services staff was unable to provide us with an accurate breakdown of the cost of parts and commercial work, but estimated that parts accounted for approximately $250,000 and commercial work for approximately $50,000.

This same line item, Property Services-Vehicle Repair & Maintenance (Element Object .04-35), also appears in each of the fleet customer's departmental budgets. However, it applies to parts and commercial work performed for non-routine maintenance. A total of $283,013 has been budgeted in all of the fleet customer's departmental budgets.

We were able to obtain year-to-date expenditures for each department, as well as year-to-date expenditures for all fleet-related parts and commercial repair work. From this data, we developed a ratio of parts expenditures to commercial expenditures and applied it to the combined budgeted amount of $283,013. As a result, we estimate that $191,317 was budgeted for commercial work and $91,696 was budgeted for parts.

Overall, it is estimated that about $341,696 was budgeted for the purchase of fleet parts. However, based on current expenditures for parts, the City will exceed the budgeted amount by about $76,000 this year, bringing total parts costs to $417,696. When this figure is divided by the number of vehicle equivalent units (VEUs), the result is $393 per unit, which is higher than the industry standard of $200 to $300 per unit. This is due in part to the higher costs of maintaining an aging fleet and the absence of contracts with parts vendors.

Fleet Services uses a variety of local vendors to provide frequently used parts to Fleet Services. Staff reports that the City's policy has historically been to ensure that the parts business is spread over the Carson City business community, as opposed to contracting with one vendor or a limited number of vendors based on specified prices and quantities. Parts are obtained through ongoing purchase orders with vendors.

Recommendation: Issue a request for proposals and award contracts with vendors to provide fleet parts with set prices and delivery criteria.

We estimate that the City could save approximately 10% or $40,000 to $50,000 per year by utilizing competitive purchasing contracts with set prices and delivery criteria. The contract should be for one year with two-year extensions, which can be exercised if the supplier satisfactorily meets all conditions. The City should also consider whether using a national parts vendor to provide on-site fleet parts and inventory programs would be cost-effective.

8. Finding: Parts tracking and inventory are manual processes.

The parts tracking function is not automated, which means mechanics must retrieve parts from the parts room and manually enter part numbers and costs on work orders. This is both time consuming and can lead to errors. A physical inventory is performed annually by Fleet Services, but an audit is not performed by the Finance Department.

Recommendation: Include parts tracking and inventory in the requirements for the planned enhanced fleet management system.

A more comprehensive fleet management information system should have the capability to automate the parts tracking function. The use of bar coding should also enhance the ability of mechanics to access and track costs more effectively.

Commercial Repair Work Program

9. Finding: Repair services are procured on a case-by-case basis with local vendors, and expenditures are expected to exceed the budget by 66% this year.

Fleet Services contracts a number of services to local vendors, including body and paint repairs, glass replacement and repairs, upholstery work, vehicle towing, transmission overhauls, crane and man lift OSHA inspections, fire apparatus and ladder inspections, auctioning of fleet units, and various specialized repairs. These are all typical of services outsourced to commercial vendors by municipal fleets. However, Fleet Services has been forced to contract out a significant amount of work, due to the fact that they are understaffed and the amount of non-wrenching time. This is covered in more detail in Section C, Staffing and Workload.

There are no formal contracts in place with vendors who provide repair work services. Fleet Services staff did not appear to be aware of the labor rates that commercial vendors charge for repair work. As a result, it is unclear whether the City is being charged competitive rates for commercial repairs to its

fleet. Furthermore, contracts should contain performance measures that guarantee turnaround time and pickup and delivery of fleet units.

As discussed earlier, we estimate that Fleet Services budgeted $241,317 for maintenance and repair work that was outsourced to commercial vendors. However, based on year-to-date expenditures, it appears that Fleet Services will exceed the budgeted amount by about $158,891, bringing the total cost of commercial work to $399,208. This amounts to approximately 23.5% of the total Fleet Services budget, which exceeds the industry target range of 10% to 15%.

Recommendation: Issue an RFP and award a contract to provide fleet repair services with local vendors with set prices, delivery criteria, and warranties.

The contract should be for one year with two-year extensions, which can be exercised if the supplier satisfactorily meets all conditions.

Fuel Program

10. Finding: Not all fuel data is being captured.

Fleet customers utilize off-site card-lock facilities to fuel their vehicles and equipment. The City has a contract with CFN Thomas Fuels to access fuel at any of their fueling stations located throughout the City. CFN fuel sites provide unleaded and diesel fuel, as well as premium fuel for use by the City's police motorcycles. For the most part, City fleet customers are responsible for obtaining their own fuel from CFN fuel sites. The Public Works Department receives a monthly report from CFN that reflects which fleet units obtained fuel at a particular site, the number of gallons pumped, and the cost. These monthly fuel reports are examined by Public Works staff to identify any discrepancies before sending the invoices to Finance for billing. However, no fuel information is entered into the HTE Fleet Module. Consequently, fuel data is not being tracked, such as average fuel consumption (mpg) by vehicle and by class, fuel cost per mile and average total fuel cost by class, all of which are critical elements in measuring a vehicle's performance.

Aside from the landfill site, the only other in-house fueling station is located at the Corporation Yard. It consists of two above-ground fuel tanks, one 400-gallon diesel tank and one 400-gallon unleaded tank. There is no water, air, or windshield self-service equipment available at the Corporation Yard. Fleet customers obtain these services at the CFN sites. Parks Department and Street Division customers are the only ones that access fuel from these tanks. Vehicle and equipment numbers, as well as gallons pumped, are recorded manually and entered into the HTE system for billing or data collection purposes.

Recommendation: Integrate fuel data from CFN reports into the planned enhanced fleet management system in order to compute average fuel consumption (mpg) by vehicle and by class, fuel cost per mile, and average total fuel cost by class.

Many governmental agencies have a variety of alternative fuel vehicles as part of their fleet. However, Carson City has none. There are many applications where alternative fuel vehicles can be used. These are typically identified in a fleet utilization study, in which vehicle applications are examined in more detail.

A breakdown of the types of fuel, quantities, costs, and average price per gallon is reflected in Table 1 below.

Table 1. Fuel Consumption and Costs for Fiscal Year 11/12

Type	Quantity	Cost	Average Price Per Gallon
Unleaded	110,347	$373,815	$3.38
Diesel	121,596	$436,511	$3.59

For FY 12/13 the city budgeted $907,964 for fuel and oil and spent $800,067 through the first 9 months of the year. Based on this data, it is estimated that the City will exceed their budget for fuel by approximately $160,000 if the cost of fuel remains stable through the end of the fiscal year. At the time of this report the City was paying, on average, $3.50 per gallon for unleaded fuel.

C. STAFFING AND WORKLOAD

Mechanic Workload

11. Finding: Mechanic staffing levels are not sufficient to support the number and type of vehicles that Fleet Services maintains.

The number of mechanics required for maintenance and repair is primarily driven by the size, condition, and composition of the fleet it supports. Because most public fleet operations maintain a wide variety of vehicles and equipment, it is necessary to establish a relative measure that allows for the evaluation and comparison of staffing needs. Currently, five Mechanic IIIs and 10% of the Fleet Services Supervisor's time are responsible for wrenching.

A vehicle equivalent unit (VEU) calculation is used to equate the level of effort required to maintain dissimilar types of vehicles and equipment to a passenger car, which is given a baseline value of 1.0. Based on experience with other public fleets, a VEU of 1.0 is equal to 12 to 15 annual maintenance labor hours, depending on a variety of factors unique to each agency. All other types of vehicles are allocated a value relative to the value of the passenger car. For example, a patrol car requires 2.5 times the annual maintenance and repair of a passenger car, or 30 to 37.5 hours per year.

By assigning a VEU value to every unit in Carson City's fleet, there are 1,062 VEUs. When this total is multiplied by the benchmark annual maintenance requirement of 12 to 15 hours per unit, it equates to 12,744 to 15,930 annual hours of required maintenance.

We calculated the required mechanic staffing level by dividing the range of total required annual maintenance hours (12,744 to 15,930) by the current average annual wrenching hours of a Carson City Fleet Services mechanic of 968 hours, based on a wrenching productivity rate of 43.9% (see calculation below). As a result, the City would need 13 to 16.5 mechanics.

Given the current productivity rate, this data suggests that Fleet Services is under-staffed by almost nine mechanics. This is further evidenced by the backlog of preventive maintenance and the cost of work being outsourced, estimated to be approximately $321,756.

The mechanics' productivity (wrenching hours) rate was estimated at 43.9% based on an average of 2,204 annual hours (2,080 hours plus average overtime of 124 hours per mechanic). National government fleet surveys suggest that productive time for average to well-managed public sector fleets ranges from 70% to 75%. Some government fleets achieve 75% to 80%. In the private sector, this number is estimated to be 80% to 85%. If Carson City could increase the productivity of its mechanics to 70% (1,543 annual hours), then the required number of mechanics to sustain the current workload would drop to 8.3 to 10.3 mechanics.

Recommendation: Hire three additional mechanics, track and monitor non-wrenching hours, and establish a 70% performance productivity goal for mechanics.

With increased productivity, the City would need to hire at least three mechanics to meet the City's fleet needs. If the City elects to add a swing shift, it should consider appointing a lead mechanic to supervise the mechanics in the absence of Shop Supervisor. Fleet Services could increase the productivity (wrenching hours) of its mechanics by reducing the time spent on non-wrenching activities, such as obtaining parts, cleaning the shop, transporting vehicles to and from commercial repair shops, and performing non-fleet activities for City departments such as welding and fabrication work. Well-run fleet operations utilize lower level, part-time employees to perform these types of tasks and do not typically provide welding and fabrication services. This staffing approach enables technicians to focus on wrenching hours, which will lower shop labor rates and markups.

To maximize productivity, Fleet Services should track, over a six-month period, non-wrenching hours that fleet staff spends obtaining parts, shuttling units between commercial vendors, and performing other non-wrenching tasks. This data will help the City to determine the number and type of employees required to perform these tasks. Increasing the productivity of the existing mechanics, coupled with the addition of three mechanics and some part-time service workers, will increase the number of wrenching hours and bring the staffing levels more in line with recommended levels.

Fleet Oversight and Management

12. Finding: Fleet Services operates only one shift per day.

Fleet Services operates only a day shift. There is no swing shift or overlapping shifts to accommodate fleet customers whose units are typically used during the day. As a result, customers will tend to utilize vehicles and equipment that should have been replaced in order to accomplish their field work when their regular units are out of service due to repairs.

Recommendation: Add a swing shift or overlapping shift to better accommodate the schedules of fleet customers.

Many municipal fleet operations of this size utilize more than one shift to perform most of their preventive maintenance work, as well as repairs that cannot be completed during the day shift. This can be accomplished quite easily with the added mechanics.

13. Finding: The fleet management function is currently performed on a part-time basis.

The current Fleet Manager evenly splits his responsibilities between Streets and Fleet Services. Although he was given the title of "Fleet Manager," the City does not have a formal job description or classification for this position. The current Fleet Manager reports directly to the Operations Manager, who devotes about 25% of his time to the Fleet Services function.

Recommendation: Create a full-time Fleet Manager position.

Other governmental fleet operations of Carson City's size are typically managed by a full-time Fleet Manager. Key responsibilities include planning, directing, managing, coordinating, and supervising all programs for the acquisition, assignment, utilization, maintenance and repair, replacement, and disposal of a city's fleet. In addition, a full-time Fleet Manager could assume some of the duties currently performed by the Operations Manager, including budget preparation and oversight of administrative and clerical duties associated with Fleet Services.

D. PROCUREMENT, FUNDING, AND UTILIZATION

Fleet Replacement Planning

14. Finding: The Fleet CIP may understate the need for vehicle replacement.

The City has a fleet replacement plan, referred to as the Fleet CIP. It projects future costs of replacing vehicles and equipment over a 20-year period. The purpose of the plan is to identify long-term spending needs and associated budgetary requirements. This long-range plan is a best practice; however, it does not contain some key elements, including salvage value, auction fees, and make-ready costs. In addition, the Fleet CIP uses a yearly inflation factor of 1%, while the average US inflation rate in 2012 was 2.07%.

Some of the average life cycle criteria used in the Fleet CIP replacement projections do not reflect cycles found in most municipalities. Typically, public agencies establish replacement criteria that take into consideration years in service, as well as miles and/or hours driven. This is not the case in Carson City, where replacement criteria is based primarily on years in service. As a result, the City may be keeping certain fleet units beyond their optimal life cycle and may be spending more money on repairs and experiencing more time out of service for these vehicles.

According to the Fleet CIP, the City's fleet has 31 units due for replacement in 2014 at an estimated cost of $1.58 million. This represents 9.2% of the City's rolling stock. Based on an analysis of the average life cycle criteria used by Fleet Services, there is a backlog of 64 units representing 19% of all rolling stock.

Recommendation: Incorporate more realistic replacement intervals, as well as salvage values, auction fees, and make-ready costs, into the City's long-range replacement plan.

Table 2 provides a comparison of current and recommended replacement intervals, where applicable, for each class of vehicle and equipment class or groups of vehicles that share a common use. Recommended replacement intervals were developed using best practice data applied to the City's current fleet.

Table 2. Current and Recommended Vehicle and Equipment Replacement Intervals

Vehicle/Equipment Type	Current Replacement Intervals		Recommended Replacement Intervals	
	Years	Miles/Hours of Use	Years	Miles/Hours of Use
Sedans	8.5	n/a	10	100,000 miles
Police Patrol Units	6	n/a	4	100,000 miles
Light Duty Pickup Trucks	7.8 to 12	n/a	10	100,000 miles
Medium/Heavy Duty Trucks[1]	15 to18	n/a	12	80,000 miles
Heavy Equipment	18	n/a	8-15	5,000 to 6,000 hours
Trailers	15	n/a	15	n/a

[1] Non-diesel vehicles

Optimal Replacement Point

15. Finding: Vehicle replacement intervals are not optimized.

When it is time to replace a vehicle or piece of equipment, most public agencies typically rely on age, mileage, hours of operation, condition or a combination of one or more of these criteria. However, other elements can also play a significant role in determining whether vehicles require replacement. These include quality of the preventive maintenance program, safety, fuel usage, driver skills, components used, parts availability, and new technology.

Recommendation: Adopt a methodology to support the replacement of vehicles and equipment based on the "optimum economic life point" of a unit.

Many fleet agencies use a weighted point system that takes into account a variety of factors to help establish potential candidates for replacement. This replacement scoring system typically apples to light-duty vehicles and takes into account a unit's age, mileage, maintenance, and repair costs, overall condition, reliability, and downtime. Points are assigned to each set of criteria as illustrated below.

- *Age:* One point for each year of chronological age, based on in-service date.
- *Miles/Hours:* One point for each 10,000 miles or 750 hours of service.
- *Maintenance/Repair Costs*: One to five points based on total life-to-date maintenance and repair costs (not including accident damage repairs) as a percentage of the original purchase price. For example, a vehicle with total maintenance and repair costs that equal the unit's original purchase price would receive a score of 5 while a unit with maintenance and repair costs that equal 20% of the original purchase price would receive a score of 1.

- *Condition:* This category takes into account body condition, interior condition, accident history, rust, and anticipated repairs. A five-point scale is used with 5 being poor condition.
- *Reliability:* Operators assigned to the vehicle are typically asked to assess the reliability of the various components, systems, and equipment of each vehicle. A five-point scale is used with 1 being excellent and 5 being poor. Another means to measure reliability is to assign one, three, or five points depending on the frequency the unit is in for repair. A rating of 5 would be assigned to a vehicle that is in the shop two or more times per month on average, while 1 point would be assigned to a vehicle in the shop an average of once every three months or less.
- *Downtime:* Typically this category would take into consideration the amount of time that a unit is out of service. A five-point scale is used with 5 indicating excessive downtime (20% or more) and a score of 1 indicating little downtime (6% or less). In cases where downtime is not tracked, the average number of repair work orders per month for each unit can be substituted. Those units with two or more work orders per month would be assigned a score of 5, while units with less than one work order per month would be assigned a score of 1.

Points for all six criteria are then totaled for each unit and compared with the point ranges found in Table 3 below.

Table 3. Scoring System for Evaluating Vehicle Condition and Replacement Need

Point Range	Condition
Under 18 points	Excellent condition
18 to 22 points	Good condition
23 to 27 points	Qualifies for replacement
28 or more points	Needs immediate consideration for replacement

Funding Vehicle Replacement

16. Finding: The decision to retain a fleet unit beyond its optimal replacement point has historically been a City department decision, not the decision of Fleet Services.

The current vehicle replacement procedure in Carson City gives fleet customers (City departments), rather than Fleet Services, the final say in determining if and when to replace their units. In many cases, the decision to retain a fleet unit beyond its optimal replacement point hinges on whether or not a City department makes a determination to budget for it. This is not a fleet best practice.

Fleet asset responsibility should be an integral part of the Fleet Services program and include determining not only when to replace a unit, but also the best means of acquiring the unit (i.e. purchase, lease, rental, or pooling).

Recommendation: Establish a vehicle/equipment replacement fund to which customers contribute to the replacement cost of their units over time.

Agencies that elect to budget for their fleet replacements may find that utilizing cash from ad hoc budget appropriations can be risky. Often a piece of equipment must compete with other requests for equipment and/or capital projects during the budget process. Consequently, organizations that try to

use this method to finance their fleet replacement program may find themselves with older and less reliable fleets if the money is not appropriated as planned. The City should consider establishing a dedicated internal service fund that accumulates funds for future replacements. This will provide a more reliable mechanism for making funds available to replace units when they have reached the end of their useful life. While a best practice, establishing such a fund may not be feasible at this time giving the City's current financial state.

Fleet Utilization

17. Finding: The City's fleet may be too large and underutilized.

It is unclear when a fleet utilization study was last performed or when the last physical inventory of fleet units was conducted. Given this, it is highly probable that the City's fleet may be "over fleeted" and underutilized.

Recommendation: Conduct a basic utilization review of the entire fleet, requiring departments to justify the need for each assignment, whether it be individually assigned or assigned as a sub-pool vehicle to the department.

The objective of a utilization study is not only to identify underutilized units, but also to offer alternative means of transportation, such as mileage reimbursement, downsizing to less expensive and more economical units, centralized and departmental pooling, sharing equipment with other public agencies, leasing equipment, and the use of commercial car rental companies. It is important to note that if fleet size is reduced, the City's operating services are not adversely impacted. Experience has shown that a fleet that has not been subjected to close utilization scrutiny can be downsized 5% to 15%. The benefits to be derived from such a study include:

- A reduction in the size of the fleet;
- One time income generated with the sale of surplus vehicles and equipment; and
- Ongoing savings in the annual operating costs associated with the surplus units.

Estimated, average values and cost savings potential associated with a 10% reduction of Carson City's fleet of 479 units is provided in Table 4.

Table 4. Estimated average surplus values of types of units removed from fleet units and annual operational and replacement savings.

Unit Type	No. Of Units	One Time Surplus Value/Unit	Annual Maintenance & Operational Savings/Unit	Annual Replacement Savings/Unit
Sedans/Light Duty Trucks	**20**	**$2,000**	**$2,500**	**$3,000**
Medium/Heavy Duty Equip.	**18**	**$8,000**	**$7,000**	**$8,000**
Miscellaneous Equipment	**10**	**$200**	**$70**	**$300**
Total Estimated Savings		**$186,000**	**$176,200**	**$207,000**

Estimated Savings Range: Assuming 10% of the fleet (48 units) is removed from service, the potential savings are $186,000 on a one-time basis from surplus sales, $176,200 per year in ongoing maintenance and operational costs, and $207,000 per year in replacement cost avoidance savings.

E. COSTS

Chargeback Rates

18. Finding: The City uses two separate accounts to budget for fleet maintenance and repair and does not use a chargeback system.

In lieu of an industry standard chargeback system, fleet customers are provided with the total annual funds they need to budget in three separate accounts. The first account, entitled "Internal Service Charges-Fleet" (Element Object .09-50), represents all routine maintenance that Fleet Services performs. This includes preventive maintenance servicing and some repair work. VEUs are assigned to each fleet unit and then are totaled. The total VEUs are then divided into the Fleet Operations budget to arrive at a cost allocated per VEU that is then multiplied by the number of units in each fleet customer's budget to arrive at a total budget amount. Rather than debiting each department's .09-50 account by the actual cost of routine maintenance for each of the fleet units contained in the department's budget, Finance debits half the budgeted amount in July and the other half in June.

A second account is set up in departmental budgets entitled "Vehicle Repair and Maintenance" (Element Object .04-35). It is supposed to represent the parts and commercial work costs of non-routine maintenance and repairs, including body damage, windshield replacements, major overhauls of components, repairs due to abuse/neglect, etc. It does not include any labor that fleet personnel perform related to this repair work. There does not appear to be any methodology to support the budgeted costs placed in each department's .04-35 account other than historical expenditures.

The third account is set up in departmental budgets entitled "Vehicle Fuel/Oil" (Element Object .06-60). Finance is responsible for coming up with a cost to place in each fleet customer's departmental budget to cover the annual cost of fuel. The City calculates this cost based on prior year's expenditures. In most governmental agencies, Fleet Services is responsible for budgeting for fuel and oil. They are usually in a better position to analyze such things as fleet usage, types of fuel used, miles per gallon data, and fuel market indicators, all of which are important elements to be considered when budgeting for fuel.

It is unclear why the City uses two separate accounts to budget for fleet maintenance and repair. It is also unclear as to how these funds are debited. For instance, fleet customers are only billed for parts and commercial costs associated with non-routine work, since mechanic salaries and benefits are accounted for in the VEU calculations that make up routine maintenance and repair. Furthermore, the types of services covered under VEU Listing do not address all routine maintenance. For example, according to Fleet Services, turning/replacing brake rotors is considered a non-routine service when the fleet industry classifies this as part of routine maintenance just like replacing brake linings/pads.

Some of the services listed as non-routine include repairs due to operator abuse/neglect and customer requests for vehicle and equipment fabrication or add-ons that deviate from original specifications.

These are examples of repairs that fleet customers should be required to pay for from other sources not associated with fleet maintenance and repair.

Recommendation: Develop a comprehensive and accountable chargeback system that incorporates fleet replacement, overhead, and all operational costs.

The City's budgetary process related to fleet costs does not encourage fleet customers to modify their behavior in terms of minimizing fleet size and influencing efficiency in the vehicle support system. When costs are identified and visible to the customer, they tend to economize. In addition, when customers are not held accountable, overall fleet costs rise and customer responsibility and care for equipment tends to lessen.

Public agencies utilize various chargeback structures to recoup their fleet costs. One structure that has been found useful in controlling fleet size is a three-tiered system that incorporates 1) a monthly flat fee that recoups the replacement costs over the life of the unit; 2) a standing or flat fee that captures the administrative overhead cost of the unit; and 3) a direct charge or cost per mile rate that recovers the operational costs of the unit (e.g., costs associated with fuel, tires, maintenance, and repair).

The purpose of a charge-back rate system is to recover the ownership and operational costs of vehicles and equipment. A properly designed charge-back rate system should recoup and differentiate among the actual costs of goods and services, such as maintenance and repair, fuel, and parts and commercial repair work provided by the fleet organization. The chargeback system should promote the equitable treatment of fleet customers based on the concept of paying only for the resources they consume, with no cross-subsidization of fleet costs and no subsidies from the General Fund.

Shop Labor Rates and Markups

19. Finding: Fleet Services' hourly rate is low, and no markups are applied to parts, fuel, or commercial repair work.

Fleet Services uses a $60.00/hour labor rate that is indicated on its work orders. However, it does not appear that it is used for any purpose. Furthermore, there seems to be no methodology in place to support how the shop labor rate is computed. Additionally, there are no markups applied to parts, fuel, or commercial repair work.

An activity-based cost analysis of the City's Fleet Services operation was conducted as part of this study to identify all fleet-related labor and overhead costs associated with each of the major functions, including administration/asset management, maintenance/repair, fuel, parts, and commercial repair work. In addition to normal fleet functions, an hourly rate for non-fleet work was computed, which mainly entails fabrication work for other City departments.

This analysis resulted in the calculation of two types of shop labor rates. The first, a *fully burdened shop labor rate,* is intended to recover all shop labor and overhead costs, except for those directly billed such as the actual costs of parts, fuel, and commercial work. The second computation is a *burdened shop labor rate with markups,* in which the labor rate recovers only the maintenance and repair labor and overhead costs, while the labor and overhead costs associated with the other functional areas (parts, commercial

work, and fuel and administration/asset management) are captured by means of adding a markup or charge. The City's shop labor rate is vastly understated when compared to fully the burdened labor rate of $248.05/hour and the burdened labor rate of $129.29/hour (with markups). Full labor rate calculations are presented in Appendix A.

Recommendation: Develop shop labor rates and markups/charges by appropriately allocating labor and overhead costs, including the functions of administration/asset management, maintenance/repair, fuel, parts, and commercial repair work.

As noted, Fleet Services appears to be unaware of the labor rates that local repair shops are charging to perform work outsourced by the City. It is critical that Fleet Services fully understands its costs relative to the local marketplace in order to determine the most economical means of accomplishing repair work and other service delivery options.

The City should be able to reduce the shop labor rate computed in this study by following some of the staffing recommendations in this report, including adding additional fleet staff and increasing the mechanic productivity. To support labor rates in the future, the City should also track wrenching and non-wrenching time for all fleet personnel involved with supporting the fleet operation.

Non-Fleet Work

20. Finding: Fleet Services performs some non-fleet work for other City departments.

In addition to the normal fleet functions that were analyzed during this study, an attempt was made to identify and isolate all non-fleet work performed for other City departments. The majority of this work can be classified as fabrication-type tasks, such as welding handrails and pipe, removing fence, and modifying force entry doors and garage doors.

One of the fleet mechanics is typically called upon to provide these services due to his fabrication experience. According to estimates supplied by Fleet Services, he spends approximately 30% of his time performing this type of work and usually charges only for materials (not labor).

Recommendation: Discontinue the practice of performing non-fleet work for City departments.

Labor rate analysis described above computed an hourly rate of approximately $168 per hour for a mechanic. If City departments were charged this hourly rate, they might look elsewhere to obtain service, since this hourly rate does not appear to be competitive with commercial rates. More importantly, these jobs take the mechanic away from his main task of maintaining the City's fleet and jeopardize the shop's productivity and ultimately drives up the shop labor rate.

Fleet Services should either decline requests for non-fleet work or charge a fair hourly rate to recoup labor costs.

F. POLICIES, FEEDBACK, PERFORMANCE, AND REPORTING

Management Policies

21. Finding: Comprehensive fleet management policies are not in place.

Policies that govern how vehicles are assigned, utilized, and cared for are a common practice in local government agencies. The Carson City has a Vehicle Use Policy that outlines the duties and responsibilities of employees who use city-owned and private vehicles for City business. It also addresses take-home vehicles, mileage reimbursement, accident procedures, fuel conservation, and use of GPS. Other than outlining proper operating and safety procedures, Carson City's policies do not define fleet maintenance policies to guide and direct the management of the City's vehicle and equipment assets. Consequently, fleet transportation goals and objectives are vague and the responsibilities for implementing them are unclear.

The City needs to establish a policy that addresses fleet transportation for officials and employees when they are conducting official business. This should include specific guidelines relating to vehicle assignment criteria, standby and take home usage, and use of personal vehicles. It should also outline the responsibilities of fleet staff, internal procedures for routine maintenance and emergency repairs, and performance measures.

Important policies for any successful fleet governing organization should include:

- Fleet Policy and Financial Management
- Customer Services Management
- Fleet Cost Control and Charge-back Management
- Assignment and Fleet Size Management
- Fleet Replacement (Cycling) Management
- Fleet Service Delivery Management

The City should create a Vehicle and Equipment Committee comprised of representatives from the various departments that utilize fleet services. A committee chair, preferably a manager from the City Manager's Office, should lead the group. The Fleet Manager's role should be to staff the committee and bring topics and analysis to the Committee for discussion. The Committee's purpose should be to address fleet-related issues, such as developing fleet policies and guidelines, resolving fleet service-related issues, and evaluating requests for additions to the fleet.

Recommendation: Establish a Vehicle and Equipment Committee to develop and oversee implementation of comprehensive administrative policies for vehicles and equipment.

Customer Feedback and Service Level Agreements

22. Finding: Regular customer feedback is solicited; however, service level agreements with customers are not in place.

The City conducts a customer survey every three years to obtain feedback about the services provided by all City departments, including Fleet Services. This is a best practice. However, one of the key elements missing from Carson City's fleet program is written service level agreements.

During interviews, many fleet customers commented about the slow turnaround time for preventative maintenance and repairs. However, most respondents seemed to be sympathetic to the fact that Fleet Services was understaffed. Communication between Fleet Services and customers was another area that customers thought could be improved.

Recommendation: Develop service level agreements between Fleet Services and each of its City department customers.

Customized service level agreements should be developed between Fleet Services and each of its largest customers. They should outline the services to be provided, as well as the charges and responsibilities of both parties. Performance standards should be included in each agreement, along with reporting requirements.

Performance Measurement

23. Finding: Fleet Services performance metrics are not currently in place.

There is no evidence that Fleet Services has established or is using performance measures to evaluate its fleet operation. Consequently, it is difficult to effectively measure the efficiency and effectiveness of the City's fleet operation.

Recommendation: Establish performance measures and monitor them with the goal of measuring performance against industry and shop standards. (See Appendix D for examples.)

Performance measurement is the process of identifying indicators that demonstrate an organization's efficiency and effectiveness in delivering a program or service. A performance measurement system relies on regular data collection and analysis to assess program performance. It is a tool to identify successes and needed improvements, as well as gauge customer satisfaction.

Tracking key indicators and analyzing performance are the foundations of process improvement. The regular analysis of performance metrics enables managers to make informed decisions about how to improve the delivery of services. Best management practices include the use of metrics in:

- Making resource allocation decisions;
- Evaluating service effectiveness (quality and efficiency);
- Assessing and improving customer satisfaction;
- Focusing on and increasing accountability;
- Identifying emerging issues and problems;
- Tracking positive or negative trends;
- Serving as the basis for policy and practice changes;
- Comparing and benchmarking with other agencies; and
- Educating, informing, and communicating improvements and successes.

Understanding that budget allocations should be tied to policy goals and objectives is critical for any government agency, especially in the face of constrained revenues, which are not likely to change in the near- or mid-term. Therefore, whether or not a formal performance budgeting system is instituted, performance measures provide management with important operating information. Performance measures enable management to develop solid budget justification, by either demonstrating program effectiveness or demonstrating a gap between needs and service levels. This, in turn, ensures that short-term resource allocation decisions are consistent with long-term goals and objectives. Some examples of critical performance measures that should be tracked include:

- Profitability
- Scheduled maintenance rate
- Vehicle and equipment downtime
- Parts turnover ratio
- Fleet utilization
- Types of repeat repairs
- Vehicle-hours (or days) lost waiting for parts

Management Reports

24. Finding: Fleet Services does not generate any reports to management or its fleet customers.

Fleet Services currently uses the SunGard HTE Fleet Module. It is part of the City's HTE SunGard enterprise software system. The system was acquired over 20 years ago. There are four workstations on the shop floor, one in the parts/library room, one in the Shop Supervisor's office, and one in the Fleet Manager's office.

Customers do not receive reports, such as the status of vehicles at the shop, the time, and reason(s) the unit has been out-of-service, and the anticipated time that repairs will be completed. Furthermore, customers are not made aware of the maintenance and repair costs of each of their units. In addition, Fleet customers are not "connected" to the system to look-up the status of a job or view a work order.

Recommendation: Develop monthly management reports for Public Works Department, the City Manager, and all fleet customer departments.

Managers of well-run fleets require analysis and reporting of certain fleet activities to properly assess fleet operations. Typical reports should, at a minimum, address the following activities:

- Number of repeat repairs;
- Percentage of preventative maintenance work completed compared with those that were scheduled;
- Fleet availability rate;
- Operational costs vs. budgeted costs; and
- Shop productivity (percent of wrenching hours).

APPENDIX A: LABOR RATE CALCULATIONS

Fully Burdened Shop Labor Rate Calculation

To calculate a fully burdened shop labor rate, it was necessary to estimate some of the indirect and direct hours of fleet staff due to the lack of available data. For example, the average wrenching hours computed for all technicians was 43.9%. This equates to about 968 hours annually for each mechanic. These hours are based on estimates provided by Public Works and conversations with fleet staff. This productivity (wrenching) rate plays an intricate part in the calculation of the fully burdened shop labor rate of $248.05/hour (see Table 5). This is almost four times the City's rate of $60.00 per hour and is not competitive with the local dealerships and independent repair shops that the City currently does business with.

Table 5. Fleet Services Fully Burdened Shop Labor Rate Comparison with Calculated Rate and Local Dealership/Independent Repair Shop Rates

Fleet Function	Current City Shop Labor Rate	Calculation of City's Shop Labor Rate	Local Market Shop Labor Rates
Fully Burdened Shop Labor Rate[1]	$60.00/hr.	$248.05hr.	$80 to $112/hr.

[1] *Fully burdened rate assumes that all shop overhead will be recouped in the shop labor rate and that the cost of parts, commercial repair work and fuel are recouped through a direct charge with no markups.*

Many hours that mechanics spend on other non-wrenching work, such as parts ordering, part runs, and delivering and picking up units from commercial repair shops, are not tracked. These non-wrenching tasks, along with indirect time (i.e., safety and training, cleanup, repairing shop equipment, and waiting for assignment), need to be tracked more accurately in order to determine how mechanics are spending their time. Once these hours are identified, they can be plotted against the various functional programs (parts, maintenance/repair, fueling, administration/asset management, and commercial repair) and a determination can be made as to total wrenching hours. These hours are then divided into total annual Fleet Services operating costs (less parts, fuel, and commercial costs directly billed) to produce a fully burdened shop labor rate.

Burdened Shop Labor Rate and Markup Calculation

Computing the burdened shop labor rate is similar to calculating the fully burdened labor rate in that indirect and non-wrenching time must first be identified in order to arrive at a total number of annual wrenching hours for all mechanics. Next is the task of identifying the hours and cost of labor for those fleet staff that do not wrench and those City employees who support Fleet Services. These labor costs, together with overhead costs, namely services and supplies, are applied to each of the main fleet functional programs (parts, fuel commercial work, and administration/asset management) in order to determine a total overhead costs for each program. These costs are subtracted from the total annual

Fleet Services operating costs, along with the parts, fuel, and commercial costs directly billed, to leave a balance that can be divided by the total number of annual wrenching hours to compute a burdened shop labor rate. The overhead costs identified for each program are then used to formulate markups and charges. These, in turn, can be used to benchmark against local markets and industry standards.

The following markups and charges are based on budgeted, not actual expenditures.

Parts Markup. Parts charged to work orders are not marked up. However, based on the activity-based costs analysis, a markup of 50.05% was computed. This exceeds the industry average of between 25% and 35%. This markup could be reduced if Fleet Services hired a Storekeeper and several part-time employees that could do parts runs.

Commercial Repair Work Markup. Fleet Services does not markup repair work sent to outside vendors. The existing commercial repair work markup of 39.78% is much higher than the industry average of 10% to 15%. This is due, in part, to the large amount of work being outsourced and the fact that higher prices are being paid for commercial work without contracts in place.

Fuel Markup. The City does not mark up its fuel to offset the overhead costs associated with this function. This is typically a best fleet practice, even if the government agency contracts for most of its fuel as Carson City does. There are overhead costs typically associated with administering the fuel contract, including billing, reconciliation of quantities and associated odometer readings, reporting, data entry, etc. We calculated a fuel markup of 8.87% or about $0.31 per gallon. This markup is much higher than the industry standard of between $0.08 and $0.09 per gallon.

Administration and Asset Management Fee. Fleet Services does not charge an administration and asset management fee. Such a fee would reflect the salaries and benefits of those who manage and support the operation and its assets. This includes some of the support from City departments (i.e., Finance, IT, Legal, and Purchasing). We computed a charge of $629 per year. This is much higher than the industry norm of $350 to $450 per year.

Table 6 illustrates what the burdened shop labor rate would be if all markups and charges were in place for parts, commercial repair work, fuel and administrative/asset management and compares these with local market rates.

Table 6. Fleet Services Burdened Rate Comparison with Calculated Rates and Market Rates

Fleet Functions	Current City Shop Labor Rate	Calculation of City's Shop Labor Rate & Markups	Local Market Shop Labor Rates	Fleet Industry Markup Standards
Burdened Shop Labor Rate[1]	$60.00/hr.	$129.29/hr.	$80-$112/hr.	N/A
Parts Markup	N/A	50.05%	Unknown	25-35%

Fleet Functions	Current City Shop Labor Rate	Calculation of City's Shop Labor Rate & Markups	Local Market Shop Labor Rates	Fleet Industry Markup Standards
Commercial Repair Work Markup	N/A	39.78%	Unknown	10-15%
Admin./Asset Management Charge	N/A	$629/unit	Unknown	$350-$450/unit
Fuel Markup	N/A	$0.31/gal.	N/A	$.08 to $.10/gal.

[1]Burdened rate calculation assumes that shop overhead will be recouped through a combination of a shop labor rate and applying markups and charges to parts, commercial repair work, fuel and administrative/asset management overhead

APPENDIX B: RECOMMENDATIONS

Recommendation 1. Redesign the main shop to support better workflow and provide supervision oversight. Include means to prevent customer access to areas where repair work is being done.

Recommendation 2. Schedule the preventive maintenance workload for the entire year. Include an optional time standard interval for scheduling PM inspections only for those fleet units that do not meet minimum mileage or hour criteria.

Recommendation 3. Redesign PM checklists to reflect appropriate (manufacturer) inspections that are applicable to various classes of vehicles and equipment.

Recommendation 4. Base service intervals according to vehicle manufacturer recommendations.

Recommendation 5. Develop a dedicated service request form. Incorporate time reported, estimated time to repair and actual completed time.

Recommendation 6. Hire a full time Storekeeper to perform all parts-related duties. A dedicated Storekeeper will free up mechanics to focus on their highest and best use, which is performing maintenance and repair duties.

Recommendation 7. Issue a request for proposals and award contract for vendors to provide fleet parts with set prices and delivery criteria. The contract should be for one year with two-year extensions if the supplier satisfactorily meets all conditions.

Recommendation 8. Include parts tracking and inventory in the requirements for the planned enhanced fleet management system.

Recommendation 9. Issue an RFP and award a contract to provide fleet repair services with local vendors with set prices, delivery criteria and warranties. The contract should be for one year with two-year extensions if the supplier satisfactorily meets all conditions.

Recommendation 10. Integrate fuel data from CFN reports in the requirements for the planned enhanced fleet management system in order to compute average fuel consumption (mpg) by vehicle and by class, fuel cost per mile and average total fuel cost by class.

Recommendation 11. Hire three additional mechanics, track and monitor non-wrenching hours, and establish a 70% performance goal for mechanics.

Recommendation 12. Add a swing shift or overlapping shift to better accommodate the schedules of fleet customers.

Recommendation 13. Create a Fleet Manager classification. Fill the position with a full-time person with the qualifications and experience to manage the fleet operation.

Recommendation 14. Incorporate more realistic replacement intervals, as well as salvage values, auction fees, and make-ready costs in the City's long-range replacement plan.

Recommendation 15. Adopt a methodology to support the replacement of vehicles and equipment based on the "optimum economic life point" of a unit.

Recommendation 16: Establish a vehicle/equipment replacement fund to which customers contribute to the replacement cost of their units over time.

Recommendation 17: Conduct a basic utilization review of the entire fleet, requiring departments to justify the need for each assignment, whether it be individually assigned or assigned as a sub-pool vehicle to the department.

Recommendation 18. Develop a comprehensive and accountable chargeback system that incorporates fleet replacement, overhead and all operational costs.

Recommendation 19. Develop shop labor rates and markups/charges by appropriately allocating labor and overhead costs, including the functions of administration/asset management, maintenance/repair, fuel, parts and commercial repair work.

Recommendation 20. Discontinue practice of performing non-fleet work for city departments.

Recommendation 21. Establish a Vehicle and Equipment Committee whose main task is to develop comprehensive administrative policies for vehicles and equipment.

Recommendation 22. Develop service level agreements between the Fleet Services and each of its customers.

Recommendation 23. Establish performance measures and monitor them with the goal of measuring performance against industry and shop standards.

Recommendation 24. Develop monthly management reports for Public Works Department, the City Manager and all fleet customer departments.

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APPENDIX C: RECOMMENDATIONS COST IMPACT

Cost Category	Fleet Services Annual Operating Resources / Costs					
	Current Fleet		Recommended Fleet		Change	
	FTEs	ANNUAL $	FTEs	ANNUAL $	FTEs	ANNUAL $
Fleet Manager	.50	$56,226	1.00	$112,452	0.50	$56,226
Fleet Service Supervisor	1.00	$87,772	1.00	$87,772	0.00	$0
Mechanic III	5.00	$384,312	5.00	$384,312	0.00	$0
Service Mechanic I	0.00	$0	3.00	$138,000	3.00	$138,000
Storekeeper	0.00	$0	1.00	$40,000	1.00	$40,000
Part-Time Service Attendants	0.00	$0	2.00	$40,000	2.00	$40,000
Sub-Total	6.5	$528,310	13.0	$802,536	6.5	$274,226
Parts[1]		$417,696		$375,926		($41,770)
Commercial Repair Work[2]		$399,208		$199,208		($200,000)
Shop Overhead		$227,304		$227,304		$0
Utilization Study[3]		$30,000		($176,200)		($146,200)
Sub-Total		$1,074,208		$626,238		($447,970)
TOTAL FLEET OPERATIONS SAVINGS/ADDITIONAL EXPENSES	6.5	$1,602,518	13.0	$1,428,774		($173,744)

* 1 Reflects estimated expenditures for FY12/13, not budgeted amount.

* 2 Reflects estimated expenditures for FY12/13, not budgeted amount.

* 3 Reflects cost of a fleet utilization study and the estimated associated annual maintenance and operations cost savings of a 10% reduction in fleet size. Estimated savings do not include annual replacement cost savings ($207,000) or one time fleet surplus value ($186,000).

APPENDIX D: SAMPLE PERFORMANCE MEASURES

Maintenance and Repair Performance Measures

- Ratio of direct technician labor hours to indirect technician labor hours
- Percentage of all PM inspections and annual state emissions inspections performed of those scheduled over a designated period
- Percentage of PM inspections performed within (XX) hours of presentation (by shop)
- Ratio of scheduled maintenance (PM) work orders to unscheduled repair work orders
- Downtime (or uptime) percentage by class of vehicle (excludes accidents)
    - Administrative vehicles and trucks
    - Medium/heavy trucks
    - Construction equipment
    - Sheriff patrol vehicles
    - Fire apparatus
    - Transit busses
- Percentage repairs that have turnaround time within one day; Percentage repairs within two days; Percentage greater than two days
- Number of unscheduled repairs per vehicle maintained
- Percentage of breakdowns per 100 vehicle repairs and miles/hours between breakdowns (such as tires)
- Percentage repairs that are repeat repairs (comebacks by shop)
- Fully burdened labor rate
    - Light duty
    - Medium/heavy duty
    - Miscellaneous equipment
- Burdened labor rate
    - Light duty
    - Medium/heavy duty
    - Miscellaneous equipment
- Average time to respond to road call
- Turnaround time to respond to road calls by towing service

Performance Measures that Monitor PM Compliance

- Technician Performance: Measures technician performance against time standard for each PM service (A, B, C, D) for each class of vehicle over a given period.
- PM Compliance: Measures the percentage (%) of PM inspections performed against PM's due and scheduled on a monthly basis. PM labor hours backlogged at month-end.
- PM Turnaround Time: Measures the percentage of all PM inspections performed within (XX) hours of presentation (by shop).
- PM Effectiveness: Ratio of scheduled maintenance (PM) work orders to unscheduled repair work orders over a given period.

Commercial Repairs (Sublet) Performance Measures

- Total value of repairs recovered under warranty
- Total cost of commercial work
    - By class
    - By repair task
    - By vendor
- Percentage charge or markup on commercial repairs
- Turnaround time of commercial work performed by vendor

Parts Services Performance Measures

- Downtime due to parts
- Vehicle-hours (or days) lost waiting for parts
- Percentage of repairs delayed due to stock outages/lack of parts
- Percentage charge or markup on the price of parts
- Parts turnover ratio (total number of parts used during a specified period divided by the average number of parts on hand at any given time)
- Total annual value of stock lost due to theft, loss, deterioration, or obsolescence (shrinkage)
- Average cost to process a purchase order
- Inventory adjustments (by line and value)
- Number of lines (and dollar value) of parts inactive in past six months
- Parts service level or the percentage of time that parts requests are filled from inventory on demand, within (XX) hours
- Number of open backorders by line, value, and age
- Ratio of the request fill rate to the level of investment in inventory

- Ratio of inventory volume to inventory value

Fuel Services Performance Measures

- Fully burdened rate per gallon of fuel
- Cost of gallon of fuel from area private providers, adjacent cities and counties
- Average fuel consumption (miles per gallon) by vehicle and class
- Fuel cost per mile by vehicle and class
- Average total fuel cost by class

Central Motor Pool/Heavy Equipment Pool/Shop Loaner Pool Performance Measures

- Average number of pool units rented per day by reason
- Number of times pool units not available by type
- Number of pool units available per day but not rented by type
- Pool revenues vs. pool costs
    - By class
    - By vehicle
- Ratio of shop loaner units dispatched to customers who are having units repaired/maintained to total number of shop loaner units

Acquisition Performance Measures

- Percentage of specifications prepared within four weeks of request
- Proportion of vehicle replacements funded from annual contributions to replacement funds
- Turnaround time from vehicle ordering to receipt of the unit
- Turnaround time from receipt of the unit to in-service date

Replacement Performance Measures

- Proportion of vehicles driven below minimum miles/hours criteria
- Average annual utilization (miles, hours) by vehicle class and type of assignment; Ratio of annual utilization (miles, hours) by vehicle class to capacity (or output available)
- Number and percentage of vehicles by total lifetime mileage grouping (to review age of fleet in miles/hours); Percentage of lightly, heavily-used vehicles
- Ratio of vehicles identified at the optimum replacement point (age and/or mileage replacement policy threshold) to vehicles actually being replaced
- Average actual vehicle retention period by class

- Number and percentage of vehicles exceeding standards on number of repairs, cost of repairs, road calls, downtime, utilization, oil consumption, cost per mile
- Number of qualifying vehicles that have planned replacement funding

Disposition Performance Measures

- Average salvage value per class by method of disposition
- Average number of days from out-of-service to disposition
- Ratio of salvage value to original purchase price

Agency Profit/Loss

- Net annual revenues vs. operating expenditures (profit/loss) by fleet by class and by vehicle

Operating Budget

- Total actual operating costs vs. budgeted costs
- Ratio of administrative overhead costs to total operating costs
- Ratio of maintenance and repair costs to total operating costs
- Ratio of parts costs to total operating costs
- Ratio of fueling costs to total operating costs
- Ratio of motor pool costs to total operating costs
- Ratio of indirect cost allocation to total operating costs

Replacement Reserve Fund

- Ratio of funds allocated for annual replacement to the estimated value of the current fleet (or class) (replacement cost method)
- Number of units to be replaced in the next year as a percentage of the fleet
- Number of units to be replaced in the next year as compared to the agency's replacement criteria guideline

Fleet Costs

- Total vehicle cost per mile/hour by fleet, by department, by class, by vehicle function
- Capital cost per mile/hour by fleet, by department, by class, by vehicle function
- Annual unit cost of each vehicle by class
- Operating and maintenance cost per vehicle by class
- Administrative overhead and replacement cost per vehicle by class

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APPENDIX E: SAMPLE MAINTENANCE CHECKLISTS

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