THE CITY OF
CALGARY
CITY AUDITOR'S OFFICE

Roads Business Unit Vehicle and Equipment Management Audit

May 13, 2015

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Executive Summary

The Roads Business Unit's (Roads) mandate is to keep Calgary's roads system safe and provide mobility for citizens and goods. The work done by Roads keeps Calgary moving; the crews and equipment have the critical tasks of:

- Maintaining, rehabilitating, and reconstructing roadways and bridges – Roads is responsible for over 400 bridges valued at over $1.5 billion;
- Clearing 15,000 lane kilometres of roadway for snow and ice control (SNIC);
- Performing street cleaning, surface overlay paving and sidewalk repair;
- Managing traffic and parking infrastructure; and
- Conducting roadway maintenance and construction programs including pothole repair.

Vehicles and Equipment used in Roads' operations are leased from the Fleet Services Business Unit (with the exception of one unit), within the City's Corporate Services Department. In 2014, Roads paid Fleet Services $12.3M in lease payments for 920 vehicles and equipment (units) among 109 classes, and $11.7M for repairs and maintenance. Roads' fleet has an average age of 7.5 years.

The objective of this audit was to provide assurance that the systems and processes in place effectively managed timely maintenance and cost of vehicles and equipment. The timeframe reviewed was September 1, 2013 to November 30, 2014. Fleet Services is responsible for ensuring units are available, fit for use, and in good repair. Roads is responsible for unit planning and coordination of requirements. Due to the close and complementary nature of the relationship between Roads and Fleet Services, the audit focused on the effectiveness of their 2012-2014 Service Level Agreement (SLA) as a tool to manage timely maintenance, costs, and coordination of Roads and Fleet Services activities. The timing of this audit was particularly important because the 2015-2018 SLA was under development.

We reviewed the SLA because it defines responsibilities, accountabilities, service level expectations and sets the framework for the working relationship between Roads and Fleet Services. The SLA includes Key Performance Indicators (KPIs) and metrics that are reported by Fleet Services at regular intervals and measure utilization rates and Roads' (Planned Maintenance Compliance) and Fleet Services' (Fleet Availability) performance. KPIs should measure performance based on an accepted standard of satisfactory performance and provide management with information to manage vehicle and equipment costs, and make decisions regarding fleet size, use and composition. KPI results should identify successful performance and areas for improvement.

Overall, as a management tool, the 2012-2014 SLA covered basic expectations. However, to be effective, the SLA should be strengthened by setting relevant performance measures, and providing clarity on roles and responsibilities to follow-up when targets are not met and ensure reliability of information. We acknowledge that inability to effectively use utilization information and meet established targets and performance measures does not in itself result in a high risk of untimely maintenance and/or increased vehicle and equipment costs. The key risk exposure is the lost opportunity to effectively measure success, improve performance and make informed decisions about the fleet.

Our review of the KPI results identified that targets for Planned Maintenance Compliance were rarely met and may provide a false warning since a unit may not be on time for a scheduled service appointment, but the legislated maintenance was completed as required. Fleet Availability targets were also rarely met. We noted that the KPIs may not be the right ones and/or achievable, which is further supported by the lack of follow-up on variances and corrective action by Roads and Fleet

Services. We made one recommendation that Fleet Services and Roads collaborate to develop KPIs for the SLA that are relevant, reliable, and achievable, and monitor and follow-up on variances.

Our review of quarterly Utilization Reports, provided by Fleet Services, identified the information was unreliable due to inaccuracies and was not effectively being used by Roads to support decisions on fleet size and composition. Fleet Services has been implementing an automated solution to improve data accuracy, which will be completed in 2016. In addition, utilization rates were measured but there were no targets or thresholds to compare to actual utilization. We made three recommendations to improve the effectiveness of the Utilization KPI; two directed to Fleet Services to improve utilization reporting, and one to Roads to monitor utilization and incorporate results into decision making. We also recommended that Fleet Services collaborate with Roads to define thresholds and targets for utilization, which is consistent with Administrative Leadership Team direction to Fleet Services to develop and implement a fleet utilization strategy by the end of 2016.

We also reviewed procedures related to maintenance and costs that were not specified in the SLA. Fleet Services' procedures include conducting Quality Control Inspections (QCIs) for 1 in 10 work orders to ensure that billed repair work is completed as required. Our review determined QCIs were conducted on less than 1 in 20 work orders. December 1, 2014, Fleet Services proposed significant changes to the QCI process. Under the revised process, the target for inspection is 5% of total work orders, but rather than random selection, the inspections will focus on higher risk areas with respect to safety functions. We agree with the risk-based approach, but recommend expanding the focus to include critical units and units that experience a high rate of breakdown and including the QCI rate in the SLA.

Roads and Fleet Services' management see the value of a strong partnership and are committed to improve their coordinated performance. They renamed the 2015-2018 SLA a "Partnership Agreement" to reinforce of the importance of their coordinated and complementary activities. The audit recommendations are aimed at supporting Roads and Fleet Services to more effectively utilize the tools that are currently available and set a measurable and meaningful level of performance. Roads and Fleet Services agreed to all the recommendations and committed to implementing many of the recommendations as part of the 2015-2018 Partnership Agreement to be finalized by June 30, 2015. The City Auditor's Office will follow up on all commitments as part of our ongoing recommendation follow-up process.

1.0 Background

The Roads Business Unit (Roads) mandate is to provide a safe, effective and well-maintained road network to keep citizens and goods moving. Roads, a Business Unit in the Transportation department, maintains, rehabilitates, and reconstructs The City's roadways and bridges, and manages traffic and parking infrastructure. Roads is responsible for over 400 bridges valued at over $1.5 billion, 1,400 hectares of green space along major roadways, and 15,000 lane kilometres of roadways. Roadway maintenance and construction programs include pothole repair, street cleaning, snow and ice control (SNIC), surface overlay paving and sidewalk repair.

Vehicles and equipment are critical to Roads' ability to complete required work. The Equipment & Materials section under the Business Services division in Roads is responsible for vehicle and equipment management and works closely with Roads' operational areas to plan and coordinate their vehicle and equipment requirements. The fleet includes sanders, plows, street sweepers, flatbeds, dump trucks, and other specialized equipment. Roads deploys vehicles and equipment for roadway work from 5 District Offices (North East, North West, South East, South West and Central).

Roads and Fleet Services have a Service Level Agreement (SLA) that communicates responsibilities, accountabilities and service level expectations. Under the SLA, the leased vehicles and equipment are acquired, maintained, repaired, and disposed by Fleet Services. Effective management of Road's fleet of vehicles and equipment impacts Roads' ability to provide a safe and effective road system and mobility for citizens and goods. The SLA expired in December 2014 and at the time of this audit report, Roads and Fleet Services are drafting a new agreement for 2015 to 2018.

2.0 Audit Objectives, Scope and Approach

2.1 Audit Objective

The objective of the audit was to provide assurance on the systems and processes in place to manage timely maintenance and costs of vehicles and equipment in Roads. The objective was achieved by analyzing data and assessing the design and effectiveness of key controls in place to ensure:

1. Roads' units are utilized efficiently and effectively;
2. Billings for repair and maintenance, and lease payments are accurate; and
3. Repair and maintenance of Roads' leased units is timely.

2.2 Audit Scope

Our focus was on systems and processes in place between September 1, 2013 and November 30, 2014. The following were outside the scope of this audit:

1. Units leased to Roads through Lessors other than Fleet Services since Fleet Services leases and maintains the majority of Roads' units; and
2. Procurement and acquisition of vehicles and equipment prior to delivery to Roads.

2.3 Audit Approach

Our audit approach included:

- Review the effectiveness of the Service Level Agreement (SLA) between Fleet Services and Roads as a fleet management tool. Testing evaluated:
  - Appropriateness of the SLA to support timely maintenance and management of vehicle costs;
  - Accuracy, completeness and use of unit utilization data; and
  - Key Performance Indicator results and follow-up activity on variances.

- Data analysis and review of key controls related to Fleet Services' procedures, systems and processes that support billing accuracy. Testing evaluated:
  - Controls supporting maintenance and repair billing accuracy and timely maintenance (review of work orders and analysis of maintenance and repair billings);
  - Controls supporting lease billing accuracy (units put in-service and end of lease returns); and
  - Anomalies identified related to scheduled maintenance billings.

- Data analysis and review of key controls related to Roads' systems, procedures and processes that support billing accuracy, timely repair and maintenance. Testing included:
  - Analyzing utilization data to identify high and low usage;
  - Assessment of controls supporting timely identification of unit deficiencies (Daily Inspection Reports); and
  - Process validation (based on interviews and walkthroughs with staff) to complete Daily Inspection Reports; report unit availability; and coordinate maintenance and repair scheduling with Fleet Services.

3.0 Results

3.1 Service Level Agreement

During this audit, we assessed the Service Level Agreement (SLA) as a tool to assist Roads in managing their fleet to ensure that they can fulfill their mandate. We evaluated both Roads and Fleet Services due to their high level of interaction and interdependence. We noted the 2012-2014 SLA outlined roles and responsibilities, and set the framework for a partnership agreement. However, the agreement can be a more effective tool by clearly describing the obligations between Roads and Fleet Services as well as establishing a mechanism to address service level deficiencies. Components of observations outlined in Sections 4.1 to 4.4 should be incorporated into the new 2015-2018 partnership agreement currently being drafted by Fleet Services and Roads (Recommendation 7).

3.2 Key Performance Indicators

The Key Performance Indicators (KPIs) measuring Roads' adherence to scheduled maintenance (Maintenance Compliance – 100% target); and Fleet Services' unit availability rates (Availability – 95% target) are both reported by Fleet Services and included in the current SLA. Performance targets should be based on an acceptable standard of good performance. Our review of the KPIs concluded 100% Maintenance Compliance and 95% Availability may not be reasonable and may not be the right measures of the performance of Roads and Fleet Services (Section 4.3). These KPI targets are rarely achieved and Fleet Services does not conduct follow-up to determine the cause of variances. We recommend Fleet Services collaborate with Roads to develop measures that are relevant, reliable and achievable. KPIs should be reviewed periodically to ensure they remain relevant and follow-up action should be taken to determine the reason for variances along with corresponding corrective action (Recommendation 5).

The SLA also includes Cost per Kilometre/Utilization KPI with an industry benchmark target. Fleet Services provides Roads with a Utilization Report that includes Cost per

Kilometre. Cost per Kilometre benchmarks have not been compared to actual, to date. Utilization is discussed under Section 3.3 below.

3.3 Utilization

The Utilization KPI measures the use compared to cost of leased units, however without a threshold or usage target, the utilization data cannot be used to identify under- or over-utilized units. The audit assessed the accuracy of the utilization data and determined that data inaccuracies impede the usefulness of the Utilization Report. We made two recommendations around utilization data and information, followed by two recommendations to apply utilization data to Roads' operations.

We reviewed the utilization data updated, maintained and reported by Fleet Services in its Utilization Report. We observed that the Utilization Report is not a reliable tool for Roads to use to assist with fleet management due to inaccuracies in the utilization data (Section 4.1). Accurate usage data supports identification of under- and over-utilized vehicles and decisions regarding right-sizing the fleet. We recommend Fleet Services take action to improve the completeness and accuracy of the data in the Utilization Report (Recommendations 1 & 2).

Fleet Services' leased units do not have maximum usage defined in the lease term. Without a definition of maximum or high usage in the lease term, Roads' unit replacement schedule may not match its actual usage. Fleet Management leading practices suggest that establishing vehicle-replacement cycles assists with predicting optimum replacement time and minimizes vehicle and equipment costs. Through data analytics, we identified units and unit classes that were under- and over-utilized when compared to average annual kilometer usage. We also reviewed a class of units critical to Roads' Snow and Ice Control activities (SNIC) and identified high maintenance costs in the final year of the lease (Section 4.2). We recommend Fleet Services collaborate with Roads to define unit usage thresholds or limits and to periodically assess the useful life of the units (Recommendation 3 & 4).

3.4 Quality Control Inspections

Fleet Services' performs Quality Control Inspections (QCIs) to review the quality of the service work, which also supports billing accuracy by ensuring that work included on the work order has been completed. The target rate of QCIs is 10% (1 in 10 work orders).

Our review identified that QCIs are conducted less than half as often as required (less than 1 in 20). Fleet Services is in the process of revising its QCI procedure to cover 5% of all work orders inspected and focus on critical work done by apprentices, brake and steering repairs, and work orders completed over more than a single shift (Section 4.4). Fleet Services has taken a risk-based approach to QCIs, and while we agree with this approach, we recommend that additional considerations be included when finalizing the revised procedure such as, increasing the rate of inspection for critical units and monitoring QCIs for compliance with the procedure (Recommendation 6).

3.5 Lease Payment Billing Accuracy and Timeliness

Fleet Services leases units and equipment to Roads, and bills Roads for lease payments. We examined billing controls and procedures for the first (units put in service) and last (lease returns) lease payments. We selected a random sample of 10% (10 of 100) of new leases initiated during our audit timeframe. Since our random sample included five units of the

same type (50%) we used judgment to select an additional three new leases to ensure that our sample was sufficient. We reviewed 13 unit records in total, and noted that Fleet Services' first billings were timely and the lease term was set up accurately (i.e. Roads was billed for units received).

We reviewed sales and disposal information for all leased units returned by Roads between January and October 2014. Fleet Services prepares a Disposal Authorization form to document a returned lease, and a copy of the form is provided to Roads. The Finance & Supply Business Unit's Investment Recovery group sells the returned units and reports the sales information to Fleet Services. We compared units' last lease billing date in Fleet Services records to the sale date provided by Investment Recovery and determined over 93% of returned leases stop billing when the unit is returned to Fleet Services. Out of 58 units, we identified four units (7%) that required further review to confirm that the last billing date coincided with the date of return on the Disposal Authorization forms. We could not conclude that the lease billing ended upon the lease return since the Disposal Authorization forms for the four units could not be located in Fleet Services or Roads records (Section 4.6).

While relatively few errors were noted in the Lease Return process (four exceptions out of 58), the confirmed errors related to secondary units attached to a main unit that were not recorded on the Disposal Authorization form. To reduce the occurrence of this type of error, we recommend that Fleet Services provide training to staff involved in the Lease-Return process and recommend that Roads monitor billing statements to ensure returned units are not included in current statements (Recommendations 8 & 9).

3.6 Repair & Maintenance Billing Accuracy

Roads is billed for parts and labour on repair and maintenance performed, which is detailed on individual work orders. Roads reviews maintenance and repair costs monthly and scans the billings for anomalies and errors. We performed data analysis on three common repair and maintenance job types (fluid replacement, oil change, and light repair) billed to Roads to identify anomalies that could be an indication of billing inaccuracy. These job types accounted for 1.6% of the work orders (860 of 53,346) completed during the audit timeframe, and total billing was $83,795. We reviewed all variances (instances where the work order total variance was more than $100 above or below the average job cost). We were satisfied that all variances were explained within written job details provided by Fleet Services technicians and noted billing was consistent with the repair and maintenance performed.

3.7 Maintenance Timeliness and Availability

We reviewed Fleet Availability and Planned Maintenance Compliance KPIs since they also provide a measure of Fleet Services' performance and timely maintenance. These are discussed under 3.2 above.

We also reviewed Roads' daily inspection process to assess the effectiveness and timeliness of the identification of deficiencies. Before and after each work shift, Roads' vehicle and equipment operators are required to physically inspect vehicles and equipment used during the shift. The results of the inspection are recorded on a Daily Inspection Report (DIR) form and if a deficiency is recorded, the form is given to the foreman who requests a service appointment with Fleet Services.

The design of the daily inspection process is effective since employees have an incentive to comply. Staff advised that employees are diligent in recording deficiencies that are present prior to a work shift to ensure that they are not held accountable for prior deficiencies (i.e. deficiencies due to an unreported accident or misuse). We reviewed a sample of 44 DIR forms and noted that all were completed and signed by the operators. We confirmed that all deficiencies recorded on the DIR were repaired and the repair was timely based on urgency. We identified an opportunity to improve the timeliness of deficiency notification which we brought to Roads' attention.

4.0 Observations and Recommendations

Recommendations 1 through 6 are focused on improving the effectiveness of oversight controls and monitoring activities. Relevant components of these recommendations should be considered as part of an effective and transparent Partnership Agreement (Recommendation 7). Recommendations 8 and 9 are process improvement recommendations.

4.1 Utilization Data and Information

The information in the Utilization Report provided to Roads by Fleet Services is not reliable due to errors in manually entered data recording hours of use and kilometer (km) usage. Utilization Reports should be reviewed for accuracy and errors identified and corrected. If the data is inaccurate, Roads may make incorrect decisions related to limiting or extending lease terms in order to manage its costs, and determining which vehicles can be rotated, reassigned, or removed.

According to the 2012-2014 SLA, Fleet Services is responsible for reporting KPIs to Roads. Included in the KPIs is Cost per Kilometre (Utilization). Fleet Services collects and maintains all data with respect to leased unit usage, costs, and maintenance and provides Roads with a Utilization Report each quarter. Current reports are available on demand.

The Utilization Report includes data such as:

- Age of the unit in months and years;
- Term of lease; remaining term of lease;
- Cost of maintenance and lease; including year-to-date and life-to-date totals; and
- Odometer (km) or hour meter readings are reported; providing year-to-date and life-to-date usage for every leased unit.

Information regarding the lease rate; lease term; and maintenance costs is imported from Fleet Services' M5[1] system. We did not review that data for accuracy. Km and hour meter data is updated manually and electronically in M5 and included in the Utilization Report as follows:

- Meter data is entered in work orders by Fleet Services' technicians.
- Vehicle and equipment operators are required to enter a vehicle's mileage at the City's fuel pumps prior to fueling. Data collected at the fuel pumps automatically updates M5's meter data.
- Since 2011, some vehicles have been equipped with a system to wirelessly report mileage and update M5 automatically. The wireless reporting system is not set up to report hour meters; it only reports mileage.

[1] FleetFocus' M5 is a system that provides all the necessary tools to manage fleet operations.

We reviewed the Utilization Report, as of November 26th, 2014, with Fleet Services and identified instances of negative usage and hour meters exceeding 2,000 hours/year. Fleet Services confirmed negative usage is an error. Fleet Services also advised it is highly unlikely that an hour meter would exceed 2,000 hours/year and as a result excess hours were identified as an error. We also physically inspected odometers and hour meters on 32 of Roads' units and confirmed 27 (84%) odometers and hour meters had variances of greater than 100 hours or 100 km when compared to the data recorded as life-to-date meters, in M5. In some cases, meter readings in M5 exceeded actual meter readings. We concluded that the differences were not due to timing.

Roads and Fleet Services staff advised that manual data entry errors can occur at the fuel pumps and during maintenance and repair. System configuration and installation errors can cause wireless updates to M5 to be inaccurate. While automating meter readings is a promising development, it is important to ensure that all meter data is reviewed for accuracy. Fleet Services does not have an effective process to review meter data accuracy and make corrections when required. Discussion with Fleet Services confirmed utilization data error identification and correction responsibilities have not been assigned.

In the Utilization Report, all usage is reported as "km", however, the actual usage may be km or hour, depending on the unit class. The Utilization Report does not make that distinction. We reviewed the Cost/km and Maintenance Cost/km information in the report, and identified information that was not representative of actual unit cost or usage. An extract from the Utilization Report is displayed in Appendix A. The results in the Cost/km and Maintenance Cost/km columns as shown in the report are not correct. We recalculated the Cost/km and Maintenance Cost/km to demonstrate how accurate information provides clearer and more representative information for future planning related management utilization decisions (Appendix B).

Recommendation 1

Fleet Services ensure greater accuracy and completeness of the data in the Utilization Report by providing procedural training to staff responsible for inputting unit usage and increasing awareness on the importance of reporting accurate usage information at the fuel pumps and in work orders.

Management Response

Action Plan	**Responsibility**
Agree. A technology driven automated solution (CFOS) is underway, and it will ensure accuracy of the data of new and existing units. In the interim, Fleet Services will create a communication plan to increase awareness of reporting accurate usage information at the fuel pump and in work orders. Status update: Steps have been initiated to have units fuelled at City pumps on a regular basis. All	Lead: Fleet Services Business Operations Manager Support: Fleet Services Customer Service Manager Commitment Date: June 30, 2015 for communication plans. December 30, 2016 to complete

Action Plan	Responsibility
technicians and customer service advisors are also being reminded of the importance of recording odometer and hour meter data on the work order when a vehicle is in for maintenance or repairs at Fleet Services.	CFOS modem installation on units.

Recommendation 2

Fleet Services assign responsibility for data accuracy in the Utilization Report, including:

a) Regular (i.e. monthly, quarterly, etc.) review of the utilization data to correct data entry errors, such as negative usage values and hour overages; and
b) Periodic assessment of meter data to ensure recorded data is accurate (i.e. comparing meter data to actual meters) and correction of the meter data when required.

Management Response

Action Plan	Responsibility
Agree. a) Fleet Services will implement a business process to enable regular review of the utilization data. b) Fleet Services will work with Roads and do spot checks each quarter to compare physical meter data to the Utilization report to provide assurance of the accuracy of the Utilization Report. As the number of units with CFOS modems increases, the accuracy of data reported will keep improving. Status Update: Utilization reports were generated on an annual basis until late in 2014 and are now generated quarterly for Roads as indicated in the draft partnership agreement (SLA). Reports are validated in Fleet Services before being released and any additional queries or anomalies detected are sent to Fleet Services for resolution with report re-submission if needed. Roads staff also have access to the reporting portal to verify data at any time between quarters.	Lead: Fleet Services Customer Service Manager Support: None Commitment Date: June 30, 2015

4.2 Vehicle and Equipment Utilization

We analyzed utilization for 100% of Road's units with an odometer reading and identified over- and under-utilized vehicles. Under-utilized vehicles may not achieve the full benefit of planned maintenance which may result in a higher maintenance cost per km or hour. Over-

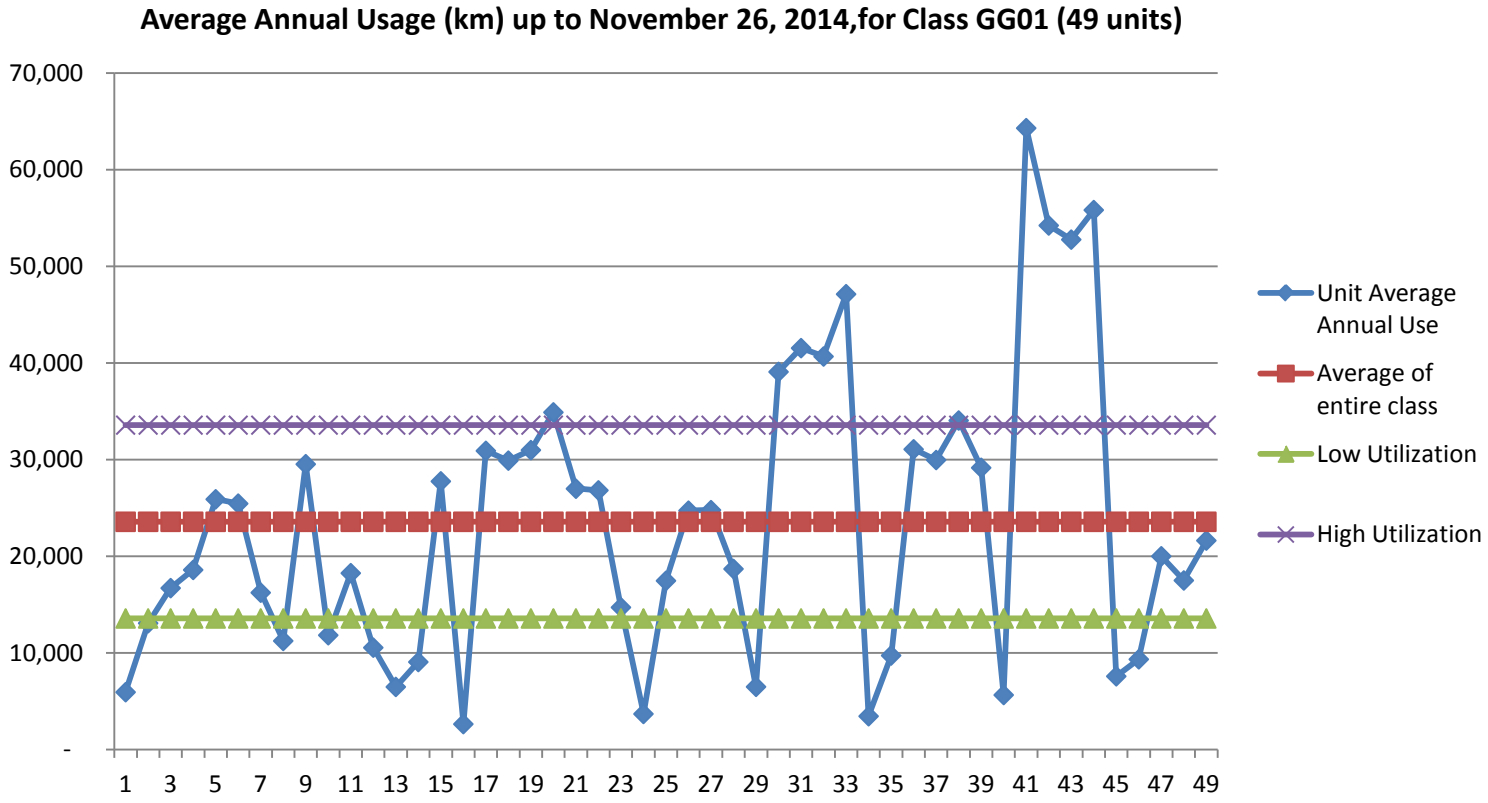
utilized units may be prone to frequent breakdown due to wear and tear. Utilization should be regularly reviewed and monitored to identify the opportunity to right-size the fleet or rotate units between divisions and avoid unnecessary wear and tear, which can lower maintenance and repair expense.

We reviewed and analyzed Roads' leased vehicles' 2014 mileage data (measured in km) and identified over- and under-utilized vehicles based on average use among classes, excluding vehicles without at least 1 year of service. We analyzed utilization of 428 vehicles in 58 classes and noted utilization variances exceeding +/-10,000km from the class average in 17.1% of the vehicles (41 over-utilized and 32 under-utilized).

Further analysis indicated:

- District Central had the most under-utilized vehicles.
- Traffic Field Operations division had the most over-utilized vehicles.
- Vehicle classes GG01 and GG12 (Medium and Large flat-deck trucks) have the most utilization variance. The information provided below is a summary of unit classes GG01 and GG12. The information was taken directly from the 2014 Utilization Report. We did not confirm the accuracy of the mileage reported for these vehicles. At November 26, 2014, the average monthly lease rate for GG01 and GG12 was $946 and $904 respectively.

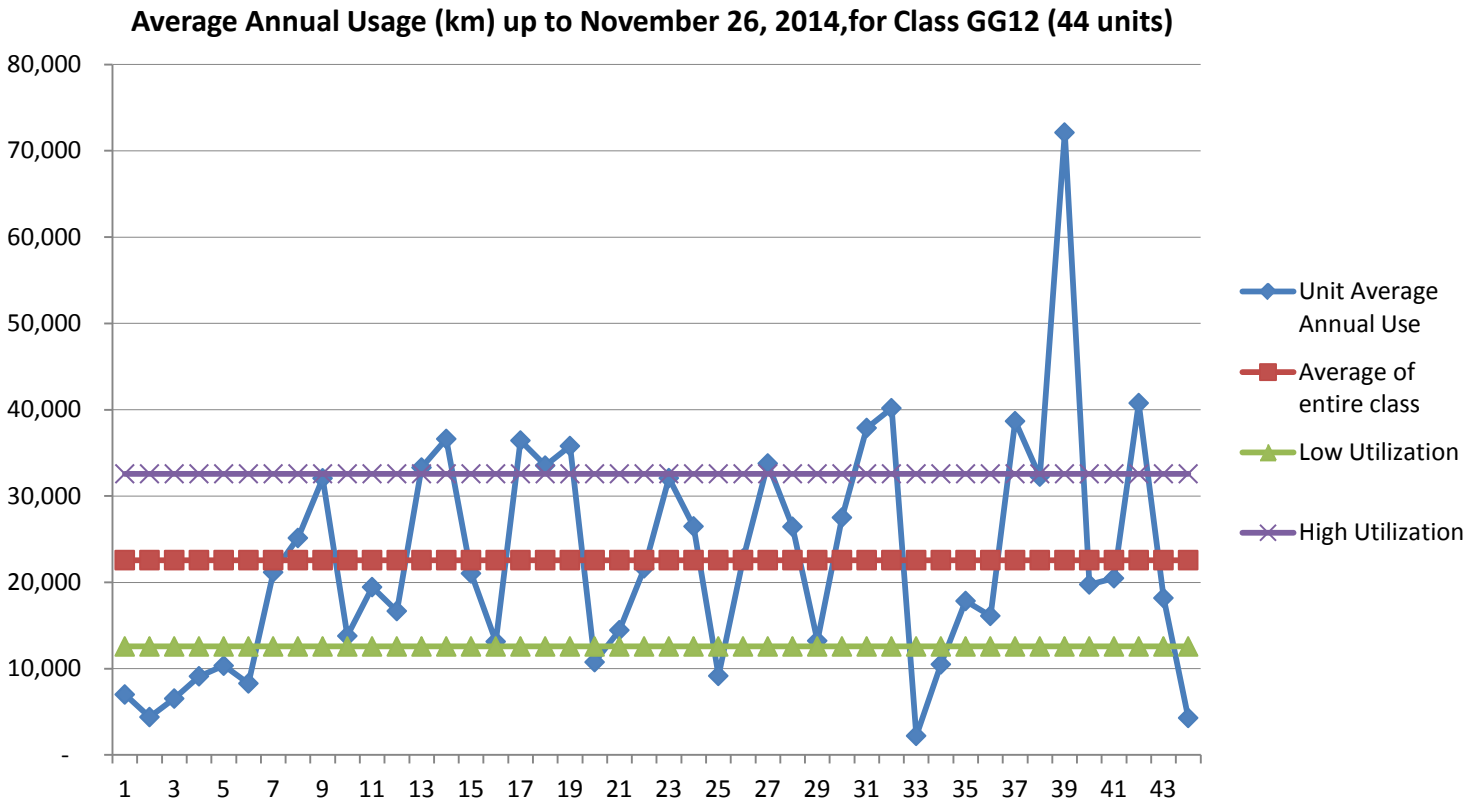
Chart 1:



Of the 49 trucks in GG01:

- 15 under-utilized, with the most under-utilized averaging 2,638 km per year, and
- 10 over-utilized, with the most over-utilized averaging 64,302 km per year

Chart 2:



Of the 44 trucks in GG12:

- 11 under-utilized, with the most under-utilized averaging 2,217 km per year and,
- 11 over-utilized, with the most over-utilized averaging 72,112 km/year.

Roads explained some of the utilization variance may be due to different job requirements amongst Roads' divisions and size of the district where the units are used. Roads does not regularly review utilization reports and does not have a process or policy to regularly review unit utilization and move units to different districts or assignments in order to level the fleets' usage.

<u>Recommendation 3</u>

Roads review and monitor utilization reports and include the following in their process:

a) Assign responsibility to regularly (i.e. monthly, quarterly, etc.) monitor and review fleet utilization; and

b) Incorporate utilization information in vehicle management decision-making to support a fully utilized fleet, i.e. rotating vehicles between districts and divisions as necessary.

Management Response

Action Plan	Responsibility
Agree. a) Roads, Business Services, Leader Equipment and Materials will oversee quarterly monitoring and review fleet utilization. Status Update: Currently, Roads is working on preparing a Summary for the top twenty classes of vehicles by costs. It is anticipated that this report will be shared with the Roads Management Team by May 15, 2015. The summary will highlight the most over-utilized and under-utilized units in a specific class of vehicles.	Lead: Roads, Business Services, Leader Equipment and Materials Support: Fleet Services Manager Fleet Operations. The Summary is a prepared with the year-end Utilization Report generated from M5, and sent from Fleet. Commitment Date: May 15, 2015
b) An effective and efficient methodology for redeploying vehicles will be established. Business areas within Roads that consume higher than average km on an annual basis should have access to the lower-usage units in order to maximize the warranty available from the manufacturer. In order to create an effective trial redeployment program, initiatives need to be completed such as: - Identify unit classes that redeployment would benefit; - Document an approach to redeploy vehicles so the process is repeatable; and - Create a checklist to document unit condition, serviceability, damage and unit photographs Status Update: Prior to receiving industry data (see Action Plan for Recommendation 4), Roads will identify occurrences of over-utilization and under-utilization. That data will be used to effectively balance the fleet by moving units across the business unit.	Lead: Roads, Business Services, Leader Equipment and Materials Support: Fleet Services Manager Fleet Operations. Work with Fleet to understand the successes and challenges of the trial program. Commitment Date: December 31, 2015

Fleet Services' lease terms are stated in months and years, without thresholds for maximum km usage during the lease term. As a result, the leased units are generally in-service until the end of the lease term. To align with leading practices, thresholds for maximum usage should be established and usage monitored. Utilization information can then be applied to enhance decision making and optimize the fleet's usage. Utilization can be measured, but without a threshold to compare it to, Roads is not able to make optimal fleet management decisions.

We reviewed a class of unit that is critical to Roads' SNIC activities. The class consisted of 19 units used during snow events, leased to Roads on a five-year term between 2010 and 2014. Roads confirmed that the unit class typically has a high utilization rate during the winter season. Our review showed that the units incurred 30.22% of lifetime total maintenance costs in the fifth year of use; maintenance and repair costs increase 43.1% from Year 4 to Year 5, which coincides with the largest snowfall recorded in 112 years. The following shows a summary of the annual and lifetime maintenance and repair costs of 19 SNIC units, in-service from 2010 to 2014:

Table 1:

	Year 1 **2010**	**Year 2** **2011**	**Year 3** **2012**	**Year 4** **2013**	**Year 5** **2014**	**Total**
Annual Maintenance and Repair Costs (in $000s)	276	522.7	562.5	598.8	857	$2,817
Allocation as a % of Average Lifetime Maintenance and Repair Costs	9.80%	18.55%	19.97%	21.26%	30.42%	100%

Recommendation 4

Fleet Services collaborate with Roads to:

a) Define thresholds or targets of usage for each unit class in order to define and identify under-utilization and over-utilization;
b) At regular intervals, review and adjust the unit class thresholds or targets;
c) Periodically assess useful life by unit class with the purpose of maximizing useful life while giving consideration to the cost-benefit of replacing versus repairing aged units; and
d) At regular intervals, review the class' useful life to ensure usage thresholds are meeting expectations with respect to anticipated repair and maintenance costs, and adjust when appropriate.

Management Response

Action Plan	Responsibility
Agree. a) Define thresholds or targets of usage by unit class to help optimizing utilization; b) Define process to review and adjust the unit class thresholds or targets; c) Define process to periodically to assess useful life by unit class and; d) Define process to review class' useful life Status Update: ALT has directed Fleet Services to develop and implement a fleet utilization strategy by the end of 2016. A staged approach will be developed with Roads in 2015-2016 to be documented in future partnership agreement (SLA) updates before 2017.	Lead: Fleet Services Manager Fleet Operations in collaboration with Roads Support: Roads, Business Services, Leader Equipment and Materials Commitment Date: December 30, 2016

4.3 Key Performance Indicators

The following KPIs are included in the SLA:

- Planned Maintenance Compliance (Target - 100%)
- Fleet Availability (Target - 95% Uptime)
- Cost per Kilometre/Utilization(Target - Industry Benchmark)

The results of our review of 100% Planned Maintenance Compliance and Fleet Availability KPIs are included below. Cost per Kilometer is discussed in Section 4.1 above.

Planned Maintenance Compliance and Fleet Availability outlined in the Service Level Agreement are rarely achieved and as a result, may not be reasonable or relevant to accurately and adequately measure Fleet Services' and Roads' performance. Without effective KPIs in place, it is difficult for Fleet Services and Roads to measure performance; determine areas of weakness; and identify improvements to Fleet Services' and Roads' processes. KPI targets should be relevant, reliable and achievable, and when a KPI target is not met, it should create a call to action to determine why the target was not met.

In the 2012-2014 SLA, Fleet Services committed to monitoring and reporting its performance, and benchmarking its products and services. Performance is measured with KPIs.

Planned Maintenance Compliance

This performance measure is to assist in assessing if units are meeting the scheduled planned maintenance requirements. Fleet Services has set a Planned Maintenance Compliance target of 100% because of the legislated requirement to comply with the

Commercial Vehicle Inspection Program (CVIP)[2]. However, the components measured in the KPI quarterly reporting provided by Fleet do not measure compliance with the CVIP requirement. The 100% Planned Maintenance Compliance target is "met" if a unit is on time for its scheduled service appointment. The target was not met in any quarter in 2014 (Appendix C). This KPI is in effect providing a false warning since a unit may not be on time for a scheduled service appointment, but the required maintenance was completed as required annually.

Fleet Services set the target at 100% Planned Maintenance Compliance in order to prepare work schedules for the technicians and full utilization of labor hours. Performing annual inspections on time to comply with legislated requirements and full utilization of technicians' labor hours are measurable KPIs, however, the result of the current measure does not provide information on the actual outcome of either.

Fleet Availability

This is a measure of Fleet Services performance and committed service level defined in the SLA. The KPI is reporting availability of the fleet as a percentage of unit's in-service and not undergoing repair and maintenance or otherwise unavailable. It is an indirect measure of the timeliness of planned and unplanned maintenance. There is no direct measure of timeliness in the current SLA.

We reviewed the KPI quarterly reporting provided by Fleet in 2014 that included 14 classes of vehicles. The target was not met in any quarter for 11 classes, the target was met in one quarter for two classes, and the target was met in three quarters for one class (refuse packer truck)(Appendix C).

Roads staff advised that they discuss unit availability regularly and during SNIC events often communicate availability twice daily. Fleet works with Roads to ensure the right amount of units are available. Staff advised that the 95% target is not discussed and may not be the right target. As a result we can't determine whether the right amount of units were available to provide the level of service required. Setting an appropriate target would allow Fleet Services to monitor availability and follow-up on the variances to identify the cause of unmet targets.

95% uptime or 95% unit availability may not accurately reflect the needs of Roads operations. Discussion with Fleet Services and Roads confirms availability requirements vary by project, ongoing commitments, and weather events. Roads projects or weather events can increase demand on certain classes of units; however the fleet, in its entirety, is not called upon at a rate of 95%. Striving for 95% availability of all units at all times does not accurately reflect Roads' operational needs or demonstrate Fleet Services' responsiveness to Roads' needs. A more useful measure would be to assess reasonable availability requirements and determine if Fleet Services achieved the target.

[2] Annual inspections need to be completed on vehicles with a combined weight of 11,794 kilograms when operating intra-provincially and 4,500 kg when operating extra-provincially. www.transportation.alberta.ca/509.htm

Recommendation 5

Fleet Services:

a) Collaborate with Roads to review Key Performance Indicators and develop measures that are relevant, reliable and achievable;
b) Review and refine Key Performance Indicators periodically (i.e. semi-annually, or annually); and
c) Monitor results, follow-up and take corrective action when variances are identified.

Management Response

Action Plan	Responsibility
Agree. a) Establish measures that are relevant, reliable and achievable. b) Define process for periodic reviews. c) Define and implement process to monitor results, do follow-ups and take corrective actions. Status update: Fleet Services has been working with Roads in 2015 to select measures or confirm existing measures to be reported going forward. The partnership agreement (SLA) will include measures, timing for reporting and reviewing, and process to manage the measures beyond 2015.	Lead: Fleet Services Customer Service Manager Support: Roads Commitment Date: June 30 2015

4.4 Quality Control Inspections

QCIs were performed on 4.6% of all work orders opened and completed between September 1, 2013 and November 30, 2014 rather than the 10% outlined in Fleet Services' procedures. Lower than prescribed rates of QCI may result in a higher incidence of undetected incomplete or deficient repair work. QCIs should be monitored to ensure procedures are complied with.

Fleet Services' FSP042 states 1 of 10 work orders will undergo QCIs. Fleet Services did not monitor QCIs to ensure that frequency was 1 in 10, or 10%. QCIs were conducted at the discretion of the foreman, and focused on the quality of the workmanship.

Fleet Services staff advised that as of December 1, 2014, Fleet Services initiated a trial procedure to replace FSP042. Under the trial procedure, the quality control check will focus on mitigating high risk exposure with a target for inspection of 5% of the total work orders focused on the following four areas:

1) Shift handover work orders;
2) Steering and brake road tests;
3) Apprentice work on critical items; and
4) Quality Control Inspections assigned by the supervisor.

The newly proposed procedure is in draft, and has not yet been approved by Fleet Services.

Audit reviewed the maintenance history of one class of 19 critical SNIC classes (Section 4.2). Our review noted overall, the unit class received fewer QCIs than the rest of Roads' fleet. While Roads' fleet average rate of QCI was 4.6%, the SNIC units reviewed had an overall rate of 2.84% or 57% fewer inspections than the rest of the Roads fleet, during a time when the SNIC units experienced an increase in maintenance costs of 43.1% ($599K to $857K).

Fleet Services' revision of the Quality Control procedure addresses safety and completeness of repairs however there are additional considerations that can be included in the risk-based approach.

Considerations could include:

- Monitoring compliance to the QCI rate;
- Aligning with the Partnership Agreement to ensure critical units receive sufficient QCIs;
- Assigning QCIs to units and classes that have a high incidence of breakdown (i.e. increased maintenance costs); and
- Determining the frequency of QCI based on a frequency of more than 5% for high risk items and less than 5% for low risk items.
- At the current frequency of QCI (4.6%), it is reasonable to anticipate that Fleet Services' could achieve the revised target of 5% or a blended target of 5% without significant adjustment to current resources. QCIs conducted with priority given to critical units may result in reduced incidences of breakdown and unit downtime resulting in lower costs and increased availability.

Recommendation 6

Fleet Services' quality control processes and procedures include:

- Monitoring Quality Control Inspections for compliance with Fleet Services' procedure; and
- Other considerations (i.e. increasing Quality Control Inspections of critical units and classes with a high incidence of breakdown) before finalizing the new process.

Management Response

Action Plan	**Responsibility**
Agree. Through quality control processes and procedures: a) Fleet Services will define process to monitor quality control inspection. b) Fleet Services will assess inclusion of other considerations prior to finalizing process. Status Update: Procedures have been documented in draft form for Quality Assurance/Quality Control on critical units (i.e.	Lead: Fleet Maintenance Manager Support: Roads Commitment Date: December 31, 2015

Action Plan	Responsibility
Sanders for SNIC) and will be reviewed with Roads and tested before adoption in 2016.	

4.5 Partnership Agreement

The SLA between Roads and Fleet expired December 2014, and a new 2015-2018 Partnership Agreement was being drafted at the time of the audit. The term, Partnership Agreement, is being used to more accurately reflect the symbiotic nature of the relationship between the two business units in the same organization. An effective agreement should create an obligation and benefit to all parties involved and include KPIs, mechanisms to address service levels issues, and mechanisms to periodically review and update the agreement.

Review of the 2012-2014 SLA noted:

- 2012-2014 KPIs may not be the most relevant or reliable measure for Fleet Services or Roads(See Section 4.3);
- It lacked a mechanism to address service level deficiencies; and
- It was not signed by the Roads Business Unit Director.

Incorporating the relevant parts of recommendations 1-6 in the 2015-2018 Partnership Agreement will assist in providing a framework for developing continuous improvement in Roads and Fleet Services' performance.

Recommendation 7

Fleet Services and Roads:

a) Incorporate relevant parts of recommendations 1-6 in the 2015-2018 Partnership Agreement;
b) Ensure Quality Control Inspection expectations are outlined in the Partnership Agreement and align with Roads' service level requirements (i.e. critical units and availability);
c) Define Fleet Services' and Roads' benefits and obligations in the Partnership Agreement;
d) Incorporate a mechanism for periodic review and evaluation of performance; and
e) Include provisions in the partnership agreement to annually review and update the agreement as needed.

Management Response

Action Plan	Responsibility
Agree. Roads and Fleet staff to meet on a regular basis until an agreed upon SLA is executed. Roads welcomes the opportunity of establishing a Service Level (Partnership) Agreement with	Lead: Roads Business Services Manager and Fleet Services Customer Service Manager Support: A partnership agreement authored to the benefits of both parties,

Action Plan	Responsibility
Fleet that provides benefit to both parties, and ultimately Calgarians. Roads and Fleet Services are working to establish Key Performance Indicators (KPIs) which will provide the decision making data required to efficiently manage Roads' vehicle fleet, and ensure Roads' lines of business are provided efficiently to Calgarians. The SLA should coincide with Action Plan 2015-2018 initiatives, and a draft version will be provided to the Auditor for review before finalization. Fleet Services will: a) ensure quality control inspections are included in the Partnership Agreement b) define Fleet Services' and Roads' benefits and obligations in the Partnership Agreement c) incorporate a mechanism for periodic review and evaluation of performance in the Partnership Agreement d) include provisions in the Partnership Agreement to annually review and update the agreement as needed <u>Status update</u>: The partnership agreement (SLA) has been drafted with input from Roads and Fleet Services from recent month's meetings. It is currently going through another review towards finalization for its implementation by June 30, 2015.	Roads and Fleet. <u>Commitment Date:</u> Fleet: June 30, 2015 Roads: June 30, 2015

4.6 Lease Return Process

When Roads returns a leased unit to Fleet Services, associated lease rate billings should stop the same month as the month of the lease return. We could not confirm that Roads wasn't overbilled for four of 58 units disposed of since documentation was not available to confirm the return date to Fleet Services. If the unit billing is not stopped in a timely fashion:

- Roads may be billed for units that are no longer in service, and
- In-service inventory records may be inaccurate in Fleet Services' and Roads' inventory databases.

We reviewed information of all disposed units; formerly leased by Roads, between January and October 2014 to confirm Fleet Services' controls were effective and mitigated the risk that monthly lease rate billing stopped once a unit was returned to Fleet Services. We chose to review disposal information to assess the Lease Return process because:

- Before disposal or sale, the leased unit must go through the Lease Return process; and
- Returned units should not have a lease rate.

Of 58 units, 54 units' last billing followed the same pattern: a time gap of 1-3 months between the last billing and the sale date. Fleet Services explained leased units are returned; prepared for sale; and then sold. This process takes time to complete. We deemed this was reasonable, and no further testing involving the 54 units was conducted. Four units had a different pattern of last billing and disposal – the last lease billing occurred in the same month as the recorded sale date. We assessed this to be an unlikely scenario and conducted further work to determine if the lease billings were stopped on the date the units were returned to Fleet Services.

Fleet Services' procedure FSP128 requires Disposal Authorization forms to be completed by Fleet Services when a leased vehicle is returned. The unit's number and date of return are recorded on the form. Fleet Services' administration stops billing the lease to Roads based on the information recorded on the form. A copy of the Disposal Authorization form is supplied to the customer (Roads). The forms for the four units under review could not be located within Fleet Services' and Roads' records. As a result, we could not confirm the last billing date was correct, or, if Roads was overbilled for months after the units had been returned.

Discussion with Roads confirmed that Roads does not review Disposal Authorization forms to ensure all units returned are listed on the form, and does not monitor the lease billing statement to ensure billings cease for returned leases. Fleet Services staff records unit identification numbers on the Disposal Authorization form, however when two units are connected because they are used together during operations, Fleet Services staff may record only one of the units on the Disposal Authorization form, even though the two units are leased individually.

Our review also confirmed that one of the four units without a Disposal Authorization form had an open work order which was not closed until several months after the unit's recorded sale date. Roads does not receive billing from Fleet Services until a work order is closed. When an open work order remains on a returned lease unit, Roads will not receive a timely billing.

Recommendation 8

Fleet Services:

a) Ensure the Disposal Authorization form is complete and accurate;
b) Raise awareness of the steps in procedure FSP128 by providing training to staff involved in the Lease Return process;
c) Follow-up by monitoring the Lease Return process to ensure training is successful; and
d) Ensure outstanding items related to returned leased units, including work orders, are closed in a timely manner.

Management Response

Action Plan	Responsibility
Agree. Fleet Services will: a) ensure the Disposal Authorization form is complete and accurate b) provide training to staff involved in the Lease Return process c) monitor the Lease Return process d) ensure outstanding items related to returned leased units, including work orders, are closed in a timely manner Status update: Several steps have been undertaken in recent months including education for completeness regarding the Disposal Authorization form, mapping the Lease Return process and engaging staff in the process. Deficiencies of the past are being addressed and corrected to meet commitment date through sampling and monitoring.	Lead: Fleet Operations Manager Support: Roads, Business Services Commitment Date: June 30, 2015

Recommendation 9

Roads assign responsibility for:

a) Reviewing Disposal Authorization forms for accuracy and completeness with respect to the following items:
   i. The unit numbers of all returned units are recorded on the form; and
   ii. The form is signed by an authorized employee in Roads, and the copy is filed in Roads' records. and
b) Monitoring the monthly billing statements, or other appropriate report, to ensure that lease rate billings are stopped in a timely manner on returned units.

Management Response

Action Plan	Responsibility
Agree. It is important for budget management that lease rate begin/end dates accurately correspond with the date the vehicle enters/leaves service. a) Roads will create a disposal process checklist to clearly identify the steps to be	Lead: Roads, Business Services, Leader Equipment and Materials Support: Assistance from Fleet Services to include additional fields in the Unit Disposal Authorization form Commitment Date: June 30, 2015

Action Plan	Responsibility
taken when a unit is being relinquished. Recommendations on changes to the form will be provided to Fleet Services in order to capture the required data. Associated attachments, using department, new unit # as examples of information that may be included. b) A Unit Disposal Checklist will be completed along with the Unit Disposal Authorization to ensure that unit status is updated accordingly in inventory records and billing statements accuracy is verified. Status Update: Roads conducted a review of units disposed since the Audit's results were known, and sampled 15 disposal records of 70 units disposed. Of records reviewed, it was confirmed that the billing had ceased in accordance with the relinquishment date.	

We would like to thank staff from Roads and Fleet Services for their assistance and support throughout this audit.

Appendix A

The following information was extracted from the Utilization Report on November 26th, 2014:

Class HM07 Unit #	Age (Years)	Current Life (months)	Periods Depreciated (LTD)	Term Remaining (Months)	Life-to-Date Usage	2014 Usage	2014 Maintenance	Total 2014 Lease and Maintenance	Cost/Hour[3] (including lease cost)	Mtce Cost/Hour (maintenance only)
10506	8	96	96	0	4322	168	$29,862.89	$49,252.89	293.17	177.75
11120	8	96	89	7	21303	-402[4]	$15,558.01	0[5]	0	-38.70
11122	8	96	89	7	40004[6]	35929[7]	$26,144.62	$45,564.62	1.26	0.72
12525	8	96	56	40	4686	431	$18,398.63	$35,128.63	81.50	42.68
12812	7	84	56	28	4728	663	$39,980.36	$50,190.36	75.70	60.30
12903	6	72	49	23	3508	614	$25,707.45	$43,237.45	70.41	41.86
12905	7	84	53	31	10064[8]	1058	$25,858.50	$43,278.50	40.90	24.44

Unit Class HM07 usage is reported in hours. Discussion with Fleet Services management confirms negative usage and annual usage exceeding 2,000 hours are errors. We noted several errors with the data, resulting in Cost/Hour and Mtce Cost/Hour that misrepresents the real costs per hour of usage. Errors were noted in Life-to-Date Usage, 2014 Usage and Lease Units 11120, 11122, and 12905. At the time of this report, Class HM07 is comprised of the 7 units listed above.

[3] The Utilization Report reports "Cost/km" and "Mtce Cost/km" regardless if the meter is recording Kilometers or Hours. Class HM07 reports usage in Hours. For clarity, we have changed the Columns to "Cost/Hour" and "Mtce Cost/Hour".

[4] Negative usage is not possible, and this entry is an error.

[5] Unit 11120 was removed from service during 2014, and the lease rate was set to 0. The Utilization Report does not reflect the lease cost during 2014.

[6] Data entry error in the 2014 usage (see footnote 7) create errors in calculating the Life-to-Date Usage.

[7] Unit 11222's 2014 Usage would likely not exceed 2,000 hours, and this entry is an error. This unit was inspected during service work on November 14, 2014, and the meter reading recorded on the work order was 4,302.

[8] Unit 12905's reported Life-to-Date usage would not likely exceed 2,000 hours per year over its life. The unit was inspected during service work on November 22, 2014, and the meter reading recorded on the work order was 3,753.

Appendix B

The data errors identified in Appendix A were removed, and replaced with usage data deemed more accurate. The following shows a report of how such information aids in decision making. Accurate and complete information allows the user to quickly determine which units are the most costly of the unit class, and which ones to consider for replacement or removal.

Class HM07, Unit #	Age (Years)	Current Life (months)	Periods Depreciated (LTD)	Term Remaining (Months)	Meter Reading (hours)	Life-to-date Lease costs	Life-to-date Maintenance costs	Life-to-date Cost/Hour (including lease cost)	Life-to-date Mtce Cost/Hour (maintenance only)
10506	8	96	96	0	4322	186,144	265,949	$104.60	$61.53
11120[9]	8	96	89	7	4457	167,012	292,492	$103.10	$65.63
11122	8	96	89	7	4302	172,838	202,228	$87.18	$47.01
12525	8	96	56	40	4694	93,688	164,825	$55.07	$35.11
12812	7	84	56	28	4728	57,176	164,714	$46.93	$34.84
12903	6	72	49	23	3508	85,897	127,673	$60.88	$36.39
12905	7	84	53	31	3753	92,326	152,273	$65.17	$40.57

Note: 2014 usage cannot be determined for all units due to meter data entry errors. Instead of measuring cost of 2014 usage as reported in Appendix A, this table shows the life-to-date usage and costs.

Possible conclusions based on this data:

- Units 12525, 12812, and 12903 have the lowest operating cost/hour.
- Unit 12812 has 975 more hours compared to Unit 12905, though they are relatively close in age.
    - Unit 12905's Cost/Hour is $65.17 and 38.9% more than Unit 12812's Cost/Hour $46.93.

[9] Unit 11120 was removed from service in July 2014 at Roads' request.

Appendix C

The following information is the Key Performance Indicators (KPIs) reported by Fleet Services to Roads in 2014.

Planned Maintenance (Roads' compliance to scheduled preventive maintenance):

Status	Q1 2014	Q2 2014	Q3 2014	Q4 2014	2014 Total
Late	140	130	129	136	535
On Time	318	559	450	370	1,697
Total # of Units	458	689	579	506	2,232
% Units on Time	**69%**	**81%**	**78%**	**73%**	**76%**

The Target is 100% On Time for scheduled preventive maintenance.

Roads' Fleet Uptime/Availability:

Class	Class Description	2014 Percentage of Uptime Days			
		Q1	Q2	Q3	Q4
GE	Dump Truck	85%	86%	79%	56%
GH	Refuse Packer Truck	95%	52%	97%	95%
GL	Aerial Truck	87%	81%	91%	88%
GN	Crane Truck/Tire	98%	90%	85%	52%
GR	Fifth Wheel Tractor	91%	93%	93%	92%
GS	Tanker and Wrecker	47%	91%	87%	80%
HA	Curber/Paver/Patcher	84%	46%	34%	68%
HB	Street Sweeper	87%	82%	73%	18%
HE	Excavator Crawler	60%	95%	89%	75%
HG	Grader	87%	78%	82%	75%
HL	Loader Crawler	81%	92%	92%	91%
HM	Tractor Fel/BH	84%	80%	88%	89%
JS	Sander	84%	65%	61%	52%
AP	Street Flusher	n/a	78%	n/a	n/a
	Total	86%	81%	77%	61%

The Target is 95% uptime or better.