



Office of the Auditor General

**Audit of Winter Operations: Capacity Planning and Performance
Measurement**

Tabled at Audit Committee – November 26, 2015



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Executive Summary

Introduction

The Audit of Winter Operations, included in the Office of the Auditor General (OAG) 2014 Work Plan, was approved by Council in March 2014.

Background

The City of Ottawa Winter Operations, operating under the Road Services branch within the Public Works department (PW), is tasked with maintaining the Nation's Capital's roads and pathways¹ by providing snow removal and ice control services. In addition PW provides year round services such as pothole repair and litter collection. Commuters, businesses, and residents rely on these services. On average, 236 cm of snow falls in Ottawa every winter. The City has approximately 5,621 km of roads, 2,175 km of sidewalks and 233 km of Transitway and Highway 174 to maintain on a regular basis². All roads and highways cleared must meet the established City standards which surpass the standards in the Ontario Regulations³.

In 2013, the City of Ottawa's annual budget for Winter Operations was \$55.3 million; the 2013 expenditures were \$79.2 million. Services are delivered from 17 Yards spread across five zones in four geographic areas. Winter Operations provide services using a mix of internally owned and staffed equipment and contracted resources.

Based on information provided by PW approximately 590 employees were engaged in the City of Ottawa Winter Operations activities as at February 1, 2013.

In 2014, Public Works completed their Corporate Risk Profile which identified areas of risk which could impact their operations. A *Winter Operations Risk Scan* was conducted by the OAG in 2014. Items from the Corporate Risk Profile supplemented by information obtained through documentation review and interviews with key Winter Operations Staff are the basis for this Audit.

Audit Objectives and Scope

The objectives of the audit were to:

1. Assess the effectiveness of the planning process related to establishing operational capacity and related budget requirements for Winter Operations.

¹ Includes select City pathways only.

²Source: <http://ozonehome.city.a.ottawa.ca>

³ Regulation 239/02, *Minimum Maintenance Standards for Municipal Highway*

2. Assess the adequacy of key performance monitoring, indicators, and their measurement of the work undertaken.
3. Assess the effectiveness of the controls and management over receipts and usage of materials such as salt, sand, brine, and grit.
4. Assess how Occupational Health and Safety (OHS) is addressed in the activities of Winter Operations.
5. Assess the adequacy of succession planning for key staff involved with Winter Operations.
6. The scope of the audit included the capacity planning process and operations conducted during the winter of 2014/15.

Summary of Key Findings

1. PW currently has no formal or documented process that considers resource capacity requirements for Winter Operations in their annual planning and/or budgetary cycle.
2. The current Council Approved Standards (Maintenance Quality Standards or MQS) for snow and ice control were adopted in May of 2003 as part of a service level harmonization process post-amalgamation. Since that time they have not been systematically reviewed or assessed for financial impact.
3. The current mix of internal and external services is primarily based on historical and/or legacy systems that were in place at the time of amalgamation (2001). The sole full service contract was put in place prior to amalgamation by the City of Kanata. Since that time there has not been a review to determine if PW has the optimum degree or mix of internal and external service providers for snow and ice control activities.
4. The City actively participates in OMBI to benchmark with other municipalities. In reviewing the latest information from OMBI it was noted that Ottawa had:
 - the second best standard for meeting provincial standards after a winter storm event;
 - among the highest ratio of owned versus contracted equipment (see table below); and,
 - the highest lane/km cost for winter control services .

Table 1: Ratio of municipally owned units vs. total fleet units including contractor owned units (OMBI 2013 Report)

	Hamilton	London	Ottawa	Toronto	York	Windsor
Total Number of Lane Km	6,399.0	3,526.3	11,850.6	14,703.0	4,093.2	2,397.8
# of municipally owned plows / salters / combination units	115	39	236	109	26	10
# of contract plows / salters / combination units	49	48	88	666	68	17
% of municipally owned Units vs. Total	70%	45%	73%	14%	28%	37%

5. PW does not have a documented process to identify potential operational efficiencies to realize cost reductions. Detailed information on staff allocation by activity is not presently considered, analysed and included in the planning process for potential operational changes or to identify efficiencies.
6. When there is no requirement to apply abrasives or plow / clear snow, staff is assigned to miscellaneous duties. There is no formal or documented list of tasks to be addressed on a priority basis. These duties can be of lower priority and available more cost effectively from commercial sources. In a harsh winter, up to 25% of time is allocated to Yard, Litter, On-call and “other” duties which relates to approximately 40 distinct activities. In a mild winter this percentage would likely be greater due to a reduced call for abrasives, plowing and clearing activities as there can be extreme swings in activity levels and costs due to weather. The volume of work related to these miscellaneous activities is unquantified. Without a clearly demonstrated need some of this work could potentially be eliminated to reduce costs.
7. The current allocation of activities is represented in the Chart and table below.

Chart 1: PW Top Five Activities: Winter 2014/15

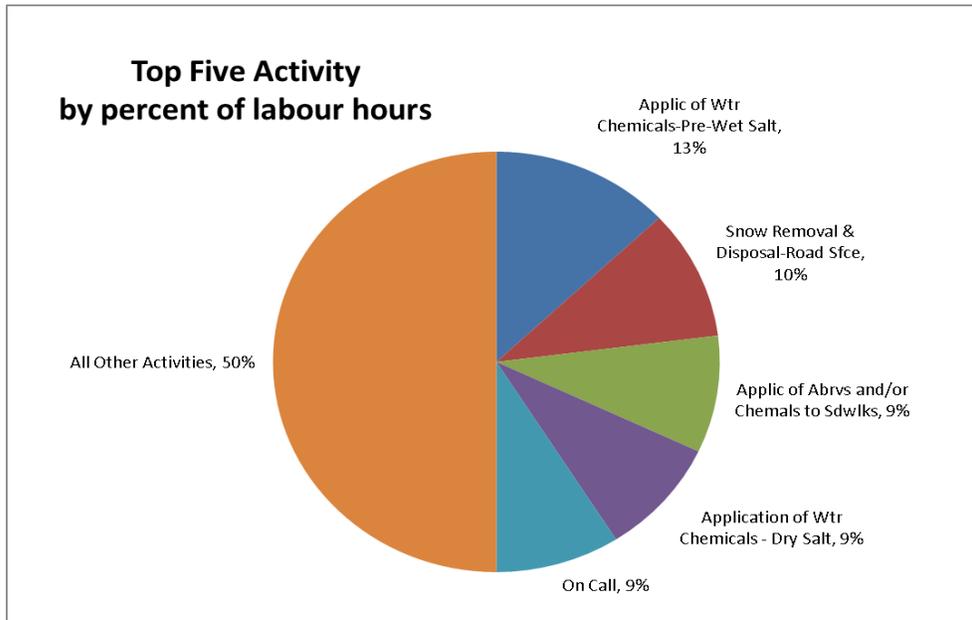


Table 2: PW Top Five Activities: Winter 2014/15

Activity	Percent of Labour Hours
Application of winter chemicals - pre-wet salt	13%
Snow removal and disposal - road surface	10%
Application of abrasives and/or chemicals to sidewalks	9%
Application of winter chemicals - dry salt	9%
On call	9%
All other activities	50%

8. The City continues to expand its use of technology in operations. All City and contracted roadway snow clearing vehicles are equipped with one of two task specific GPS. To date Management has not conducted the analysis to determine whether the intended benefits of these investments in technology have been realized.
9. For overnight parking bans the City has a detailed communication plan. Management believes it would not be practical to implement a “rolling ban” for snow related overnight parking bans as is utilized in some municipalities. Such a practice might overcome the stated lack of sufficient enforcement officers to cover the entire City through more focused attention to problem areas.
10. Monthly variance reporting includes appropriate and relevant measures such as comparison of budgeted to actual and detailed costs by category. Reporting

could be enhanced by providing commentary on performance associated cost drivers such as; monthly lane/Km cost, impact of monthly precipitation and average temperature and the amount of staff time spent on-call as well as on other duties not directly related to snow and ice control, such as litter and yard duties.

11. The key performance measurement indicators (KPIs) used in Winter Operations are the Council-approved Standards which are detailed in the Maintenance Quality Standards (MQS). These are not routinely reported on, whether internally to PW, or to Committee or Council. Some are tracked as part of responding to the annual OMBI Survey.
12. Performance indicators have been developed and are reported on in the Service Excellence Scorecard (SES).

All time is accounted for either as productive (time worked) and non-productive (sick, vacation, etc.) A further breakdown of time worked on duties not directly related to Winter Operations or of a lower priority and /or available internally or externally at lower cost is not reported.

13. The SES reports do not include the information available in the OMBI report such as time to meet MQS after a storm event or overall cost per lane kilometer.
14. Procedures for the Supervisor's review of the adequacy of snow clearing activities are largely unstructured and experience-based. Monitoring reports are exception-based. There is no documented assurance that MQS are being applied consistently across the City or that standards are being met or over-achieved.
15. PW has a proactive means to plan for and respond to winter storms. The City has a weather reporting service provider (AMEC) which provides meteorological access 24/7.
16. The Standard Operating Procedure for salt deliveries allows for acceptance of deliveries with a high variance and does not specify the number of times a random weighing should be performed. There is no monitoring in place to ensure the portable weigh scales are used at every yard throughout the winter season and that contractors are not notified in advance. There is no evidence that salt spreaders are calibrated at least twice per winter, as required in the Standard Operating Procedure. There was less than recorded salt in ending inventory in 2013/2014, 2012/2013 and 2011/2012. Winter Operations attributes the difference to compaction of materials, moisture absorption and limitations with equipment accuracy. Other possible reasons like inaccurate usage

measurement, inaccurate amounts being received or loss of materials due to misappropriation are not explored.

17. An annual reconciliation of winter materials is performed once at the end of the winter season. No periodic reconciliations are performed throughout the year.
18. As of June, 2015, 96% of workers and 95% of Supervisors in the Roads Services branch have completed their Occupational Health and Safety Awareness Training and Public Works is 50% complete with assessing the risks in Winter Operations' occupations related to Hazard Identification and Risk Assessment (HIRA).
19. Succession planning in Winter Operations is an active consideration. The succession plan is updated on an annual basis, which is consistent with the requirement in the City of Ottawa Succession Management Guide.

Recommendations and Management Responses

Recommendation 1

That Public Works develop and document a planning process methodology to establish the optimal capacity of resources, both internal and external, to provide efficient and effective Winter Control services.

That this methodology include specific processes to identify and assess:

- a. **The costs, benefits and efficiencies of outsourcing resources, both staff and equipment, to establish the optimal mix of internal and external resources;**
- b. **Resourcing to match activity requirements (i.e. demand) which are clearly determined to be legitimate work activities to ensure idle capacity is reduced to the minimum level;**
- c. **Opportunities for efficiencies and/or outsourcing through an in depth review and analysis of activities at the level of Winter Operations overall, including a mix of severe and mild winters;**
- d. **The impact of adjustments to MQS to bring them in line with Provincial Standards;**
- e. **The impact of new developments, historical weather patterns, and information gathered from relevant technologies such as GPS and vehicle weather sensors;**
- f. **Potential operational changes in order to realize cost reductions;**
- g. **Historical data and general weather patterns to ensure mild winters are factored into the analysis; and,**
- h. **The real cost of depreciation and overhead.**

Management Response

Management agrees with this recommendation.

Public Works is currently developing a planning process methodology through the Roads Services Winter Operations Review. As part of this Review, the mix of internal and external resources is being analysed in order to provide efficient and effective winter operations services.

The Review findings and subsequent recommendations will be presented to the Transportation Committee and Council in Q2 2016.

Recommendation 2

That Public Works review the Climate Change Adaption Strategy to ensure:

- a. that it is still current and relevant;**
- b. the steps taken to date have been effective; and,**
- c. the MQS triggers incorporate measures to address changing weather patterns such as freezing rain, rain on snow and wet snow.**

Management Response

Management agrees with this recommendation.

As part of the Roads Services Winter Operations Review, historical weather patterns along with work completed as part of the 2006 Climate Change Adaption Strategy, will be analyzed and will inform any recommendations that may be made specific to the Maintenance Quality Standards.

The Review findings and subsequent recommendations will be presented to the Transportation Committee and Council in Q2 2016.

Recommendation 3

That Public Works assess the impact on costs of adjustments to MQS to bring them in line with Provincial Standards including reporting the results and changes to Committee and Council on a mid-term basis.

Management Response

Management agrees with this recommendation.

Adjustments to the Maintenance Quality Standards are currently being investigated through the Roads Services Winter Operations Review, comparing costing between the City's current Maintenance Quality Standards and the provincial Minimum Maintenance Standards.

The Review findings and subsequent recommendations will be presented to the Transportation Committee and Council in Q2 2016.

Recommendation 4

That Public Works assess the costs, benefits and efficiencies of outsourcing resources to establish an optimal mix of internal and external resources. That this include:

- a. a comparison of City Forces costs to costs for comparable commercial services;**
- b. an in-depth review and analysis of activities at the level of Winter Operations overall, including a mix of severe and mild winters, with an objective of resourcing to match activity requirements (i.e. demand) which are clearly determined to be legitimate work activities reducing idle capacity to the minimum level; and,**
- c. the true cost of overhead and depreciation.**

Management Response

Management agrees with this recommendation.

Public Works is currently developing a planning process methodology through the Roads Services Winter Operations Review. As part of this Review, the mix of internal and external resources is being analysed in order to provide efficient and effective winter operations services.

The Review findings and subsequent recommendations will be presented to the Transportation Committee and Council in Q2 2016.

Recommendation 5

That Public Works ensure that the intended benefits of the investments in technology are being obtained.

Management Response

Management agrees with this recommendation.

To ensure that the intended benefits of 'Where is My Plow' and Webtech are being realized, Public Works will continue to review performance reporting in order to identify that the intended KPI's are being achieved. The public will have access to 'Where is My Plow' for winter 2015-16 for the first time since making the tool available to supervisors, managers and the 3-1-1- Call Centre. As part of the public launch, a feedback process has been developed for the application. Public Works will review all feedback received from the public in order to analyze the

effectiveness of 'Where is My Plow' upon conclusion of the winter season. This analysis will be completed by Q3 2016.

Recommendation 6

That Public Works develop a practice to occasionally track any differences between the application rates of abrasives of City vehicles and contracted vehicles to ensure compliance with rates established in the Roads Manual.

Management Response

Management agrees with this recommendation.

To ensure compliance with the Material Application Policy, Public Works will develop a report using the data available in Webtech that will monitor and track any differences in the application rates of salt and abrasives for both City vehicles and contracted vehicles. The report will be developed by Q2 2016.

Recommendation 7

That Public Works identify and assess potential operational changes in order to realize cost reductions.

Management Response

Management agrees with this recommendation.

Public Works is currently developing a planning process methodology through the Roads Services Winter Operations Review. As part of this Review, the mix of internal versus external resources is being analysed in order to provide efficient and effective winter operations services.

The Review findings and subsequent recommendations will be presented to the Transportation Committee and Council in Q2 2016.

Recommendation 8

That Public Works consider charging the owners of illegally parked vehicles for the cost of towing required during snow clearing activities.

Management Response

Management agrees with the recommendation.

Public Works will work with By-law Services to investigate the feasibility of charging owners of illegally parked vehicles for the cost of towing required during snow clearing activities. This review will be completed by Q4 2016.

Recommendation 9

That Public Works conduct the analysis to determine if steps can be taken to initiate a “rolling ban” in order to minimize the number of residents receiving tickets unnecessarily.

Management Response

Management agrees with this recommendation and it has been implemented.

Public Works has completed a review of the winter overnight parking ban and has presented the findings of this review to the Transportation Committee and Council. As a result, on October 14, 2015 Council approved the following changes to the Winter Overnight Parking Ban:

- Expansion of the Authority of the General Manager of Public Works to allow for greater flexibility to implement or not implement an overnight parking ban based on public safety or operational requirements;
- Free parking in City-owned parking garages for time periods in which an overnight winter parking ban has been implemented; and
- Amendments to the fee structure for on-street parking permits to reflect the true maintenance costs associated with on-street parking during the winter months.

As part of this review, consultations were conducted with internal stakeholders and the public, which identified some concerns with a rolling ban including communications to residents on when different areas of the City would be impacted in addition to the increased costs associated with signage.

Recommendation 10

That Public Works review the feasibility of enhancing monthly financial reporting through providing commentary on performance associated cost drivers. This would include items/activities such as: monthly lane/Km cost, impact of monthly precipitation and average temperature and the amount of staff time spent on-call as well as on other duties not directly related to snow and ice control, such as litter and yard duties.

Management Response

Management agrees with this recommendation.

Public Works will review the feasibility of including commentary on performance associated cost drivers such as lane/km cost, impact of precipitation and average temperature and the amount of staff time spent on non-winter activities in the monthly Service Excellence Scorecard for Roads Services in order to enhance

monthly financial and performance reporting. This review will be completed by Q2 2016.

Recommendation 11

That the City improve its KPI reporting by:

- a. Including the information included in the OMBI report such as time to meet MQS after a storm event and Lane per Km costs. That this information is also included in semi-annual reports to the Transportation Committee.**
- b. Identifying staff time for non-winter control activities (and including On-Call) in SES.**
- c. Identifying time to complete Service Requests in number of days.**

Management Response

Management agrees with this recommendation.

Public Works will review the feasibility of enhanced and more frequent KPI reporting such as time to meet MQS after a storm event and Lane per Km costs. The review will be completed by the end of Q2 2016.

Based on the results of this review, Public Works will incorporate any required enhancements specific to staff time associated with non-winter control activities including on-call into the Roads Services Service Excellence Scorecards so that KPI's can be tracked on a monthly basis. The implementation of this recommendation will be completed by the end of Q3 2016.

As part of the Client Journey Experience Initiative, Public Works with the assistance of Service Ottawa, is looking at establishing a quality standard related to the client experience and satisfaction with the services provided by Roads. As a result of this initiative, specific targets for 3-1-1 SR response time will be established and reported on the City/PW Balanced Scorecard. The implementation of this recommendation will be completed by the end of Q3 2016.

Recommendation 12

That the City develop a Standard Operating Procedure (SOP) which outlines an adequate process for the supervisor review of the adequacy of snow clearing activities.

Management Response

Management agrees with this recommendation.

Public Works will develop a Standard Operating Procedure, which outlines the process for snow clearing activities in accordance with the Maintenance Quality Standards.

This Standard Operating Procedure will be completed immediately and will be ready for implementation as part of the 2015/16 winter response plan.

Recommendation 13

That the City develop a Standard Operating Procedure (SOP) which outlines the process as well as roles and responsibilities for pre-event communications for operational supervisors.

Management Response

Management agrees with this recommendation.

A Standard Operating Procedure, which outlines the process as well as roles and responsibilities for pre-event communications will be completed for operational supervisors.

This Standard Operating Procedure will be completed immediately and will be ready for implementation as part of the 2015/16 winter response plan.

Recommendation 14

That the City develop a Standard Operating Procedure (SOP) which outlines the process for the supervisor to establish and prioritize assignments for staff when there is no requirement for snow clearing activities.

Management Response

Management agrees with this recommendation.

Public Works will develop a Standard Operating Procedure for Supervisors that will outline the process to establish and prioritize work activities when there is no requirement for snow clearing activities. This SOP will build on the current practice investigating service requests in relation to weather conditions factoring in a number of variables such as mild weather, potholes, winter drainage, presence of litter and/or freeze/thaw cycles.

This Standard Operating Procedure will be completed immediately and implemented during the 2015/16 winter season.

Recommendation 15

That Winter Operations assess why a 15% threshold is used to determine if a salt shipment is acceptable or not and whether the threshold should be lowered.

Management Response

Management agrees with this recommendation.

Public Works has conducted an assessment that concluded that there are a number of factors that can impact weighing of salt delivery trucks including the accuracy of the scale, if they are being weighed on level ground, moisture content of the salt and to a lesser extent the burning of fuel. A survey of best practices specific to the weighing of salt will be conducted as part of the Roads Services Winter Operations Review in order to determine an acceptable threshold. This survey will be completed by Q2 2016.

Recommendation 16

That Winter Operations put in place a monitoring process to ensure the portable weigh scales are used throughout the season. That Winter Operations consider setting a minimum number of times random weighing will be performed per season. That Winter Operations ensure random weighing is performed at all yards that receive salt.

Management Response

Management agrees with this recommendation.

The current Standard Operating Procedure will be updated and processes will be put in place to ensure that the monitoring and frequency is followed.

The revisions to the SOP will be implemented for the 2015-16 winter season.

Recommendation 17

That Winter Operations ensure that all Operations Technicians and other staff do not notify the delivery trucks in advance that they will be weighed.

Management Response

Management agrees with this recommendation.

This requirement will be incorporated into the Standard Operating Procedure referred to in Recommendation 16 and will be implemented for the winter of 2015-16 season.

Recommendation 18

That Winter Operations obtain a clear understanding of the reasons behind the difference between the SAP ending inventory of salt in the accounting system compared to the actual physical amount counted as remaining in the domes.

Management Response

Management agrees with this recommendation.

Public Works will conduct a survey of best practices to obtain a clear understanding of the reasons behind the difference between the SAP ending inventories of salt in the accounting system compared to the actual physical amount counted as remaining in the domes as part of the Roads Services Winter Operations Review. This survey will be completed by Q2 2016.

For the 2015-16 winter season, salt dome inventory reports will also be provided to management on a bi-weekly basis, which will alert Managers to any inconsistencies in salt reporting.

Recommendation 19

That the Roads Services branch ensure that the individuals who had not completed the Occupational Health and Safety Awareness Training complete the training as soon as possible and/or as soon as they return from their leave.

Management Response

Management agrees with this recommendation.

As of Q3 2015, 99% of Roads Services Supervisors and 98% of Roads Services Workers respectively had completed the training.

Public Works will continue to train and monitor new Roads Services employees through the on-boarding process and returning to work from leave.

Recommendation 20

That Public Works ensure the Hazard Identification and Risk Assessment for Winter Operations be completed by addressing the highest risk workplaces and occupations first.

Management Response

Management agrees with this recommendation.

Corporate Health and Safety is leading the Hazard Identification and Risk Assessment project across the City with support from Public Works. All positions within Roads Services were reviewed and grouped into three groups by priority from highest to lowest. As of October 22, 2015, HIRA's for all priority 1 and 2 categories, which are the highest risk workplaces and occupation, are 100% complete. HIRA's for the priority 3 group, which includes office staff will be completed by Q4 2015.

Potential Savings

Our analysis of several types of activities indicates that there may be opportunities for the City to identify savings. The demand for these miscellaneous activities has not been quantified to clearly demonstrate the need and legitimacy which indicates that there is a high likelihood that these activities could be reduced to lower costs. This would require PW to use available activity sheet information and MMS data to conduct a review to ensure the City has the optimal mix of internal and contracted services for Winter Operations.

Other potential savings could be achieved through a review of and changes to current MQS to bring them in line with provincial standards and better controls over receipt and use of materials.

Conclusion

Overall, the City has MQS higher than Provincial MMSMH standards, a high ratio of owned to contracted equipment and the associated operators and better post-storm clean up times than most municipalities.

While response times and the ratio of owned to contracted equipment do not in and of themselves determine the cost per lane km they would appear contribute to the City having the highest cost per lane Km in OMBI, although prevailing weather patterns and the mix of road classes under maintenance can differ significantly from municipality to municipality.

In the absence of a full analysis to determine the best mix of internal and external services, there is a risk that City staff is spending time on tasks that are available commercially at lower cost. This increases as the severity of winter is diminished and contributes to the risk that the City may be paying more than necessary for Winter Control services.

PW is collecting information related to MQS performance indicators but is not currently providing this to Management and Committee and Council.

Acknowledgement

We wish to acknowledge our appreciation for the cooperation and assistance afforded the audit team by management.

The section that follows is the detailed audit report.

Detailed Audit Report

Introduction

The Audit of Winter Operations, included in the Office of the Auditor General (OAG) 2014 Work Plan, was approved by Council in March 2014.

Background

The City of Ottawa Winter Operations, operating under the Road Services branch within the Public Works department (PW), is tasked with maintaining the Nation's Capital's roads and pathways⁴ by providing snow removal and ice control services. Commuters, businesses, and residents rely on these services. On average, 236 cm of snow falls in Ottawa every winter. The City has approximately 5,621 km of roads, 2,175 km of sidewalks and 233 km of Transitway and Highway 174 to maintain on a regular basis⁵. All roads and highways cleared must meet the established City standards which surpass the standards in the Ontario Regulations⁶.

In 2013, the City of Ottawa's annual budget for Winter Operations was \$55.3 million; the 2013 expenditures were \$79.2 million. Services are delivered from 17 Yards spread across five zones in four geographic areas. Winter Operations provide services using a mix of internally owned and staffed equipment and contracted resources.

Based on information provided by PW approximately 590⁷ employees were engaged in the City of Ottawa Winter Operations activities as at February 1, 2013.

In 2014, Public Works completed their Corporate Risk Profile which identified areas of risk which could impact their operations. A *Winter Operations Risk Scan* was conducted by the OAG in 2014. Items from the Corporate Risk Profile supplemented by information obtained through documentation review and interviews with key Winter Operations Staff are the basis for this Audit Plan.

Audit Objectives and Scope

The objectives of the audit were to:

1. Assess the effectiveness of the planning process related to establishing operational capacity and related budget requirements for Winter Operations.

⁴ Includes select City pathways only.

⁵Source: <http://ozonehome.city.a.ottawa.ca>

⁶ Regulation 239/02, *Minimum Maintenance Standards for Municipal Highway*

⁷ Roads FTEs are seasonally supplemented with staff from Parks, Traffic, Forestry and other branches to meet Roads branch Winter Operations work requirements of 590 staff.

2. Assess the adequacy of key performance monitoring, indicators, and their measurement of the work undertaken.
3. Assess the effectiveness of the controls and management over receipts and usage of materials such as salt, sand, brine, and grit.
4. Assess how Occupational Health and Safety (OHS) is addressed in the activities of Winter Operations.
5. Assess the adequacy of succession planning for key staff involved with Winter Operations.

The scope of the audit included the capacity planning process and operations conducted during the winter of 2014/15.

Audit Objective No. 1:

Assess the effectiveness of the planning process related to establishing operational capacity and related budget requirements for Winter Operations.

Criteria:

- The planning process has a methodology to establish the current capacity of internal resources, both staff and equipment, to meet the current standards and KPIs. The methodology includes a specific process to identify and assess risks.
- The costs, benefits and efficiencies of outsourcing resources have been documented and considered appropriately to establish the optimal mix of internal and external resources.
- The planning process includes consideration, and documentation, of new developments, historical weather patterns, and information gathered from relevant technologies such as GPS and vehicle weather wands.
- The planning process identifies potential operational changes in order to realize cost reductions.
- The planning process for management of on-street parking includes assessment and documentation of the impact on snow removal and clearing activities.
- The planning process includes assessment and documentation of how requests for service (ie. 3-1-1, Councillor requests, etc.) are considered.
- The forecasting of expenditures during the year is an ongoing reviewed activity.
- Financial reporting, and their respective variance reporting, is sufficient and appropriate.
- Council / Committee direction has been considered in the planning process.

Audit Objective No. 2:

Assess the adequacy of key performance monitoring, indicators, and their measurement of the work undertaken.

Criteria:

- Appropriate KPIs (Key Performance Indicators) exist, and are applied for routine measurement of the Winter Operations activities, and are benchmarked against other municipalities (e.g., OMBI and other)
- Maintenance Quality Standards exist and are met by both staff and contractors.
- Measures exist to track performance during weather events and there are mechanisms to draw upon additional resources (overtime and contracted services) as required.
- Performance and quality service standards are monitored and are routinely assessed for financial impact.
- Staff utilization is monitored and reported to ensure the effective use of staff assigned to duties during snow events and at other times.
- Direction provided by Council and / or its Committees have been adhered to by Winter Operations.

Audit Objective No. 3:

Assess the effectiveness of the controls and management over receipt and usage of materials such as salt, sand, brine, and grit.

Criteria:

- Documented policies, procedures, and guidelines exist to control and manage the receipt and usage of materials such as salt, sand, brine, and grit.
- The above policies, procedures, and/or guidelines are adhered to and monitored and follow up action is taken when and as necessary.

Audit Objective No. 4:

Assess how Occupational Health and Safety (OHS) is addressed in the activities of Winter Operations.

Criteria:

- Documented policies, procedures, guidelines, and plans exist to address OHS requirements in Winter Operations. The above are readily available for reference, and include the accident / incident reporting requirements.
- Occupational Health and Safety Awareness training is provided to all employees on a regular and timely basis.

- Safety hazard identification and risk assessment are conducted in the workplace. Employees know how to report safety hazards in the workplace.

Audit Objective No. 5:

Assess the adequacy of succession planning for key staff involved with Winter Operations.

Criteria:

- Documented procedures and plans exist to ensure succession planning is an active consideration.

Approach

Our audit approach included examination of relevant policies, procedures, reports and other documentation; interviews of Winter Operations staff and management as well as relevant staff in respective yards / branches.

For testing purposes, we focussed on recent and current processes, procedures and reports.

The above testing procedures were dependent upon the City providing the Office of the Auditor General with the relevant requested information.

Detailed Findings, Observations and Recommendations

Audit Objective No. 1:

Assess the effectiveness of the planning process related to establishing operational capacity and related budget requirements for Winter Operations.

There is currently no formal or documented process that considers resource capacity⁸ in the annual planning and/or budgetary cycle.

At present the only process that currently considers an increase in resources is the annual budgetary cycle which is effectively an A-base⁹ process plus a consideration for overall growth.

PW works closely with the Planning and Growth Management branch (PGM) to ensure that all new approved street additions are incorporated into new or existing beats.

⁸ Resource capacity is deemed to be the staff and equipment required to meet demand.

⁹ A Base Funding is a historical funding level required to operate the entity's activities of recent year(s) and attributable to the current years anticipated budget submissions, subject to adjustments to factor elements such as growth, financial restraints, goals, etc.

PGM advised they work closely with PW to keep them abreast of what streets will have actual occupants so that beats can be updated. A new street can exist for a year without needing to be plowed if it has no residents.

In the fall PGM contacts Operations who develop new beats and they exchange information on which streets should be added/flagged as additions. It is a two stage process.

- First at the high level planning level – what is PW going to take over from developers.
- Second, there is the Actual state – the Road Report to make sure beat maps are updated appropriately and in time.

While they don't exchange information on the absence of snow storage for residents or the City, they do provide some basic indicators in the general design of the development. The urban design process identifies the width of the approved right-of-way (easement). This ranges from 16.5 meters (the tight ones) to 18 m (the standard) to 20.5 m for some areas, but exceptions may be made.

City operating budgets are to be developed to provide program and services based on Council approved service standards. The previous year's budget provides the basis for developing and identifying the financial and human resources required to deliver these programs and services. The budget should identify all the requirements associated with the delivery of the program and services. Each department portfolio is provided with a funding envelope based on the target set by Council in the Budget directions report. Management is responsible for identifying and categorizing budget pressures and must ensure that all pressures presented in the budget fit within the envelope provided.

This budgetary process has an understood ceiling increase of 2% and a net increase of zero Full-Time Equivalent (FTE¹⁰) even though funds for growth are requested through the budget process. Given that the City experiences continuous annual growth, this translates into the possible requirement that staff needs to find efficiencies, deal with increased overtime demand, add contractor services or decrease the service level (assuming a similar winter from year to year).

Budgets are completed at the department – branch level. In 2010 and 2011 the budgets were at the RTOM level (Roads and Traffic Maintenance branch). In 2014 PW re-organized at which point Roads became its own branch and aligned Traffic into its

¹⁰ This is in keeping with Council direction as outlined in the Mayor's 2015 Budget Address (calls for reduction of 20 FTE overall) <http://ottawa.ca/en/city-hall/budget-and-taxes/budget/mayors-2015-budget-address>.

own branch. Below in Table 3 is the approved FTE's associated with the Roads component for 2010 to 2015.

Table 3: Comparison of Year-over-Year Growth for Roads

Budget Year	Number of FTEs
2010 Budget	Roads: 6.39 FTEs
2011 Budget	Roads: 9.44 FTEs
2012 Budget	Roads: Reduction of 0.16 FTEs
2013 Budget	Roads: .99 FTEs
2014 Budget	Roads: Reduction of 2.54 FTEs
2015 Budget	Roads: 0 FTEs
Total Change 2010 to 2015*	Roads: 14.12 FTEs

In 2015 the Adopted Budget reflects the 519¹¹ approved Roads Services FTEs. Overall this represents a modest growth over the six years of less than three percent.

PW utilizes historical weather data (such as patterns, “20 year” rolling average weather data, and the number of weather events days) to explain variances (shortfalls and/or surpluses) in the budget disposition process. It has not been used as an analytical tool or variable in an ongoing, documented, annual planning process.

In May of 2005 PW did provide the Transportation Committee with an overview of the impact of climate change and the pressures it brings to bear on meeting MQS in a timely fashion. The report recommended against changing the City MQS for Roads and Sidewalks/Pathways. PW was to continue to monitor climate change and develop a Climate Change Adaption Strategy. In June of 2006, as part of its Climate Change Adaption Strategy, PW hosted a symposium on *Winter Maintenance in a Changing Climate*.

As a part of this Symposium, PW had a PowerPoint presentation outlining some short and long term strategies. These included additional specialized equipment acquisitions, additional application of abrasives and additional operational procedures such as scarifying¹². The presentation notes that current MQS triggers do not fully address changing weather patterns (freezing rain, rain on snow and wet snow).

Management advised that weather data has influenced and is used in their planning process. The last three years has seen a significant change in weather patterns and

¹¹ Roads FTEs are supplemented with staff from Parks, Traffic, Forestry and other branches to meet Roads branch Winter Operations work requirements of 590 staff.

¹² Scarifying is the process of scoring the ice on roadway surfaces to provide traction.

caused major budget variances. This has triggered the decision to conduct a detailed review of Winter Operations which was identified in the 2015 Budget review process.

Recommendation 1

That Public Works develop and document a planning process methodology to establish the optimal capacity of resources, both internal and external, to provide efficient and effective Winter Control services.

That this methodology include specific processes to identify and assess:

- a. The costs, benefits and efficiencies of outsourcing resources, both staff and equipment, to establish the optimal mix of internal and external resources;**
- b. Resourcing to match activity requirements (i.e. demand) which are clearly determined to be legitimate work activities to ensure idle capacity is reduced to the minimum level;**
- c. Opportunities for efficiencies and/or outsourcing through an in depth review and analysis of activities at the level of Winter Operations overall, including a mix of severe and mild winters;**
- d. The impact of adjustments to MQS to bring them in line with Provincial Standards;**
- e. The impact of new developments, historical weather patterns, and information gathered from relevant technologies such as GPS and vehicle weather sensors;**
- f. Potential operational changes in order to realize cost reductions;**
- g. Historical data and general weather patterns to ensure mild winters are factored into the analysis; and,**
- h. The real cost of depreciation and overhead.**

Management Response

Management agrees with this recommendation.

Public Works is currently developing a planning process methodology through the Roads Services Winter Operations Review. As part of this Review, the mix of internal and external resources is being analysed in order to provide efficient and effective winter operations services.

The Review findings and subsequent recommendations will be presented to the Transportation Committee and Council in Q2 2016.

Recommendation 2

That Public Works review the Climate Change Adaption Strategy to ensure;

- a. that it is still current and relevant;
- b. the steps taken to date have been effective; and,
- c. the MQS triggers incorporate measures to address changing weather patterns such as freezing rain, rain on snow and wet snow.

Management Response

Management agrees with this recommendation.

As part of the Roads Services Winter Operations Review, historical weather patterns along with work completed as part of the 2006 Climate Change Adaption Strategy, will be analyzed and will inform any recommendations that may be made specific to the Maintenance Quality Standards.

The Review findings and subsequent recommendations will be presented to the Transportation Committee and Council in Q2 2016.

The current Council Approved Standards (Maintenance Quality Standards or MQS) have been reviewed sporadically since amalgamation in 2001.

The current Council Approved Standards (Maintenance Quality Standards or MQS) were presented to the Transport and Transit Committee and Council in May of 2003. It was part of a service level harmonization process post-amalgamation. Since that time they have not been systematically reviewed or assessed for financial impact.

The last review was as part of the 2007 Strategic Alignment Initiative. There was some limited review of beat lengths by district which resulted in some boundary re-alignment and equipment re-deployment but no review of MQS (standards). Also, in 2005 a Report to Transportation Committee outlined the operational results of the new Winter Maintenance Standards.

The Ontario Minimum Maintenance Standards for Municipal Highways, Ontario Regulation 239/02, has not altered the standards related to Snow Accumulation or Icy Roadways since 2003.

Recommendation 3

That Public Works assess the impact on costs of adjustments to MQS to bring them in line with Provincial Standards including reporting the results and changes to Committee and Council on a mid-term basis.

Management Response

Management agrees with this recommendation.

Adjustments to the Maintenance Quality Standards are currently being investigated through the Roads Services Winter Operations Review, comparing costing between the City's current Maintenance Quality Standards and the provincial Minimum Maintenance Standards.

The Review findings and subsequent recommendations will be presented to the Transportation Committee and Council in Q2 2016.

A comparative analysis (in-house versus Contracted services) is not routinely conducted

The current mix of internal and external services is primarily based on historical and/or legacy systems that were in place at the time of amalgamation (2001). The sole full service contract was put in place prior to amalgamation by the City of Kanata. There has not been, to management's knowledge, a review to determine if they have the optimum degree of internal and external service providers for various services.

Auditors were provided a single analysis of employees cost / workload for City sites compared to the sites contracted to private contractors (Bridlewood). This was an ad hoc report (a "one-off") and the exercise was not a full cost analysis. Based on interviews and available documentation supporting the Area Maintenance Cost Analysis from the Bridlewood area, we found that the costing exercise does not represent a true comparison to external costs. The City includes only direct costs, such as; wages, abrasives, fuel, maintenance costs, however it does not factor in salaried staff from PW, Business Analysts or, corporate overhead such as FSU staff supporting PW and HR, or land and facility costs.

The City's analysis includes the "burden" associated with salary costs such as benefits, EI, CPP, OMERS, as well as various leaves (such as sick, vacation, statutory, etc.) which are approximately 65% of the base salary of an employee.

While the analysis is not directly transferable, the federal government utilize a rate of 30-50% of salary costs to allow for overhead for administrative personnel and would include:

- Indirect costs: office equipment, furniture, suppliers, phones, etc.: 16%,
- Facilities: 13%,
- Corporate services: 5-10%.

In the context of the City's Winter Control operations this rate may be higher given the specialized facilities and the nature of operating supplies consumed.

The Area Maintenance Contract analysis below, in Table 4, prepared by City (PW) staff, demonstrates that the City costs are relatively in-line with private contracts in Kanata. However, the City analysis omits the inclusion of overhead as discussed above. This factor is significant and should be considered in the analysis.

Table 4: Comparison of Area Maintenance Contract to Maple Grove City Forces

Activities	Five Year Average Cost per Lane KM	
	Goldie Mohr Area Maintenance Contract	Maple Grove City Forces
Roadway Salting and Plowing	\$ 2,367	\$ 2,370
Sidewalk Plowing	\$ 2,871	\$ 2,540

Our own analysis, summarized below in Table 5M, indicates that some larger high value equipment has operating costs that are roughly approximate or better than contracted services even including overhead as discussed above, estimated at a minimum of 30% of salary costs. The exception is the cost to operate sweepers. Furthermore, our analysis utilized the depreciation rates as described in the audited external financial statements as provided by PW staff.

The depreciation policies for capital equipment listed in the audited financial statements are relevant for Financial Statement purposes. The City calculates the depreciation rate based on the estimated asset class life which is also the rate used in Table 5. However, it is our opinion that a costing exercise should include a depreciation rate based on the actual life of equipment, not the estimated asset class life. This could significantly alter the determination of the accuracy of internal versus external ownership cost of the assets and could significantly change the variances in Table 5. For example, if the depreciation policy is 12 years but the asset's end of life is effectively in 8 years, the amount used for costing would inherently be higher and closer to actual.

Table 5: Comparison of Equipment Cost per Hour

Equipment	Direct Costs + Depreciation	Overhead on Salary Costs	Total	Contract Cost	Variance
Sweeper	\$117	\$15	\$132	\$103	(\$29)
Loader	\$94	\$15	\$109	\$138	\$29
Grader	\$113	\$15	\$128	\$133	\$5

The City costs for loaders and graders appear to be better during harsh winters and therefore high seasonal use given the impact of depreciation on hourly rates. In mild winters the City cost is expected to increase.

At present there is no detailed modelling or similar review process undertaken to assess impact of variables and assumptions (i.e., changes to standards, weather events, etc.) to establish the optimal mix of internal and external resources. A review to determine the optimal degree of internal and external service providers for various services has not been undertaken; although we were told a comparison on the costs of purchasing versus leasing equipment has been conducted.

The source information is available and adequately documented in the corporate records (SAP based – MMS module and other information) to conduct a comparative analysis of in-house vs. contracted services.

Our review of contracts to document external contracted costs confirmed that there were bidders who did not receive work as a result of tenders for various Winter Operations work. This included examples such as: Transitway Stations, Sidewalk Plows and Removal and Haulage of Snow from Core Roads Area Arterials (Centretown). This demonstrates that there is remaining capacity in the commercial sector.

Recommendation 4

That Public Works assess the costs, benefits and efficiencies of outsourcing resources to establish an optimal mix of internal and external resources. That this include:

- a. a comparison of City Forces costs to costs for comparable commercial services;**
- b. an in-depth review and analysis of activities at the level of Winter Operations overall, including a mix of severe and mild winters, with an objective of resourcing to match activity requirements (i.e. demand) which are clearly determined to be legitimate work activities reducing idle capacity to the minimum level; and,**
- c. the true cost of overhead and depreciation.**

Management Response

Management agrees with this recommendation.

Public Works is currently developing a planning process methodology through the Roads Services Winter Operations Review. As part of this Review, the mix of

internal and external resources is being analysed in order to provide efficient and effective winter operations services.

The Review findings and subsequent recommendations will be presented to the Transportation Committee and Council in Q2 2016.

The City actively participates in benchmarking with other municipalities.

The City actively participates in OMBI to benchmark with other municipalities. OMBI membership includes many municipalities outside of Ontario, including Winnipeg, Calgary and just recently Montreal. Benchmarking with other municipalities through OMBI is for comparison purposes only and is not a driver for identification of new procedures for efficiencies.

Historical baseline costs exist for actual curb km costs. These are not routinely developed for both in-house and external services. These actual curb km costs are provided to OMBI drawing on SAP sources.

In particular, OMBI tracks “Operating costs for winter maintenance of roadways per km maintained”. For 2013, while all municipalities reported increases over 2012 costs, Ottawa is above the median and average.

While there is no oversight / audit function to ensure all cities provide a comparable data set to OMBI, Ottawa’s results were among the highest reported per the analysis conducted by Ottawa representative on the OMBI Road Expert Panel.

OMBI template / surveys are detailed, specific, and distributed to its members for data collection and consolidation purposes. Results are shared with its members. Responses provided outside the norm are requested to provide explanations to allow membership to better understand cost drivers. While OMBI is a non-legislative organization and its results are unaudited, the data it relies on, for Ontario municipalities, comes from the Financial Information Report (FIR) which is provincially legislated.

Key OMBI indices demonstrate that Ottawa has among the highest ratios of owned versus contracted equipment items. This is discussed in more detail under Key Performance Indicators.

Ottawa also has the second quickest / best response time to achieve Minimum Maintenance Standards (Ontario Provincially Legislated service levels) for Ontario municipalities in OMBI. This is discussed in more detail under Key Performance Indicators.

PW has an adequate risk assessment process.

PW completes an annual corporate risk assessment, although it is not done in conjunction with a capacity review and analysis identifying resource efficiency opportunities.

The current internally produced 2014 Risk Assessment for Public Works raises the issue of insufficient budget to meet Winter Operations requirements. The document does not indicate that PW is actively considering alternative solutions such as changes to standards or increased outsourcing. It does indicate Public Works will review means to achieve cost containment to realize savings. This is further discussed in the section preceding Recommendation 7.

The PW Risk Assessment does identify other high risk areas requiring attention such as brine spills, sweepings containment and high risk driver related items.

The City continues to expand its use of technology in operations.

- All city roadway snow clearing vehicles are equipped with one of two task specific GPS. In addition, non-City roadway snow clearing vehicles are also equipped with City owned GPS.
- (Note: contractors must have pre-defined controllers in their vehicles for purposes of connectivity as stipulated in the “combo” tender).

The GPS (“**Webtech**”) is installed in the City’s roadway salt/abrasives spreading trucks (City owned and hired contractors). It is primarily for material management/reporting as well as operational compliance such as proper rate, material type, pre-wetting used, etc. This system doesn’t currently track beat completion times.

The system currently in the City’s residential roadway plowing equipment is called “**Where’s my Plow**”. This system tracks beats by percentage complete, missed streets and will be able to show beat completion time once the rollout is completed this coming winter season.

Councillor’s offices were supplied with trial versions of the “Where’s my plow” software during the last winter season (2014-2015) to preview it. This gives them the ability to see what the beat completion percentages are in their wards. A function of the software that will provide an estimated time of arrival (ETA) of the plow equipment to an address submitted by a member of the public is proposed for this coming winter season. For major arterials, the “**Where’s my Plow**” Program has less of an application as these are multi-lane roads and once snow starts to accumulate it is a virtually continuous process to keep roads clear.

As noted GPS equipment is utilized for the application of road abrasives. Site supervisors determine the application rate of abrasives based on standards in the Material Application Policy. The standard takes into consideration several variables including surface and ambient temperatures. Supervisors use information from temperature sensors attached to vehicles to measure the road surface and ambient temperatures.

Management advised that the “Webtech” software would make it possible to track any differences between the application rates of abrasives of City vehicles and contracted vehicles and that this would be a good means to ensure compliance with rates established in the Roads Manual.

Management advised that sidewalk plows do not have GPS presently, aside from some limited testing. Staff is planning to pilot technology for sidewalk plows for the upcoming winter with the intention of a future rollout.

A Business Case was developed to support the acquisition of the GPS “Webtech” tool used on the City’s fleet of roadway salt/abrasives spreading trucks as well as contractor trucks. The October 2008 business case for deploying GPS technology to all 150 salt spreaders is based on the ITIF financial analysis. Over a 3 year period, it shows a projected savings of \$850,350, total benefits of \$1,000,000 and annual 7% ROI.

No formal business case exists for “Where’s My Plow”. Management advised it was developed in-house, as no applicable software was available to provide members of the public an estimated time that a plow could be expected to be on their street. Management advised that the initial objective was to reduce the number of 3-1-1 calls and long waiting times by allowing residents to self-serve to get the information. It has since evolved through the development to be an operational tool to help supervisors and managers monitor progress through an event as well as reassigning equipment to beats needing additional resources due to breakdowns, etc.

To date Management has not conducted the analysis to determine whether the intended benefits of these investments in technology have been realized.

Recommendation 5

That Public Works ensure that the intended benefits of the investments in technology are being obtained.

Management Response

Management agrees with this recommendation.

To ensure that the intended benefits of ‘Where is My Plow’ and Webtech are being realized, Public Works will continue to review performance reporting in order to

identify that the intended KPI's are being achieved. The public will have access to 'Where is My Plow' for winter 2015-16 for the first time since making the tool available to supervisors, managers and the 3-1-1- Call Centre. As part of the public launch, a feedback process has been developed for the application. Public Works will review all feedback received from the public in order to analyze the effectiveness of 'Where is My Plow' upon conclusion of the winter season. This analysis will be completed by Q3 2016.

Recommendation 6

That Public Works develop a practice to occasionally track any differences between the application rates of abrasives of City vehicles and contracted vehicles to ensure compliance with rates established in the Roads Manual.

Management Response

Management agrees with this recommendation.

To ensure compliance with the Material Application Policy, Public Works will develop a report using the data available in Webtech that will monitor and track any differences in the application rates of salt and abrasives for both City vehicles and contracted vehicles. The report will be developed by Q2 2016.

At present PW does not have a documented process to identify potential operational efficiencies.

PW does not presently review the curb cost per Km or per equipment unit for efficiencies. However there have been a number of "top – down" City wide initiatives and/or programs which involved the identification of efficiencies. These include Service Improvements/efficiencies for Service Ottawa projects.

Although staff allocation by activity is available from activity sheets it is not presently considered/analysed and included in planning process for potential operational changes. Our analysis of several types of activities indicates that there may be opportunities for the City to use activity sheet information/data to identify opportunities for savings. This is discussed in more detail under Key Performance Indicators.

Recommendation 7:

That Public Works identify and assess potential operational changes in order to realize cost reductions.

Management Response:

Management agrees with this recommendation.

Public Works is currently developing a planning process methodology through the Roads Services Winter Operations Review. As part of this Review, the mix of internal versus external resources is being analysed in order to provide efficient and effective winter operations services.

The Review findings and subsequent recommendations will be presented to the Transportation Committee and Council in Q2 2016.

The planning process for management of on-street parking incorporates the impact on snow removal and clearing activities

For overnight parking bans, where vehicles are not towed, the plow (grader) goes around the vehicle and the snow is plowed the next day when the “combo” truck goes through the zone to do follow-up plowing and apply abrasives; the second trip is considered regular and necessary practice. There may be an additional trip due to service requests and this trip does not include the application of abrasives. The incremental costs of plowing the unplowed areas during the first run are not considered significant; as such there are no actual additional costs in the estimation of PW managers. This appears reasonable. The number of parking infractions related to snow clearing and removal activities is summarized below in Table 6.

Table 6: - Number of Infractions from November 15, 2014 to April 1, 2015¹³

# of infractions	Nature of infractions
166	Warnings for interfere with snow removal, issued when temporary signs are insufficient or missing, vehicles are still removed.
1,011	Tickets for interfere with snow removal. [this can include towing]
389	Tickets for interfere with snow clearing. [this violation is for actually witnessing the plow have to go around a vehicle and is often confused with the above violation by some of our casual staff]
12,025	Overnight ban tickets [between 1 am and 7 am]

The Program Manager Parking Enforcement stated that there is really only a six hour window to do entire City for the overnight ban. They possess a staff of 42 FTE and 29 part-time. All overnight ban work is considered overtime and not all staff are interested – particularly as a hard winter continues and staff are less inclined to seek overtime. Therefore they can’t cover the entire City in one evening – especially since it is after a

¹³ Information provided by Parking Enforcement

storm and travel in their cars is difficult. The process is broken down into beats and they work with PW to pay attention to known problem areas.

For “removal” work they have access to 50 to 60 casual staff and the officer stays with the tow truck for the duration of the event.

A ticket must be issued before a vehicle can be towed. The tow truck is hired by Public Works on an hourly basis for removal and vehicle owners are not charged with the cost of towing the vehicles. Records are kept by the police regarding the location of vehicles towed so that they can advise residents who call in on the current location of towed vehicles. Public Works pays for the towing unless the vehicles are brought to an impound yard where the vehicle owner would be required to pay.

All costs for By-law enforcement are charged back to PW but the revenue from fines is not attributed back to PW.

Recommendation 8

That Public Works consider charging the owners of illegally parked vehicles for the cost of towing required during snow clearing activities.

Management Response

Management agrees with the recommendation.

Public Works will work with By-law Services to investigate the feasibility of charging owners of illegally parked vehicles for the cost of towing required during snow clearing activities. This review will be completed by Q4 2016.

For overnight parking bans and snow removal parking bans the City has a detailed communication plan

There is an internal stakeholder relations board. For overnight parking bans - if there is to be a snowfall that exceeds the 7 cm standard (it is based on Environment Canada projections – and can be based on a range of from 5 to 9 cm for example) the City makes a public announcement about the ban. There are:

- a. e-alerts (email distribution list for residents who sign up – 18,500 english and 1,700 french)
- b. twitter messages (followers – 71,800 english and 1,700 french)
- c. facebook postings (followers – 7,300 english and 1,000 french)
- d. notification to the media for public service announcements
- e. councillors are notified
- f. a “flag” is added to the City’s general website

- g. 3-1-1 “hold” message advises of ban and there is a media event in the fall to remind residents about winter operations and parking bans.

During winter clearance / plowing activities, by-law parking enforcement may be advised; and supervisors sometimes email By-law a list of problem areas to address as enforcement does not have the resources to cover the entire City in one night (in their opinion). As noted earlier, when cars are towed to a previously cleared street the police keep records of relocations.

Management advised that as the intent is to clear all City roadways if snowfall exceeds the 7 cm standard it would not be practical to implement a “rolling ban” as is utilized in some municipalities. Management advised that there is a challenge in that residents are not always aware of the class of a roadway and how some road classes take precedence in road clearing activities.

The introduction of a “rolling ban” might address the issue of insufficient enforcement officers being available in order to cover the entire City in one night as they could focus on areas actually being cleared.

Recommendation 9

That Public Works conduct the analysis to determine if steps can be taken to initiate a “rolling ban” in order to minimize the number of residents receiving tickets unnecessarily.

Management Response

Management agrees with this recommendation and it has been implemented.

Public Works has completed a review of the winter overnight parking ban and has presented the findings of this review to the Transportation Committee and Council. As a result, on October 14, 2015 Council approved the following changes to the Winter Overnight Parking Ban:

- Expansion of the Authority of the General Manager of Public Works to allow for greater flexibility to implement or not implement an overnight parking ban based on public safety or operational requirements;
- Free parking in City-owned parking garages for time periods in which an overnight winter parking ban has been implemented; and
- Amendments to the fee structure for on-street parking permits to reflect the true maintenance costs associated with on-street parking during the winter months.

As part of this review, consultations were conducted with internal stakeholders and the public, which identified some concerns with a rolling ban including

communications to residents on when different areas of the City would be impacted in addition to the increased costs associated with signage.

The planning process does not include an assessment and/or documentation of how requests for service (i.e., 3-1-1, Councillor requests, etc.) are considered. However, the in-house PW process to create and manage Service Requests is adequate and reasonable.

Service Requests (SR) can be initiated in several ways. Residents can call 3-1-1 to register a complaint or log a complaint using the 3-1-1 self-serve application found on the City website. In some cases emails are forwarded to employees directly by residents. Councillors are also sometimes contacted directly by residents and Councillors in-turn advise/contact 3-1-1.

Information collected is entered and tracked into a Citizen Services Management system which will automatically forward the service request (SR) to the proper group/employee for resolution. If the matter is urgent, the 3-1-1 operator will contact the employee responsible to resolve the matter and forward the information (i.e., sink hole, man hole cover missing, broken water main, etc.). A service request is created and a reference number and ticket number is issued. Once the SR is resolved, the resolution is entered into the system and time stamped for tracking purposes.

Service requests (3-1-1 items) needing attention by the yard are downloaded every morning and are delegated to the appropriate supervisors. Once completed, supervisors return the SR signed off with a documented resolution which is entered into the system. The 3-1-1 list is live but historical reports can be printed to understand what requests were made on a particular day.

Iron work¹⁴ performed is tracked but cost per event is not tracked. If crews are conducting activities that have accomplishment units, such as pothole repair, this will be included in the Activity Sheet (AS) and captured in the system.

The follow-up process, i.e., who (including Councillors) and when to call back, is not tracked electronically. As such, there is a risk that a status update is not provided following the resolution of the issue.

Cost of 3-1-1 activities / process is not tracked, as a whole or on a per call basis.

¹⁴ Iron work, like pothole repair, can be assigned to Winter Operations staff when there is no immediate need for snow plowing or removal.

The 3-1-1 process is very straight forward. However, the measure in the SES does not address the time to complete when reporting on actual SRs completed and if the time is related to the MQS.

Currently Management, in its SES reporting, indicates that a certain number of calls have been responded to (such as 95%). However, the metric is unclear as it doesn't indicate the number of calls in a certain period, or the established quality standard (such as 95% of the calls were addressed in the first five days of the issue being recorded). This is discussed in greater detail under Key Performance Indicators where related recommendation is included.

Financial reporting, and their respective variance reporting, is sufficient and appropriate

The budget is tabled in October as a first draft. The second and final draft is approved in November by the Transportation committee. Council subsequently approves it prior to their January to December fiscal year. The winter period is November 15 to April 15. The City runs on a calendar year. Any action items resulting from the first draft (or second) is logged by the committee secretary and are resolved prior to final budget approval.

Typically, future growth in the City is examined in detail every three years upon appointment of new council. This in depth review however is supported by annual reviews. The PGM (Planning Growth Management) team is called upon to assist in this exercise.

The budget is largely an A-Base (last year amount) amount +/- an amount for growth. The budget is not a bottom up calculation of what is required.

Budget is limited by the intent of Council's targets outlined in the Mayor's 2015 Budget Address (limit (1) budget growth to 2% and (2) limit FTE to a net increase of zero). The budgeted amount presents challenges due to;

- COLA / inflation;
- new contracts entered into;
- new developments, roads, sidewalks;
- new equipment required; and
- recurring winter reserves deficits

The PW FSU reviews the financial results on a monthly basis. The FSU manager subsequently reviews, and findings are addressed with the GM PW. In addition, the results are reviewed by all PW departments to ensure all variances are addressed. DCMO reviews before any presentations to Council.

The year-end disposition report and the quarterly disposition report address the spending to date and provide variance analysis. By the end of Q2 (June 30) Winter Operations is aware of the extent of the residual funds for the balance of the calendar year (November 15 to December 31). In our opinion the variance reporting includes appropriate and relevant measures such as comparison of budgeted to actual (as a minimum). Monthly reports detail costs by labour, material, internal equipment and external services broken out by Zone. Inherently, these cost variances would increase with the severity of winter.

The monthly tracking of actual expenditures in comparison to budget provides an opportunity to ensure the Division is on track as per budget and provide explanations for why PW is over / under spending. This also provides relevant information with respect to the extent of funds remaining between that point in time and the end of the year (forecasting to year-end). This combined with information in SES, this is deemed be adequate and sufficient.

Obtaining additional funds during the year is very difficult given the budget is approved. The Treasurer is aware of the fact that winter weather is not within the control of the City thus maintains a winter reserve to assist (surpluses and deficits flow through this account) in making up shortfalls. The PW FSU, through the FSU manager, keeps the Treasurer informed of surpluses and / or deficits.

Monthly variance reporting does not go to the level of curb/meter costs (which are addressed in OMBI as curb/ km costs), but the annual budget variance disposition report does refer to the impact of precipitation (using historical data) and the impact of freeze thaw cycles.

Staff utilization reporting does not include “idle” time. All time is accounted for either as productive (any time at work) and non-productive (sick, vacation etc.). The reporting does not identify time spent on duties not directly related to Winter Operations or of a lower priority and /or available internally or externally at lower cost. This is discussed in more detail under Key Performance Indicators. While sufficient, financial reporting could be enhanced if monthly summaries provided some additional commentary on performance and/or were linked to cost drivers. Examples would be; monthly lane/Km cost, impact of monthly precipitation, average temperature and the amount of staff time spent on-call as well as on other duties not directly related to snow and ice control, such as litter and yard duties.

Recommendation 10:

That Public Works review the feasibility of enhancing monthly financial reporting through providing commentary on performance associated cost drivers. This would include items/activities such as: monthly lane/Km cost, impact of monthly

precipitation and average temperature and the amount of staff time spent on-call as well as on other duties not directly related to snow and ice control, such as litter and yard duties.

Management Response

Management agrees with this recommendation.

Public Works will review the feasibility of including commentary on performance associated cost drivers such as lane/km cost, impact of precipitation and average temperature and the amount of staff time spent on non-winter activities in the monthly Service Excellence Scorecard for Roads Services in order to enhance monthly financial and performance reporting. This review will be completed by Q2 2016.

Directives from Council and Committee (via Minutes); are addressed and tracked and are factored into planning process / plan as required.

Auditors reviewed the transportation committee minutes from November 6, 2013 until May 6, 2015 to cover the entire audit period.

There is a routine status update of Transportation Committee Inquiries and Motions in place to ensure Council direction is considered and Inquiries are responded to.

Audit Objective No. 2:

Assess the adequacy of key performance monitoring, indicators, and their measurement of the work undertaken.

The Key Performance Indicators (KPIs) used in Winter Operations are not routinely reported on internally to PW nor to Council.

The key performance measurement indicators (KPIs) used in Winter Operations are the Council-approved Standards which are detailed in the Maintenance Quality Standards (MQS). However these are not routinely reported on, whether internally to PW, or to Council; but some are tracked as part of responding to OMBI Survey.

In reviewing the latest information from OMBI it was noted that Ottawa had:

- a. the second best standard for meeting provincial standards after a winter storm event;
- b. among the highest ratio of owned versus contracted equipment; and,

The following tables represent information included in the most recent OMBI report (2013). Municipalities were judgementally selected for comparability¹⁵. While OMBI is a non-legislative organization and its results are unaudited, the data it relies on, from Ontario municipalities, comes from the Financial Information Report which is provincially legislated.

Table 7: Response time to meet provincial standards in hours (OMBI 2013 Report)

	MMSMH	Hamilton	London	Ottawa	Toronto	York	Windsor
class 1	3-4	4	3-4	2	2.5	2	18
class 2	3-6	8	3-6	3	7	2	18
class 3	8-12	8	8-12	4	9	2	18
class 4	12-16	24	12-16	6	15	2	24-36
class 5	16-24	24	16-24	10	15	2	24-36

MMSMH: Ontario Regulation 239/02, Minimum Maintenance Standards

¹⁵ The five cities below were selected based on the applicability of the same provincial (Ontario) standards, their relative population and exposure to similar weather patterns. Other cities included in the OMBI report had much lower populations, and / or were located outside of the province.

Table 8: Ratio of municipally owned units vs. total fleet units including contractor owned units (OMBI 2013 Report)

	Hamilton	London	Ottawa	Toronto	York	Windsor
Total Number of Lane Km	6,399.0	3,526.3	11,850.6	14,703.0	4,093.2	2,397.8
# of municipally owned plows / salters / combination units	115	39	236	109	26	10
# of contract plows / salters / combination units	49	48	88	666	68	17
% of municipally owned Units vs. Total	70%	45%	73%	14%	28%	37%

The chart and corresponding table below illustrate the cost per lane kilometer in relation to the level of service. A level of service of 1 means that service is provided in the same timeframe as set out in minimum maintenance standards (MMS). Service exceeding MMS (LOS<1) is provided in less time than the standard¹⁶.

The different classes of roads are:

- Class 1: High Priority Roads
- Class 2: Most Arterials
- Class 3: Most Major Collectors
- Class 4: Most Minor Collectors
- Class 5: Residential Roads and Lanes

¹⁶ This is the extent of the explanatory comments in the OMBI Report. The only other detail is a formula for how the cost is calculated and how all classes of roads are factored into account; essentially an average cost per lane km.

Chart 2: Cost per lane kilometer in relation to the level of service

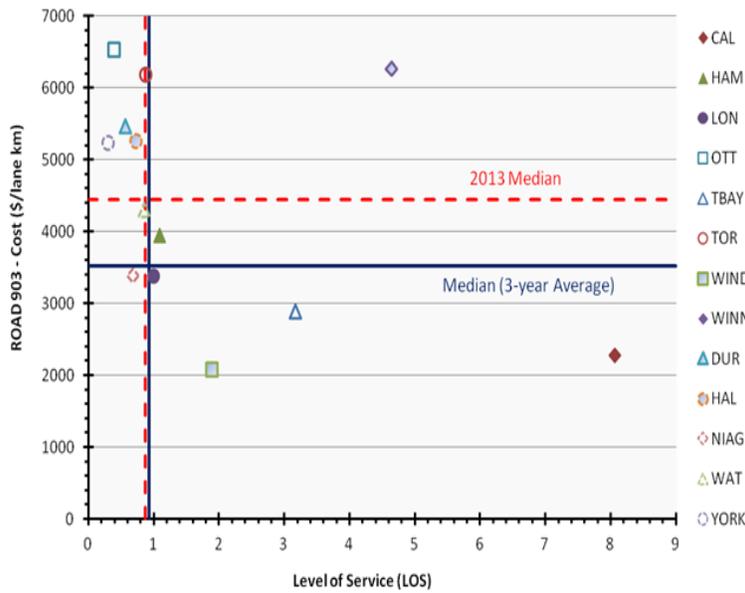


Table 9: Cost per lane kilometer in relation to the level of service

Municipality	Cost per lane kilometer \$	Level of Service (estimated)
YORK York Region	5,200	0.4
OTT City of Ottawa	6,500	0.5
DUR Region of Durham	5,500	0.6
NIAG Niagara Region	3,400	0.7
HAL Halton Region	5,300	0.8
TOR City of Toronto	6,200	0.9
WAT Region of Waterloo	4,300	0.9
LON City of London	3,400	1.1

Municipality	Cost per lane kilometer \$	Level of Service)
HAM City of Hamilton	3,900	1.2
WIND City of Windsor	2,100	1.8
TBAY City of Thunder Bay	2,900	3.1
WINN City of Winnipeg	6,300	4.5
CAL City of Calgary	2,300	8

Response times and the ratio of owned to contracted equipment do not in and of themselves determine the cost per lane km. They would have to be considered in conjunction with existing standards, prevailing weather patterns and the mix of road classes under maintenance which can differ significantly from municipality to municipality.

Some high level information is provided to the Transportation Committee through the Semi-Annual Report process (formerly the Quarterly Reports).

Other performance indicators have been developed and are reported on in the Service Excellence Scorecard (SES). SES reports are produced monthly and are one month in arrears allowing the time to collect and review data (in other words, month-end results are published approximately 4 weeks after). In addition there are Accomplishment Units for specific tasks such as pothole repairs, which track the number of potholes actually patched (drawn from activity sheets). Given the variability of the nature of the work (size of holes, current weather, etc.) there are no specific targets to achieve for potholes repaired.

The SES is reviewed by the Branch Management Team (limited to PW branch). They will review, ask questions, and request changes to the report. Changes are limited in order to maintain the comparativeness of the data from period to period.

Our review of documentation supports the appropriateness of KPI and their relevance to the standards utilized.

The SES results are communicated in a timely fashion but should be expanded to include the information included in OMBI report such as time to meet MQS after a storm event and Lane per Km costs. PW should also include information on the time to

complete service requests in days rather than just the percentage of service requests completed.

Recommendation 11:

That the City improve its KPI reporting by:

- a. Including the information included in the OMBI report such as time to meet MQS after a storm event and Lane per Km costs. That this information is also included in semi-annual reports to the Transportation Committee.**
- b. Identifying staff time for non-winter control activities (and including On-Call) in SES.**
- c. Identifying time to complete Service Requests in number of days.**

Management Response

Management agrees with this recommendation.

Public Works will review the feasibility of enhanced and more frequent KPI reporting such as time to meet MQS after a storm event and Lane per Km costs. The review will be completed by the end of Q2 2016.

Based on the results of this review, Public Works will incorporate any required enhancements specific to staff time associated with non-winter control activities including on-call into the Roads Services Service Excellence Scorecards so that KPI's can be tracked on a monthly basis. The implementation of this recommendation will be completed by the end of Q3 2016.

As part of the Client Journey Experience Initiative, Public Works with the assistance of Service Ottawa, is looking at establishing a quality standard related to the client experience and satisfaction with the services provided by Roads. As a result of this initiative, specific targets for 3-1-1 SR response time will be established and reported on the City/PW Balanced Scorecard. The implementation of this recommendation will be completed by the end of Q3 2016.

Procedures for the supervisor review of snow clearing activities are undocumented

PW Management advised that procedures for the supervisor review of snow clearing activities adequacy is largely unstructured and experience-based. To ensure that MQS are met Supervisors use "informal prompting" through radio or face-to-face and/or personal contact to ensure standards are adhered to. If MQS or contractual requirements are not met by contractors, the deficiency process (deficiency reports are prepared and available on file) comes into play and is handled, if required, by the Procurement group. If it is a staff issue it is addressed through the HR process. No

other documentation is maintained or produced although some information may be included in Activity Sheets. Currently there is no assurance that MQS are being applied consistently across the City or that standards are being met or over-achieved.

Monitoring reports are exception-based. In the 2013-2014 Winter, there were nine deficiency reports issued. For the 2014-2015 Winter, two non-performance letters were issued by Procurement, both in April of 2015, which indicated that if supplier did not provide an adequate resolution to a documented deficiency it could result in contract termination.

PW has, on occasion, made presentations to Council to explain response to major storm events.

Recommendation 12

That the City develop a Standard Operating Procedure (SOP) which outlines an adequate process for the supervisor review of the adequacy of snow clearing activities.

Management Response

Management agrees with this recommendation.

Public Works will develop a Standard Operating Procedure, which outlines the process for snow clearing activities in accordance with the Maintenance Quality Standards.

This Standard Operating Procedure will be completed immediately and will be ready for implementation as part of the 2015/16 winter response plan.

PW has a proactive means to plan for and respond to winter storms

The City has a weather reporting service provider (AMEC) which provides meteorological access 24/7. This permits a proactive means to plan for and respond to winter storms. Special weather alerts are provided and individual consultation is obtained to evaluate the severity of the potential weather event. This helps to assist the City in planning their response when dealing with winter weather activities.

All operational supervisors participate in a conference call in advance of a weather event, and if necessary additional staff are placed “on-call” and contractors are contacted to participate in the winter weather event activities. There is no documented SOP (Standard Operating Procedure) which outlines the process or roles and responsibilities for pre-event communications.

Recommendation 13

That the City develop a Standard Operating Procedure (SOP) which outlines the process as well as roles and responsibilities for pre-event communications for operational supervisors.

Management Response

Management agrees with this recommendation.

A Standard Operating Procedure, which outlines the process as well as roles and responsibilities for pre-event communications will be completed for operational supervisors.

This Standard Operating Procedure will be completed immediately and will be ready for implementation as part of the 2015/16 winter response plan.

Staff allocation by activity is not considered in the budget planning process

Individuals performing work (employee or contractor) are required to complete and submit an activity sheet (AS) on a daily basis. Activity Sheets are essentially timesheets where one notes the activity performed (or redeployment) and its duration. The AS tracks chargeable and non-chargeable time. If work was done for a 3-1-1 call, the service request number is referenced. In the case of a 3-1-1 service request, the resolution is noted on the service request sheet and provided to the yard clerk. Staff AS would reflect the activity performed by the City member to resolve the service request issue.

Contractors supply and fill out 'tickets' which are confirmed and entered on an activity sheet by a City supervisor. Information from submitted tickets is entered into the MMS system.

Internal and external efforts are captured and reported on at the cost level.

A review is done of the AS to ensure the data entered is reasonable (SAP audit reports are printed for review). Audit reports are run by the Senior Operations Clerk and Constellation (such as HR and Payroll) to ensure the data integrity is acceptable/accurate. Reports can be customized by day, by person, by week, by activity code.

The process to capture the activities performed on a daily basis and recorded on activity sheets was, based on our observations, acceptable; we noted no discrepancies in the small sample selected for data entry accuracy verification.

No “idle” time is identified on the AS; all time on the job is accounted for as productive. Only time away from the job such as for sick/vacation/etc. is accounted for as non-productive.

Given the level of data captured through the AS data entry process, the ability to perform adequate cost analysis should be available.

As noted earlier, Management has advised that there has not been any specific analysis to determine if the City has the optimum mix of internal and external resources.

In our analysis of time allocation for staff based on AS, we noted that:

- Approximately 5% of staff time is directed towards litter collection and yard duties. Our sample of 24 employees¹⁷ is drawn from the 154 staff at the Core Yards (which include Woodward, Catherine and Hurdman). Of interest, the Core counts approximately twenty-two 24/7 shift staff. In our own analysis, the minimum cost to the City to put a three person litter crew on the street would be in the range of \$120/hour ($\{\$25/\text{hour} * 3 \text{ individuals}\} + 63\% \text{ city burden}^{18}$ rate before including overhead. The City currently purchases these services for \$60 an hour for a three person crew inclusive of a pick-up truck. In addition, there would be cost associated with contract set up and management, however they would likely have a marginal impact on overall costs.
- We selected four days judgmentally across the core yards (Hurdman, Catherine, and Woodward) and reviewed the activities undertaken for all staff working on that day. The days selected were not weather event days, and the purpose of the test was to review the activities performed by winter operations staff during non-weather days. We noted no abnormalities during the review of work performed on the 4 specific days; and the work performed, based on activity sheets, was reasonable.
- When reviewing 24 employees for the whole winter season, we noted no abnormalities in the activity performed given the recorded weather event. Of these 24, 10 were selected specifically due to their nature of their duties (i.e., heavy and special heavy equipment operators, or in laymen’s terms, the plow operators).

Time Allocation of Duties: Winter 2014/15

Our analysis indicates a City cost of approximately \$140/hour ($\{\$25/\text{hour} * 3\} + \text{burden} + \text{depreciation and overhead}$) for pothole repairs for a service which can be purchased for approximately \$130/hour. In addition, there would be cost associated with contract set up and management which would likely have a marginal impact on costs.

¹⁷ The sample included four 24/7 shift staff but the 5% noted above excludes the time spent by City staff who are focused on litter control in the downtown core

¹⁸ Burden includes benefits, EI, CPP, OMERS, as well as various leave (sick, vacation, statutory, etc.)

PW Managers advised that when there is no requirement to apply abrasives or plow / clear snow, staff is assigned to miscellaneous duties. There is no formal or documented list of tasks to be attended to on a priority basis. The demand for activities has not been quantified to clearly demonstrate the need. Management advised that these duties are determined based on routine reviews as well as Councillor and 3-1-1 calls. The demand for activities has not been quantified. Without a clearly demonstrated need these activities could potentially be reduced to reduce costs.

As depicted in Chart 3 below, for our sample of 20 staff (sample of 24 less the four 24/7 staff), in a harsh winter up to 25% of time is allocated to Yard, Litter, On-call and “other” duties, some of which are non-weather related and/or require lower skilled employees or could potentially be purchased at reduced cost from commercial providers. Heavy and special heavy equipment operators, those with among the highest pay rates in our sample, also spend between 15 and 20% of their time in similar roles.

Chart 3: OAG Summary of Duties - Winter 2014/15

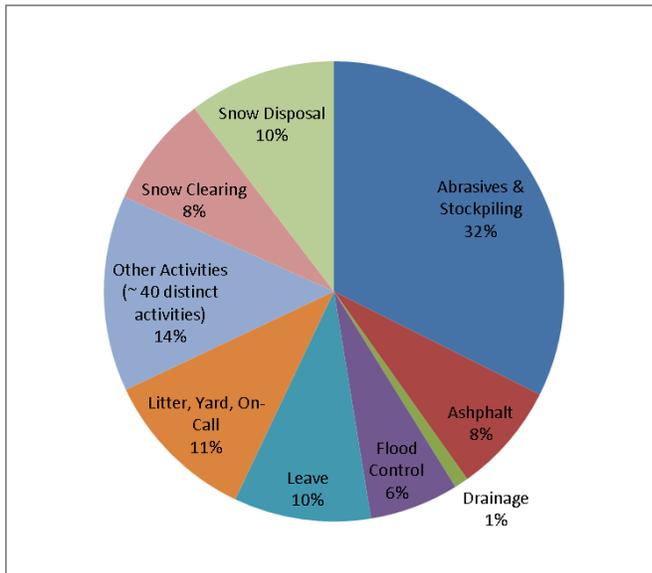


Table 10: OAG Summary of Duties - Winter 2014/15

Duties	Percentage of time allocated
Abrasives and stockpiling	32%
Snow disposal	10%
Snow Clearing	8%
Other activities (approx. 40 distinct activities)	14%
Litter, yard, on-call	11%
Leave	10%
Flood control	6%
Drainage	1%
Asphalt	8%

In a mild winter this percentage would likely be greater due to a reduced call for abrasives, plowing and clearing activities as there can be extreme swings in activity levels. The year 2010 is noted as a mild winter and results show a surplus of \$10 million compared to a deficit of \$23.9 million in 2013 against a budget of \$55.3 million. The 2014 deficit was \$11.4M.

In our analysis time allocated as “Other Activities” includes approximately 40 distinct activities that have time charged to them, albeit very limited in some instances.

PWs own summary of the top five labour categories by hours, City wide, has 50% for direct snow related services and On-Call and 50% for other activities. Please see Chart 4 below.

Chart 4: PW Top Five Activities: Winter 2014/15 (repeat of Chart 1 in Executive Summary)

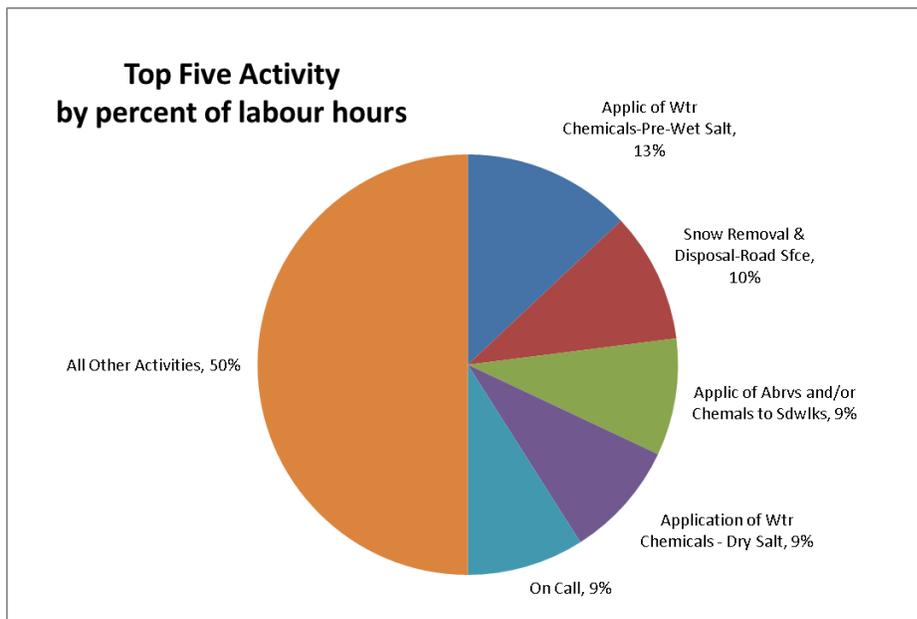


Table 11: PW Top Five Activities: Winter 2014/15 (repeat of Table 2 in Executive Summary)

Activity	Percent of Labour Hours
Application of winter chemicals - pre-wet salt	13%
Snow removal and disposal - road surface	10%
Application of abrasives and/or chemicals to sidewalks	9%
Application of winter chemicals - dry salt	9%
On call	9%
All other activities	50%

The City has removed a portion of the risk for contractors by allowing for a \$1,400 per month standby fee for heavy equipment or building into snow clearing contracts a minimum of two removals.

In the absence of a documented list of tasks and SOP (Standard Operating Procedure) to establish the need for and priority of assignments, there is a risk that City staff is spending time on tasks that are available commercially at lower cost. This increases as the severity of winter is diminished and contributes to the risk that the City may be paying more than necessary for winter control services.

Recommendation 14

That the City develop a Standard Operating Procedure (SOP) which outlines the process for the supervisor to establish and prioritize assignments for staff when there is no requirement for snow clearing activities.

Management Response

Management agrees with this recommendation.

Public Works will develop a Standard Operating Procedure for Supervisors that will outline the process to establish and prioritize work activities when there is no requirement for snow clearing activities. This SOP will build on the current practice investigating service requests in relation to weather conditions factoring in a number of variables such as mild weather, potholes, winter drainage, presence of litter and/or freeze/thaw cycles.

This Standard Operating Procedure will be completed immediately and implemented during the 2015/16 winter season.

Audit Objective No. 3:

Assess the effectiveness of the controls and management over receipt and usage of materials such as salt, sand, brine, and grit.

The current 15% threshold for weight discrepancies for salt shipments has not been assessed for reasonability.

Salt shipments are to be selected at random to be weighed for inventory control purposes. Each shipment will be weighed in the presence of City Staff using an approved portable weigh scale.

Based on Standard Operating Procedure 2.01 - Deliveries to the Maintenance Yards, a shipment will be accepted if the percentage difference between the randomly measured gross weight and the documented weight on the scale ticket is less than 15%. This variance threshold seems to be unnecessarily high. Winter Operations has not actively considered whether a 15% threshold for weight discrepancies is reasonable.

Management has indicated that the threshold was created a long time ago and that at the time the scales were not as accurate as they are now.

Recommendation 15

That Winter Operations assess why a 15% threshold is used to determine if a salt shipment is acceptable or not and whether the threshold should be lowered.

Management Response

Management agrees with this recommendation.

Public Works has conducted an assessment that concluded that there are a number of factors that can impact weighing of salt delivery trucks including the accuracy of the scale, if they are being weighed on level ground, moisture content of the salt and to a lesser extent the burning of fuel. A survey of best practices specific to the weighing of salt will be conducted as part of the Roads Services Winter Operations Review in order to determine an acceptable threshold. This survey will be completed by Q2 2016.

Winter Operations does not specify the number of times a random check should be performed and there is no monitoring in place to ensure the scales are being used.

The Standard Operating Procedure does not specify the number of times a random check should be performed in a season and in each yard. There is no monitoring in place to ensure that the Operations Technicians utilize the portable weigh scales. This has resulted in some of the scales not used at all in the 2014/2015 season.

In the 2014/15 season, 13 instances of weighing were done in the East area, 3 in Special Operations, and 7 in the South area. No weighing was done in the West and Core area yards. Management indicated that there was no weighing done in the Core area because in the 2014/15 season, they were short 1 Operations Technician, from the usual 2 Operations Technicians in the Core area. The lack of salt weighing in the Core area is a cause for concern. In the previous 2013/2014 annual reconciliation of Winter Materials, the Core area had the highest salt discrepancy representing 16% of total purchases in the area. This should have prompted Winter Operations to monitor the receipt of salt in the 2014/2015 season. Management indicated that there was no weighing done in the West area because it was overlooked by the Operations Technician. There is no oversight in place to ensure that Operations Technicians are using the scales on a regular basis. In total, only a very small sample representing 0.80% of the total tonnes of salt used in the 2014/2015 season was weighed. When scales are used inconsistently or not used at all, incorrect shipments may not be caught. The risk to Winter Operations is that they may be paying more for winter materials than is actually received.

Of the random weighing performed, the weight discrepancies found in the 2014/15 season were not significant. The percentage difference between the weighed amount and the ticketed amount varied from receiving an excess of 6.75% to receiving a shortfall of 1.47%. However, as previously indicated, no weighing was done in the Core and West area yards. The yards in the Core area could have had larger shipping discrepancies as evidenced by the large discrepancies found in the previous annual reconciliation of Winter Materials.

Recommendation 16

That Winter Operations put in place a monitoring process to ensure the portable weigh scales are used throughout the season. That Winter Operations consider setting a minimum number of times random weighing will be performed per season. That Winter Operations ensure random weighing is performed at all yards that receive salt.

Management Response

Management agrees with this recommendation.

The current Standard Operating Procedure will be updated and processes will be put in place to ensure that the monitoring and frequency is followed.

The revisions to the SOP will be implemented for the 2015-16 winter season.

Salt delivery trucks may be notified in advance when they will be weighed.

It is unclear whether trucks are notified in advance that they will be weighed. Based on the tour of the Conroy Facility done on December 22, 2014, we were informed that when staff plans to utilize the weigh scales, they generally advise the contractor in advance. This may lead to more attention on the days when measurements will be taken. If this is a consistent practice at each of the yards, it may explain why out of the random weighing performed, the weight discrepancies found in the 2014/15 season were not significant. The documented weighing may not be representative of the actual discrepancies in other shipments. However, at our meeting with Management on May 6, 2015, we were told that no advance notification is provided. On June 19, 2015, Management informed us that the comments made on December 22, 2014 at the Conroy Facility were that the supplier was informed when Winter Operations started the weighing process in approximately the 2008/2009 winter season.

Recommendation 17

That Winter Operations ensure that all Operations Technicians and other staff do not notify the delivery trucks in advance that they will be weighed.

Management Response

Management agrees with this recommendation.

This requirement will be incorporated into the Standard Operating Procedure referred to in Recommendation 16 and will be implemented for the winter of 2015-16 season.

Winter Operations does not have evidence of being compliant with Standard Operating Procedure 2.06's requirement of checking spreader calibrations at least twice per winter.

Salt spreader calibration has a direct impact on material usage. If the material output is lower than the selected application rate, then road safety has been compromised. If the material output is higher than the selected application rate, then material is needlessly wasted. Based on Standard Operating Procedure 2.06 - Spreader Calibration Checks, spreader calibrations are to be checked at least twice per winter and logged on the Spreader Calibration Log Sheet. The Operations Technician is responsible for maintaining a record of calibration checks for the spreaders operating in his or her zone.

Management was unable to provide the 2013/2014 and 2014/2015 Spreader Calibration Log Sheets for all the areas except the Core area. Without the log sheets, there is no evidence to indicate that they have been abiding by the Standard Operating Procedure's requirement of checking salt spreader calibration at least twice per winter. Based on review of the 2013/2014 and 2014/2015 Spreader Calibration Log Sheets provided for the Core area, it appears that spreader calibration checks were not completed for all the spreaders operating in the area and were not completed at a minimum of twice per winter. The lack of regular calibration checks could lead to inaccurate usage reports and possible material wastage.

Management has indicated that while equipment does go out of calibration due to a variety of reasons, including sensor failures, it is often detected by the equipment operator and brought in for repair. In addition, the Zone Supervisor will check the Inter-Fleet Report at the end of each shift for any irregularities; particularly in salt usage. They would be able to see exactly which date, time and truck number is causing the irregularity.

Recommendation 18

That Winter Operations obtain a clear understanding of the reasons behind the difference between the SAP ending inventory of salt in the accounting system compared to the actual physical amount counted as remaining in the domes.

Management Response

Management agrees with this recommendation.

Public Works will conduct a survey of best practices to obtain a clear understanding of the reasons behind the difference between the SAP ending inventories of salt in the accounting system compared to the actual physical amount counted as remaining in the domes as part of the Roads Services Winter Operations Review. This survey will be completed by Q2 2016.

For the 2015-16 winter season, salt dome inventory reports will also be provided to management on a bi-weekly basis, which will alert Managers to any inconsistencies in salt reporting.

Underlying reasons for salt discrepancies found at the end of the season may not be fully investigated.

An annual reconciliation of winter materials is performed once at the end of the winter season. No periodic reconciliations are performed throughout the year. The materials are measured at the end of each season by an engineering consulting firm. The remaining quantity as counted by the consulting firm is compared to the SAP ending inventory on hand.

In the 2013/2014 salt reconciliation, Winter Operations had 18,140 tonnes less salt in the domes than was recorded in the SAP ending inventory. The value of this difference is \$1,334,900 or 8.5% of total purchases. The differences range from 5% to 16% of total purchases by area. As previously noted, the Core area had the highest difference of 16% of total purchases in the area.

In the 2012/13 and 2011/12 salt reconciliations, the amount counted by the consulting firm as remaining in the domes was also less than the amount of salt recorded in SAP ending inventory. The values of the differences were \$632,400 and \$794,022 respectively.

Management indicated that the main variables that impact salt inventory are compaction, moisture and equipment accuracy. Salt densities can increase by approximately 17% through consolidation of the stockpile. Salt absorbs moisture from the air as well as from leftover material returned to the dome at the end of a shift which can impact its density. Management indicated that equipment manufacturers of large truck controllers report 10% as a realistic threshold for accuracy. Every year, Management accepts the differences and attributes them to these variables.

The underlying reasons for the salt discrepancies may go unnoticed if the variance is always explained with the same general reasons. Other possible explanations like inaccurate usage measurement, inaccurate amounts being received or loss of materials due to theft or misappropriation are not considered.

In the 2013/2014 grit reconciliation, Winter Operations had 4,675 tonnes more grit on hand than was recorded in the SAP ending inventory. The value of this difference is \$93,500 or 65.7% of total purchases. The reason for this is because Winter Operations does not keep an on hand inventory of mixes in SAP. As these mixes are expensed they create a negative balance that is manually adjusted throughout the season drawing down from the salt, sand, or grit on hand inventories.

Given the trend of having less than recorded salt in ending inventory in 2013/2014, 2012/2013 and 2011/2012, Winter Operations should consider whether it could be due to inaccurate usage measurement, inaccurate amounts being received or loss of materials due to theft or misappropriation.

Recommendation 19

That the Roads Services branch ensure that the individuals who had not completed the Occupational Health and Safety Awareness Training complete the training as soon as possible and/or as soon as they return from their leave.

Management Response

Management agrees with this recommendation.

As of Q3 2015, 99% of Roads Services Supervisors and 98% of Roads Services Workers respectively had completed the training.

Public Works will continue to train and monitor new Roads Services employees through the on-boarding process and returning to work from leave.

Audit Objective No. 4:

Assess how Occupational Health and Safety (OHS) is addressed in the activities of Winter Operations.

Occupational Health and Safety Awareness Training has not been completed by all active employees.

A Health and Safety Resource Board is posted in each yard, usually in or near the lunchroom. The Board contains useful information on workplace policies, safety, the Joint Health and Safety Committee and the Employee Assistance Program.

Training records generated from SAP, as at June 5, 2015, indicate 96% of workers and 95% of Supervisors in the Roads Services branch have completed their Occupational Health and Safety Awareness Training. Of the individuals that have not completed the training, most were on leave such as long term disability, leave without pay, IPP, WSIB, or parental leave. We identified three individuals who had not completed the mandatory Occupational Health and Safety Awareness Training where there did not appear to be a reason.

Hazard Identification and Risk Assessment (HIRA) for high risk operations within Winter Operations has not been completed.

Public Works is currently in the process of completing HIRA. The estimated completion date is by the end of the calendar year. It is being done by clustering like jobs in the

Public Works department. The Safety Unit under Human Resources is spearheading HIRA across the City and workplace inspections are being conducted. The Joint Health and Safety Committee and employee representatives are also participating in the process.

The positions in the Roads Services branch were grouped by priority from highest to lowest, in groups called P1, P2 and P3. Most of the Winter Operations staff falls under the P1 classification. The percentage complete for the P1 category is 50% as at July 23 2015. The percentage complete for P2 and P3 position grouping were 50% and 0% respectively. The Roads Services branch has identified many risks related to Winter Operations activities.

Public Works should ensure that its highest risk workplaces and occupations are addressed first. Given the various risks involved in Winter Operations, hazard identification and risk assessment should be a priority. Public Works should continue to complete HIRA and provide assistance to managers as needed to ensure its timely completion.

Recommendation 20

That Public Works ensure the Hazard Identification and Risk Assessment for Winter Operations be completed by addressing the highest risk workplaces and occupations first.

Management Response

Management agrees with this recommendation.

Corporate Health and Safety is leading the Hazard Identification and Risk Assessment project across the City with support from Public Works. All positions within Roads Services were reviewed and grouped into three groups by priority from highest to lowest. As of October 22, 2015, HIRA's for all priority 1 and 2 categories, which are the highest risk workplaces and occupation, are 100% complete. HIRA's for the priority 3 group, which includes office staff will be completed by Q4 2015.

Audit Objective No. 5:

Assess the adequacy of succession planning for key staff involved with Winter Operations.

Succession planning in Winter Operations is an active consideration.

Eight critical positions have been identified and potential successors have been named. The succession plan is updated on an annual basis, which is consistent with the

requirement in the City of Ottawa Succession Management Guide. There are no gaps in internal resources identified as the department is currently has 2 or 3 individuals available and ready to replace each critical position. Evidence of employee development is seen in career development plans and opportunities given to staff to help prepare them for a more senior role.

Roads Services branch also does succession planning for employees who hold non-management positions and are involved in the day-to-day winter operations. This is called the Crew Leader, Maintenance Coordinator and Zone Supervisor Training Program. Under this program, an employee can start as an equipment operator and progress to become a crew leader, maintenance coordinator, or a zone supervisor.

Potential Savings

Our analysis of several types of activities indicates that there may be opportunities for the City to identify savings. The demand for these miscellaneous activities has not been quantified to clearly demonstrate the need and legitimacy which indicates that there is a high likelihood that these activities could be reduced to lower costs. This would require PW to use available activity sheet information and MMS data to conduct a review to ensure the City has the optimal mix of internal and contracted services for Winter Operations.

Other potential savings could be achieved through a review of and changes to current MQS to bring them in line with provincial standards and better controls over receipt and use of materials.

Conclusion

Overall, the City has MQS higher than Provincial MMSMH standards, a high ratio of owned to contracted equipment and the associated operators and better post-storm clean up times than most municipalities.

While response times and the ratio of owned to contracted equipment do not in and of themselves determine the cost per lane km they would appear contribute to the City having the highest cost per lane Km in OMBI, although prevailing weather patterns and the mix of road classes under maintenance can differ significantly from municipality to municipality.

In the absence of a full analysis to determine the best mix of internal and external services, there is a risk that City staff is spending time on tasks that are available commercially at lower cost. This increases as the severity of winter is diminished and contributes to the risk that the City may be paying more than necessary for Winter Control services.

PW is collecting information related to MQS performance indicators but is not currently providing this to Management and Committee and Council.

Acknowledgement

We wish to acknowledge our appreciation for the cooperation and assistance afforded the audit team by management.