New England States Performance Measurement Project

Measure, Share, Improve

Measuring Government Performance: Snow/Ice Removal Operations

NESPMP: 05
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The Research Bureau

THE NEW ENGLAND STATES GOVERNMENT FINANCE OFFICERS ASSOCIATION

PREFACE

In 2008, the New England States Government Finance Officers Association (NESGFOA) initiated a project to develop and implement a government performance measurement project that would serve as a catalyst for service improvement in participating local governments throughout its six-state jurisdiction. Performance measurement has several purposes:

- Produce reliable performance and cost data for internal and external comparisons over time for selected municipal services.
- Facilitate the use of performance and cost data for service improvement.
- Increase government responsiveness to citizens.

In order to fund this project, NESGFOA made a three-year commitment from its membership resources, secured a three-year grant from the Alfred P. Sloan Foundation, and requested a modest annual stipend from each participating community. NESGFOA contracted with the Worcester Regional Research Bureau to organize and manage the project because of its experience in working with the City of Worcester, MA in government performance measurement during the previous seven years under a grant from the Sloan Foundation.

The goal of this project is to expand the adoption of performance measurement practices at the local level by regularly collecting and reporting timely data on service delivery that are accurate and reliable. These data will assist policymakers, managers, and citizens in determining whether the delivery of a particular service is efficient and effective. The project's overall goal is to improve service delivery and to make government more responsive to its citizens.

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I. INTRODUCTION

Performance measurement is…

- the regular measurement of results or outcomes and efficiency of services or programs
- a tool to create accountability for results and improve performance
- government's way of determining whether it is providing a quality product at a reasonable cost
- an inherent and indispensable part of the management process.

This government performance benchmarking report is part of the New England States Performance Measurement Project. This report focuses on the treatment of municipal roads during snow and ice precipitation events in seven New England towns during the 2009/2010 winter season. These towns realized there was a high degree of public interest in these services being done effectively. Winter road conditions are very visible to the public, impact public safety, require significant financial resources, represent unpredictable periodic events, and can be addressed using a wide variety of manpower, equipment, road treatment materials, and implementation strategies.

The data collection processes and analytical techniques used for this project grew out of an initial project to collect meaningful snow and ice operation information during the 2008/2009 winter season. That project provided a very important opportunity to build a conceptual study model and then test its design. The 2008/2009 study accomplished several important milestones.

They included:

1. Clearly identifying important winter storm characteristics that drive operational decisions by Public Works Departments.

2. Understanding the variety of resources (Labor, Equipment, Materials) that can be used to develop an operational strategy for treating road surfaces during winter weather conditions.

3. Developing a data collection process that was both effective and efficient in gathering a wide variety of information for every winter storm event.

4. Applying a common cost accounting methodology to gather cost information for all resources used by towns.

5. Building and testing a benchmarking analytical framework to compare operational data between towns. Because data was collected at a very detailed level, a wide variety of analysis tools and techniques were developed and tested. Final techniques for this study were then selected based on their ability to identify each town's strategy for labor, equipment, and treatment material usage and allow comparative analysis with other towns.

The results of the 2008/2009 project were presented in the fall of 2009 and provided participating municipalities with a baseline of their own performance which they could use to learn how other cities were providing the same services and promote improvement in their own operations.

Completing the 2008/2009 project provided valuable experiences that resulted in changes and improvements to this 2009/2010 study.

Three significant 2009/2010 changes were:

1. The opportunity for several towns to improve their data collection processes to gather accurate information. Using new techniques to collect data provided additional information not available before and improved the accuracy of data being collected. This study has five times the amount of data collected for the winter of 2008/2009.

2. Additional benchmarking analytical techniques were identified and applied. Winter operations are complex because of the uniqueness of storm characteristics, a wide variety of truck, plow, spreader, and specialized equipment choices, and a significant variety of road treatment materials and chemical products. Benchmarking data should identify alternative operating choices for discussion and evaluation.

3. The addition of direct citizen evaluations on service performance levels. One important government goal is to deliver municipal services that citizens value. Providing timely, quality services that are cost effective are significant tests of performance. Letting citizens judge these performance factors can be a very valuable change and improvement driver. This study adds the voice of the citizens to the performance data.

This 2009/2010 study provides a significant opportunity for policy makers to evaluate service performance, identify improvement opportunities, and promote effective government services. This benchmarking initiative required significant collaboration and commitment of personnel from the participating cities toward a common goal of improving government performance of specific services. This study is another important step toward their commitment to improving government services.

II. STUDY FRAMEWORK

There are many interrelated performance factors involved in the delivery of winter road services. Each storm occurrence (event) will have unique weather characteristics. Municipal personnel also have a wide variety of resources to mix and match when they determine winter precipitation conditions (snow and/or ice) require road treatment. Their decisions during each winter event impacts the timeliness, quality, and cost effectiveness of road treatments.

The decision-making process for winter road services is multi-faceted. When to start road treatment? How many units of manpower and equipment to commit? What equipment options to select? What type of road material treatment to use? How much material to apply? The collective total of these decision points determines the ability to provide safe road surfaces at an effective cost.

Because the decision process is complex, study data collection forms were developed and used for each snow and/or ice occurrence (event). Detailed data collected included labor hours, equipment type and usage, and materials used to treat street surfaces. Both the amount and cost of resources were identified and recorded.

Once data were recorded, towns provided a diary of data for all storms during the 2009/2010 winter season. Seven towns collected data for a total of 140 winter events that required road treatment services. The total cost of resources used was over $2.5 million.

Data from the towns were analyzed from two primary perspectives. The first analytical process was applied to each individual town's storm data. Section III will review the format of this town analysis in greater detail. Each individual town analysis results are also provided in Appendix A of this report. The primary goal of the town analysis was to clearly identify the operational "profile" or "model" each town uses to approach road services during the winter season. Each

town analysis uses all their event data to identify the resource solutions municipal managers used to deliver road treatment services. This analysis provides a basic resource summary for town managers to evaluate their resource decisions and have informed decisions about future actions. Each town was also provided with a file for every winter event.

The second analytical perspective uses a comparable benchmarking process that focuses on key resource decision points. It was clear after reviewing all of the seven towns' storm data that there are different service strategies for committing resources to winter road treatments. It is important to note that there is not a "right" or "wrong" road treatment strategy. But some towns do commit more resources (and costs) to winter precipitation events that require road treatment. The study goal of Section IV (Benchmarking) is to identify differences in service delivery actions and provide town management an opportunity to:

- Understand the areas where they are performing well
- Identify areas where there may be opportunities to improve service delivery
- Establish goals for performance improvement
- Identify high performing practices being used by other cities

Treating road surfaces during the winter is a significant cost for many towns. The two analytical perspectives that this study presents can promote a healthy (fact based) discussion of service delivery options and review of current operating strategies for delivery of winter road services. Both of these actions should lead to a more effective delivery of municipal services.

III. INDIVIDUAL TOWN ANALYSIS

The first analytical process was to develop a data model that reflected each town's use of resources to deliver winter road treatment services. This analytical perspective provides a basic data summary for municipal officials to evaluate their resource decisions and have informed discussions about future actions.

Seven individual town analyses are provided in Appendix A. Each town analysis includes the following 11 data sections.

Total Storm Costs - There are four categories of resources that towns can use to deliver winter road services. The first pie chart summarizes the total cost for these resources for the entire 2009/2010 winter season. The second pie chart excludes the equipment cost category because the equipment cost category includes the depreciation cost of capital equipment (trucks, plows, etc.) that is purchased periodically. The second cost chart will also closely represent the cash expenses for the 2009/2010 winter season.

Winter Season Profile - After analyzing the event data for <u>all</u> seven towns, it was apparent that resource decisions were significantly different at three distinct precipitation levels:

0-1.9"	Snow / Ice / Black Ice
2.0-7.9"	Snow
8" +	Snow

This section profiles each town's winter season (# events, # storm days) into the 3 precipitation categories.

Storm Costs - This data section breaks down storm costs by precipitation category. Cost data per lane mile of service coverage and average storm cost by resource category are all provided or graphed.

Labor Resources - Three labor usage and cost views are provided. The Highest and Lowest O/T Labor rate used during the winter season is listed. The actual average Labor rate for the entire season is also provided. A breakdown of total Labor Hours used by Regular, Overtime, and Double Overtime during the season and averaged by precipitation category, per event are charted.

Equipment Profile - A table presents the complete inventory of town equipment used to service winter road conditions. The FEMA equipment code and their hourly operating cost (including depreciation) factors are provided.

Equipment Usage - The chart depicts the average units of equipment used by precipitation category and type of equipment used. Please note that "Combo" units represent trucks that have both material spreaders and plow attachments.

Outside Services - A few towns supplemented their operating resources with outside, private company labor and equipment. These services were usually hired only when larger amounts of storm precipitation occurred. The report table summarizes the costs associated with a town hiring private services.

Material Costs - Selecting the type and amount of materials to apply to road surfaces are the most important decisions that impact the effectiveness of road treatments. For most towns, material costs also represent the largest cash expense for winter road services. This section identifies the type of material the town used during 2009/2010 and its cost.

Material Cost by Precipitation Category - The chart developed identifies the average material cost (by material type) used for each storm event in the three precipitation categories.

Material Usage - This chart graphs the average amount of material used (by material type) for each storm event in the three precipitation categories.

Citizen Survey Results - In the fall of 2009 several towns surveyed citizens about their satisfaction with various municipal services. This table shows the survey results for winter road services. Also provided are the citizens' evaluation of overall Public Works and Town Service Performance levels.

IV. COMPARATIVE BENCHMARKING

There are three significant categories of resources that municipal leaders use to treat winter road surfaces. Their decisions and strategies for deploying Labor, Equipment, and Treatment Material determine the effectiveness of providing safe road surfaces at an efficient cost. A variety of different weather conditions also adds a level of complexity to resource decisions.

This benchmarking section is primarily a data report. It reviews the three major categories of resources; Labor, Equipment, and Treatment Materials. It uses graphics and summary tables to identify the differences in service delivery actions used by seven New England towns during the 2009/2010 winter season. Each section will also list several suggested analytical perspectives to assist municipal officials in identifying opportunities to develop different strategies for delivering winter road services.

The table below provides the basic town profile information for the seven participating towns.

	Holden, MA	Lewiston, ME	S. Burlington, VT	Biddeford, ME	S. Portland, ME	Freeport, ME	Newport, RI
TOWN PROFILE							
Population	16,581	35,690	17,000	21,594	23,000	8,100	25,340
# Road Miles	117	188	78	131	125	85	94
# Lane Miles	240	394	164	284	250	170	189
Storm Cost							
Labor	$143,818	$146,016	$56,551	$76,303	$84,619	$51,819	$45,276
Equipment	$227,102	$261,374	$159,585	$147,042	$163,330	$105,529	$52,554
Material	$137,815	$229,372	$68,546	$89,922	$95,003	$60,685	$40,526
Outside Services	$0	$35,497	$0	$0	$52,688	$0	$0
Total Cost	$508,735	$672,259	$284,682	$313,267	$395,640	$218,033	$138,356
# Storm Days	42	27	36	30	16	26	10

Attached in Appendix B-1 is additional profile resource data for all towns.

A. LABOR RESOURCE ANALYSIS

There are four pages of comparative benchmark data. The first page provides Labor Cost Analysis data and the next three pages provide Labor Usage Analysis information. When useful, data was broken down by precipitation categories and measured against the number of lane miles per town. Both of these factors helped balance the analysis perspective from significant differences in weather and town size characteristics.

Appendix B-2 provides a comprehensive table of additional labor cost and background data.

The following are suggested analytical perspectives to promote the identification and consideration of change (improvement) options based on the resource benchmarks attained from all towns. Periodically there are also analytical examples with hypothetical results from possible operating changes.

1. Employee compensation contracts are a major cost driver for town services including winter road services. Obtaining efficient wage and benefit packages are therefore important to managing costs. Can you improve the cost effectiveness of your DPW Labor contract?

2. How do you select and assign employees to winter road services? Do you have choices to use employees that have lower hourly compensation rates?

   Analytical Example: *Freeport's average labor hourly cost for the 2009/2010 season was $6.25 per hour higher than the average of the other six towns. Had Freeport's labor average rate been the same as the other six towns it would have saved over $8,000.*

3. How do you manage the commitment of resources during regular work hours vs. overtime periods? Do you stagger employees' regular work schedules during the winter to have greater employee availability in the early morning or evenings? Do you have options to commit more road services units during regular work hours and reduce units during O/T periods?

   Analytical Example: *South Burlington and Holden were consistently able to use a greater percentage of regular labor hours for road services. An average O/T labor hour costs a town over <u>100%</u> more than a regular labor hour. Had Newport been able to use 10% more regular hours vs. O/T hours they would have saved over $4,000 in labor costs.*

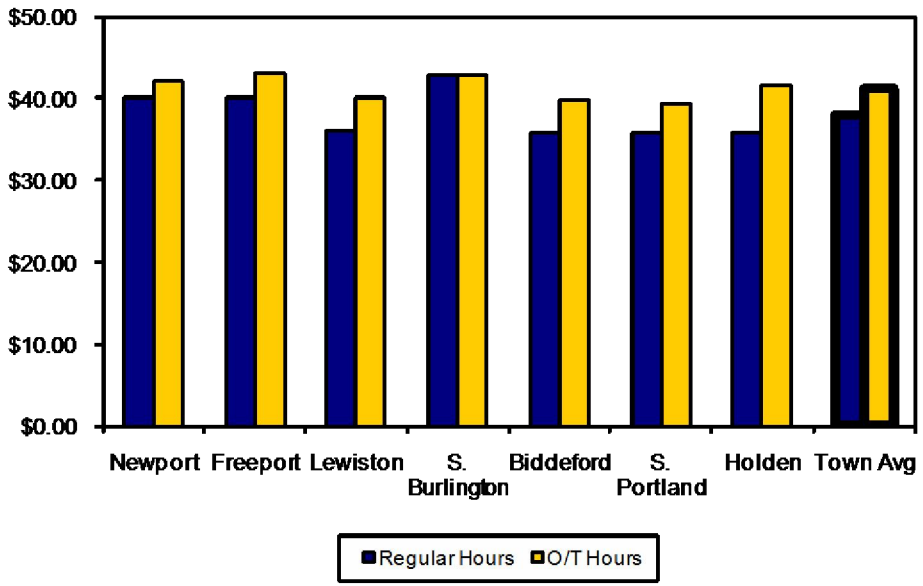
4. Do you have guidelines for determining when you start road treatment and stop road services? Are there different guidelines for various road categories (i.e., residential roads vs. main arteries, etc.)? Can you adjust your guidelines to reduce the amount of hours your service units are on the road?

   Analytical Example: *South Portland uses significantly (over 60%) more labor hours per lane mile of coverage than any other town. Reducing the amount of labor hours to the average of the other six towns would save South Portland over $50,000.*

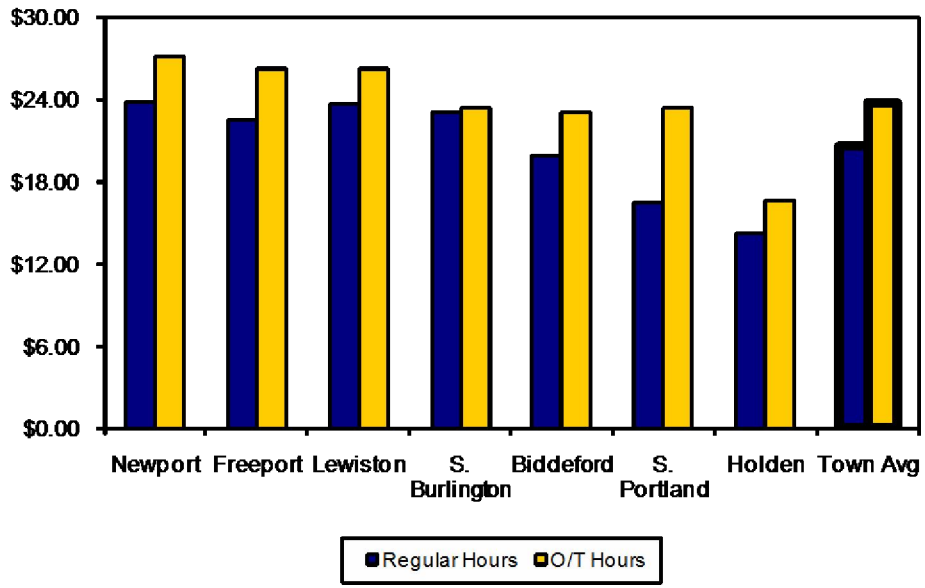
Labor Cost Analysis
2009/2010 Winter Season

	Newport	Freeport	Lewiston	S. Burlington	Biddeford	S. Portland	Holden	Town Avg
Highest Reg Lbr Hrly Rate (w/ benefits)	$40.00	$39.99	$36.05	$42.84	$35.74	$35.74	$35.72	**$38.01**
Lowest Reg Lbr Hrly Rate (w/ benefits)	$23.80	$22.45	$23.67	$23.03	$19.94	$16.38	$14.25	**$20.50**
Highest O/T Lbr Hrly Rate (w/ benefits)	$42.10	$43.05	$39.97	$42.75	$39.93	$39.37	$41.57	**$41.25**
Lowest O/T Lbr Hrly Rate (w/ benefits)	$27.13	$26.13	$26.24	$23.30	$23.06	$23.35	$16.59	**$23.69**

Highest Hourly Rates (with benefits)



Lowest Hourly Rates (with benefits)



Labor Usage Analysis
2009/2010 Winter Season

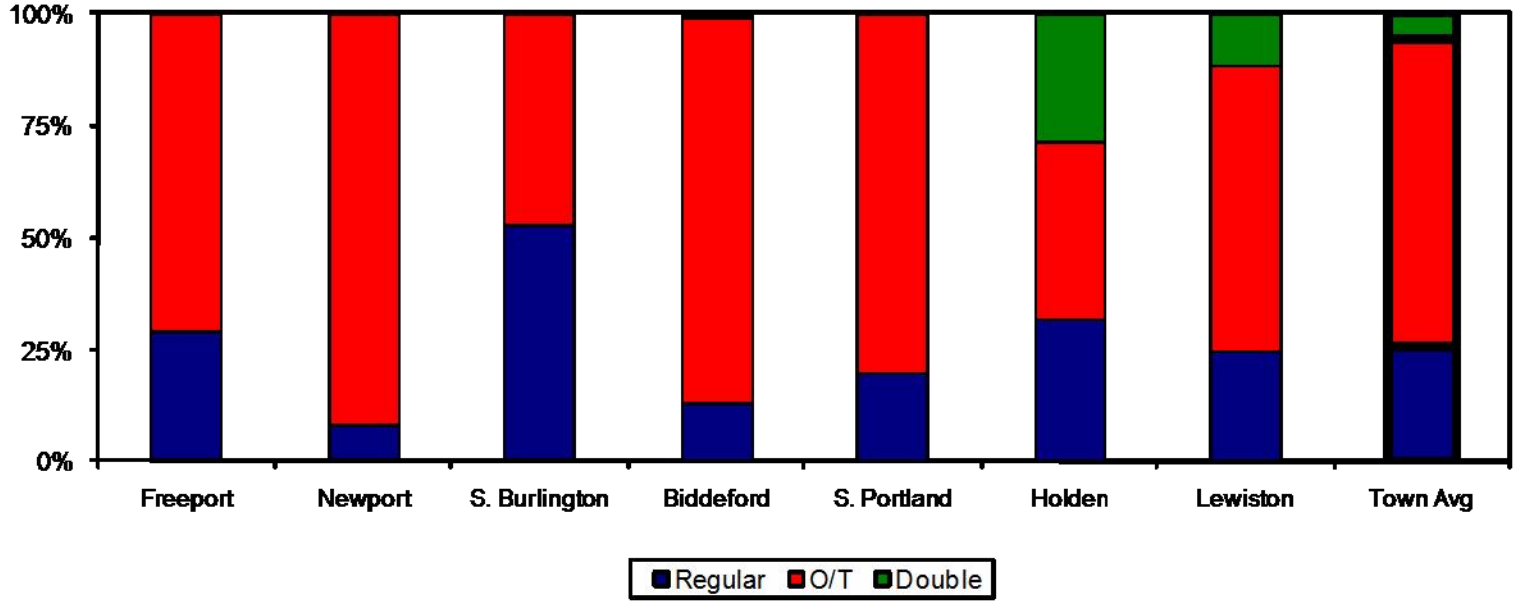
Total Labor Hours

	Freeport	Newport	S. Burlington	Biddeford	S. Portland	Holden	Lewiston	Town Avg
Regular	383.90	107.00	959.75	318.50	558.00	1,214.50	1,106.75	**664.06**
O/T	939.00	1,216.50	869.25	2,063.50	2,240.80	1,495.00	2,829.00	**1,664.72**
Double	0.00	0.00	0.00	28.00	N/A	1,096.00	531.50	**275.92**
Total	1,322.90	1,323.50	1,829.00	2,410.00	2,798.80	3,805.50	4,467.25	**2,565.28**

Average Labor Hours per Storm Event
By Precipitation Category

	Freeport	Newport	S. Burlington	Biddeford	S. Portland	Holden	Lewiston	Town Avg
0-1.9"	36.12	28.00	22.47	32.92	72.78	39.74	63.55	**42.23**
2-7.9"	94.50	185.50	75.56	173.30	443.32	205.43	470.38	**235.43**
8"+	300.20	553.50	460.00	557.75	N/A	383.25	504.75	**459.91**

Labor Hour Usage
2009/2010 Winter Season

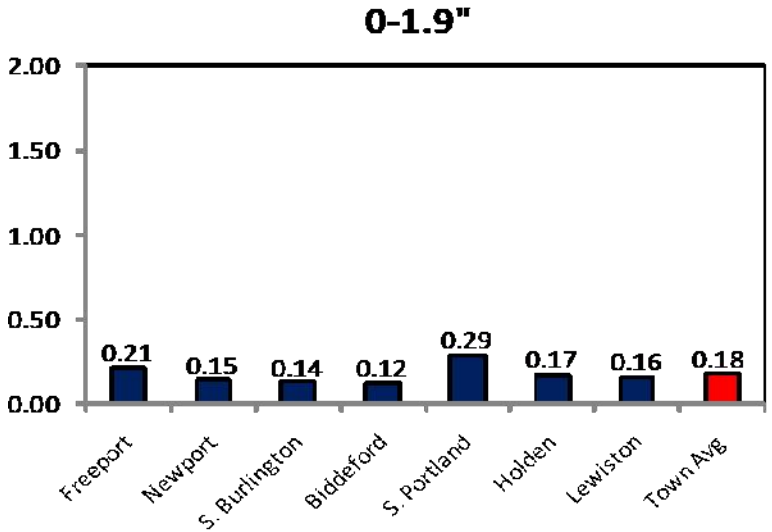


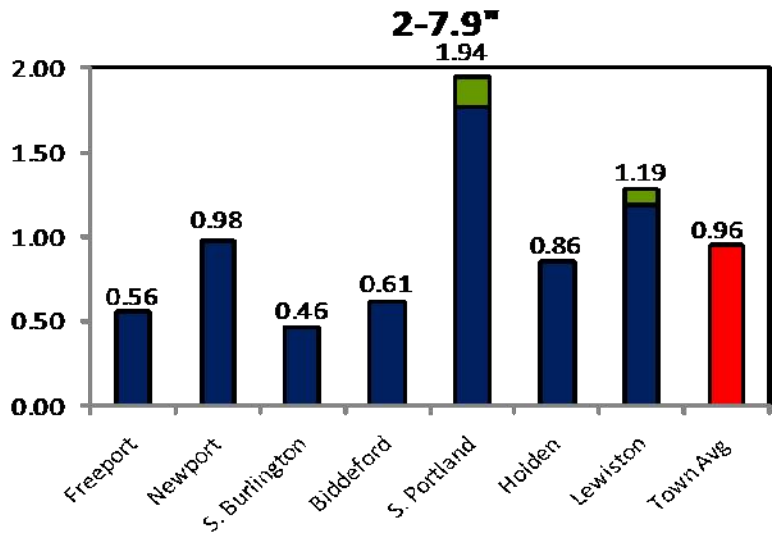
	Freeport	Newport	S. Burlington	Biddeford	S. Portland	Holden	Lewiston	Town Avg
Regular	29%	8%	52%	13%	20%	32%	25%	**26%**
O/T	71%	92%	48%	86%	80%	39%	63%	**68%**
Double	0%	0%	0%	1%	0%	29%	12%	**6%**
Total	100%	100%	100%	100%	100%	100%	100%	**100%**

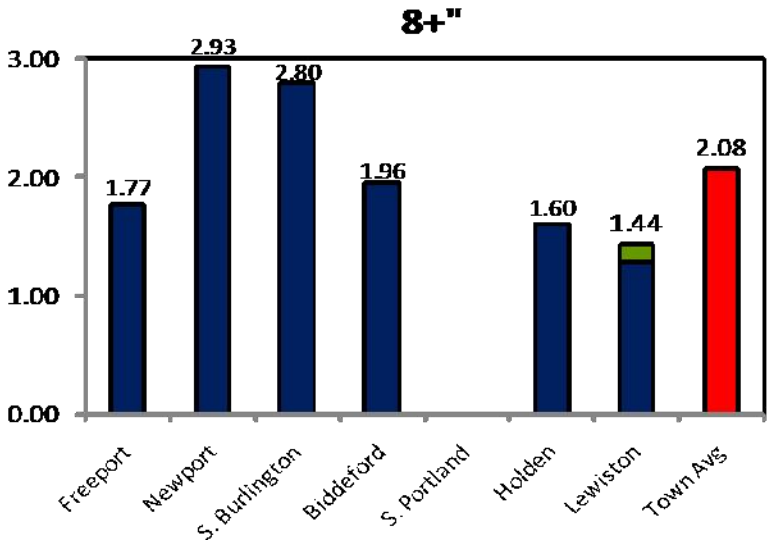
Labor Usage Analysis

Average Labor Hours per Lane Miles by Precipitation Category

2009/2010 Winter Season







B. EQUIPMENT RESOURCE ANALYSIS

This report has six pages of comparative equipment benchmark resource data. The next three pages of graphics (Equipment/Cost Profiles) illustrate the current inventory of town equipment available for winter road services. Also provided is the FEMA hourly cost of operating the equipment (including depreciation).

The Equipment Inventory Summary Graph (page 18) compares the amount of road lane miles each unit of primary road servicing equipment (plows, material spreader, trucks) is expected to cover if all available equipment were being utilized.

The final two pages of Equipment Benchmarking (pages 19 – 20) data provide the actual number of lane miles each unit of equipment was expected to cover based on the actual number of equipment units called out for each storm precipitation category. Please note that the graphic axis measurement for the # of lane miles is significantly less for 0-1.9" and 2-7.9" storm graphs because of the significant difference in these storm characteristics and equipment usage.

Appendix B-2 is a complete equipment inventory for all town-owned equipment with their respective FEMA codes and hourly operating cost guidelines.

The following are suggested analytical perspectives to promote the identification and consideration of change (improvement) options based on the resource benchmarks attained from all towns. Periodically there are also analytical examples with hypothetical results from possible operating changes.

1. Truck operating costs vary significantly depending on their size. Larger trucks also tend to have more experienced personnel (with higher labor cost rates) assigned to them. When selecting the type of equipment to service the roads, do you commit lower cost equipment (and attendant labor costs) whenever possible?

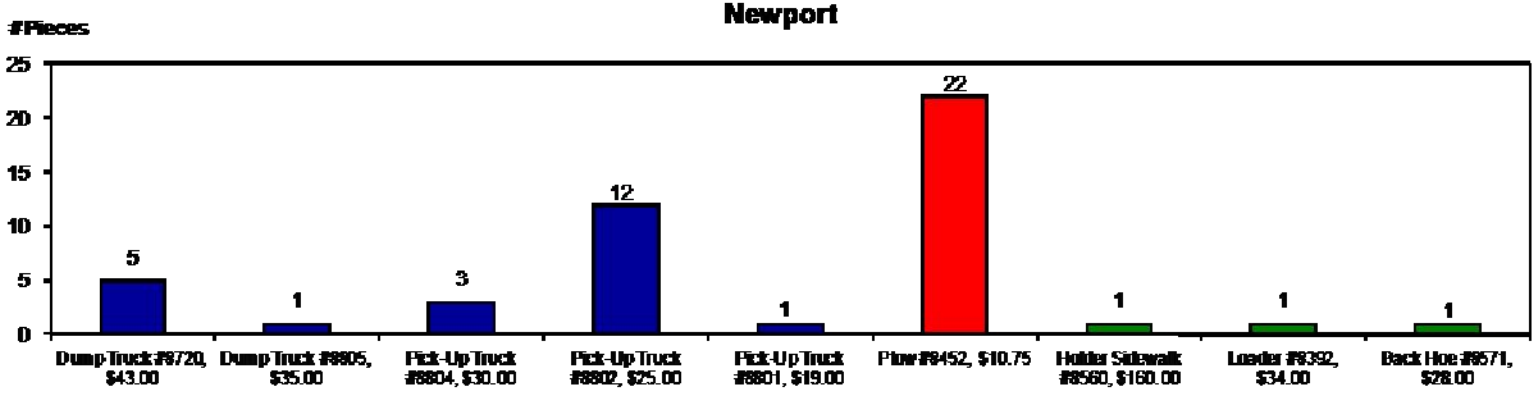
   Analytical Example: *Biddeford is the only town that does not use any pick-up truck plow or spreader equipment. Dump truck hourly cost rates are at least 40% higher than pick-up trucks (not including potentially higher labor cost rates for operators). If Biddeford could replace dump trucks with pick-up trucks for 2 units of equipment the cost savings for winter storm services would be over $30,000.*

2. The data indicated that all towns commit a significantly different number of plows and/or material spreaders depending on the amount of storm precipitation. As heavier precipitation amounts occur, what is your road clearing strategy that determines the number of plows and/or spreaders you deploy? Do you have a strategy that prioritizes road-clearing services?

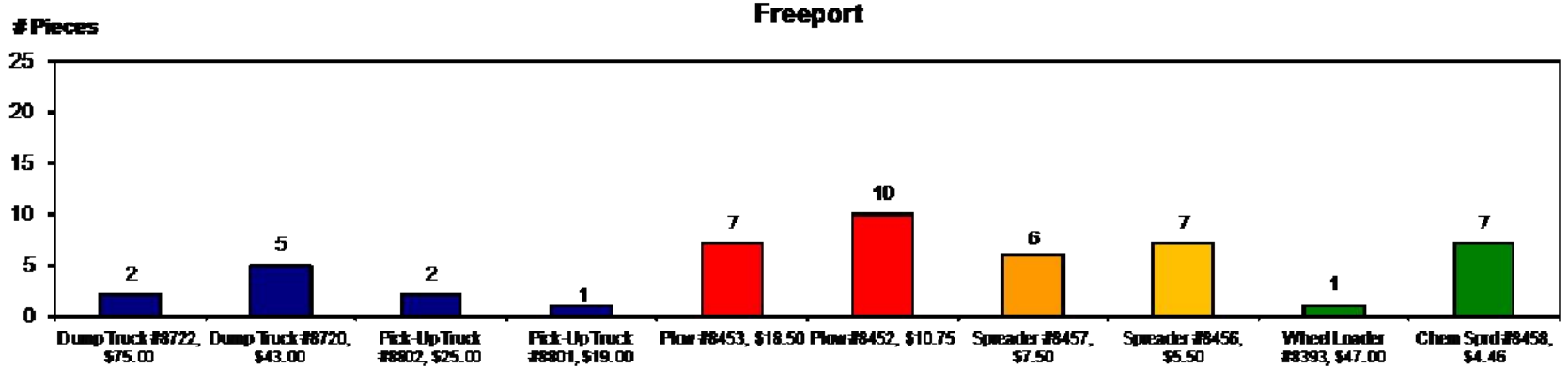
   Analytical Example: *For heavier precipitation levels Newport expects plows to cover 30% to 45% fewer lane miles than the average of all other towns. If they were at the same town average for number of lane miles as other towns, they could save over $70,000.*

2009/2010 Equipment/Cost Profile

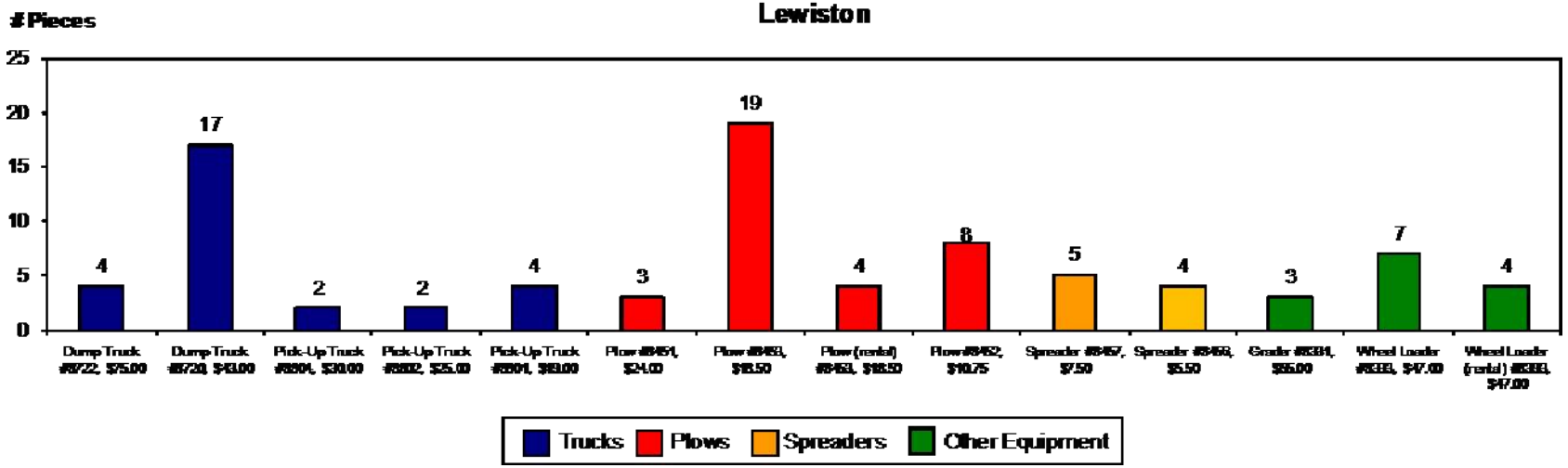
Newport



Freeport

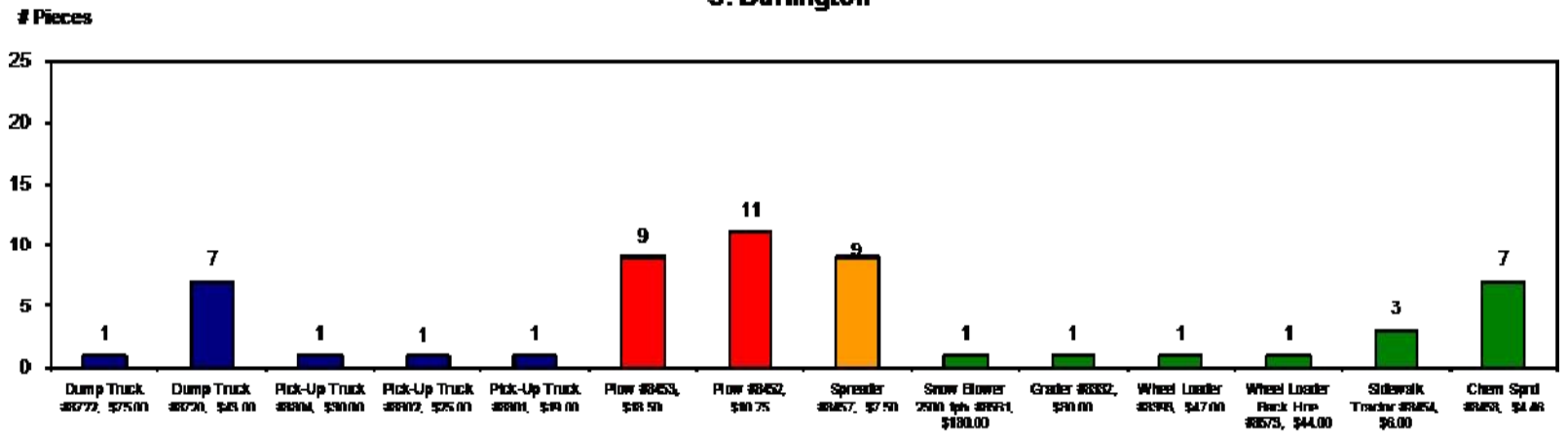


Lewiston

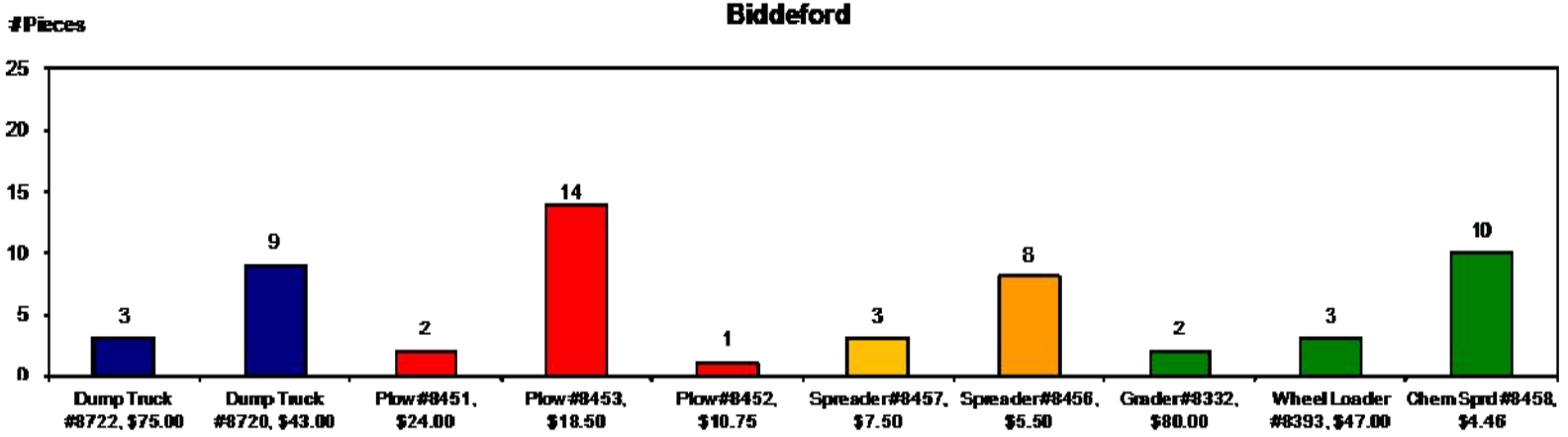


2009/2010 Equipment/Cost Profile

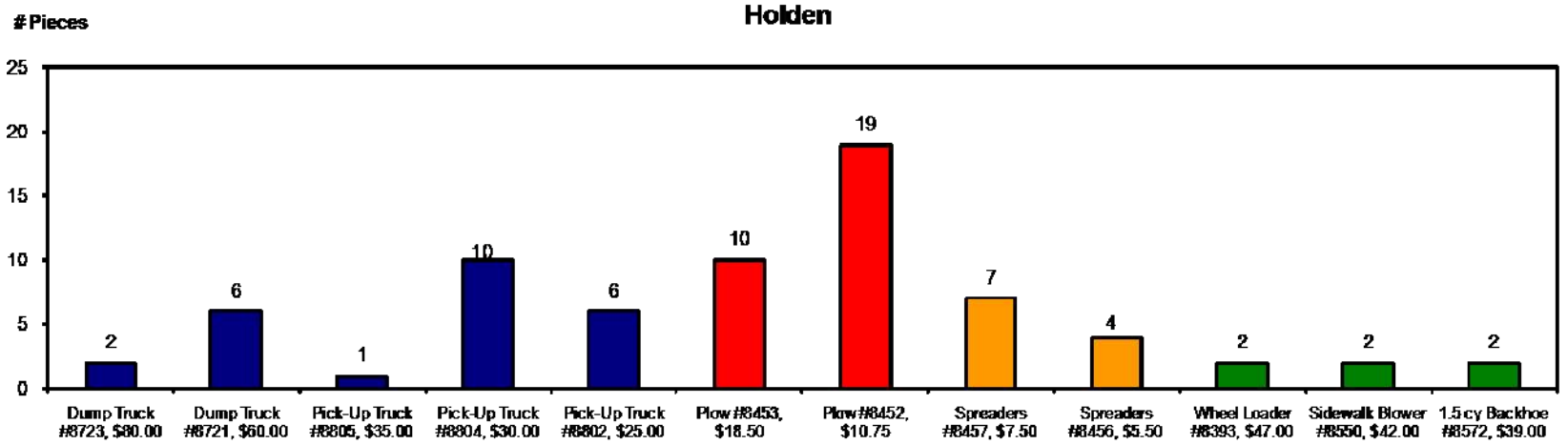
S. Burlington

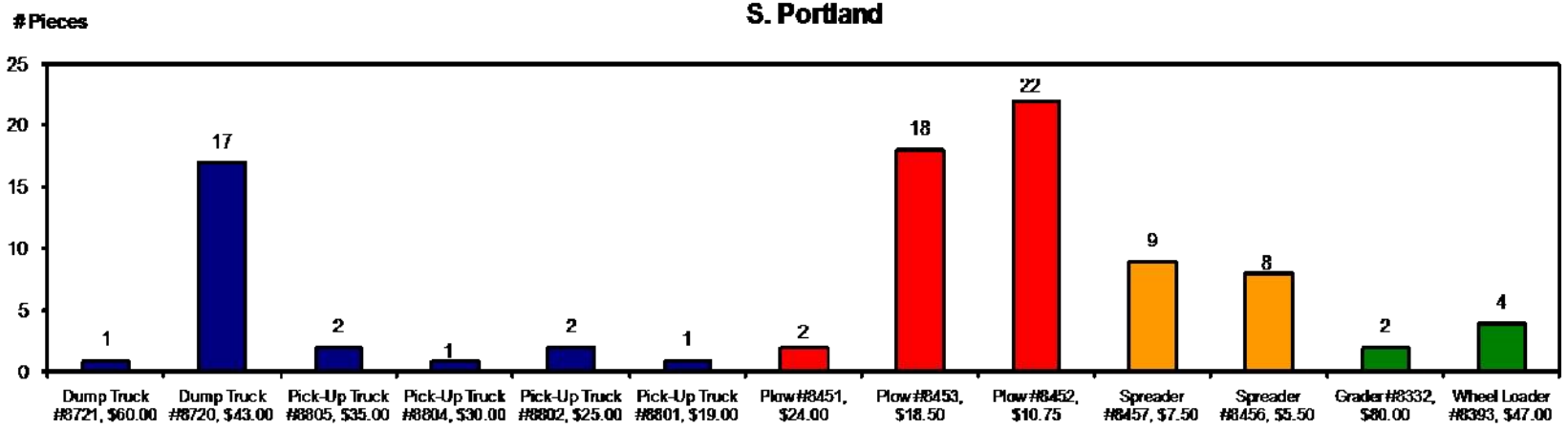


Biddeford

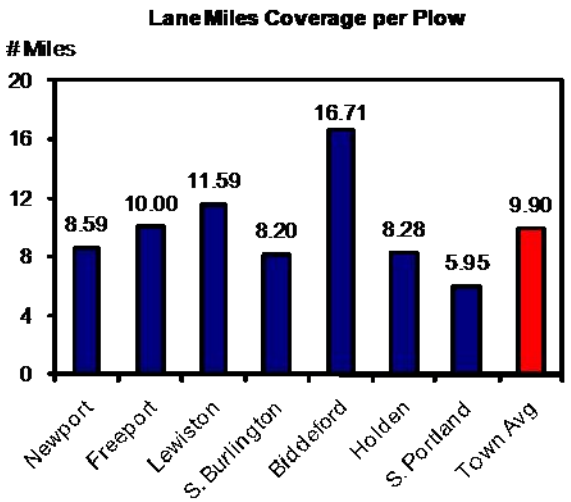


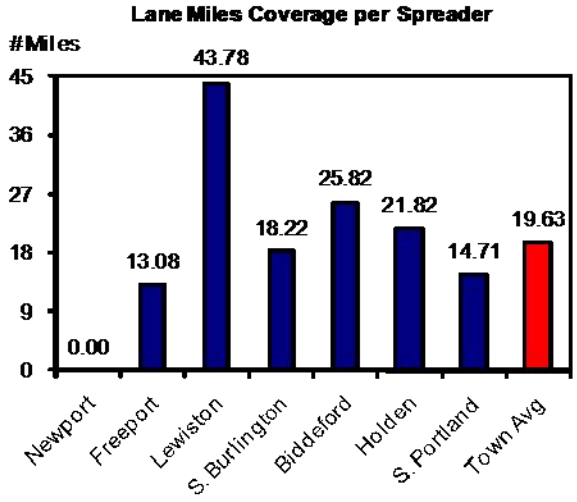
2009/2010 Equipment/Cost Profile

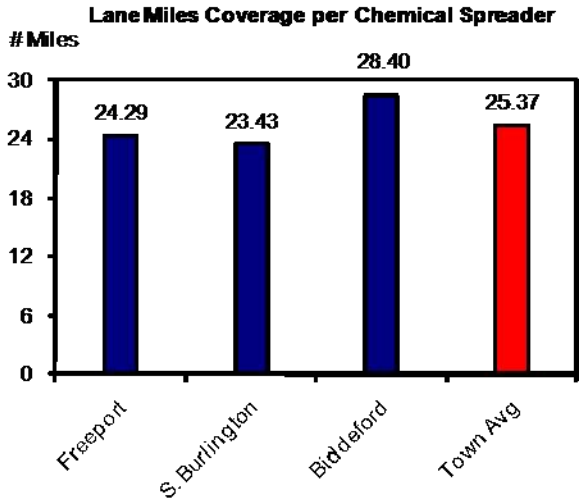


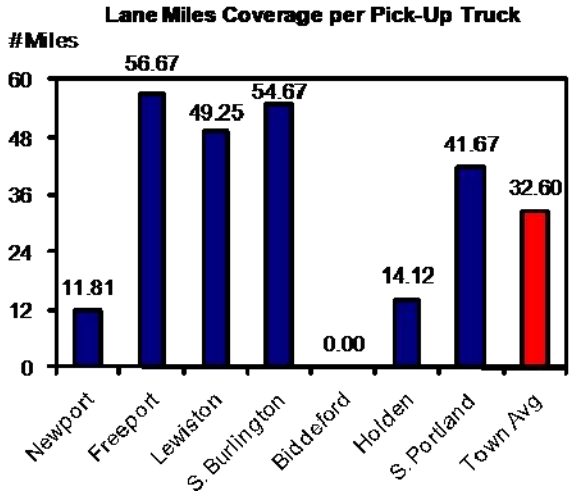


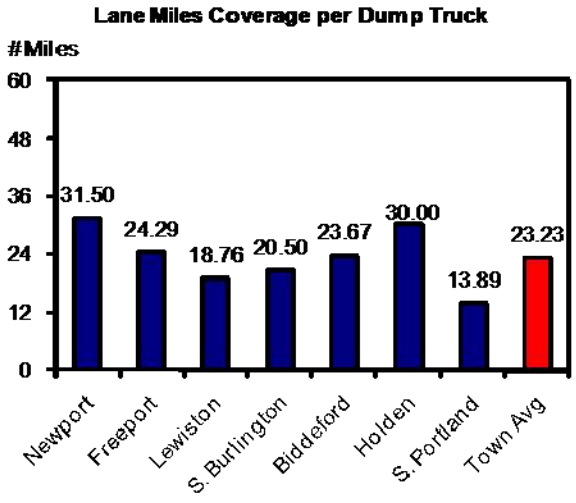
Equipment Inventory Summary
2009/2010 Winter Season

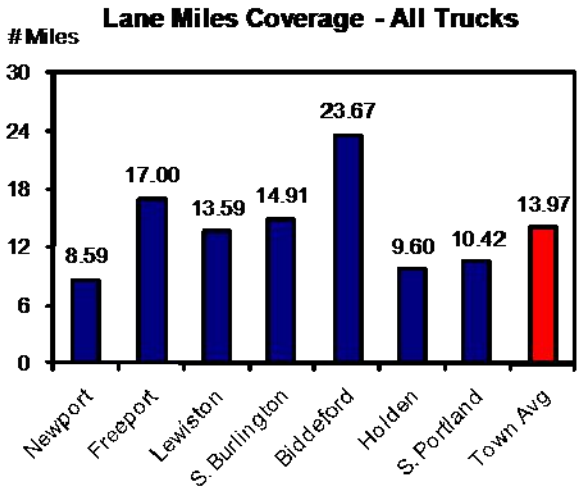






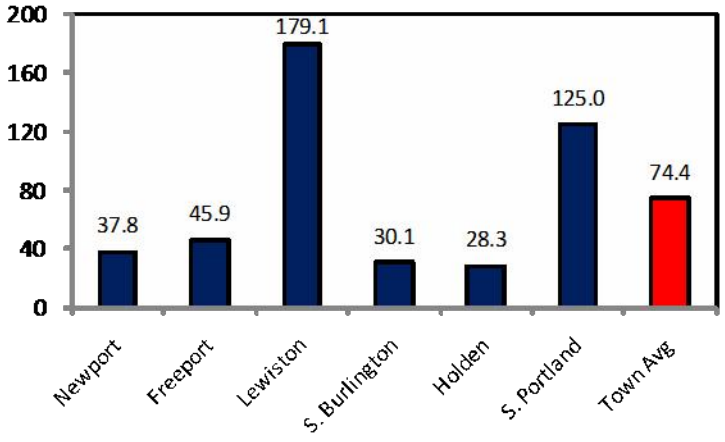




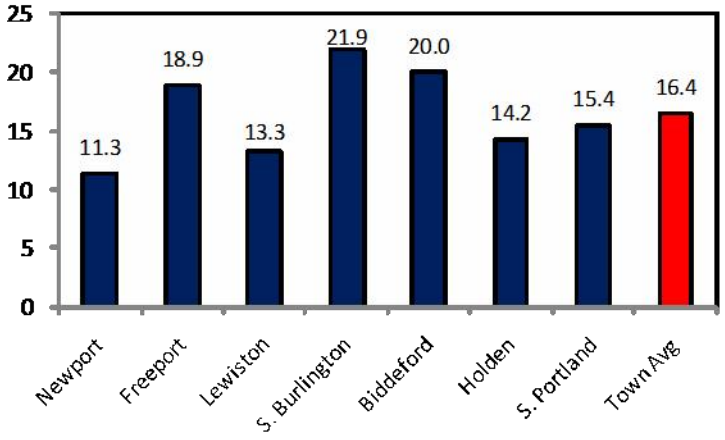


PLOWS
Average # of Lane Miles per Piece of Equipment
By Precipitation Category
2009/2010 Winter Season

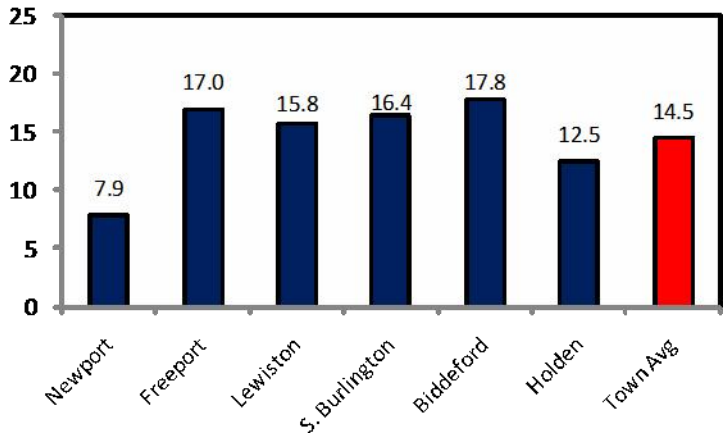
0-1.9"



2-7.9"

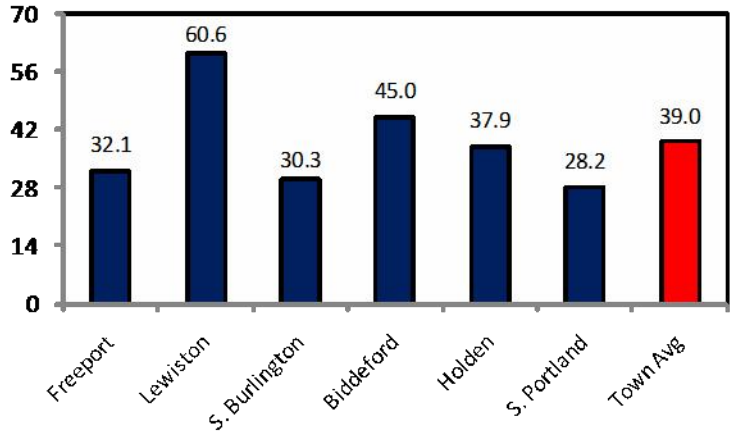


8" +

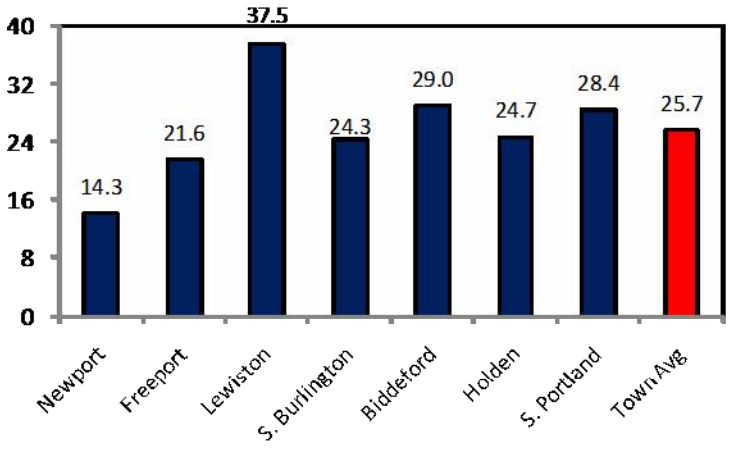


SPREADERS
Average # of Lane Miles per Piece of Equipment
By Precipitation Category
2009/2010 Winter Season

0-1.9"



2-7.9"



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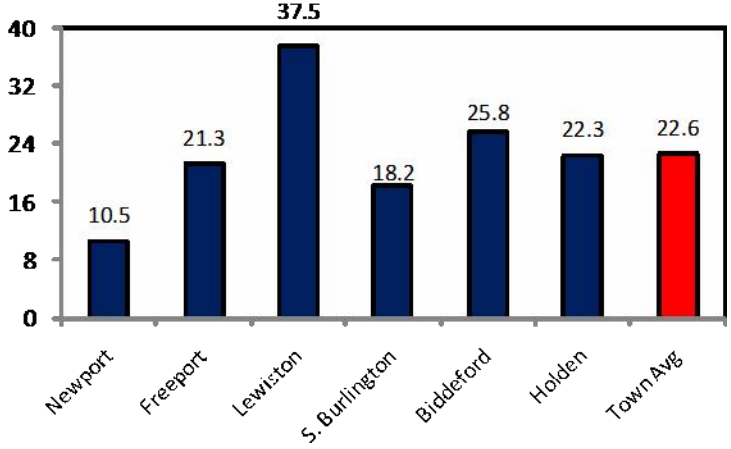


C. MATERIAL RESOURCE ANALYSIS

The selection of road treatment materials and the amount of material to apply to road surfaces are the most complex decisions municipal managers make during winter storm events. The seven towns participating in this study used over 18 different types of materials to treat roads. Material costs for most towns represent 50% to 60% of the annual expense for winter road services and is usually more costly than labor storm costs during the winter season.

Because the variety of material choices, this resource category also provides the most opportunity for town officials to critically challenge their current material strategies and consider other options that could be both effective and less costly than current solutions.

This report has six pages of comparative benchmark material resource data. The first table (page 23) lists all the types of road treatment materials being used by the seven towns and their cost. The next four pages of graphics (pages 24 to 27) compare material costs by type of material used, and by storm precipitation category. The final two pages depict the amount of material usage by storm precipitation category.

It is recommended that municipal officials spend the most analytical time reviewing this resource category. Both labor and equipment cost changes may require longer time frames to have a significant impact. However, changing and/or experimenting with new material options can be pursued aggressively and provide significant cost saving opportunities.

Appendix B-4 and B-5 provides additional data tables for material usage and costs.

The following are suggested analytical perspectives to promote the identification and consideration of change (improvement) options based on the resource benchmarks attained from all towns. Periodically there are also analytical examples with hypothetical results from possible operating changes.

1. Do you have the opportunity to purchase your material in greater quantities, participate in co-op purchasing to obtain better material pricing, or change your material mixture ratios to lower the material cost used on road surfaces?

   Analytical Example: Holden is the only town that uses a 1 to 1 salt/sand mixture ratio. If they could change this mixture ratio to 1 to 2, they could save over $14,000.

2. How do you select the type of material to apply to the roads during a storm event? Are there other effective material choices that have lower costs?

   Analytical Example: *South Burlington uses the most expensive material mixtures of any town in this study at a cost of $72.43 and $54.50 per ton. The highest mixture cost used by any other town is $36.00 per ton. The cost difference between $36.00 and South Burlington's material cost is over $34,000 in the 2009/2010 winter season.*

3. How do you determine the amount of material to spread on road surfaces? Do you spread at different rates based on the type of material used? Can you be more selective in material spread rates? Do you have a material strategy by category of roads (i.e., residential vs. main arteries, etc.)?

   Analytical Example: *Lewiston has the highest material cost per mile of any town in this study. If a 10% reduction in per lane mile costs could be achieved by using lower cost materials and/or lower amounts of materials during each storm event, Lewiston could save over $22,000 per year.*

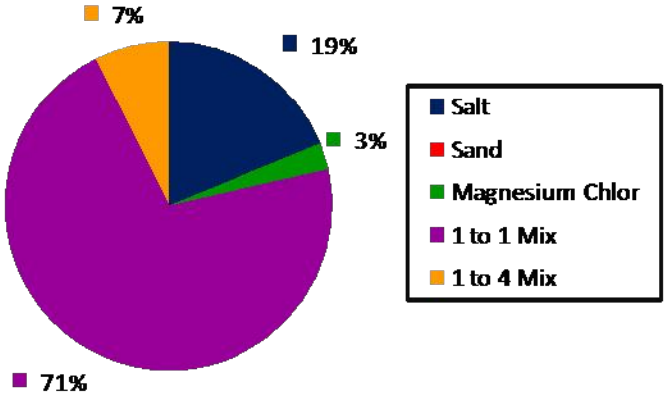
Material Cost Analysis
2009/2010 Winter Season

	Holden MA	Lewiston ME	S. Burlington ME	Biddeford ME	S. Portland ME	Freeport ME	Newport RI
Salt							
Unit Measure	Ton	Ton	Ton	Ton	Ton	Ton	Ton
Unit Cost	$64.12	$63.03	$62.51	$65.00	$66.50	$66.67	$68.00
Sand							
Unit Measure	Ton	Ton	Ton	Ton	Ton	Ton	Ton
Unit Cost	$11.29	$6.25	N/A	$4.00	$19.25	$19.26	$20.00
Sand/Salt Mix							
Unit Measure	Ton	Ton	Ton	Ton	Ton	Ton	Ton
1 to 1	$27.98						
1 to 2							$36.00
1 to 4	$19.77	$20.11					
1 to 6						$19.26	
1 to 6 (extra salt)						$30.37	
Treatment			$72.43				
Special			$54.50				
Chemical Mix							
Unit Measure	Gallons	Gallons	Gallons	Gallons	Gallons	Gallons	Gallons
Magnesium Chloride	$1.07			$0.98		$2.24	$2.47
Calcium Chloride		$1.20					
Ice Be Gone			$1.24				
Salt Brine			$0.20				
70/30 Mix			$0.51				
Pre Treat					$1.04		

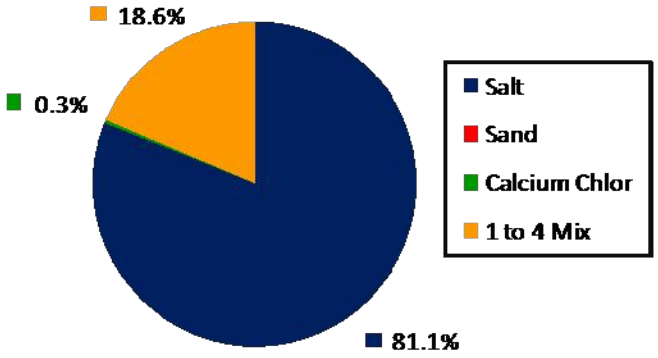
2009/2010 Material Cost Analysis

Percentage of Total Material Cost by Material Type

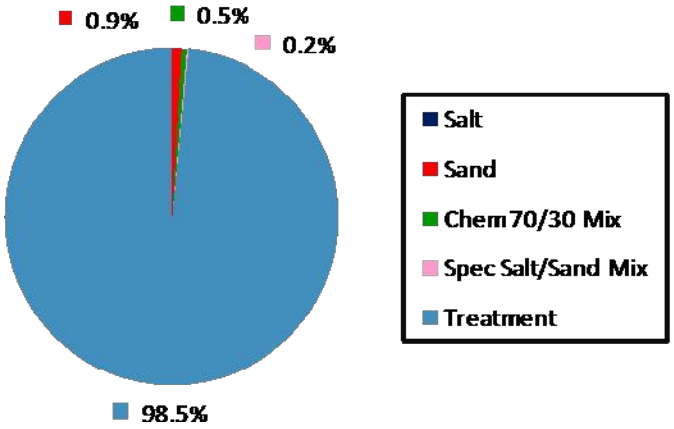
Holden



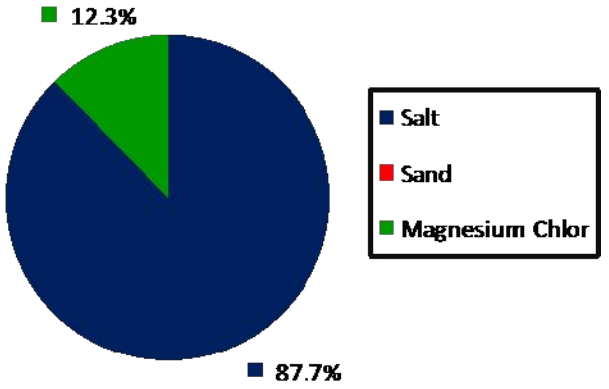
Lewiston



S. Burlington

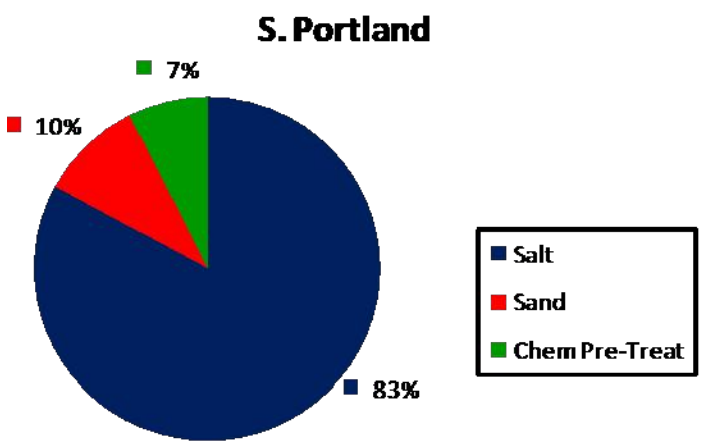


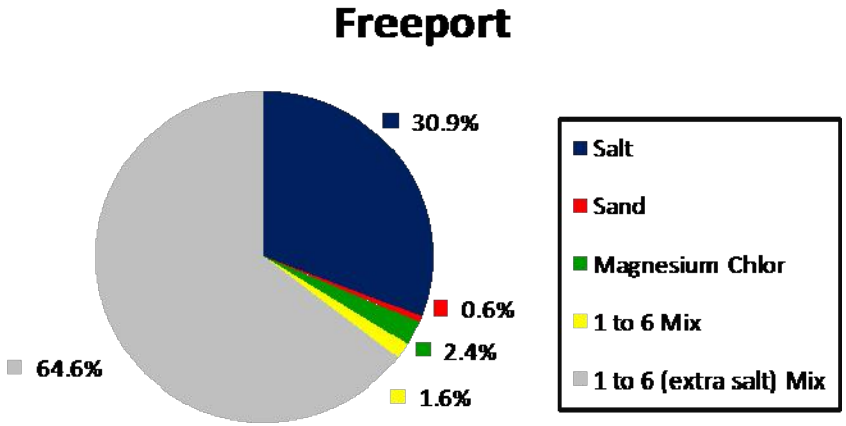
Biddeford

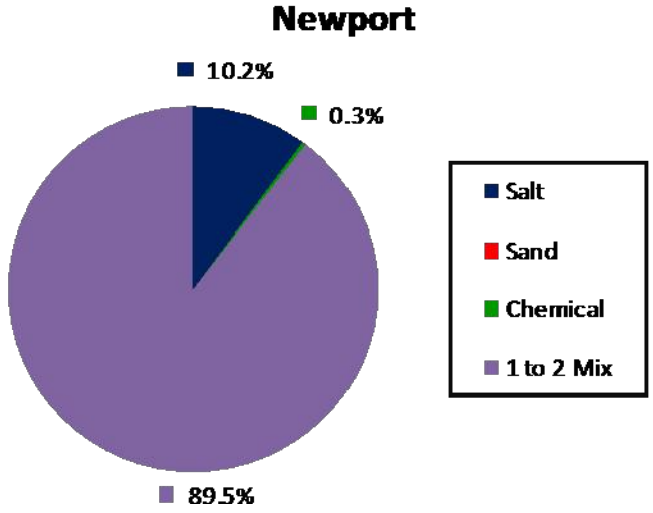


2009/2010 Material Cost Analysis

Percentage of Total Material Cost by Material Type

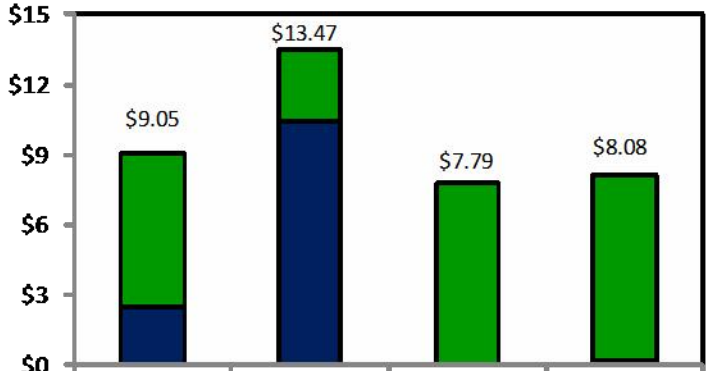






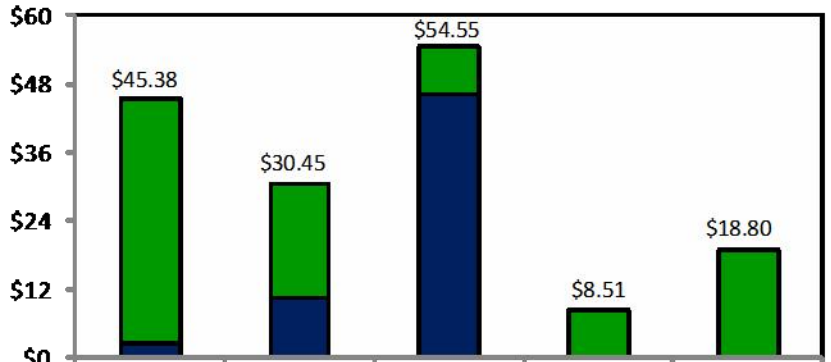
Average Material Cost per Lane Mile
Storms Without Chemical Usage
By Precipitation Category
2009/2010 Winter Season

0-1.9"



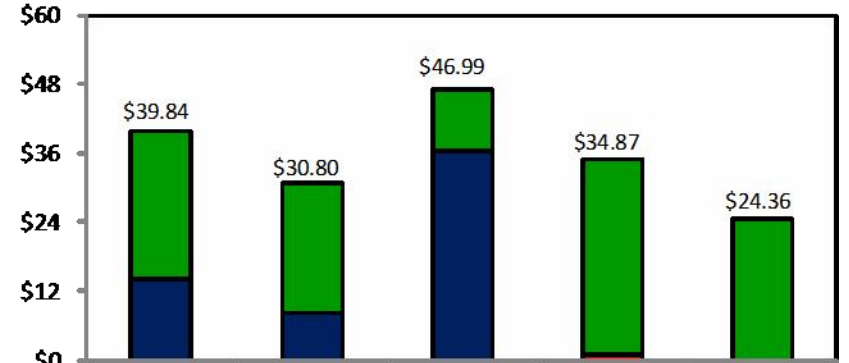
	Freeport	Lewiston	S. Burlington	Holden
Mix	$6.60	$3.07	$7.79	$7.91
Sand	$0.00	$0.00	$0.00	$0.00
Salt	$2.45	$10.40	$0.00	$0.17

2-7.9"



	Newport	Freeport	Lewiston	S. Burlington	Holden
Mix	$42.83	$20.01	$8.46	$8.51	$18.80
Sand	$0.00	$0.00	$0.00	$0.00	$0.00
Salt	$2.55	$10.43	$46.10	$0.00	$0.00

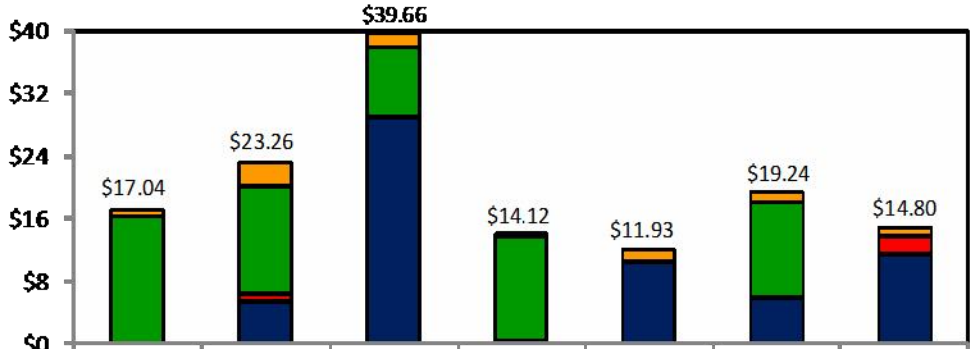
8" +



	Newport	Freeport	Lewiston	S. Burlington	Holden
Mix	$25.84	$22.56	$10.59	$34.14	$24.36
Sand	$0.00	$0.00	$0.00	$0.73	$0.00
Salt	$14.00	$8.24	$36.39	$0.00	$0.00

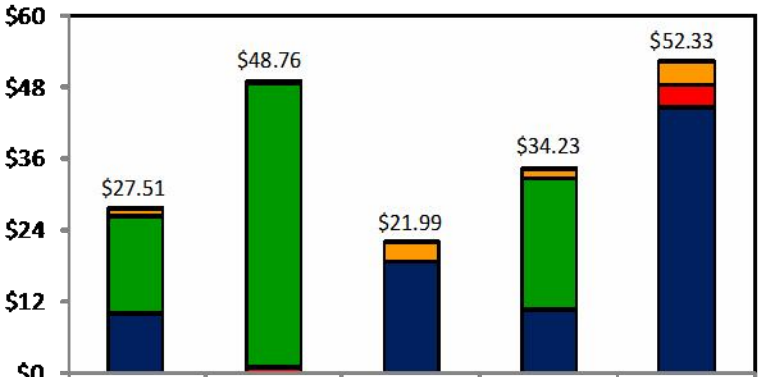
Average Material Cost per Lane Mile
Storms with Chemical Usage by Precipitation Category
2009/2010 Winter Season

0-1.9"



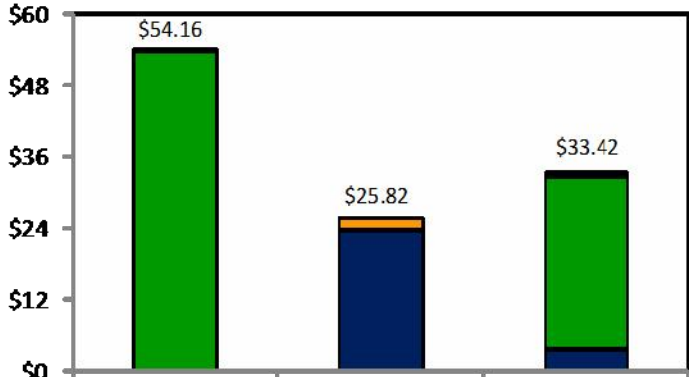
	Newport	Freeport	Lewiston	S. Burlington	Biddeford	Holden	S. Portland
Chemical	$0.73	$3.13	$1.83	$0.21	$1.40	$1.12	$1.05
Mix	$16.31	$13.76	$8.88	$13.61	$0.00	$12.08	$0.00
Sand	$0.00	$1.08	$0.00	$0.29	$0.00	$0.00	$2.18
Salt	$0.00	$5.29	$28.95	$0.00	$10.52	$6.04	$11.57

2-7.9"



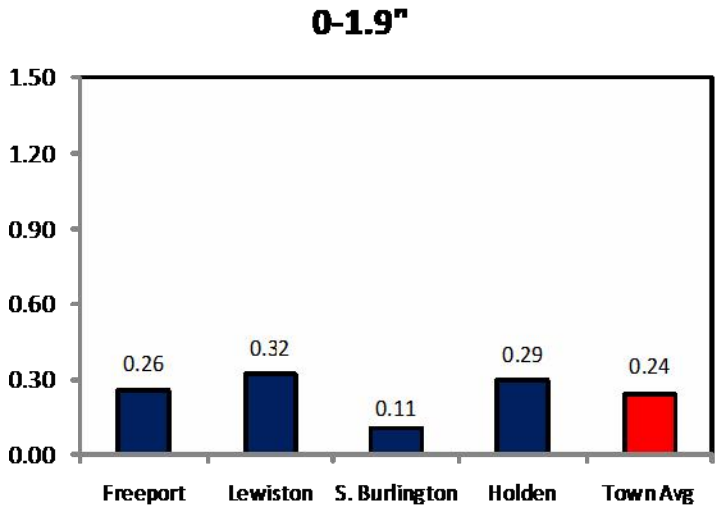
	Freeport	S. Burlington	Biddeford	Holden	S. Portland
Chemical	$1.09	$0.27	$3.25	$1.56	$3.93
Mix	$16.61	$47.57	$0.00	$22.03	$0.00
Sand	$0.00	$0.91	$0.00	$0.00	$3.86
Salt	$9.81	$0.00	$18.73	$10.64	$44.53

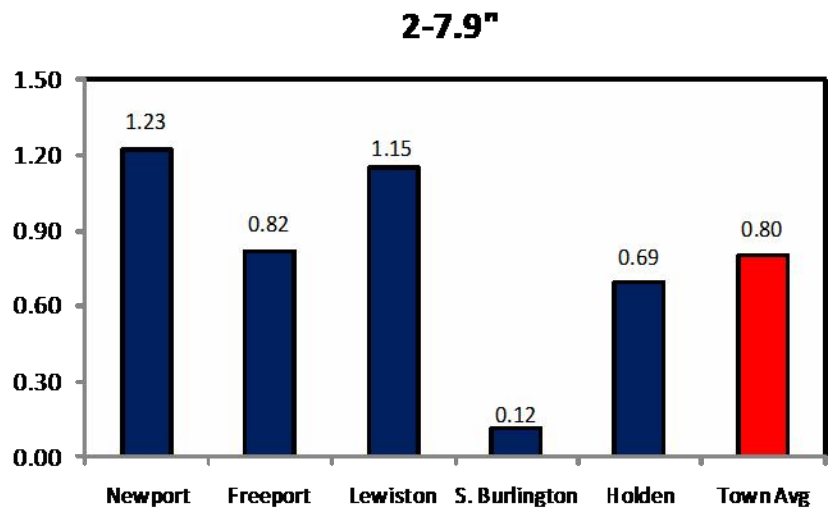
8" +

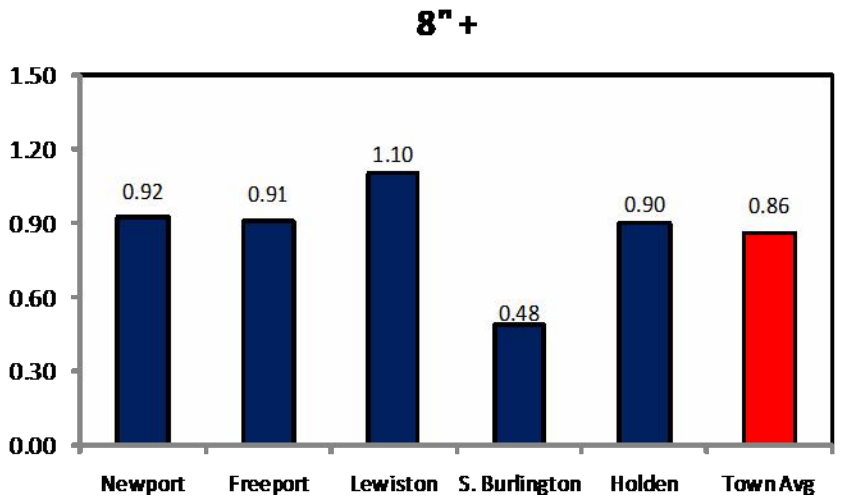


	S. Burlington	Biddeford	Holden
Chemical	$0.32	$2.27	$0.83
Mix	$53.84	$0.00	$28.93
Sand	$0.00	$0.00	$0.00
Salt	$0.00	$23.55	$3.65

Average Material Usage per Lane Mile
Storms Without Chemical Usage
By Precipitation Category
2009/2010 Winter Season

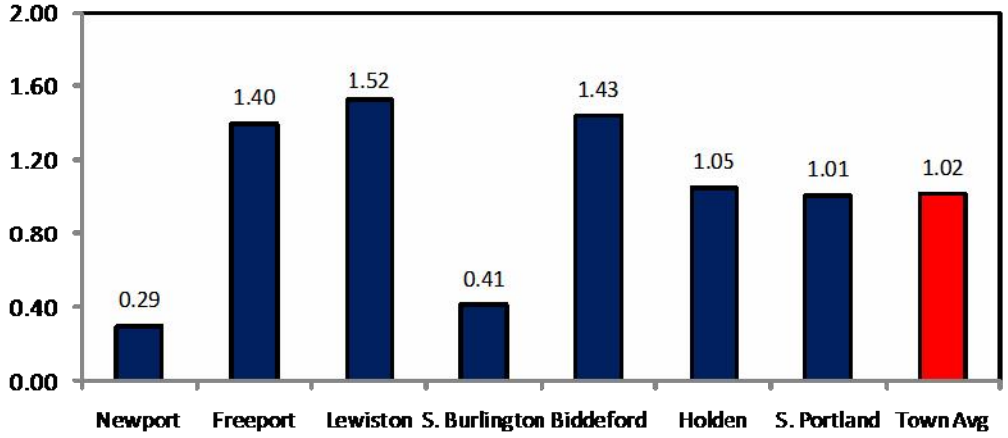






Average Chemical Material Usage per Lane Mile
By Precipitation Category
2009/2010 Winter Season

0-1.9"



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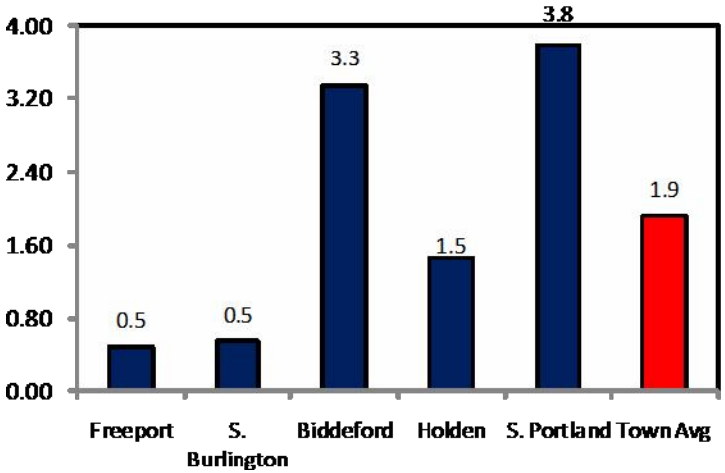

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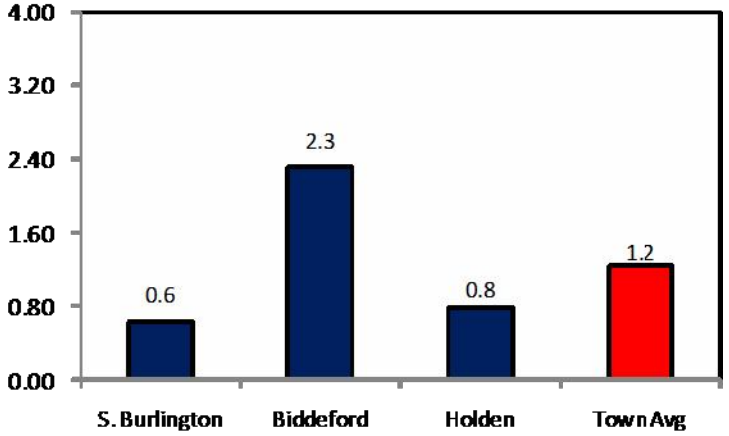


D. CITIZEN PERSPECTIVE

One Important government goal is to deliver municipal services that citizens value. Providing timely, quality services that are cost effective are significant tests of performance. Letting citizens judge these performance factors can be a very valuable change and improvement driver. This study adds the voice of the citizens to the performance data.

In the fall of 2009, most of the towns participating in this study conducted a citizen survey that covered a wide variety of town services and operations. The table below shows the survey results for winter road services. Also provided is the citizens evaluation of overall Public Works and Town Service Performance levels. Appendix B-3 provides original survey data.

Survey Question	Holden	Lewiston	South Portland	Freeport	Newport
1. Value of all town services for tax dollars paid *	69.4%	56.0%	73.4%	70.5%	52.2%
2. Level of satisfaction with Public Works Dept.*	94.8%	87.9%	87.9%	94.4%	79.4%
3. Major roads are passable during or shortly after ice/snow storm**	93.5%	90.1%	93.5%	92.4%	73.3%
4. Residential streets are passable the day after an ice/snow storm.**	91.6%	84.3%	92.7%	92.4%	55.5%

* Represents % of citizens rating service “Satisfied” or “Very Satisfied”.

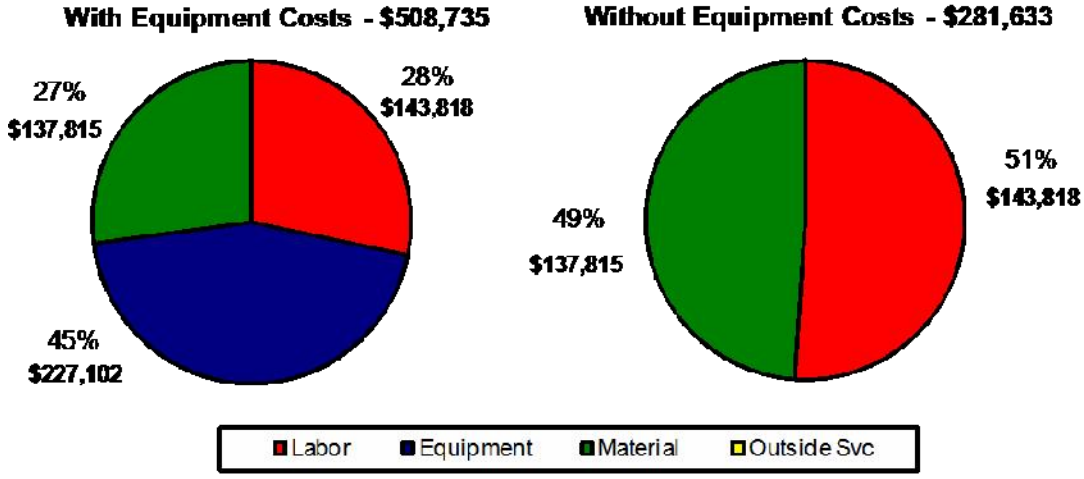
** Represents % of citizens that “Agree” or “Strongly Agree” with statement.

APPENDIX A

Individual Town Analysis

A-1: Holden, MA

Total Storm Cost



SUMMARY DATA

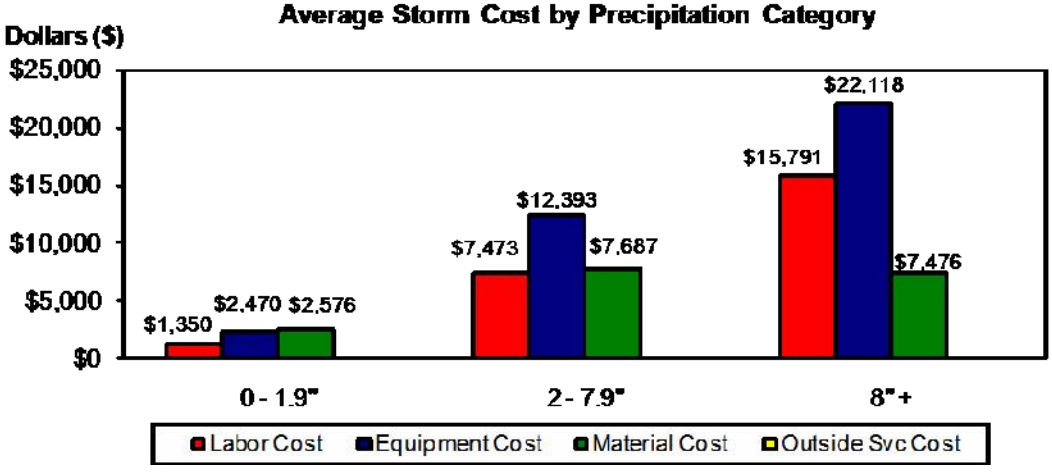
A. Winter Season Profile

	Storm Events		Storm Days	
	#	%	#	%
0 - 1.9"	21	66%	24	57%
2 - 7.9"	7	22%	9	21%
8" +	4	13%	9	21%
Total	32	100%	42	100%

B. Storm Cost

	Total Storm Cost	% of Total Storm Cost	Avg Cost per Storm	Avg Cost of Storm (w/o equip)	Total Avg Cost per Lane Mi*
0 - 1.9"	$134,327	26.4%	$6,397	$3,926	$26.65
2 - 7.9"	$192,869	38%	$27,553	$15,159	$114.80
8" +	$181,540	36%	$45,385	$23,267	$189.10
Total	$508,735	100%	$15,898	$8,801	$66.24

** Total # of Holden lane miles covered 240.*



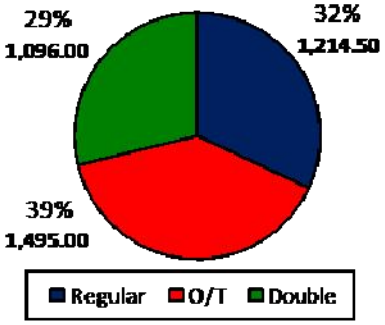
A-1: Holden, MA

C. Labor Resources

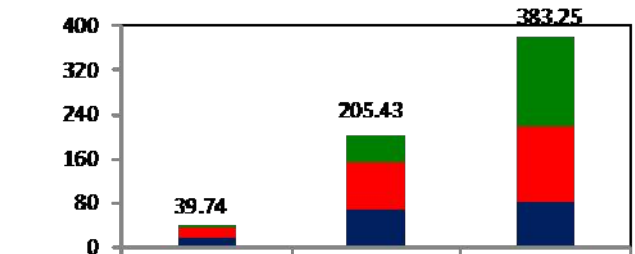
Labor Cost

Highest O/T Lbr Hrly Rate (w/benefits)	$41.57
Lowest O/T Lbr Hrly Rate (w/benefits)	$16.59
Average Town Labor Rate - All Storms	$37.79
Total Labor Hours Used - All Storms	3,805.50

Total Labor Hour Usage



Total Labor Hours per Storm Event (by Precipitation Category)



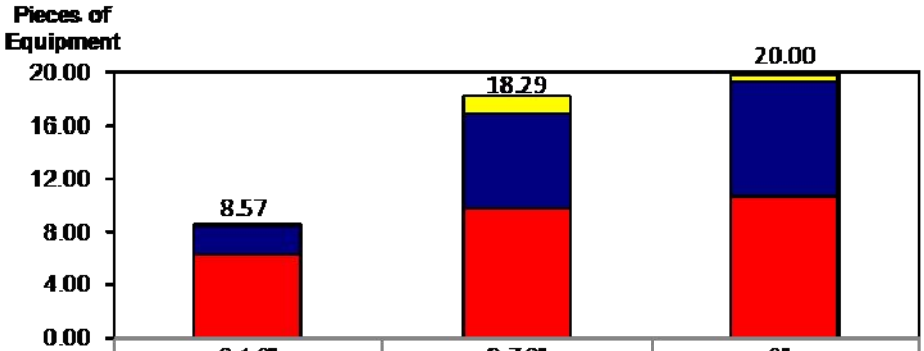
	0-1.9"	2-7.9"	8"+
Double	3.19	52.43	165.50
O/T	17.17	83.14	138.13
Regular	19.38	69.86	79.63

D. Equipment Profile

Equipment Description	FEMA Code	$ per Hour	# of Units
10 Cy. Dump Truck	8721	$60.00	6
18 Cy. Dump Truck	8723	$80.00	2
1 Ton Pick-Up Truck	8802	$25.00	6
1 1/2 Ton Pick-Up Truck	8804	$30.00	10
1 3/4 Ton Pick-Up Truck	8805	$35.00	1
Truck Mntd. Plow	8452	$10.75	19

Equipment Description	FEMA Code	$ per Hour	# of Units
Truck Mntd. Leveling Wing	8453	$18.50	10
Sand/Dump Body Spreader	8456	$5.50	4
Sand/Truck Spreader	8457	$7.50	7
Wheel Loader	8393	$47.00	2
Sidewalk Blower	8550	$42.00	2
1.5 cy. Backhoe	8572	$39.00	2

E. Equipment Usage by Precipitation Category



	0-1.9"	2-7.9"	8"+
Other	0.10	1.43	0.75
Spreaders	0.00	0.00	0.00
Plows	2.14	7.14	8.50
Combo	6.33	9.71	10.75

A-1: Holden, MA

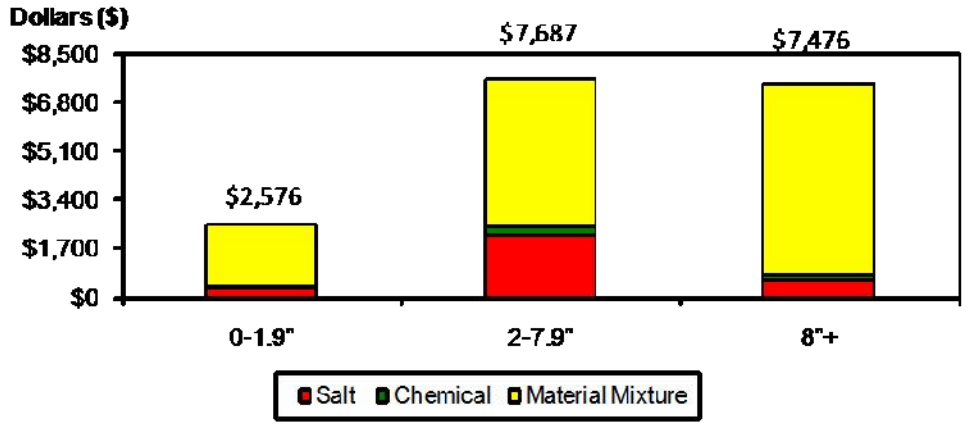
F. Outside Services

Total Cost for all year	$0
Average Cost per Storm Used	$0
Average Outside Equipment Hourly Cost	$0.00

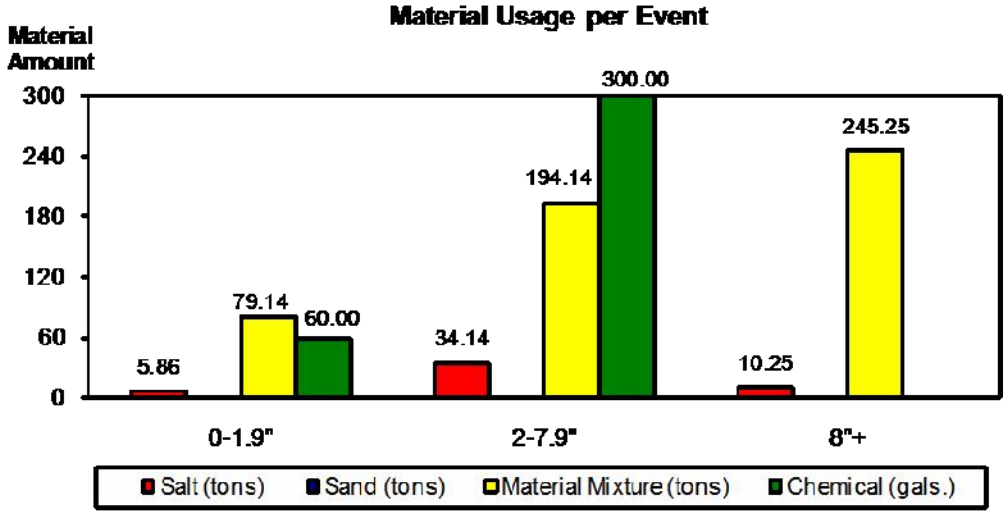
G. Material Cost Totals

Salt	$25,840	Material Mixtures:	
Sand	$0	- 1 to 1 Ratio	$97,678
Chemical:		- 1 to 4	$10,102
- Magnesium Chloride	$3,595		
Total	$137,216		

H. Average Material Cost by Precipitation



I. Average Material Usage per Event (by Precipitation)

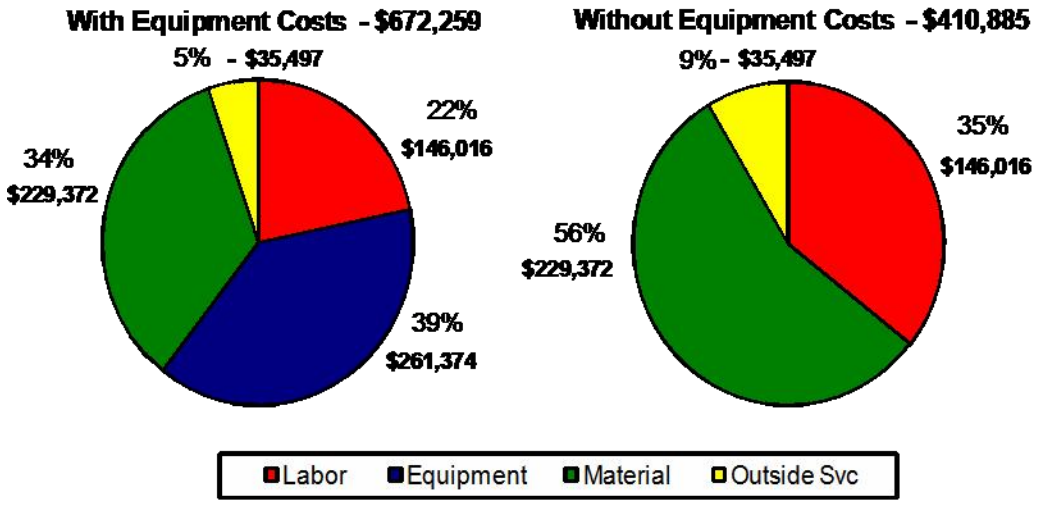


J. Citizen's Survey

	Value of all town services for tax dollars paid	Level of Satisfaction with Public Works Department	Major roads are passable during or shortly after ice/snow storm	Residential Streets are passable the day after a ice/snow storm
Satisfaction Rate	69.4%	94.8%	93.5%	91.6%

A-2: Lewiston, ME

Total Storm Cost



SUMMARY DATA

A. Winter Season Profile

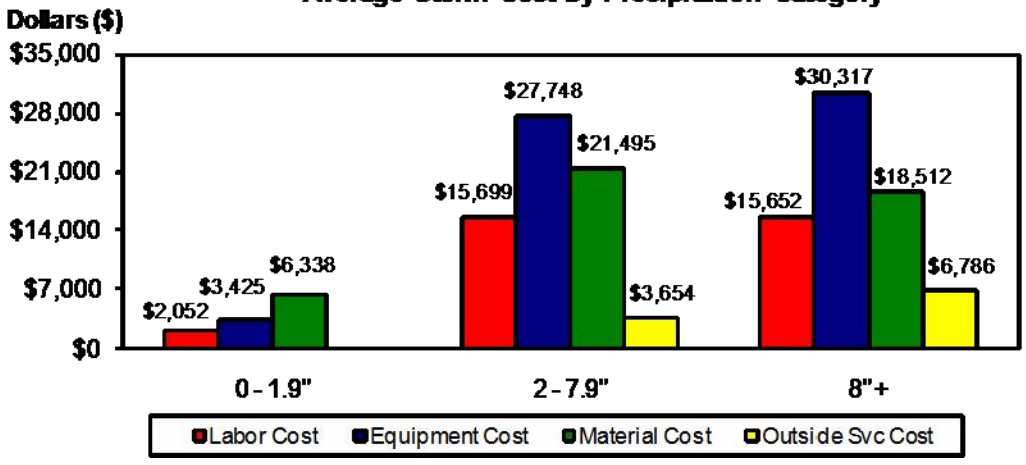
	Storm Events		Storm Days	
	#	%	#	%
0 - 1.9"	10	56%	12	44%
2 - 7.9"	6	33%	13	48%
8"+	2	11%	2	7%
Total	18	100%	27	100%

B. Storm Cost

	Total Storm Cost	% of Total Storm Cost	Avg Cost per Storm	Avg Cost of Storm (w/o equip)	Total Avg Cost per Lane Mi*
0 - 1.9"	$118,153	17.6%	$11,815	$8,390	$29.99
2 - 7.9"	$411,573	61%	$68,596	$40,848	$174.10
8"+	$142,533	21%	$71,267	$40,950	$180.88
Total	$672,259	100%	$37,348	$22,827	$94.79

** Total # of Lewiston lane miles covered 394.*

Average Storm Cost by Precipitation Category



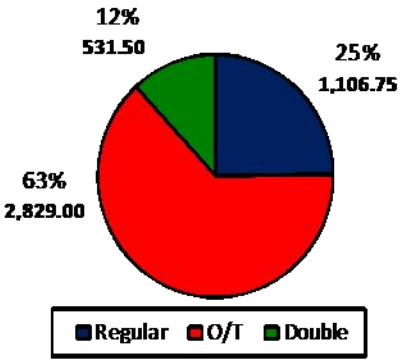
A-2: Lewiston, ME

C. Labor Resources

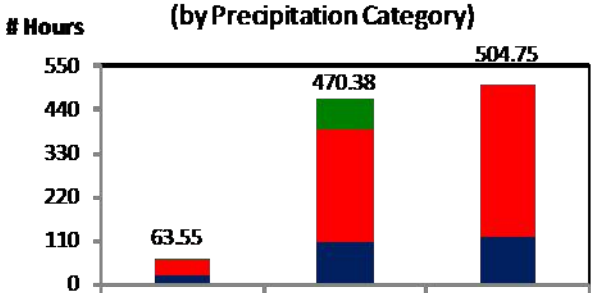
Labor Cost

Highest O/T Lbr Hrly Rate (w/ benefits)	$39.97
Lowest O/T Lbr Hrly Rate (w/ benefits)	$26.24
Average Town Labor Rate - All Storms	$32.69
Total Labor Hours Used - All Storms	4,467.25

Total Labor Hour Usage



Total Labor Hours per Storm Event (by Precipitation Category)



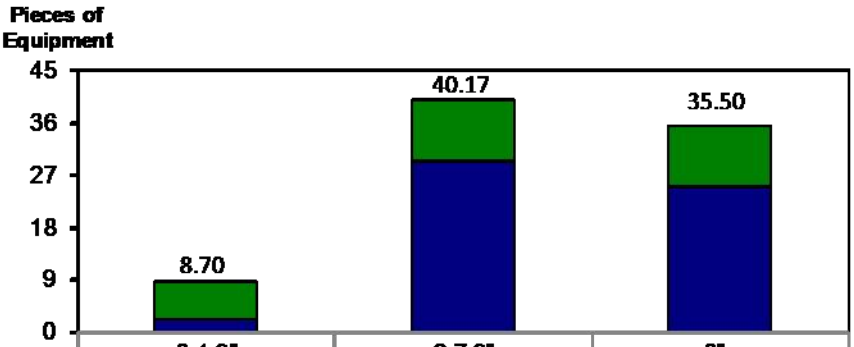
	0-1.9"	2-7.9"	8"+
Double	4.93	80.38	0.00
O/T	35.98	283.46	384.25
Regular	22.65	106.54	120.50

D. Equipment Profile

Equipment Description	FEMA Code	$ per Hour	# of Units
8 Cy. Dump Truck	8720	$43.00	17
12 Cy. Dump Truck	8805	$75.00	4
1/2 Ton Pick-Up Truck	8801	$19.00	4
1 Ton Pick-up Truck	8802	$25.00	2
1 1/2 Ton Pick-Up Truck	8804	$30.00	2
Truck Mounted Plow	8452	$10.75	8

Equipment Description	FEMA Code	$ per Hour	# of Units
Truck Mntd Leveling Wing	8453	$18.50	19
Wing for Grader	8451	$24.00	3
Truck Mntd L Wing - rental	8453	$18.50	4
Sand/Dump Body Sprdr	8456	$5.50	4
Sand/Truck Spreader	8457	$7.50	5

E. Equipment Usage by Precipitation Category



	0-1.9"	2-7.9"	8"+
Other	0.00	0.00	0.00
Spreaders	6.50	10.50	10.50
Plows	2.20	29.67	25.00
Combo	0.00	0.00	0.00

A-2: Lewiston, ME

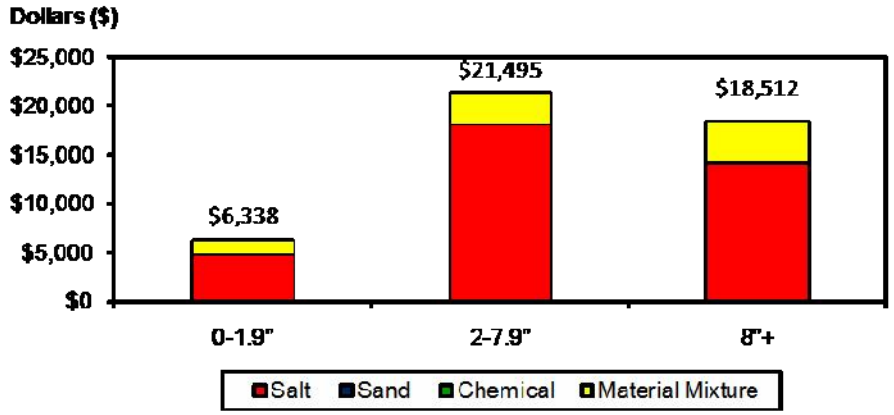
F. Outside Services

Total Cost for all year	$35,497
Average Cost per Storm Used	$4,437
Average Outside Equipment Hourly Cost	$0.00

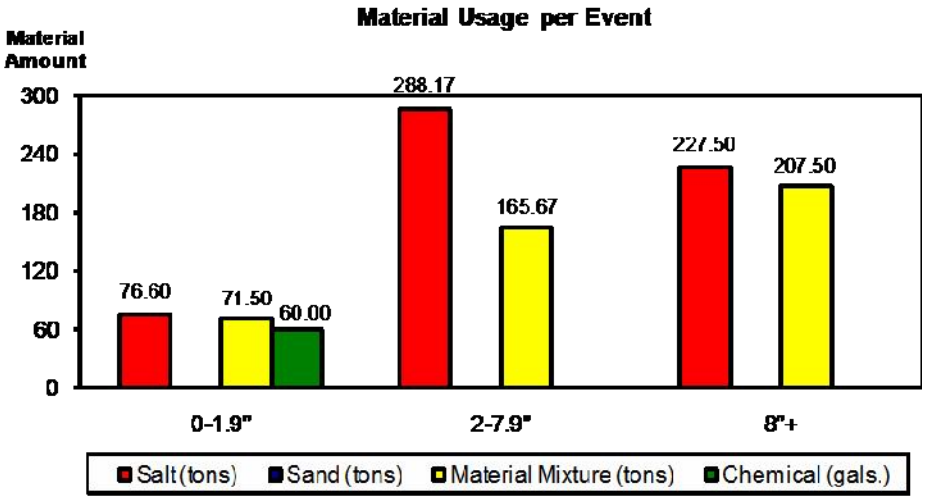
G. Material Cost Totals

Salt	$185,939
Sand	$0
Chemical:	
Calcium Chloride	$720
Material Mix	$42,714
Total	$229,372

H. Average Material Cost by Precipitation



I. Average Material Usage per Event (by Precipitation)

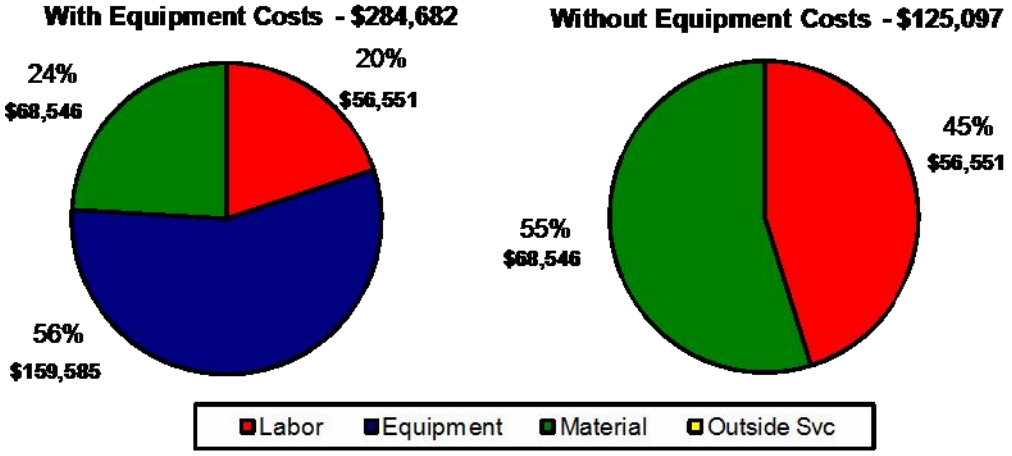


J. Citizen's Survey

	Value of all town services for tax dollars paid	Level of Satisfaction with Public Works Department	Major roads are passable during or shortly after ice/snow storm	Residential Streets are passable the day after a ice/snow storm
Satisfaction Rate	56.0%	87.9%	90.1%	84.3%

A-3: South Burlington, VT

Total Storm Cost



SUMMARY DATA

A. Winter Season Profile

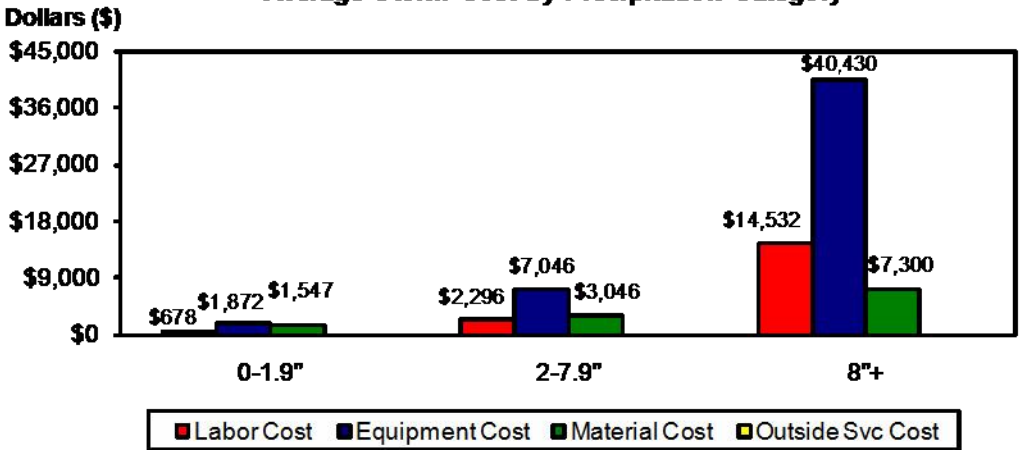
	Storm Events		Storm Days	
	#	%	#	%
0 - 1.9"	27	82%	27	75%
2 - 7.9"	4	12%	4	11%
8" +	2	6%	5	14%
Total	33	100%	36	100%

B. Storm Cost

	Total Storm Cost	% of Total Storm Cost	Avg Cost per Storm	Avg Cost of Storm (w/o equip)	Total Avg Cost per Lane Mi*
0 - 1.9"	$110,608	38.9%	$4,097	$2,225	$24.98
2 - 7.9"	$49,548	17%	$12,387	$5,341	$75.53
8" +	$124,525	44%	$62,262	$21,832	$379.65
Total	$284,682	100%	$8,627	$3,791	$52.60

** Total # of South Burlington lane miles covered 164.*

Average Storm Cost by Precipitation Category



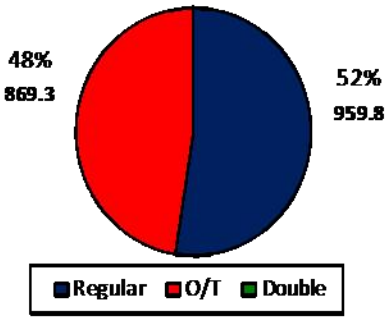
A-3: South Burlington, VT

C. Labor Resources

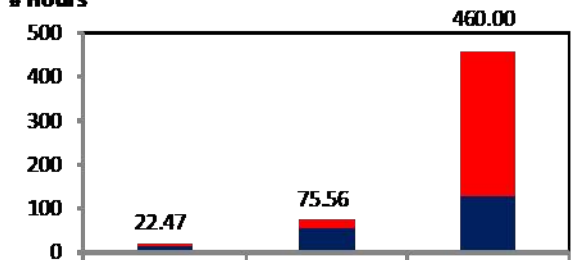
Labor Cost

Highest O/T Lbr Hrly Rate (w/ benefits)	$42.75
Lowest O/T Lbr Hrly Rate (w/ benefits)	$23.30
Average Town Labor Rate - All Storms	$30.92
Total Labor Hours Used - All Storms	1,829.00

Total Labor Hour Usage



Total Labor Hours per Storm Event (by Precipitation Category)



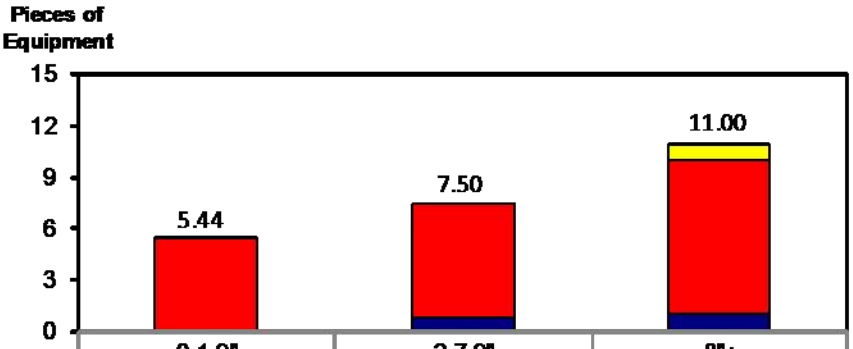
	0-1.9"	2-7.9"	8"+
Double	0.00	0.00	0.00
O/T	5.08	18.88	328.25
Regular	17.39	56.69	131.75

D. Equipment Profile

Equipment Description	FEMA Code	$ per Hour	# of Units
8 Cy. Dump Truck	8720	$43.00	7
12 Cy. Dump Truck	8805	$75.00	1
1/2 Ton Pick-Up Truck	8801	$19.00	1
1 Ton Pick-up Truck	8802	$25.00	1
1 1/2 Ton Pick-Up Truck	8804	$30.00	1
Truck Mounted Plow	8452	$10.75	11
Truck Mntd Leveling Wing	8453	$18.50	9

Equipment Description	FEMA Code	$ per Hour	# of Units
Sand/Truck Spreader	8457	$7.50	9
Chemical/Truck Spreader	8458	$4.46	7
Wheel Loader	8393	$47.00	1
Snow Blower 2500 tph	8561	$180.00	1
Grader	8332	$80.00	1
Wheel Loader Backhoe	8573	$44.00	1
Sidewalk Tractor	8454	$6.00	3

E. Equipment Usage



	0-1.9"	2-7.9"	8"+
Other	0.00	0.00	1.00
Combo	5.41	6.75	9.00
Spreaders	0.00	0.00	0.00
Plows	0.04	0.75	1.00

A-3: South Burlington, VT

F. Outside Services

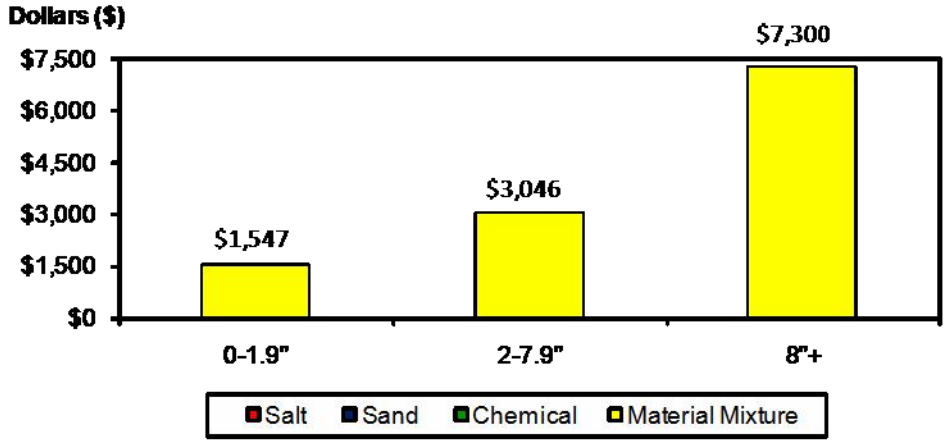
Total Cost for all year	$0
Average Cost per Storm Used	$0
Average Outside Equipment Hourly Cost	$0.00

G. Total Material Cost for 2009/2010

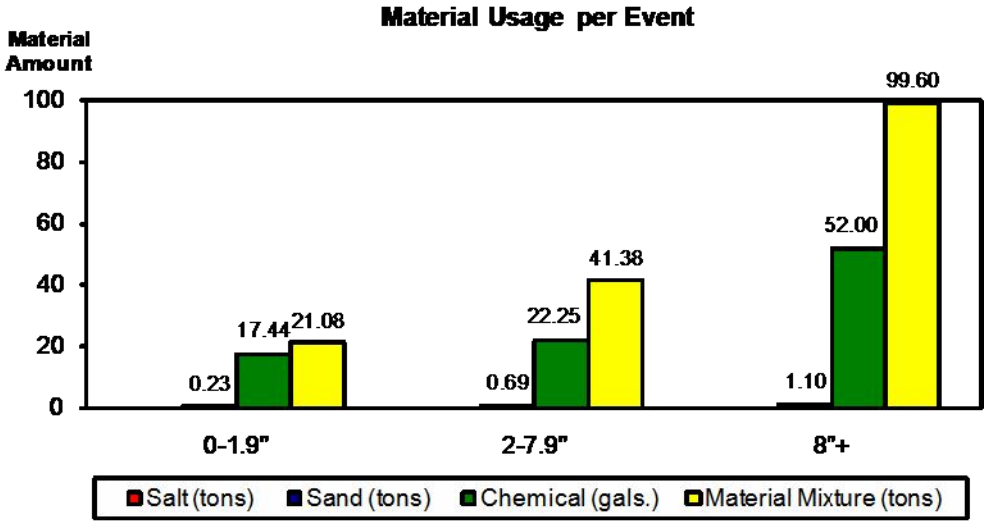
Salt	$0	Material Mixures:	
Sand	$608	- Special Salt/Sand Mix	$109
Chemical:		- Treatment	$67,490
- 70/30 Mix	$339		

Total Material Cost **$68,546**

H. Average Material Cost by Precipitation



I. Average Material Usage per Event (by Precipitation)

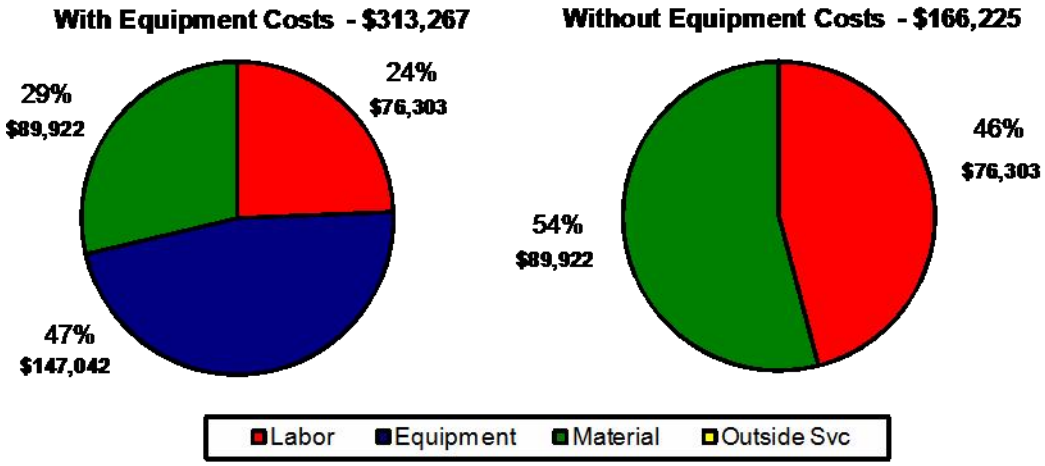


J. Citizen's Survey

No Citizen Survey data was collected for South Burlington on Snow and Ice Operations.

A-4: Biddeford, ME

Total Storm Cost



SUMMARY DATA

A. Winter Season Profile

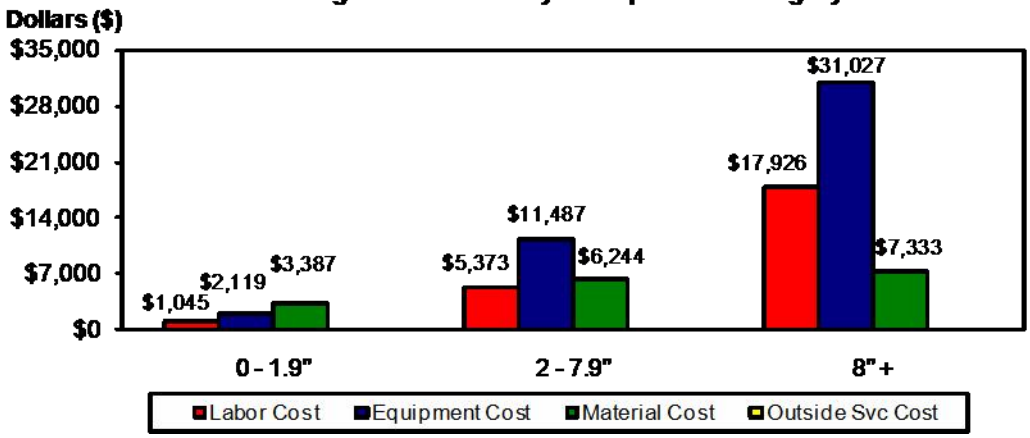
	Storm Events		Storm Days	
	#	%	#	%
0 - 1.9"	13	65%	17	57%
2 - 7.9"	5	25%	9	30%
8" +	2	10%	4	13%
Total	20	100%	30	100%

B. Storm Cost

	Total Storm Cost	% of Total Storm Cost	Avg Cost per Storm	Avg Cost of Storm (w/o equip)	Total Avg Cost per Lane Mi*
0 - 1.9"	$85,173	27.2%	$6,552	$4,432	$23.07
2 - 7.9"	$115,523	37%	$23,105	$11,617	$81.35
8" +	$112,571	36%	$56,285	$25,259	$198.19
Total	$313,267	100%	$15,663	$8,311	$55.15

** Total # of Biddeford lane miles covered 284 .*

Average Storm Cost by Precipitation Category



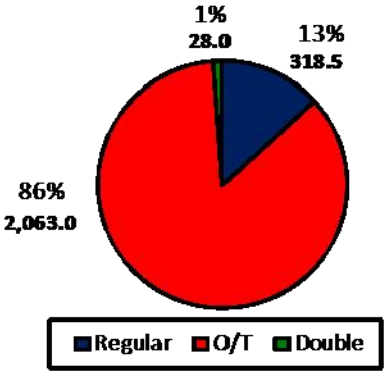
A-4: Biddeford, ME

C. Labor Resources

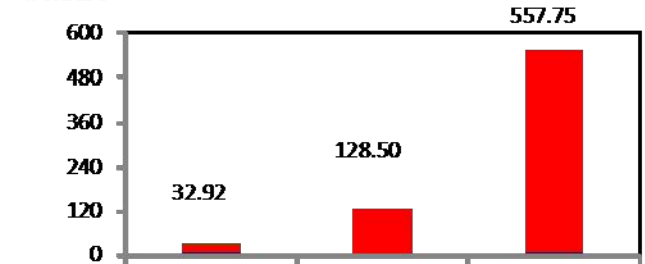
Labor Cost

Highest O/T Lbr Hrly Rate (w/ benefits)	$39.93
Lowest O/T Lbr Hrly Rate (w/ benefits)	$23.06
Average Town Labor Rate - All Storms	$31.66
Total Labor Hours Used - All Storms	2,410.00

Total Labor Hour Usage



Total Labor Hours per Storm Event (by Precipitation Category)



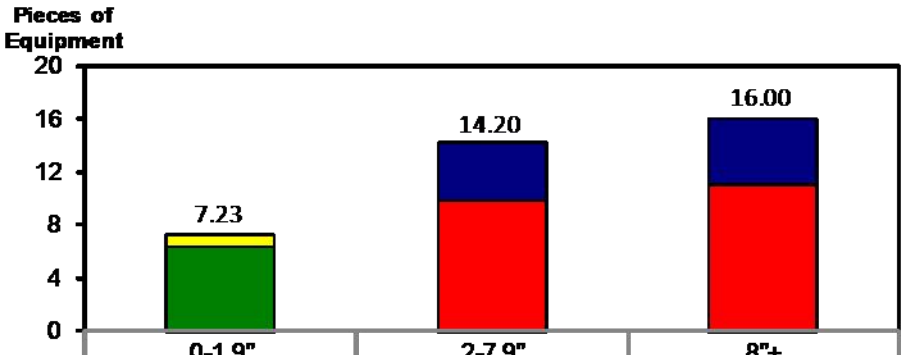
	0-1.9"	2-7.9"	8"+
Double	2.15	0.00	0.00
O/T	25.81	125.50	550.25
Regular	4.96	3.00	7.50

D. Equipment Profile

Equipment Description	FEMA Code	$ per Hour	# of Units
8 Cy. Dump Truck	8720	$43.00	9
12 Cy. Dump Truck	8722	$75.00	3
Truck Mounted Plow	8452	$10.75	1
Truck Mntd Leveling Wing	8453	$18.50	14
Wing for Grader	8451	$24.00	2

Equipment Description	FEMA Code	$ per Hour	# of Units
Sand/Dump Spreader	8456	$5.50	8
Sand/Truck Spreader	8457	$7.50	3
Chemical/Truck Spreader	8458	$4.46	10
Wheel Loader	8393	$47.00	3
Grader	8332	$80.00	2

E. Equipment Usage by Precipitation Category



	0-1.9"	2-7.9"	8"+
Other	0.92	0.00	0.00
Spreaders	6.31	0.00	0.00
Plows	0.00	4.40	5.00
Combo	0.00	9.80	11.00

A-4: Biddeford, ME

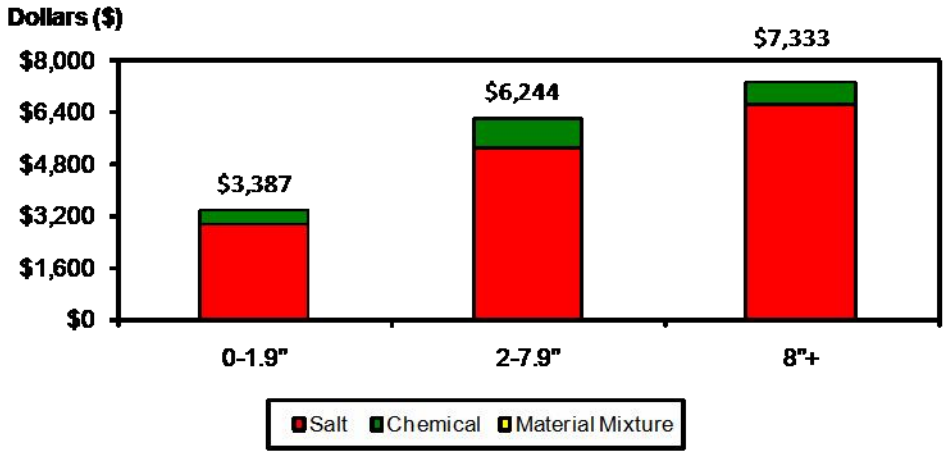
F. Outside Services

Total Cost for all year	$0
Average Cost per Storm Used	$0
Average Outside Equipment Hourly Cost	$0.00

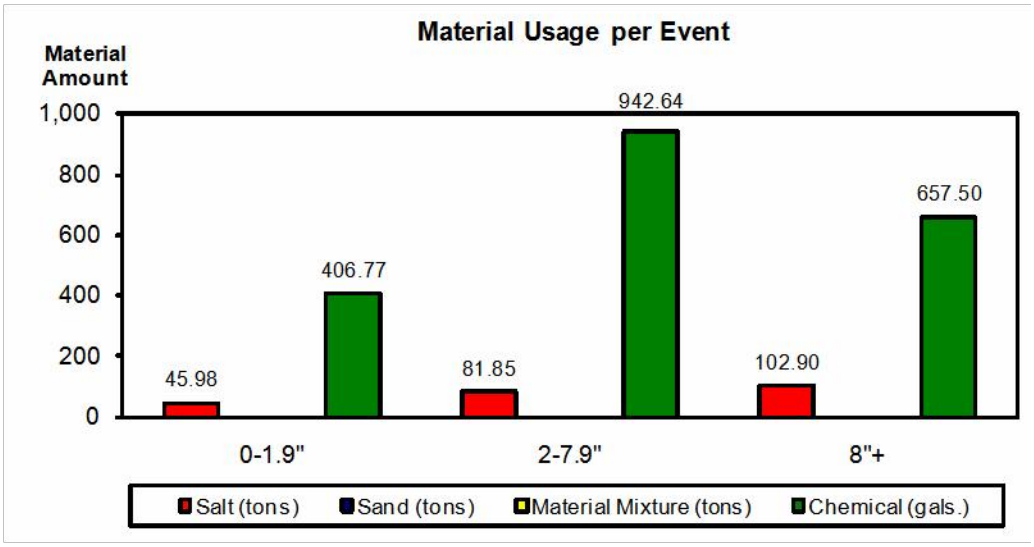
G. Material Cost Totals

Salt	$78,832
Sand	$0
Chemical:	
Magnesium Chloride	$11,090
Material Mix	$0
Total	$89,922

H. Average Material Cost by Precipitation



I. Average Material Usage per Event (by Precipitation)

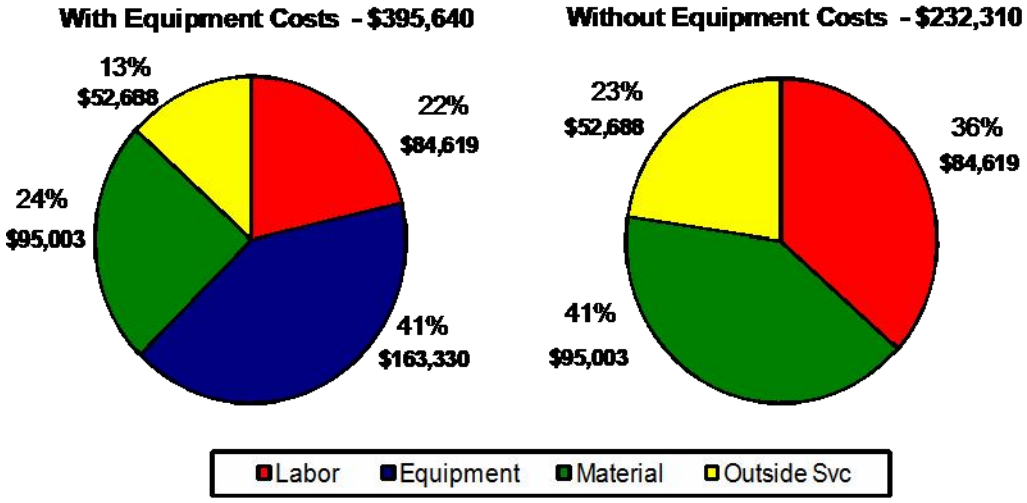


J. Citizen's Survey

No Citizen Survey data was collected for Biddeford on Snow and Ice Operations.

A-5: South Portland, ME

Total Storm Cost



SUMMARY DATA

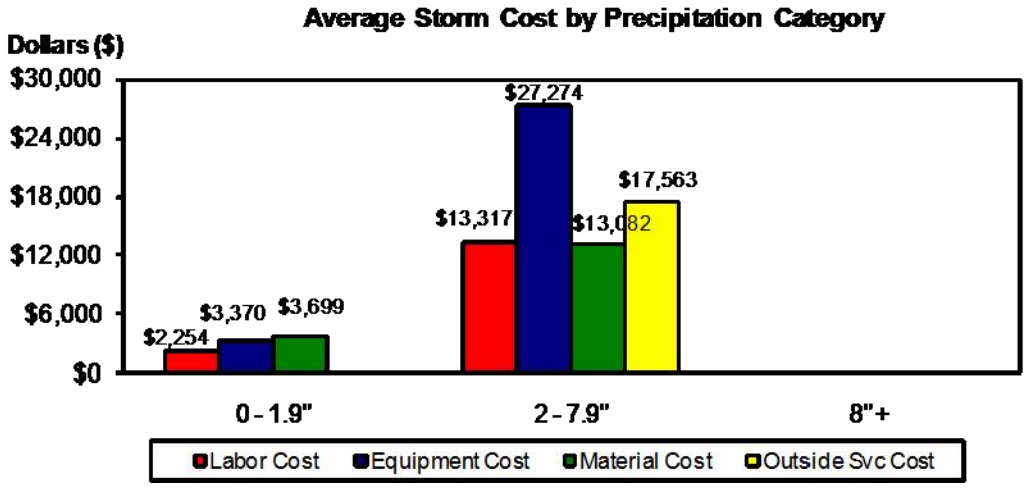
A. Winter Season Profile

	Storm Events		Storm Days	
	#	%	#	%
0 - 1.9"	8	62%	8	50%
2 - 7.9"	5	38%	8	50%
8"+	0	0%	0	0%
Total	13	100%	16	100%

B. Storm Cost

	Total Storm Cost	% of Total Storm Cost	Avg Cost per Storm	Avg Cost of Storm (w/o equip)	Total Avg Cost per Lane Mi*
0 - 1.9"	$74,587	18.9%	$9,323	$5,953	$37.29
2 - 7.9"	$321,054	81%	$64,211	$36,937	$256.84
8"+	$0	0%	$0	$0	$0.00
Total	$395,640	100%	$30,434	$17,870	$121.74

** Total # of S. Portland lane miles covered 250.*



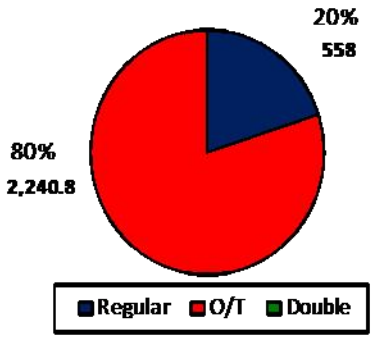
A-5: South Portland, ME

C. Labor Resources

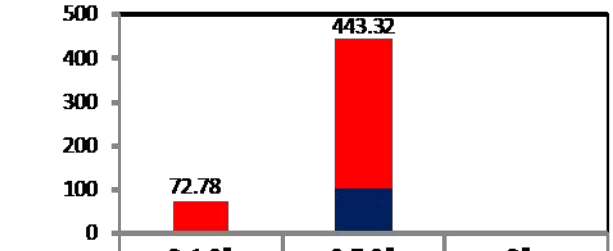
Labor Cost

Highest O/T Lbr Hrly Rate (w/ benefits)	$39.37
Lowest O/T Lbr Hrly Rate (w/ benefits)	$23.35
Average Town Labor Rate - All Storms	$30.23
Total Labor Hours Used - All Storms	2,798.80

Total Labor Hour Usage



Total Labor Hours per Storm Event (by Precipitation Category)



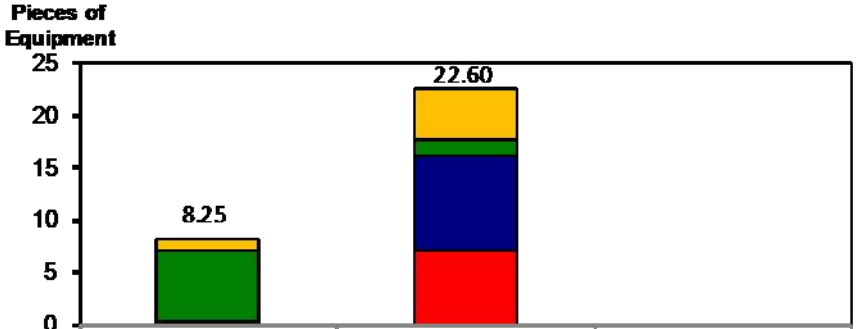
	0-1.9"	2-7.9"	8"+
Double	0.00	0.00	0.00
O/T	65.78	342.92	0.00
Regular	7.00	100.40	0.00

D. Equipment Profile

Equipment Description	FEMA Code	$ per Hour	# of Units
8 Cy. Dump Truck	8720	$43.00	17
10 Cy. Dump Truck	8721	$60.00	1
1/2 Ton Pick-Up Truck	8801	$19.00	1
1 Ton Pick-up Truck	8802	$25.00	2
1 1/2 Ton Pick-Up Truck	8804	$30.00	1
1 3/4 Ton Pick-Up Truck	8805	$35.00	2

Equipment Description	FEMA Code	$ per Hour	# of Units
Truck Mntd Plow	8452	$10.75	22
Truck Mntd Leveling Wing	8453	$18.50	18
Wing for Grader	8451	$24.00	2
Sand/Dump Body Sprdr	8456	$5.50	8
Sand/Truck Spreader	8457	$7.50	9
Wheel Loader	8393	$47.00	4
Grader	8332	$80.00	2

E. Equipment Usage by Precipitation Category



	0-1.9"	2-7.9"	8"+
Other	1.13	4.80	0.00
Spreaders	6.88	1.60	0.00
Plows	0.00	9.00	0.00
Combo	0.25	7.20	0.00

A-5: South Portland, ME

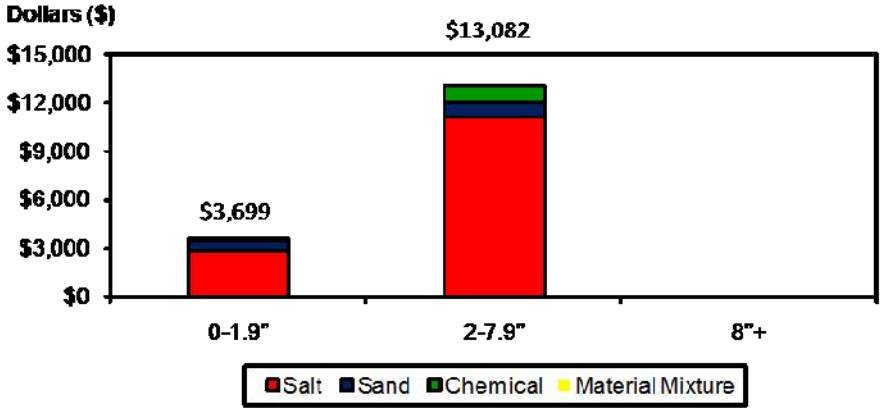
F. Outside Services

Total Cost for all year	$52,688
Average Cost per Storm Used	$17,563
Average Outside Equipment Hourly Cost	$0.00

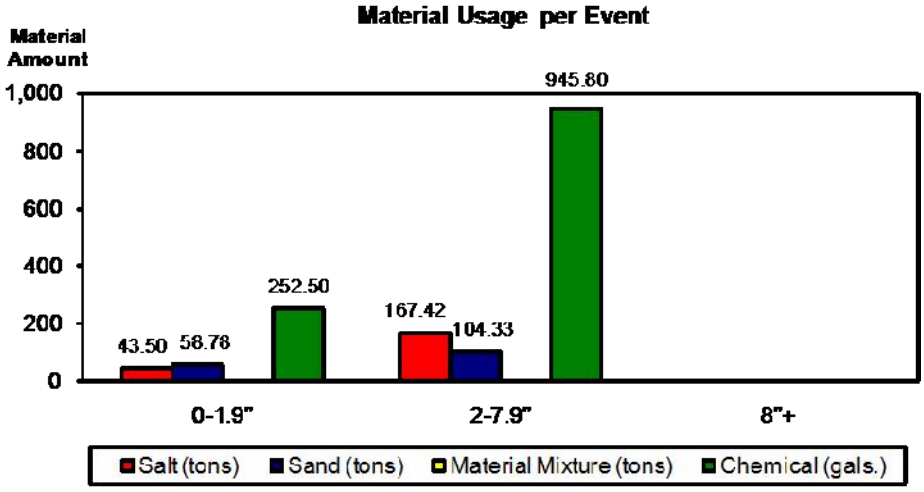
G. Material Cost Totals

Salt	$78,809
Sand	$9,175
Chemical:	
Pre-Treat	$7,019
Material Mix	$0
Total	$95,003

H. Average Material Cost by Precipitation



I. Average Material Usage per Event (by Precipitation)

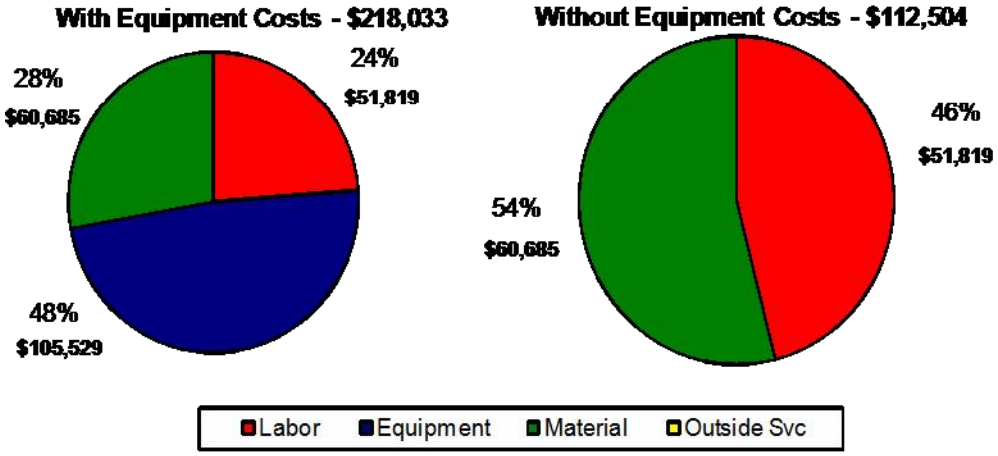


J. Citizen's Survey

	Value of all town services for tax dollars paid	Level of Satisfaction with Public Works Department	Major roads are passable during or shortly after ice/snow storm	Residential Streets are passable the day after a ice/snow storm
Satisfaction Rate	73.4%	87.9%	93.5%	92.7%

A-6: Freeport, ME

Total Storm Cost



SUMMARY DATA

A. Winter Season Profile

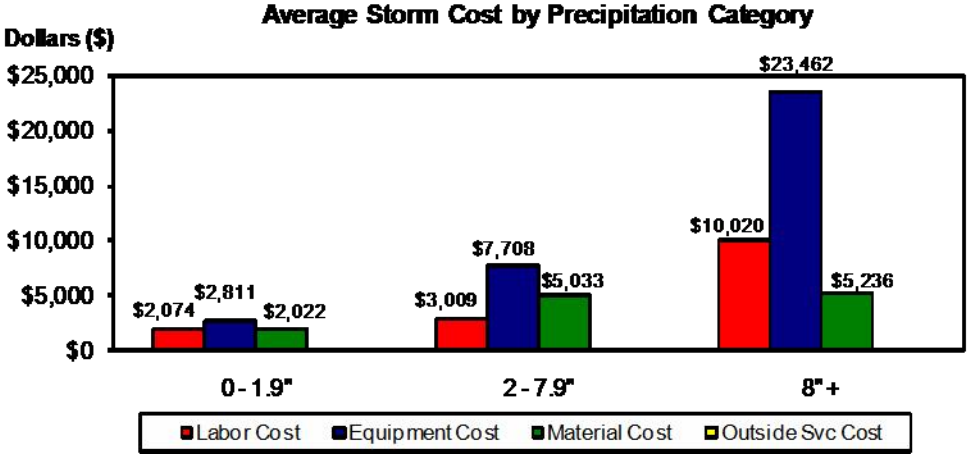
	Storm Events		Storm Days	
	#	%	#	%
0 - 1.9"	10	56%	11	42%
2 - 7.9"	7	39%	13	50%
8" +	1	6%	2	8%
Total	18	100%	26	100%

B. Storm Cost

	Total Storm Cost	% of Total Storm Cost	Avg Cost per Storm	Avg Cost of Storm (w/o equip)	Total Avg Cost per Lane Mi*
0 - 1.9"	$69,066	31.7%	$6,907	$4,096	$40.63
2 - 7.9"	$110,249	51%	$15,750	$8,042	$92.65
8" +	$38,718	18%	$38,718	$15,256	$227.75
Total	$218,033	100%	$12,113	$6,250	$71.25

* *Total # of Freeport lane miles covered* 170.

Average Storm Cost by Precipitation Category



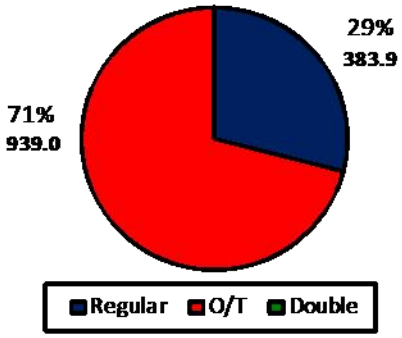
A-6: Freeport, ME

C. Labor Resources

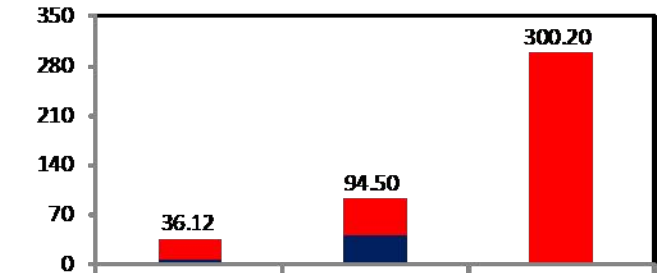
Labor Cost

Highest O/T Lbr Hrly Rate (w/ benefits)	$43.05
Lowest O/T Lbr Hrly Rate (w/ benefits)	$26.13
Average Town Labor Rate - All Storms	$39.17
Total Labor Hours Used - All Storms	1,322.90

Total Labor Hour Usage



Total Labor Hours per Storm Event (by Precipitation Category)



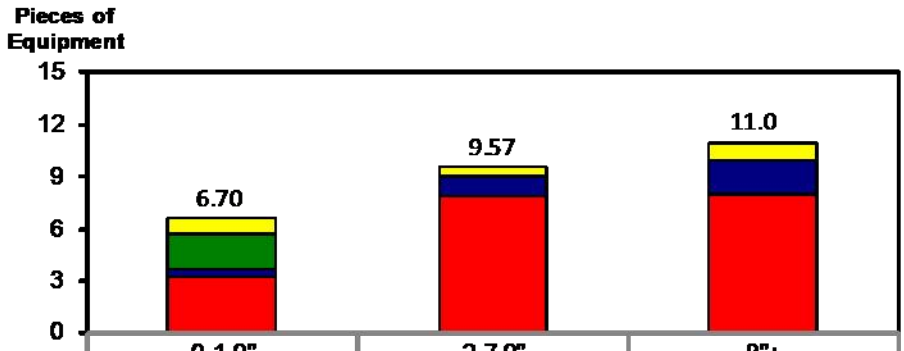
	0-1.9"	2-7.9"	8"+
Double	0.00	0.00	0.00
O/T	27.22	52.37	300.20
Regular	8.90	42.13	0.00

D. Equipment Profile

Equipment Description	FEMA Code	% per Hour	# of Units
8 Cy. Dump Truck	8720	$43.00	5
12 Cy. Dump Truck	8722	$75.00	2
1/2 Ton Pick-Up Truck	8801	$19.00	1
1 Ton Pick-Up Truck	8802	$25.00	2
Truck Mounted Plow	8452	$10.75	10

Equipment Description	FEMA Code	$ per Hour	# of Units
Truck Mntd Leveling Wing	8453	$18.50	7
Sand/Dump Spreader	8456	$5.50	7
Sand/Truck Spreader	8457	$7.50	6
Chemical/Truck Spreader	8458	$4.46	7
Wheel Loader	8393	$47.00	1

E. Equipment Usage by Precipitation Category



	0-1.9"	2-7.9"	8"+
Other	1.00	0.57	1.00
Spreaders	2.00	0.00	0.00
Plows	0.40	1.14	2.00
Combo	3.30	7.86	8.00

A-6: Freeport, ME

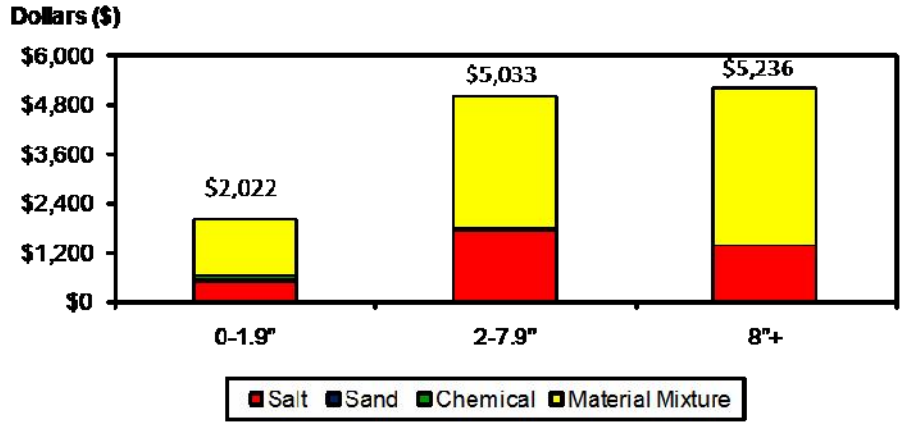
F. Outside Services

Total Cost for all year	$0
Average Cost per Storm Used	$0
Average Outside Equipment Hourly Cost	$0.00

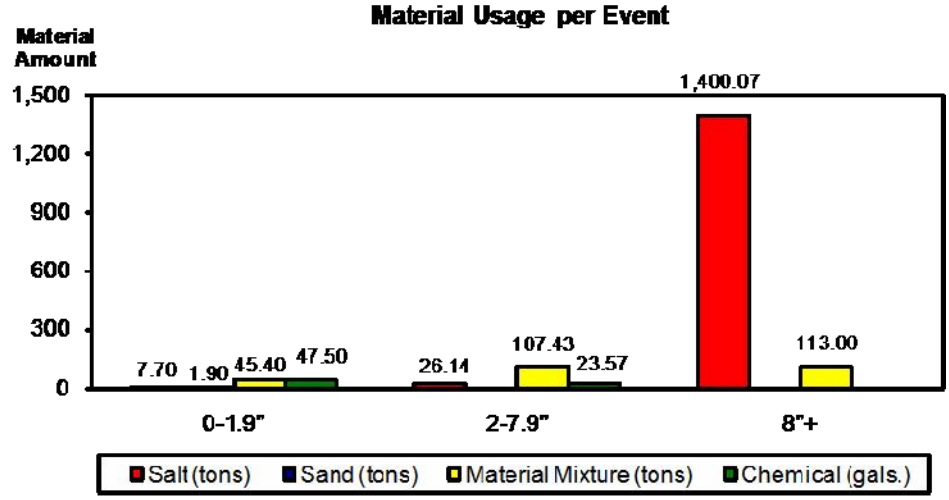
G. Material Cost Totals

Salt	$18,734	Material Mixtures:	
Sand	$366	- 1 to 6 Ratio	$944
Chemical:		- 1 to 6 (extra salt) Ratio	$39,208
- Magnesium Chloride	$1,434		
Total	$60,685		

H. Average Material Cost by Precipitation



I. Average Material Usage per Event (by Precipitation)

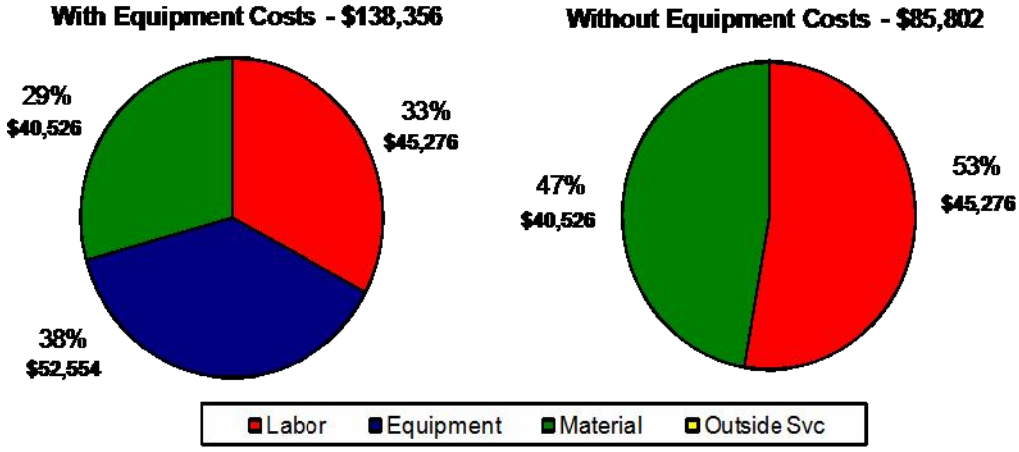


J. Citizen's Survey

	Value of all town services for tax dollars paid	Level of Satisfaction with Public Works Department	Major roads are passable during or shortly after ice/snow storm	Residential Streets are passable the day after a ice/snow storm
Satisfaction Rate	70.5%	94.4%	92.4%	92.4%

A-7: Newport, RI

Total Storm Cost



SUMMARY DATA

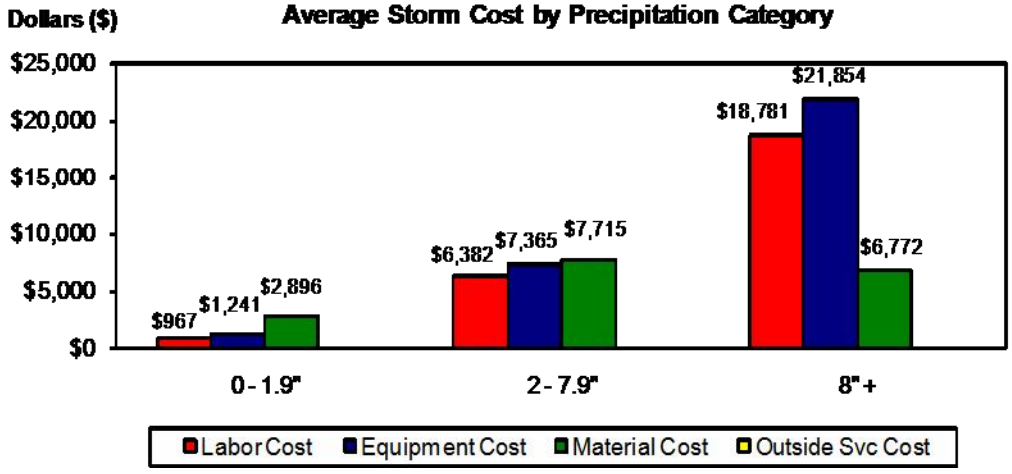
A. Winter Season Profile

	Storm Events		Storm Days	
	#	%	#	%
0 - 1.9"	1	17%	1	10%
2 - 7.9"	4	67%	6	60%
8" +	1	17%	3	30%
Total	6	100%	10	100%

B. Storm Cost

	Total Storm Cost	% of Total Storm Cost	Avg Cost per Storm	Avg Cost of Storm (w/o equip)	Total Avg Cost per Lane Mi*
0 - 1.9"	$5,104	3.7%	$5,104	$3,863	$27.00
2 - 7.9"	$85,845	62%	$21,461	$14,097	$113.55
8" +	$47,407	34%	$47,407	$25,553	$250.83
Total	$138,356	100%	$23,059	$14,300	$122.01

* *Total # of Newport lane miles covered 189*



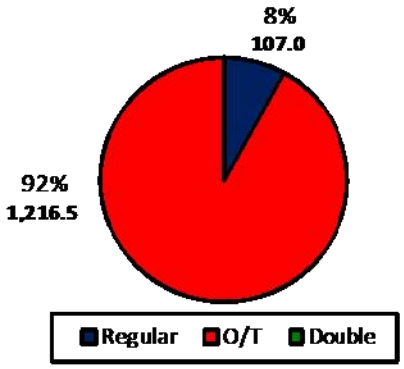
A-7: Newport, RI

C. Labor Resources

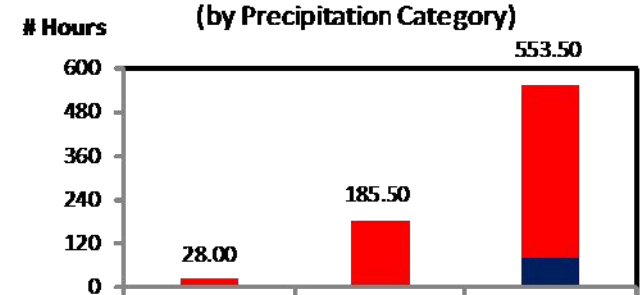
Labor Cost

Highest O/T Lbr Hrly Rate (w/ benefits)	$42.10
Lowest O/T Lbr Hrly Rate (w/ benefits)	$27.13
Average Town Labor Rate - All Storms	$34.21
Total Labor Hours Used - All Storms	1,323.50

Total Labor Hour Usage



Total Labor Hours per Storm Event (by Precipitation Category)



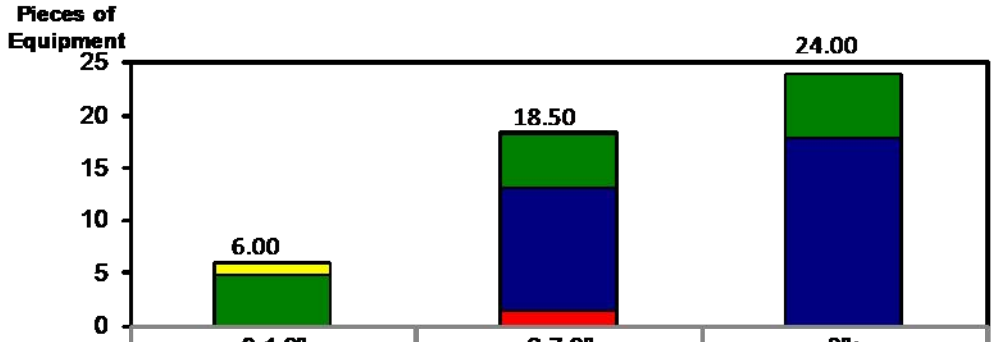
	0-1.9"	2-7.9"	8"+
Double	0.00	0.00	0.00
O/T	28.00	178.75	473.50
Regular	0.00	6.75	80.00

D. Equipment Profile

Equipment Description	FEMA Code	$ per Hour	# of Units
8 Cy. Dump Truck	8720	$43.00	5
F550 Dump Truck	8805	$35.00	1
1/2 Ton Pick-Up Truck	8801	$19.00	1
1 Ton Pick-up Truck	8802	$25.00	12
1 1/2 Ton Pick-Up Truck	8804	$30.00	3

Equipment Description	FEMA Code	$ per Hour	# of Units
Truck Mounted Plow	8452	$10.75	22
Loader	8392	$34.00	1
Back Hoe	8571	$28.00	1
Holder Sidewalk	8560	$160.00	1

E. Equipment Usage by Precipitation Category



	0-1.9"	2-7.9"	8"+
Other	1.00	0.25	0.00
Spreaders	5.00	5.00	6.00
Plows	0.00	11.75	18.00
Combo	0.00	1.50	0.00

A-7: Newport, RI

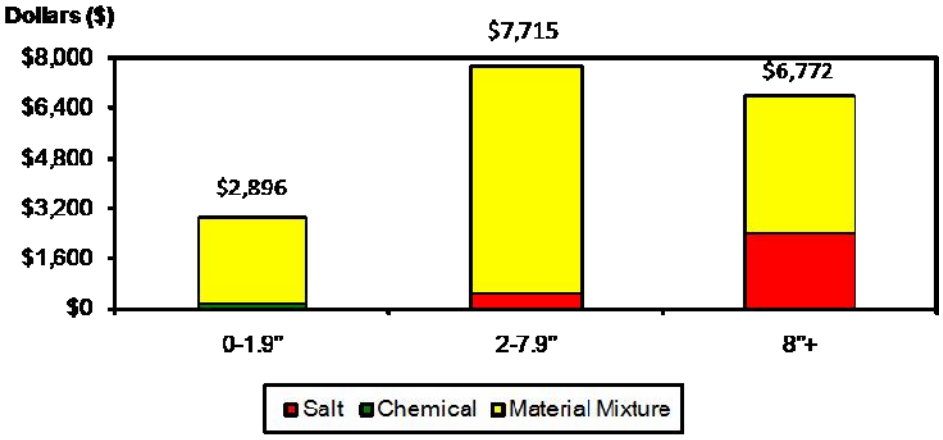
F. Outside Services

Total Cost for all year	$0
Average Cost per Storm Used	$0
Average Outside Equipment Hourly Cost	$0.00

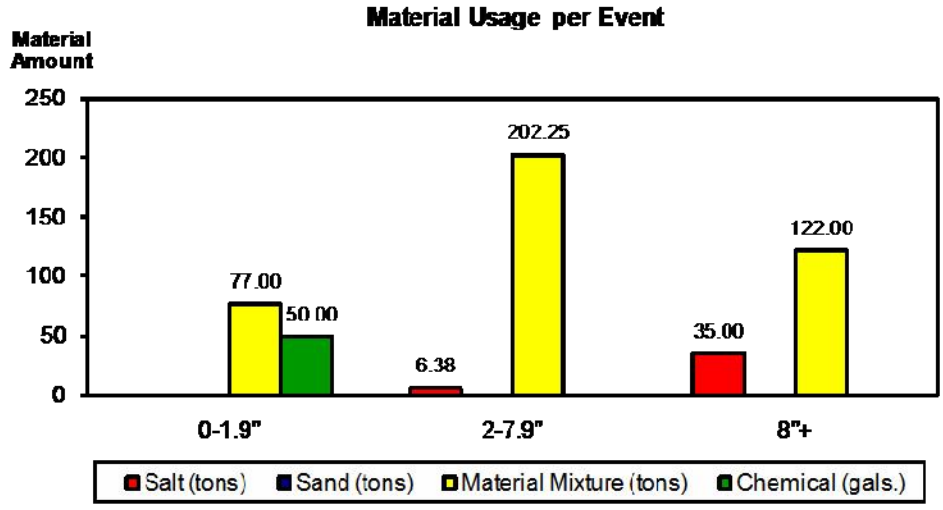
G. Total Material Cost for 2009/2010

Salt	$4,114	Material Mixtures:	
Sand	$0	1 to 2	$36,288
Chemical	$124		
Total Material Cost	$40,526		

H. Average Material Cost by Precipitation



I. Average Material Usage per Event (by Precipitation)



J. Citizen's Survey

	Value of all town services for tax dollars paid	Level of Satisfaction with Public Works Department	Major roads are passable during or shortly after ice/snow storm	Residential Streets are passable the day after a ice/snow storm
Satisfaction Rate	52.2%	79.4%	73.3%	55.5%

APPENDIX B

Benchmark Data Tables

B-1 Staff Profile

B-2 Equipment Profile

B-3 Citizen Survey Data

B-4 Average Material Cost Data

B-5 Average Material Usage Data

B-1: Staff Profile

	Holden MA	Lewiston, ME	S. Burlington VT	Biddeford, ME	S. Portland, ME	Freeport, ME	Newport, RI
STAFF PROFILE							
Highest Reg Hrly Rate	$23.81	$22.39	$26.36	$23.25	$23.40	$24.32	$25.20
HRHR-w/ benefits	$35.72	$36.05	$42.84	$35.74	$35.74	$36.99	$40.00
Lowest Reg Hrly Rate	$9.50	$14.70	$14.17	$13.74	$14.00	$14.76	$16.80
LRHR-w/ benefits	$14.25	$23.67	$23.03	$19.94	$16.38	$22.45	$23.80
Highest O/T Hrly Rate	$35.72	$33.59	$38.85	$34.88	$35.10	$36.48	$39.11
Highest O/T - w/ benefits	$41.57	$39.97	$42.75	$39.93	$39.37	$43.05	$42.10
Lowest O/T Hrly Rate	$14.25	$22.05	$21.26	$20.61	$21.00	$22.14	$25.20
Lowest O/T - w/ benefits	$16.59	$26.24	$23.30	$23.06	$23.35	$26.13	$27.13
Reg Hrly Benefit %	50.00%	61.00%	62.60%	45.1-60.5%	12.9-62.8%	52.10%	48.23%
O/T Hrly Benefit %	16.40%	19.00%	10.05%	11.9-18.2%	11.2-19.2%	18.00%	7.65%
# Hrly Staff- Available for Snow/Ice Oper.	24	37	20	36	23	10	21

B-2: Equipment Profile

			Holden, MA	Lewiston, ME	S Burlington VT	Biddeford, ME	S. Portland, ME	Freeport, ME	Newport, RI
EQUIPMENT PROFILE									
DUMP TRUCKS									
A. 8 cy Dump	8720	$43.00		17	7	9	17	5	5
B. 10 cy Dump	8721	$80.00	8				1		
C. 12 cy Dump	8722	$75.00		4	1	3		2	
D. F550 Dump	8805	$35.00							1
E. 18 cy Dump	8723	$80.00	2						
PICK-UP TRUCKS									
F. 1/2 Ton P/U	8801	$19.00		4	1		1	1	1
G. 1 Ton P/U	8802	$25.00	8	2	1		2	2	12
H. 1 1/2 Ton P/U	8804	$30.00	10	2	1		1		3
I. 1 3/4 Ton P/U	8805	$35.00	1				2		
PLOWS									
K. Truck Mntd Plow	8452	$10.75	19	8	11	1	22	10	22
L. Truck Mntd Leveling Wing	8453	$18.50	10	19	9	14	18	7	
M. Wing for Grader	8451	$24.00		3		2	2		
N. Trk Mntd L Winged - rental	8453	$18.50		4					
SPREADERS									
P. Sand/Dump Body	8456	$5.50	4	4		8	8	7	
Q. Sand/Truck	8457	$7.50	7	5	9	3	9	6	
R. Chemical/Truck	8458	$4.46			7	10		7	
OTHER EQUIPMENT									
U. Wheel Loader	8393	$47.00	2	7	1	3	4	1	
V. Loader	8392	$34.00							1
W. Back Hoe	8571	$28.00							1
X. Snow Blower	8551	$80.00							
Y. Track Loader	8383	$85.00							
Z. Holder Sidewalk	8560	$160.00							1
AA. Snow Blower 2500 tph	8561	$180.00			1				
BB. Grader	8332	$80.00			1	2	2		
CC. Bobcat	8541	$21.00							
DD. Sidewalk Blower	8550	$42.00	2						
EE 1.5 cy Backhoe	8572	$39.00	2						
FF Grader	8331	$55.00		3					
GG Wheel Loader - rental	8393	$47.00		4					
HH Wheel Loader Back Hoe	8573	$44.00			1				
II Sidewalk Tractor	8454	$6.00			3				

B-3: Citizen Survey

	Holden MA	Lewiston, ME	S. Burlington VT	Biddeford, ME	S. Portland, ME	Freeport, ME	Newport, RI	Town Average
CITIZEN SURVEY								
Value of all town services for your tax								
% satisfied or very satisfied	69.40%	56.00%	N/A	N/A	73.40%	70.50%	52.20%	64.30%
Your level of satisfaction with the public works dept:								
% satisfied or very satisfied	38.50%	43.60%	N/A	N/A	49.20%	44.20%	43.90%	43.88%
% dissatisfied	2.10%	6.00%	N/A	N/A	6.80%	2.60%	11.40%	5.78%
Did not use	52.70%	38.70%	N/A	N/A	39.90%	48.10%	34.70%	42.82%
Major roads/arteries are passable during or shortly after snow/ice storm?								
% strongly agree	31.60%	17.00%	N/A	N/A	30.30%	30.40%	8.80%	23.62%
% agreee	61.90%	73.10%	N/A	N/A	63.20%	62.00%	64.50%	64.94%
% disagree	3.90%	9.10%	N/A	N/A	5.40%	7.60%	24.90%	10.18%
Residential streets are passable the day after a snow/ice storm?								
% strongly agree	27.70%	16.30%	N/A	N/A	31.60%	36.70%	4.90%	23.44%
% agreee	63.90%	68.00%	N/A	N/A	61.10%	55.70%	50.60%	59.86%
% disagree	5.80%	14.60%	N/A	N/A	5.90%	3.80%	43.00%	14.62%

B-4: Average Material Cost Data by Precipitation Category

HOLDEN

Avg. Material Cost
Storms with No Chemical Cost

	0-1.9"	2-7.9"	8" +
Salt	$40	$0	$0
Sand	$0	$0	$0
Mix	$1,898	$4,513	$5,846
Total	$1,938	$4,513	$5,846

Avg. Material Cost
Storms with Chemical Cost

	0-1.9"	2-7.9"	8" +
Salt	$1,449	$2,554	$876
Sand	$0	$0	$0
Mix	$2,899	$5,287	$6,944
Total	$4,349	$7,841	$7,821
Chemical	$270	$375	$200

Avg. Material Cost per Lane Mile
Storms with No Chemical Cost

	0-1.9"	2-7.9"	8" +
Salt	$0.17	$0.00	$0.00
Sand	$0.00	$0.00	$0.00
Mix	$7.91	$18.80	$24.36
Total	$8.08	$18.80	$24.36

Avg. Material Cost per Lane Mile
Storms with Chemical Cost

	0-1.9"	2-7.9"	8" +
Salt	$6.04	$10.64	$3.65
Sand	$0.00	$0.00	$0.00
Mix	$12.08	$22.03	$28.93
Total	$18.12	$32.67	$32.59
Chemical	$1.12	$1.56	$0.83

LEWISTON

Avg. Material Cost
Storms with No Chemical Cost

	0-1.9"	2-7.9"	8" +
Salt	$4,097	$18,163	$14,340
Sand	$0	$0	$0
Mix	$1,209	$3,332	$4,173
Total	$5,306	$21,495	$18,513

Avg. Material Cost
Storms with Chemical Cost

	0-1.9"	2-7.9"	8" +
Salt	$11,408	$0	$0
Sand	$0	$0	$0
Mix	$3,499	$0	$0
Total	$14,907	$0	$0
Chemical	$720	$0	$0

Avg. Material Cost per Lane Mile
Storms with No Chemical Cost

	0-1.9"	2-7.9"	8" +
Salt	$10.40	$46.10	$36.39
Sand	$0.00	$0.00	$0.00
Mix	$3.07	$8.46	$10.59
Total	$13.47	$54.55	$46.99

Avg. Material Cost per Lane Mile
Storms with Chemical Cost

	0-1.9"	2-7.9"	8" +
Salt	$28.95	$0.00	$0.00
Sand	$0.00	$0.00	$0.00
Mix	$8.88	$0.00	$0.00
Total	$37.84	$0.00	$0.00
Chemical	$1.83	$0.00	$0.00

B-4: Average Material Cost Data by Precipitation Category

SOUTH BURLINGTON

Avg. Material Cost
Storms with No Chemical Cost

	0-1.9"	2-7.9"	8" +
Salt	$0	$0	$0
Sand	$0	$0	$119
Mix	$1,278	$1,395	$5,599
Total	$1,278	$1,395	$5,718

Avg. Material Cost
Storms with Chemical Cost

	0-1.9"	2-7.9"	8" +
Salt	$0	$0	$0
Sand	$48	$150	$0
Mix	$2,233	$7,801	$8,829
Total	$2,281	$7,951	$8,829
Chemical	$34	$45	$53

Avg. Material Cost per Lane Mile
Storms with No Chemical Cost

	0-1.9"	2-7.9"	8" +
Salt	$0.00	$0.00	$0.00
Sand	$0.00	$0.00	$0.73
Mix	$7.79	$8.51	$34.14
Total	$7.79	$8.51	$34.87

Avg. Material Cost per Lane Mile
Storms with Chemical Cost

	0-1.9"	2-7.9"	8" +
Salt	$0.00	$0.00	$0.00
Sand	$0.29	$0.91	$0.00
Mix	$13.61	$47.57	$53.84
Total	$13.91	$48.48	$53.84
Chemical	$0.21	$0.27	$0.32

BIDDEFORD

Avg. Material Cost
Storms with No Chemical Cost

	0-1.9"	2-7.9"	8" +
Salt	$0	$0	$0
Sand	$0	$0	$0
Mix	$0	$0	$0
Total	$0	$0	$0

Avg. Material Cost
Storms with Chemical Cost

	0-1.9"	2-7.9"	8" +
Salt	$2,989	$5,320	$6,689
Sand	$0	$0	$0
Mix	$0	$0	$0
Total	$2,989	$5,320	$6,689
Chemical	$399	$924	$645

Avg. Material Cost per Lane Mile
Storms with No Chemical Cost

	0-1.9"	2-7.9"	8" +
Salt	$0.00	$0.00	$0.00
Sand	$0.00	$0.00	$0.00
Mix	$0.00	$0.00	$0.00
Total	$0.00	$0.00	$0.00

Avg. Material Cost per Lane Mile
Storms with Chemical Cost

	0-1.9"	2-7.9"	8" +
Salt	$10.52	$18.73	$23.55
Sand	$0.00	$0.00	$0.00
Mix	$0.00	$0.00	$0.00
Total	$10.52	$18.73	$23.55
Chemical	$1.40	$3.25	$2.27

B-4: Average Material Cost Data by Precipitation Category

SOUTH PORTLAND

Avg. Material Cost

Storms with No Chemical Cost

	0-1.9"	2-7.9"	8" +
Salt	$0	$0	$0
Sand	$0	$0	$0
Mix	$0	$0	$0
Total	$0	$0	$0

Avg. Material Cost

Storms with Chemical Cost

	0-1.9"	2-7.9"	8" +
Salt	$2,893	$11,133	$0
Sand	$544	$965	$0
Mix	$0	$0	$0
Total	$3,437	$12,098	$0
Chemical	$263	$984	$0

Avg. Material Cost per Lane Mile

Storms with No Chemical Cost

	0-1.9"	2-7.9"	8" +
Salt	$0.00	$0.00	$0.00
Sand	$0.00	$0.00	$0.00
Mix	$0.00	$0.00	$0.00
Total	$0.00	$0.00	$0.00

Avg. Material Cost per Lane Mile

Storms with Chemical Cost

	0-1.9"	2-7.9"	8" +
Salt	$11.57	$44.53	$0.00
Sand	$2.18	$3.86	$0.00
Mix	$0.00	$0.00	$0.00
Total	$13.75	$48.39	$0.00
Chemical	$1.05	$3.93	$0.00

FREEPORT

Avg. Material Cost

Storms with No Chemical Cost

	0-1.9"	2-7.9"	8" +
Salt	$417	$1,773	$1,400
Sand	$0	$0	$0
Mix	$1,122	$3,402	$3,836
Total	$1,539	$5,176	$5,236

Avg. Material Cost

Storms with Chemical Cost

	0-1.9"	2-7.9"	8" +
Salt	$900	$1,667	$0
Sand	$183	$0	$0
Mix	$2,339	$2,825	$0
Total	$3,422	$4,492	$0
Chemical	$532	$185	$0

Avg. Material Cost per Lane Mile

Storms with No Chemical Cost

	0-1.9"	2-7.9"	8" +
Salt	$2.45	$10.43	$8.24
Sand	$0.00	$0.00	$0.00
Mix	$6.60	$20.01	$22.56
Total	$9.05	$30.45	$30.80

Avg. Material Cost per Lane Mile

Storms with Chemical Cost

	0-1.9"	2-7.9"	8" +
Salt	$5.29	$9.81	$0.00
Sand	$1.08	$0.00	$0.00
Mix	$13.76	$16.61	$0.00
Total	$20.13	$26.42	$0.00
Chemical	$3.13	$1.09	$0.00

B-4: Average Material Cost Data by Precipitation Category

NEWPORT

Avg. Material Cost

Storms with No Chemical Cost

	0-1.9"	2-7.9"	8" +
Salt	$0	$434	$2,380
Sand	$0	$0	$0
Mix	$0	$7,281	$4,392
Total	$0	$7,715	$6,772

Avg. Material Cost

Storms with Chemical Cost

	0-1.9"	2-7.9"	8" +
Salt	$0	$0	$0
Sand	$0	$0	$0
Mix	$2,772	$0	$0
Total	$2,772	$0	$0
Chemical	$124	$0	$0

Avg. Material Cost per Lane Mile

Storms with No Chemical Cost

	0-1.9"	2-7.9"	8" +
Salt	$0.00	$2.55	$14.00
Sand	$0.00	$0.00	$0.00
Mix	$0.00	$42.83	$25.84
Total	$0.00	$45.38	$39.84

Avg. Material Cost per Lane Mile

Storms with Chemical Cost

	0-1.9"	2-7.9"	8" +
Salt	$0.00	$0.00	$0.00
Sand	$0.00	$0.00	$0.00
Mix	$16.31	$0.00	$0.00
Total	$16.31	$0.00	$0.00
Chemical	$0.73	$0.00	$0.00

B-5: Average Material Usage Data by Precipitation Category

HOLDEN

Avg. Material Usage
Storms with No Chemical Usage

	0-1.9"	2-7.9"	8" +
Salt	0.63	0.00	0.00
Sand	0.00	0.00	0.00
Mix	70.06	166.00	216.00
Total	70.69	166.00	216.00

Avg. Material Usage
Storms with Chemical Usage

	0-1.9"	2-7.9"	8" +
Salt	22.60	39.83	13.67
Sand	0.00	0.00	0.00
Mix	108.20	198.83	255.00
Total	130.80	238.67	268.67
Chemical	252.00	350.00	186.67

Avg. Material Usage per Lane Mile
Storms with No Chemical Usage

	0-1.9"	2-7.9"	8" +
Salt	0.0026	0.00	0.00
Sand	0.00	0.00	0.00
Mix	0.29	0.69	0.90
Total	0.29	0.69	0.90

Avg. Material Usage per Lane Mile
Storms with Chemical Usage

	0-1.9"	2-7.9"	8" +
Salt	0.09	0.17	0.06
Sand	0.00	0.00	0.00
Mix	0.45	0.83	1.06
Total	0.55	0.99	1.12
Chemical	1.05	1.46	0.78

LEWISTON

Avg. Material Usage
Storms with No Chemical Usage

	0-1.9"	2-7.9"	8" +
Salt	65.00	288.17	227.50
Sand	0.00	0.00	0.00
Mix	60.11	165.67	207.50
Total	125.11	453.83	435.00

Avg. Material Usage
Storms with Chemical Usage

	0-1.9"	2-7.9"	8" +
Salt	181.00	0.00	0.00
Sand	0.00	0.00	0.00
Mix	174.00	0.00	0.00
Total	355.00	0.00	0.00
Chemical	600.00	0.00	0.00

Avg. Material Usage per Lane Mile
Storms with No Chemical Usage

	0-1.9"	2-7.9"	8" +
Salt	0.1650	0.73	0.58
Sand	0.00	0.00	0.00
Mix	0.15	0.42	0.53
Total	0.32	1.15	1.10

Avg. Material Usage per Lane Mile
Storms with Chemical Usage

	0-1.9"	2-7.9"	8" +
Salt	0.46	0.00	0.00
Sand	0.00	0.00	0.00
Mix	0.44	0.00	0.00
Total	0.90	0.00	0.00
Chemical	1.52	0.00	0.00

B-5: Average Material Usage Data by Precipitation Category

SOUTH BURLINGTON

Avg. Material Usage
Storms with No Chemical Usage

	0-1.9"	2-7.9"	8" +
Salt	0.00	0.00	0.00
Sand	0.00	0.00	2.20
Mix	17.67	19.27	77.30
Total	17.67	19.27	79.50

Avg. Material Usage
Storms with Chemical Usage

	0-1.9"	2-7.9"	8" +
Salt	0.00	0.00	0.00
Sand	0.89	2.80	0.00
Mix	30.83	107.70	121.90
Total	31.71	110.50	121.90
Chemical	67.29	89.00	104.00

Avg. Material Usage per Lane Mile
Storms with No Chemical Usage

	0-1.9"	2-7.9"	8" +
Salt	0.0000	0.00	0.00
Sand	0.00	0.00	0.01
Mix	0.11	0.12	0.47
Total	0.11	0.12	0.48

Avg. Material Usage per Lane Mile
Storms with Chemical Usage

	0-1.9"	2-7.9"	8" +
Salt	0.00	0.00	0.00
Sand	0.01	0.02	0.00
Mix	0.19	0.66	0.74
Total	0.19	0.67	0.74
Chemical	0.41	0.54	0.63

BIDDEFORD

Avg. Material Usage
Storms with No Chemical Usage

	0-1.9"	2-7.9"	8" +
Salt	0.00	0.00	0.00
Sand	0.00	0.00	0.00
Mix	0.00	0.00	0.00
Total	0.00	0.00	0.00

Avg. Material Usage
Storms with Chemical Usage

	0-1.9"	2-7.9"	8" +
Salt	45.98	81.86	102.90
Sand	0.00	0.00	0.00
Mix	0.00	0.00	0.00
Total	45.98	81.86	102.90
Chemical	406.77	942.64	657.50

Avg. Material Usage per Lane Mile
Storms with No Chemical Usage

	0-1.9"	2-7.9"	8" +
Salt	0.0000	0.00	0.00
Sand	0.00	0.00	0.00
Mix	0.00	0.00	0.00
Total	0.00	0.00	0.00

Avg. Material Usage per Lane Mile
Storms with Chemical Usage

	0-1.9"	2-7.9"	8" +
Salt	0.16	0.29	0.36
Sand	0.00	0.00	0.00
Mix	0.00	0.00	0.00
Total	0.16	0.29	0.36
Chemical	1.43	3.32	2.32

B-5: Average Material Usage Data by Precipitation Category

SOUTH PORTLAND

Avg. Material Usage
Storms with No Chemical Usage

	0-1.9"	2-7.9"	8" +
Salt	0.00	0.00	0.00
Sand	0.00	0.00	0.00
Mix	0.00	0.00	0.00
Total	0.00	0.00	0.00

Avg. Material Usage
Storms with Chemical Usage

	0-1.9"	2-7.9"	8" +
Salt	43.50	167.42	0.00
Sand	58.78	104.33	0.00
Mix	0.00	0.00	0.00
Total	102.28	271.75	0.00
Chemical	252.50	945.80	0.00

Avg. Material Usage per Lane Mile
Storms with No Chemical Usage

	0-1.9"	2-7.9"	8" +
Salt	0.0000	0.00	0.00
Sand	0.00	0.00	0.00
Mix	0.00	0.00	0.00
Total	0.00	0.00	0.00

Avg. Material Usage per Lane Mile
Storms with Chemical Usage

	0-1.9"	2-7.9"	8" +
Salt	0.17	0.67	0.00
Sand	0.24	0.42	0.00
Mix	0.00	0.00	0.00
Total	0.41	1.09	0.00
Chemical	1.01	3.78	0.00

FREEPORT

Avg. Material Usage
Storms with No Chemical Usage

	0-1.9"	2-7.9"	8" +
Salt	6.25	26.60	21.00
Sand	0.00	0.00	0.00
Mix	37.50	113.20	134.00
Total	43.75	139.80	155.00

Avg. Material Usage
Storms with Chemical Usage

	0-1.9"	2-7.9"	8" +
Salt	13.50	25.00	0.00
Sand	9.50	0.00	0.00
Mix	77.00	93.00	0.00
Total	100.00	118.00	0.00
Chemical	237.50	82.50	0.00

Avg. Material Usage per Lane Mile
Storms with No Chemical Usage

	0-1.9"	2-7.9"	8" +
Salt	0.0368	0.16	0.12
Sand	0.00	0.00	0.00
Mix	0.22	0.67	0.79
Total	0.26	0.82	0.91

Avg. Material Usage per Lane Mile
Storms with Chemical Usage

	0-1.9"	2-7.9"	8" +
Salt	0.08	0.15	0.00
Sand	0.06	0.00	0.00
Mix	0.45	0.55	0.00
Total	0.59	0.69	0.00
Chemical	1.40	0.49	0.00

B-5: Average Material Usage Data by Precipitation Category

NEWPORT

Avg. Material Usage
Storms with No Chemical Usage

	0-1.9"	2-7.9"	8" +
Salt	0.00	6.38	35.00
Sand	0.00	0.00	0.00
Mix	0.00	202.25	122.00
Total	0.00	208.63	157.00

Avg. Material Usage
Storms with Chemical Usage

	0-1.9"	2-7.9"	8" +
Salt	0.00	0.00	0.00
Sand	0.00	0.00	0.00
Mix	77.00	0.00	0.00
Total	77.00	0.00	0.00
Chemical	50.00	0.00	0.00

Avg. Material Usage per Lane Mile
Storms with No Chemical Usage

	0-1.9"	2-7.9"	8" +
Salt	0.0000	0.04	0.21
Sand	0.00	0.00	0.00
Mix	0.00	1.19	0.72
Total	0.00	1.23	0.92

Avg. Material Usage per Lane Mile
Storms with Chemical Usage

	0-1.9"	2-7.9"	8" +
Salt	0.00	0.00	0.00
Sand	0.00	0.00	0.00
Mix	0.45	0.00	0.00
Total	0.45	0.00	0.00
Chemical	0.29	0.00	0.00