Fleet Replacement Evaluation Tool for the Town of Milton

January 2019

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McCORMACK GRADUATE SCHOOL OF POLICY AND GLOBAL STUDIES

UMASS BOSTON

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OVERVIEW

PROJECT SCOPE

The Edward J. Collins Jr. Center for Public Management at the University of Massachusetts Boston was hired by the Town of Milton to develop an evaluative tool (or "model") that would assist in determining if and when a piece of rolling stock should be replaced and to prepare a multi-year replacement schedule based on the currently available relevant data. The tool subsequently developed can be used in the future by the Fleet Manager, with input from other municipal staff, to provide pertinent quantitative and qualitative information to Town leadership including the Town Administrator, Board of Selectmen, Finance Committee, and Town Meeting.

Accurate fleet replacement projections are not simply quantitative calculations but require the expertise of managers and maintenance personnel to identify the strengths and weaknesses of a particular vehicle for its assigned mission. Two identical vehicles operated in very different environments, under varying conditions, with different operators and preventative maintenance histories, can reach their failure thresholds at vastly different times. As such, there is no definitive time one *must* replace a vehicle, as its life can be shortened or lengthened by numerous factors. It should also be noted that different levels of risk are acceptable to different managers and organizations. However, judging all vehicles by industry standards and using the same operational criteria will help reach decision points more consistently and with less inherent prejudice.

The goal of this fleet replacement evaluation tool is to consider a vehicle's operative status within context, especially the potential impact on the municipality if the vehicle becomes inoperative. This analysis can better inform town officials as they select of a course of action, one that typically involves the expenditure of hundreds of thousands of public dollars in any given year. The fleet replacement model incorporates 16 of the 48 total vehicles in the Department of Public Works inventory for the purpose of model calibration and to provide the template for future data collection and potential use across multiple departments.

METHODOLOGY

Incorporating generally agreed upon best practices for municipal fleet management, the fleet model was designed to offer a prioritized listing of vehicles to replace by asking two key questions: (1) what is the likelihood that the vehicle will fail in the next year? and, (2) what is the consequence to the Town should that failure occur? While not conclusive, the model is intended to help municipalities make an informed decision as to whether and when it is prudent to replace a specific vehicle in the fleet. The evaluation tool is data-driven and as such will need to be updated annually in conjunction with the capital investment plan to capture the most recent assessment of each vehicle's cost and performance.

Determining the optimal time to replace a piece of equipment can be as much an art as a science and will ultimately depend on the amount of risk that can be tolerated by decision-makers. However, the model attempts to replicate the considerations in such a decision and provide consistency in decision-making for fleet replacement. Too often the decision to replace a vehicle is based on one or two criteria- most

commonly mileage and/or age. This is partly because the data are easily obtainable and offer a "black or white" decision. While these data are useful and ultimately should have a role in the final disposition of the vehicle, they should not be used in isolation of the many other factors that affect vehicle life, and a broader assessment should yield more effective decisions.

Through the application of fleet management theory, several parameters were identified that either accelerate or inhibit vehicle deterioration, thus helping to predict the likelihood of vehicle failure the following year. But in addition to the physical and operational assessments, this model also considers financial measures which play a role in replacement decisions. As illustrated below, acceptable risk is a function of several different parameters, such as how critical a function a vehicle provides (i.e., the more highly critical, the lower the acceptable risk), or whether there is an easy back-up option (i.e., with readily available back-up options, more risk can be tolerated), and so on. The model uses a total of 18 parameters in 5 major categories:

1. Condition
    a. Age
    b. Mileage
    c. Storage Condition
    d. Vehicle Cleaning
    e. Degree of Corrosion

2. Utilization of Equipment
    a. Nature of Work
    b. Skill to Operate
    c. Mandated by State/Fed Regulations

3. Impact on Operations
    a. Alternative Plan to Achieve Mission
    b. Frequency of Use
    c. Reliability
    d. Environmental Impact

4. Return on Investment (ROI)
    a. Historical Repair Cost Trend
    b. Projected Future Repair Costs
    c. Depreciation
    d. Annualized Cost-to-Own

5. Obsolescence
    a. Evolution of Technology
    b. Availability of Repair Parts

In the model, points are granted to each sub-category based on the vehicle's history and an educated estimate of its future performance made by municipal staff and available service providers who are most knowledgeable about each vehicle. Each parameter is then weighted based on its relative impact on vehicle viability over the period of continued utilization. While the gross score for any vehicle across all parameters can total several hundred points, the output is normalized to a 100-point scale, with defined "break points" for recommended actions.

Model Scale:

- 0-50 points – **RETAIN**
- 50-65 points – **PREPARE** (for replacement)
- 65-100 points – **REPLACE**

This predictive tool is not designed to achieve definitive certainty as to a vehicle's fate in any given year, but rather to provide some degree of numerical probability of failure while offering consistency in the decision-making process to determine whether or not to remove a vehicle from service. The output is a numerical estimate of the risk to a municipality should they retain a specific vehicle for its intended purpose. This defined risk may be acceptable or unacceptable to decision-makers, and if unacceptable, should shift the conversation to actions to be taken to mitigate the risk of failure.

As these decisions can be financially significant and occur infrequently for some vehicle types, it may be worth using the interim period when a vehicle is approaching the end of its reasonable lifetime to explore alternatives to "replace-in-kind". Looking critically at the function of the vehicle, the current state of the operation, and what other communities are doing to address the same challenges might suggest satisfactory alternative solutions other than purchasing an equivalent replacement vehicle. An overview of such alternatives is provided in Appendix A.

PROCESS

The project team met with the Town Administrator and Department of Public Works staff to kick-off the project. The Town Administrator informed the Director of DPW about the project and their roles and responsibilities.

The Collins Center team reviewed the department's fleet inventory using the Town's vehicle insurance schedule. (See Appendix B.) The department was then asked to submit a form that collected quantitative and qualitative information about each vehicle or piece of equipment. A total of 16 of the 48 total vehicles in the Department of Public Works inventory had data forms submitted by the Maintenance Superintendent and subsequently entered into the model which will also provide a template for future data collection and potential use across multiple departments. Shop files provide important data for the evaluative tool and if continually updated, will be useful to the Town in future years for records management and fleet cost analyses.

Next, project team members visited the department to visually inspect the fleet, ask clarifying questions, and collect additional data as needed. The model was adjusted to accommodate the particularities of the Milton's equipment usage, and draft results were discussed with staff. This report presents the project team's findings and serves as a user guide to help Town staff maintain important data that can be used in the model in future years.

MODEL PARAMETERS

Evaluative Criteria Input

Baseline data for each vehicle must be input into the model, as listed below. Of these, items 4-6 below will need to be updated annually. Items 1-3 will remain unchanged:

(1) Type/Model
(2) Industry Life Expectancy (years or miles)
(3) Year of Manufacture
(4) Mileage (or Hours) on Vehicle
(5) Current Replacement Cost
(6) Current Estimated Turn-in Value

These data together with additional quantitative and qualitative information, are used to generate an overall risk factor rating for each vehicle. The following sections describe the content of and rationale for the point assignments for each of the sub-sections of the model. In addition, the scoring "bands" for each parameter are identified below. Points may be awarded from 0-10 for each of the parameters below – descriptions are included for scores of 0, 5, and 10 for illustrative purposes, but scores may be assigned across the continuum.

VEHICLE CONDITION

Probably one of the most important factors in determining whether a vehicle should be retained or replaced is its condition. Condition is pervasive in determining a vehicle's disposition as it is also a factor in its reliability, operations, and return on investment. The probability of whether a vehicle will fail in its intended purpose is inexorably tied to its condition. A wide variety of factors impact a vehicle's condition, but the most familiar are age and mileage/hours operated. There are factors that can prolong a vehicle's service such as storing the vehicle in a heated, dry location, or washing those areas on a vehicle that are exposed to corrosive chemicals, especially if used in roadwork and snow fighting. The longer the corrosive materials are in contact with the metals on a vehicle, the more corrosive damage to the mechanical systems will occur. Vehicle condition indicators include:

- ***Age*****.** Many municipal fleet managers use age as one of the single-most important criteria for determining the replacement schedule for a vehicle. This is partly because it is easily determined and removes the guesswork out of what might fail on the vehicle, thereby jeopardizing reliability. However, two vehicles of the same age could have experienced significantly different life histories that could result in a drastically different plan for their ultimate retirement. For instance, one may have been used for light trucking on a daily basis and stored inside a heated garage while another truck that may been worked hard lifting great loads in the most severe environment while utilizing corrosive materials. As such, age is not a stand-alone benchmark in this model, but weighted appropriately along with several other parameters.

- ***Mileage*.** An indicator of the degree of usage is a more significant parameter than age as it indicates relative wear and tear on the power train as well as the electrical, mechanical and hydraulic systems on the vehicle. In some cases, more constant usage can be more beneficial to a vehicle than incidental use throughout the year, as moving parts are continuously lubricated. In other cases, such as on construction sites, the increased usage in a rough environment puts a much greater strain on all the vehicle components.

Some equipment does not regularly transit on public streets and instead are mostly used for site-specific work. Examples of these vehicles are backhoes, front end loaders, forklifts, and brush chippers. The more accurate measure of wear for these type vehicles is the hours they have been operating, not mileage.

- ***Storage*.** The location where a vehicle is stored when not being used is important in gauging the impact of its years on its ability to perform. Comparing a vehicle stored outside in the elements all year to one that is stored in a heated, dry environment, can significantly impact the costs anticipated to maintain the vehicle. Additionally, the repetitive "cold starting" of a vehicle in freezing temperatures over the course of several years can prematurely wear the power train (such as engine pistons and rings) due to poor lubrication, and can further result in greater metal fatigue as the moving parts go through temperature extremes on a repeated basis. Other impacts can be expected due to moisture condensation accelerating chemical reactions in areas such as the exhaust system.

- ***Cleaning*.** The build-up of dirt and corrosive materials on electrical and hydraulic systems will more quickly render components inoperative as increasing contact time allows for more deterioration. Especially during the winter, when washing is difficult without an interior wash bay, salts and liquid brines can aggressively corrode the metals they come in contact with, resulting in premature failure.

- ***Degree of Corrosion*.** Corrosion is likened to a cancer to the structural and mechanical parts on a vehicle and is one of the hardest conditions to reverse or mitigate without exceptional expense. The chemical composition of the metals that make up a vehicle interact with the salts used to melt ice, resulting in corrosion which reduces the metal's strength. Spreading initially to exposed parts, if left unattended rust can penetrate deep into metals and significantly weaken structural members and result in decreased reliability in the earliest stages (e.g. electrical shorts or 'frozen' hydraulic parts). In the more advanced corrosion cases, the likelihood of catastrophic failures or safety hazards (e.g. cracked frame or penetrations in the metal allowing unsafe exhaust gases to enter the cab) increase. To reflect the importance of condition to the operative status of a vehicle, this parameter is weighted heavily.

VEHICLE CONDITION – 110 points maximum		
Parameters to Assess	**Points**	**Criteria for Point Bands**
Age relative to industry standard (weight = 2)	10	More than 3 years older than industry standard
	5	1 year under to 3 years over industry standard
	0	More than 1 year below industry standard
Mileage relative to industry standard (weight = 3)	10	More than 20% greater than industry standard
	5	+/- 20% of industry standard
	0	More than 20% lower than industry standard
Storage location (weight = 1)	10	Outside exposed to elements
	5	Under roof only
	0	Indoors, heated
Vehicle washing, annually	10	Never washed

VEHICLE CONDITION – 110 points maximum		
Parameters to Assess	**Points**	**Criteria for Point Bands**
(weight = 1)	5	Occasionally, less than 5x per year
	0	Frequently, more than 5x per year
Degree of corrosion (weight = 4)	10	Significant rust (>70% with rot on undercarriage)
	5	Modest rust (30%) with some flaking
	0	Little rust (<5%) and only on paint/surface

UTILIZATION

- ***Nature of work*.** In the event that a vehicle under review should fail to operate, assessing the nature of the work to which it is dedicated will help to determine the amount of risk a municipality could accept when determining whether to replace it or extend its service for another year. For instance, is the vehicle engaged in public safety tasks or is its main mission to maintain aesthetics? A vehicle engaged in daily road safety work would be assessed higher than one that seasonally maintains roadside brush.

- ***Skill to operate*.** In order to accomplish some tasks, special training and licenses may be required to operate a vehicle. In fact, in some cases, personnel are hired specifically to operate a particular type of vehicle. Thus, a lower risk factor threshold would be appropriate in order to maintain continuity of operations and avoid paying a salaried employee without a proper vehicle to operate. Examples of this are street sweepers, sewer vactor trucks, or TV camera trucks.

- ***Mandated work by State/Federal regulation*.** In some instances, State or Federal regulations dictate the performance of a task. Should the vehicle responsible for the execution of that task fail, and if the municipality does not have a viable back-up plan, they could be deemed out of compliance and subject to fines or administrative consent orders. Cleaning catch-basins with specialized equipment is an example of this type of work. Fire response times could also be deemed regulatory as insurance premiums are determined in part by such standards.

VEHICLE UTILIZATION – 60 points maximum		
Parameters to Assess	**Points**	**Criteria for Point Bands**
Work Critical or Life/Safety (weight = 3)	10	Critical to life-safety
	5	Core mission of Town
	0	Aesthetics, not permanent
Skills needed to Operate (weight = 1)	10	Specific license required, limited operators
	0	No special license required
Work Mandated by State/Federal Regulations (weight = 2)	10	Yes
	0	No

OPERATIONS

- ***Alternatives available to achieve end result*.** One question to answer is what alternatives may exist if/when a vehicle becomes inoperable. For instance, if several of vehicles in the inventory could be re-purposed to accomplish the task(s) assigned, then the severity of the impact of failure of the vehicle in question is lessened, and it is granted a lower score. Other alternatives may be available such as securing the same services from the commercial sector in a timely manner, such as a small dump sander. Hence, a higher risk factor is acceptable to perhaps get additional years of service from the vehicle.

- ***Frequency of use*.** How often a vehicle is used impacts the consequence should the vehicle fail unexpectedly. Daily usage for a safety-related mission of the department necessitates taking less risk due to the impact on the disruption of operations. Alternatively, if a vehicle is used sporadically throughout the year, then the model awards fewer points, allowing a higher level of risk to maximize the investment in the vehicle.

- ***Upgrade includes environmental improvements*.** In some models of vehicles, substantial progress has been made in improved fuel efficiency or even alternative fuels (e.g., propane or electric) that greatly lessen the impact on the environment and reduce operating costs. Depending on the community, realizing a "green" component in a new vehicle may be a significant reason for replacing fleet vehicles, especially those used for administrative purposes.

- ***Reliability*.** Once a task has been scheduled, having the resources available is an important management concern; and that includes having a vehicle reliable for operation. Historical records provide an insight into the amount of time a vehicle was in the shop and for how long. Depending on whether the vehicle could be driven or had to be towed back to the shop, or the number of days in the shop for repair, helps determine its reliability and subsequently influences the replacement decision. Documented situations where the vehicle has caused the mission to be delayed or aborted on a repeated basis will assess greater points toward replacement in this category.

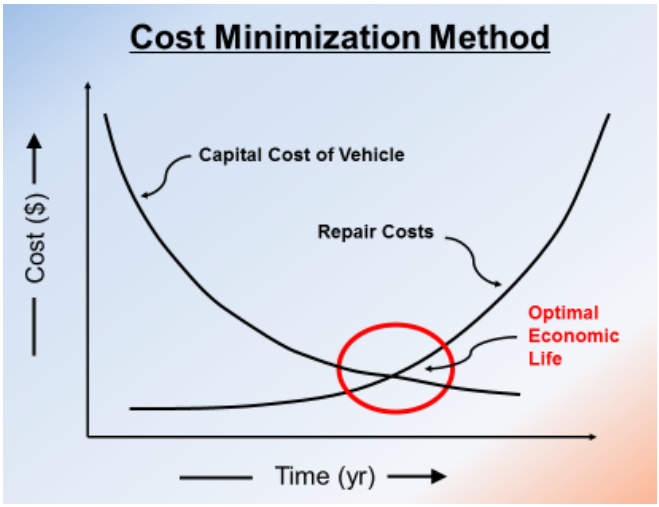
VEHICLE OPERATIONS – 70 points maximum		
Parameters to Assess	**Points**	**Criteria for Point Bands**
Alternatives Available to Achieve Result (weight = 2)	10	No dependable alternative
	5	Could be contracted out or borrowed from another community
	0	Have other available pieces
Frequency of Use (weight = 1)	10	Relied on daily, 5+ months per year
	5	Relied upon seasonally, <5 months per year
	0	Used randomly as need arises
Reliability (Downtime) (weight = 3)	10	Down >2x per month or 10 days/month (33%)
	5	Down 3x in 3 months or 14 days in 3 months (15%)
	0	Down 1x in 3 months or <3 days in 3 months (<55)
Environmental (Green) Component (weight = 1)	10	New model with specific green component
	5	No targeted initiative, generally improved mileage

RETURN ON INVESTMENT (ROI)

Financial considerations are important in any municipal operation as they define not only the annual operating costs, but the cost-to-own over the life of the vehicle, or the life-cycle costs. Good records on repair costs are important to be able to quantify the ROI. Using this data for each vehicle will provide the relationship between the vehicle's value and its operational repair costs.

The chart below illustrates how the capital value decreases over time while the annual costs increase as parts and automotive systems wear out. Where the capital cost curve and the repair cost curve intersect, the annual cost of owning the vehicle is at the lowest point. Unfortunately, a vehicle typically does not remain at this point for very long and will tend to experience increasing annual costs as the repairs continue to mount. However, this exact "low point" may not be the optimal time to replace the vehicle. In fact, accepting some additional annual costs higher than the minimum may be preferred when compared to the annualized cost of purchasing a new vehicle (see Annualized Cost-to-Own ratio).

Factors that help determine the return on investment of retaining a vehicle versus purchasing new include:



- ***Repair cost five-year trend*.** Evaluating the repair cost trend over the most recent five-year period helps to define where the vehicle is on the cost minimization curve. An upward trend may indicate that the vehicle is approaching or has passed its optimal economic life. The rate of expenditure growth should be taken into account when assessing this factor.

- ***Projected repair cost in the next year*.** Estimating next year's repair costs is even more important than past repair costs, but it relies on experienced operators and maintenance personnel to provide the necessary expertise, as such a prediction can be more of an art than a science. A thorough inspection of the vehicle can highlight conditions that inevitably will result in higher repair costs in the following year. Replacing the vehicle before incurring those anticipated expenses is usually the better practice, assuming the vehicle is beginning to meet or exceed other criteria such as life expectancy, mileage, and reliability, among others. This parameter is used in the calculation of the "Annualized Cost-to-own Ratio" below.

- ***Depreciation*.** What value the vehicle has on the resale market is important financial information. If a vehicle has no trade-in value on the market, then there is less incentive by the owner to replace it. However, if the resale results in a sizable cash value, it can help off-set the cost of a new vehicle. Hence in an effort to optimize the "cash back", the greater the retained vehicle value, the more points awarded to the vehicle. This parameter is used in the calculation of the "Annualized Cost-to-Own Ratio" below.

- ***Annualized Cost-to-Own Ratio*.** Calculations are provided whereby the projected costs the following year are compared to the annual cost of purchasing a new vehicle. For the current vehicle, the projected costs to own the vehicle for the next year are the sum of the repair costs next year plus the loss

in value (depreciation), while the annual cost to own a new vehicle is the total cost of the vehicle divided by the life expectancy. Annualized, if it is less expensive to own and operate the current vehicle, then the ratio of the two values will be less than 1.0. In the model, it would be economically prudent to replace a vehicle when the ratio exceeds (0.7), while anything between 0.5 and 0.7 would be questionable as to whether to continue with the older vehicle and would look to other factors to reinforce the decision.

For example, if a new vehicle (assuming no repairs) costs $100,000 and industry standards predict the life to be 10 years, then the cost-to-own the new vehicle is hypothetically $10,000 per year. If an older vehicle of the same model has repair costs estimated at $12,000 next year, but will likely keep the vehicle operational for 2 more years, then the cost to retain the older vehicle is $6,000 per year just for repairs. There is also a "lost value" due to depreciation. If the market value for a vehicle of its age and condition is $10,000, the annual depreciation is estimated to 10% annually, or $1,000.

The cost-to-own ratio then is calculated to be: ($6,000 + $1,000) / $10,000 = 0.7. In this example, while it is still cheaper on an annual basis to repair and continue to own the older vehicle, considering the likelihood of further unanticipated costs in the next year or two and general overall vehicle demise, the threshold for the ratio is set where any ratio value above 0.7 is awarded the maximum points for this parameter.

RETURN ON INVESTMENT – 100 points maximum		
Parameters to Assess	**Points**	**Criteria for Point Bands**
Repair costs over the last 5 years (weight = 2)	10	Steep rise in repair costs; vehicle likely past optimal economic life point
	5	Gradual rise in repair costs
	0	No upward trend in repair costs
Projected repair cost next year (weight = 3)	10	Major costs foreseen (>10% of replacement)
	5	Constant minor repair costs expected (<10%)
	0	No signs of future failure
Depreciation (weight = 1)	10	Turn in value >20% of new
	5	Turn in value 5-20% of new
	0	Turn in value <5% of new
Annualized cost to own ratio (Future repair costs+ depreciation)/(cost new/life span) (weight = 4)	10	Ratio > 0.7
	5	Ratio from 0.5-0.7
	0	Ratio <0.5

Obsolescence

- ***Evolution of technology*****.** As technology continues to evolve, improvements in the safety, functionality, and comfort will typically accompany newer models of the same vehicle. In some cases, while the vehicle could continue to be operated, there are key improvements in the vehicle technology that favor replacement sooner than later. Especially in public safety vehicles, such as a fire truck or ambulance, while a vehicle could remain in service for several additional years, the advanced technological improvements in the newer vehicles mandate replacement to ensure the safety of the crew or public health of the patient. Additionally, in the public works or parks maintenance vehicles, redesign of equipment in recent years has allowed the merging of tasks to be accomplished with one piece of

equipment instead of two or three. This consolidation of functions can result in significant savings due to reduction in the fleet size, and may warrant vehicle replacement earlier than otherwise forecasted.

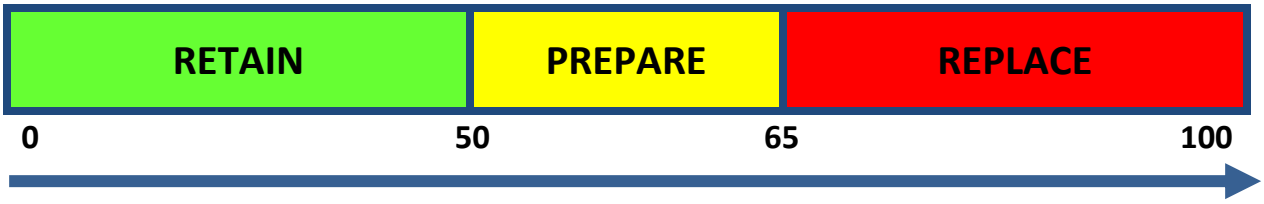
- ***Repair parts availability*.** Over time, a specific vehicle model undergoes redesign and its repair parts are no longer manufactured and are phased out of the supply system. Once the limited stock is consumed, a vehicle deficiency may only be repaired by finding a similar vehicle in a scrap yard, unless the part can be fabricated in the shop. If these options are not possible, it could render a vehicle unusable for its intended purpose. The phasing out of specific models are driven by market forces. An example of a recent phase-out has been the Crown Vic police cruisers which were phased out for a newer Interceptor model which is safer and more rugged for the needs of police departments. In coming years, the only available Crown Vic parts will be through the reuse system where parts are stripped from old vehicles. However, this form of resupply is unacceptable for a front-line vehicle due to the emergency response needs, and such a vehicle would consequently be granted very high points to support replacement.

OBSOLESCENCE – 50 points maximum		
Parameters to Assess	**Points**	**Criteria for Point Bands**
Evolution of technology (weight = 1)	10	Newer models combine multiple tasks in one vehicle
	5	Significant improvements in efficiency/safety
	0	Small or negligible improvements
Repair parts availability (weight = 4)	10	Repair parts no longer available
	5	Parts only by special order or cannibalization
	0	Parts are readily available

RISK FACTOR RATINGS

As discussed above, the calculation of the risk factor for a vehicle is achieved through the assessment of parameters defined in five categories. It then determines a vehicle's: (1) likelihood of failure in the next year (see Condition); and, (2) the consequence if a vehicle is does fail (see Utilization, Operations, Return-on-Investment, and Obsolescence).

As some empirical parameters involve more complex calculations, in an effort to facilitate input and reduce errors, the assessment values are auto-calculated using input data. The gross raw points assessed for a vehicle is automatically normalized to a 100 scale, and the resultant score is termed the "Risk Factor". The risk factor can be used to inform decisions as to a vehicle's disposition as follows:



In this model, a vehicle theoretically starts near zero risk factor when purchased new, and progresses to a higher risk index as it ages and is utilized to a greater degree. Unless the vehicle was a "lemon" and fails to perform early on, it would be expected that with "normal" usage, the vehicle reaches its optimal time for replacement at or near the industry standard for age and mileage. However, because no vehicle or operating environment or frequency of usage is exactly the same, this model attempts to quantify some of those variables which may either lengthen or shorten a vehicle's usefulness and highlight a reasonable point at which to replace the vehicle.

Retain

Starting from the time of a new purchase and through the first years of utilization, a vehicle is expected to perform its intended function with a high degree of reliability. Like any mechanical system, there are requirements for regular servicing and standards of good operation that reduce the extent of repairs during this period. Policies and procedures in a motor pool that ensure fluids and filters are checked regularly and renewed at designated intervals, and lubrication occurs at points where there is metal-on-metal moving parts, will help maximize the performance and life expectancy of a vehicle.

It has been demonstrated that through good, thorough fleet maintenance practices, a high percentage of repair costs can be saved over the life of a vehicle while extending its operating capacity significantly. For vehicles costing nearly a quarter million dollars (e.g. street sweepers, large dump trucks, front end loaders, etc.), this could result in tens of thousands of dollars saved per vehicle over its life. Especially in New England, the outside environment can be extremely harsh on the wear and tear a vehicle experiences, so making extra efforts to wash and remove corrosive chemicals as well as storing the vehicle in a dry

environment will enhance a vehicle's long term condition. Giving operators refresher training and reinforcing good maintenance practices will also go a long way toward reducing a vehicle's life-cycle costs.

Prepare

As a vehicle nears its expected life expectancy, various components begin to show outward signs of wearing out. As these parts comprise larger systems on the vehicle, they are interrelated and can cause larger and more expensive repairs. As mentioned earlier, how soon a vehicle gets to this point is very much a factor on not only how it was used on a day-to-day basis, but how it was maintained. However, usually there develops a pattern of increasing down-time when a vehicle is in the shop, or when the number of unanticipated repairs is growing. This begins to characterize the vehicle's downturn in performance. A good fleet manager or mechanic will take notice of these signs and look to more systemic problems that will help forecast when a vehicle is nearing replacement.

While a vehicle could begin to be listed in year 4 or 5 on a 5-year capital improvement plan based on its industry standard for age alone, as the reliability begins to decrease and costs increase, this model reflects the point in time to prepare for the vehicle's replacement. At this point, while the vehicle is still serviceable, the risk factor indicates costlier repairs will be forthcoming without sufficient time remaining for an adequate return on investment. Planning for a vehicle's replacement at this point would be reflected in year 2 or 3 of the CIP. Even at this point predictive failure is not conclusive, and depending on the vehicle's utilization and maintenance, it could be that very little changes over the next year and the vehicle's replacement could remain 2 or 3 years out in the capital improvement plan.

Replace

As the risk factor increases over time, at some point the vehicle may be projected to reach a single or multiple point of failure, where it is uneconomically feasible to repair it or operations may be jeopardized beyond acceptable limits. That said, the predictive model calculates a level of risk that a vehicle *may* fail, and the consequence if it *does* fail, but does not guarantee this will occur. While a risk factor of 68 indicates "replacement", albeit at the lower end of the scale, the culture of the community may be that such risk is acceptable or perhaps the community may lack sufficient funds to replace the vehicle, thus deciding to sustain its operational status for another year (or longer).

However, at the higher end of the risk factor scale, perhaps at 80 or beyond, it is indicative of several areas of unacceptable risk; not only a higher assurance of non-performance but increasingly higher impact on operations and likely a very poor financial return on investment. Certainly, the highest risk factors are indicative of vehicles that pose serious life-safety concerns, or when a repair cannot be made due to lack of available parts or when it is actually less expensive to purchase a new vehicle.

It should be noted that the overview of the fleet replacement model has described the *need* to replace a vehicle, but not about *availability* of a particular piece of equipment. Market conditions will vary from year to year and even month to month, but typically for the larger, more expensive or very specialized equipment (e.g. fire engines, large dump trucks, vactor trucks), vehicles are not likely available upon demand, but rather may take up to a year (or more) to actually receive the vehicle after placing the order. Therefore, part of the replacement planning should allow for this delay in the delivery of the replacement vehicle once it is ordered.

ANNUAL MODEL MAINTENANCE

Town staff will need to update the fleet replacement evaluation tool to ensure that the tool remains an accurate reflection of the fleet status and to determine if any priorities for vehicle replacement may have changed in the intervening months. Often this would occur during the Capital Improvement Plan (CIP) development to better inform managers of potential investments for vehicle replacements.

Quantitative Data for Model Upkeep

In the model itself, the fleet inventory is listed in order of the vehicle number (column C). White cells are intended to be numeric ratings (1-10) that are input by staff. Cells that are yellow highlighted (for example, columns O through V) will auto-fill data as they have formulas embedded that draw from the database to calculate metrics. Additional yellow highlighted cells (columns AH, AI, AJ) are auto-fill numeric ratings (1-10) awarded based on computations and criteria defined in the various tabs. These cells should not be modified unless the intention is to change the model calibration. Finally, cells in columns AM through BH are strictly internal calculation cells and need not be altered. In fact, it may be advantageous to "hide" these cells to simplify the screen viewing.

Each year then, a fleet manager should review the data in the white cells for each vehicle in the fleet and update as needed as they are used for model calculations. Specifically:

- Column C - Vehicle Identification
- Column D - Owning Department
- Column E - Vehicle Type or Model (choose from pull-down menu)
- Column F - Year (only in the event the vehicle was replaced)
- Column G - Current odometer reading in mileage/hours for the vehicle
- Column H - Unit of measure (miles or hours)
- Column I - Any changes to the vehicle description or utilization
- Column J - Update as to operational condition and areas of particular concern
- Column K - Projected repair costs for the next year (do not include normal servicing)
- Column L - The number of years this repair will last
- Column M - Turn-in Value
- Column N - Market cost for new vehicle of desired replacement

For Columns M and N, the relevant fiscal year will automatically change so that the information input would apply to the subsequent fiscal year. Users should be careful to save a new version of the file at the beginning of each fiscal year.

Qualitative Data for Model Upkeep

The columns that contain ratings based on qualitative assessments, (e.g., Columns W-AG, AK, and AL) must be reviewed closely each year by staff to determine if any conditions have changed. An in-depth discussion of each category can be found in the "Model Parameters" section above. In the section below,

specific questions have been posed for consideration when staff provide a vehicle qualitative ratings. All ratings can range from 0-10.

Vehicle maintenance staff and users are best positioned to consider the reliability of each vehicle under review and should be responsible for updating the ratings in the model, as appropriate. However, as noted above, the care and maintenance of a vehicle will directly impact its lifespan so these same individuals should also be actively involved in making sure that vehicle(s) entrusted to their care receive timely preventative maintenance, are cleaned regularly, and are stored in sheltered conditions whenever possible.

In inputting the qualitative ratings, it is imperative that staff be honest and rigorous in their vehicle assessments, as failure to be objective will affect the usefulness of the fleet evaluation tool. They should recognize that public funds will be invested as a result of their assessments – dollars that if not used to purchase vehicles could be used upgrade town parks, make improvements to schools and the town library, improve local streets, and make other investments that directly affect the quality of life of local residents. Therefore, all involved in updating the fleet assessment tool should take their responsibility seriously and strive to maximize the lifetime of any public vehicle.

Further definition of the qualitative rating inputs can be informed by consideration of additional questions offered below:

<u>Condition</u>

- **Column V, Mileage/Hours** -Have the majority of vehicle miles/hours been in a highly dusty and/or corrosive environment or used for work which pushes the threshold of its rated capability and has it reached industry standards for this type of vehicle; or has the utilization been mainly on paved streets for lighter transport however at industry standard?
- **Column W, Storage** --Was the vehicle consistently stored in a dry, heated environment or out in the motor pool exposed to rain, snow and extreme temperatures?
- **Column X, Cleaning** -How soon after utilization was the vehicle washed of its damaging materials (salts, mud, sand); hours, days or weeks?
- **Column Y, Corrosion** - Where is the greatest degree of the corrosion taking place; on peripheral body sections that could be replaced if desired such as cab, dump bed, or attached lines (hydraulic or electric), or on areas which could result in catastrophic failure, such as the vehicle frame?

<u>Utilization</u>

- **Column Z, Work critical** --Should the vehicle fail, will critical work for the department go unmet for an unacceptable length of time causing either an unavoidable safety condition or distress to the community?
- **Column AA, Skill to operate** - Is the equipment intended for a unique function that employees were hired/trained to conduct which could render them without work for the period of time without the vehicle? (e.g. Sewer/storm water television truck, mowing tractor for summer hires, police cruisers)
- **Column AB, Mandated by regulations** -Is the task normally accomplished by the vehicle mandated by local/state/federal regulation and unable to be reasonably accomplished without this vehicle in the immediate future? (e.g. catch basin cleaning, fire truck, special needs van)

Operations

- **Column AC, Available alternatives** - Are alternatives to complete the mission of the vehicle reasonably available? Are there back-up vehicles, mutual aid, rentals or contracting of the service available?
- **Column AD, Frequency of use** -How often is this vehicle used throughout the day, week or season? Will the op-tempo of the department be negatively impacted immediately by less effectiveness and loss of productive man-hours?
- **Column AE, Reliability** - How dependable is the equipment for its assigned mission; is there likelihood that it will be returning to the motor pool for necessary adjustments, potentially jeopardizing the safety of the operator or success of the mission?
- **Column AF, Environment/Energy** - Is the vehicle a detriment to sustainability (e.g. fuel consumption) or the environment (e.g. leaking oil) and could be replaced by a much "greener" vehicle without compromising the tasks expected of it? Is this move toward "greener" vehicles encouraged by the Administration?

Return on Investment

- **Column AG, Historical repair costs** – Have repair costs been on an upward trend over the past five years? How quickly have repair costs escalated? Can it be determined that the vehicle has likely passed the optimal economic life point on the Cost Minimization curve (see page 8)?

All other Return-on-Investment parameters are calculated by the model.

Obsolescence

- **Column AK, Technology advancement** -Has the industry evolved such that the technology on a newer model would support a wider array of tasks making the workforce more efficient or significantly improve the safety for the operator/public or offer far greater protections for the equipment?
- **Column AL, Repair part availability** -Can repairs be quickly acquired by using the supply system without jeopardizing the mission? Do routine replacement parts entail special order? Is the only means to keep the vehicle operating through the fabrication of parts?

Once all input data have been defined, a "Risk Factor" (defined from 0 - 100) for each vehicle is automatically calculated and color coded on the point scale described in the previous section. A summary of vehicle risk factors is provided in a condensed format of key information is offered on the "Results Report" tab that may be useful for viewing and/or printing.

Should additional vehicles be added to the rating model, new rows will need to be added at the bottom, making sure to copy any cell formulas from the row above it to ensure the Risk Factor is calculated properly. Since there are links to different tabs, such as Industry Standards, it is important that the Vehicle/Equipment Type or Model be chosen from the pull-down menu using the arrow key which appears when the cursor is selected in that cell. Additions to the types of vehicles currently offered requires coding of the cells and related data tabs.

RISK FACTORS & RECOMMENDED REPLACEMENT SCHEDULE (FY2020)

FLEET OVERVIEW

The Town of Milton is a suburban town in eastern Massachusetts with a population of approximately 27,000 (2010 U.S. Census) in metropolitan Boston. The Town has vehicles and equipment that are used by its Public Works, Parks, Police, and Fire Departments. The Department of Public Works staff performs basic routine maintenance in-house, on their own as well as the Parks, Fire, and Police Department's equipment. Only specialized repairs or those that fall under warranty are outsourced to specialized shops in the region. For example: body work, motorcycle repair and fire engine pumps are typically sent out.

The recent Town's vehicle inventory includes over 190 pieces of rolling stock valued at nearly $10 million dollars. While the fleet size is driven by many factors within a municipality, Milton has a comparatively large fleet size for its population when considering other municipalities in the Commonwealth. It is noted that several vehicles are used only seasonally, mainly for snow removal, and others are retained well past their normal life perhaps providing some level of "back-up" capability. As such, some consideration may want to be given to outsourcing some of the seasonal work to avoid future capital investments for single-purpose vehicles, thereby reducing long-term costs.

Below are two 29-year-old Mack Trucks which have been well-maintained and continue to operate well. For instance, they both received extensive modifications to bring them up to current standards such as: LED head lights, strobes, marker lights, heated mirrors and wiper blades, air ride seats, and self-adjusting brakes. The exhaust systems have been moved from undercarriage to a stack system, with back-up cameras mounted for added safety. However, two other vehicles, 2012 International Harvester plow trucks, are found to be failing in their operation well before their anticipated life span. Close tracking of future maintenance costs and vehicle downtime would be important considerations to determine the future disposition of these vehicles.

Picture of 1990 Mack Trucks (#41 & #45) used for sanding and plowing

Milton stores a high percentage of vehicles and equipment storage in a facility that is dry and heated during the winter months. This extends the life of the vehicles and greatly aides in the readiness of the

fleet year-round. Storage facilities reduce the wear-and-tear to mechanical moving parts experienced upon repeated starting when temperatures are below freezing, as well as corrosion of the body and attached systems (hydraulic, fuel, electrical) as a result of repeated wet conditions.

Summary of Public Works Vehicles				
Type	**Count**	**Value (New)**	**Total Age (Yrs)**	**Average Age (Yrs)**
Sedan	8	$146,000	66	8.3
SUV	2	$65,000	7	3.5
Pick-up Truck	8	$295,000	87	10.9
Utility/Flatbed Truck	2	$40,000	50	25
Bucket Truck	1	$108,000	14	14
6-Wheel Heavy Duty Truck	11	$713,000	154	14
Large 20T Truck	10	$1,754,000	35	3.5
Sweeper/Trackless	3	$436,000	16	5.3
Front-end Loader	3	$486,000	28	9.3
TOTAL	**48**	**$4,043,000**	**457**	**9.5**

The summary of the Department of Public Works inventory alone is shown in the table below, with an average age of just under 10 years of age. This listing doesn't include trailers and smaller wheeled-equipment such as air compressors or snow machines. The full fleet inventory is provided in Appendix B.

REPLACEMENT PRACTICES OVERVIEW

Historically, the Town has purchased Public Works vehicles on an as-needed basis using available free cash, debt, and donations raised by community interest groups. The Town is open to the purchase of new or used equipment, depending on the recommendation of the department head and resource availability. Additionally, the Town uses State pre-bid contracts as well as internal bid specs and direct purchase.

In 2010, Milton was designated as one of the State's "Green Communities", demonstrating the town's leadership's commitment to converting the fleet across all departments to energy efficient vehicles, whenever "commercially available and practicable". Specified emergency and front-line heavy snow-fighting vehicles are exempt in order to address public safety to the fullest extent possible. In meeting the requirements of the Green Community, the Town has:

- Adopted a Fuel-Efficient Vehicle Policy requiring all municipal departments to purchase fuel-efficient vehicles,
- Developed and maintained a vehicle inventory for all four-wheeled vehicles,
- Provided a plan for replacing non-exempt vehicles that don't meet specified fuel efficiency ratings.

These energy-consumption thresholds for non-safety vehicles will play a role in decisions to replace specific vehicles in the fleet, and are accounted for in this assessment model.

Finally, it is noted that recently there has been a change in managerial staff for the fleet, and there is an ongoing assessment of the current fleet conditions and the operations practices. This assessment tool was calibrated using a representative sample of vehicles in the Department of Public Works in order to provide replacement status on particular vehicles as well as demonstrate the types of data needed to collect going forward to best support the utilization of this fleet replacement model.

The following table is the “Results Report” tab from the working model, a summary of the risk factors for each of the 16 vehicles for which the project team received data:

Vehicle ID #	Vehicle/Equipment Type o	Year of Manufactur	Est Cost New in FY2019	Vehicle Description / Operational impact	Risk Factor
6	Med Duty Pick-up Truck	1985	$ 45,000	General purpose Chevy Pick-up truck recently caught fire and destroyed. Utilized daily to pick-up trash in the town square.	**80**
11	Med Duty Pick-up Truck	2003	$ 45,000	General purpose Pick-up truck (Chevy 2500) utilized daily in transportation of tools and supplies to worksites	**63**
8	Med Duty Pick-up Truck	2003	$ 45,000	General purpose Pick-up truck (Chevy 2500) utilized daily in transportation of tools and supplies to worksites	**60**
26	6 Wheel Dump Truck	2012	$ 170,000	International Harvester Dump Truck used for sanding and plowing operations only.	**56**
25	6 Wheel Dump Truck	2012	$ 170,000	International Harvester Dump Truck used for sanding and plowing operations only.	**56**
44	Bucket Truck	2005	$ 100,000	F-750 Utility Truck with bucket hydraulic attachment, used extensively for tree pruning and emergency operations.	**55**
11	Med Duty Pick-up Truck	2002	$ 30,000	Chevy 2500 pick-up 2-wheel drive, used universally on town streets, year round.	**50**
49	6 Wheel Dump Truck	2005	$ 130,000	Sterling Plow truck, sander, and dump; used seasonally	**45**
16	6 Wheel Dump Truck	2008	$ 45,000	Used as part of the paving crew in rugged environments, year round.	**42**
15	Med Duty Pick-up Truck	2008	$ 40,000	A universal vehicle used on town streets, year round.	**40**
41	6 Wheel Dump Truck	1990	$ 175,000	Mackr688p Sander and plow, used seasonally	**36**
3	Med Duty Pick-up Truck	2013	$ 40,000	Ford F-250 Pick-up Truck used year round for water meter installations.	**31**
12	Med Duty Pick-up Truck	2014	$ 30,000	F-250 Fleet Maintenance Road Service truck used year round	**27**
20	Med Duty Pick-up Truck	2015	$ 50,000	F-350 Fleet Maintenance Service truck used year round	**25**
17	6 Wheel Dump Truck	2015	$ 50,000	F-450 Carries tools for the Water Dept construction work and travels over all terrain- goes anywhere and used year round.	**24**
47	6 Wheel Dump Truck	2016	$ 125,000	Peterbuilt 330 Roll off multi-body plow truck used year round	**16**

REPLACEMENT SCHEDULE & RECOMMENDATIONS

The vehicle replacement model results indicate that three vehicles of the fleet sample are recommended to be replaced, while another three are recommended to "prepare" to replace in the near future. Specifically, a 1985 Chevy Pick-up truck (#6) that experienced a catastrophic loss due to a fire (see picture below) and two 15-year-old pick-up trucks (#11 and 8) are the only vehicles that are shown not to be economically or operationally beneficial to continue to maintain.

Picture of 1985 Chevy Pick-up damaged in recent fire

However, more significant decisions will need to be made soon concerning three large trucks as the model suggests the Town "prepare" to replace those vehicles, including:

- Two 2012 International Harvester Sanding/Plowing Truck (#25 & #26) at an estimated cost of $170,000 each. The primary reason for replacement of these vehicles is their underperformance for the tasks needed.

- A 2005 Bucket Truck used extensively in dangerous situations with a reliance on the hydraulic system.

The remaining vehicles may last 3 to 5 more years, but that largely depends on the utilization and maintenance going forward. The risk factors for the remaining vehicles could remain stable over the next few years but there is also the potential for other vehicles' risk factors to increase substantially, moving them from the "retain" category into the "prepare" or even "replace" category. During each annual assessment period, it is incumbent upon the Town to review its replacement plan.

Recommendation 1: Consider replacing three medium duty pick-up trucks (est. total cost $135,000)

The pick-up truck is a main transport vehicle for staff and supplies as well as the collection of debris/refuse around town. Experience in other communities has shown these vehicles are a DPW's "work horses" and get used for myriad tasks year-round and begin to show a sharp rise in repair expenses at about 10 years or 150,000 miles. These vehicles are typically used on a daily basis by staff to load trucks with sand/salt for snow fighting, move materials, and do other lifting/loading/scraping functions. Multiple reported factors converged to result in a high risk factor indicating that replacement is warranted, including:

- **Criticality to Mission/Frequency of use:** The pick-up trucks are used on virtually a daily basis year-round to support fundamental town operations.

- **Age:** Utilizing best practices, municipalities typically replace a medium duty pick-up truck between 10-12 years of age while these three trucks are 23 years, 15 years, and 15 years old respectively.

- **Degree of corrosion and wear:** Two trucks have significant rust throughout the body and undercarriage, compromising electrical systems and structural integrity. The third truck had less corrosion but unfortunately was destroyed in a fire.

- **Lack of reliability:** Staff have indicated that the trucks are currently providing a reduced level of service, especially during the winter operations, and are no longer an efficient or effective means for accomplishing assigned tasks.

- **Degree of repair anticipated:** Necessary repairs costing close to $11,000 over the past three years indicate that the vehicles could have been replaced a few years ago, and costs are expected to rise in the future.

- **Technology Advancement/Supply Parts Availability:** Modern fleet vehicles have considerably advanced engine diagnostics and displays to help avoid mechanical damage or unsafe conditions as well as improved design. While basic parts are still available, replacement can easily cause further damage to connecting parts due to corrosion.

Recommendation 2: Begin discussing vehicles in the "Prepare" (for replacement) category.

The Town faces potentially-costly replacements in the medium term. The three vehicles that the model suggests the Town prepare to replace include:

- Two Large International Harvester Dump Trucks (est. combined cost: $340,000)
- Bucket Truck with hydraulic arm (est. cost: $100,000)

It should be noted that it is possible that the results may change within the next few months as the dump trucks are primarily snow-fighting vehicles, and the season is just starting.

Two Large IH Dump Trucks (#24 and #26)

These are identical large trucks used seasonally for plowing and sanding. Only approaching seven (7) years old, they are showing signs of failure far earlier than expected. These trucks should last 12-15 yrs.

Underpowered and with repeated mechanical problems since their purchase has proven them unreliable and ill-suited for emergency operations clearing large amounts of snow on public streets.

- **Turn-in Value:** these trucks are young enough to hold some residual value estimated at close to $25,000. This could be useful to offset the cost of a new truck.

- **Work Critical:** as large snow plow vehicles, the training needed to operate these vehicles is significant and not easily replaced when down for mechanical problems. Additionally, the dump is not satisfactory for the required work.

- **Cleaning:** these trucks were not properly cleaned after dispensing corrosive materials and suffer from exceptional rust.

- **Corrosion:** this is a cancer which has a firm grip on these trucks and would be very expensive to reverse.

- **Repair Costs:** costs have been uncharacteristically high in the past 3 years totally over $9,000, most of it early in 2017. Further needs anticipated with the failing hydraulic and exhaust systems.

- **Technical Advancements:** the nature of the work for which these trucks are enlisted require more advanced material for the exposed parts that resist corrosion, such as stainless steel. While a more expensive initial cost, the longevity gained has proven the worthy of investment.

Bucket Truck (#44)

F-750 Utility Truck with bucket hydraulic attachment, used extensively for tree pruning and emergency operations. This truck requires the utmost dependability due to the heights a person is working when in the bucket. Hydraulic problems are manifesting itself however not supported by cost data. About $2,860 has been spent on the truck over the last 3 yrs.

- **Work Critical:** used extensively for emergencies which could compromise the safety of residents.

- **Skill to Operate:** a specialty piece of equipment that required trained operators to be effective.

- **Alternatives Available:** there is only such vehicle in the Town for the nature of work required. As such it is critical for continuing operations.

- **Reliability:** while not totally supported by cost data, this truck has had numerous hydraulic problems that could jeopardize the operator and completing an assignment when critically needed.

- **Technology Advancements:** Trucks for used for this purpose are constantly gaining additional safety features that this truck would benefit from.

NEXT STEPS

The fleet replacement model is intended to be a dynamic tool that is updated annually by municipal officials. This report includes detailed instructions about updating the tool, and the project team will provide informal training to DPW staff as part of this project.

The project team also offers the suggestions below to improve the Town's ability to use the fleet replacement model in subsequent years:

- **Maintain electronic records of repairs.** This does not necessarily have to include regular or preventive maintenance, although it can, and these data may prove useful to the Town. However, the model is designed to take into account a five-year historical repair record. Electronic documentation is generally more accurate, sustainable, and reduces time in the long run as opposed to maintaining paper copies in folders.

- **Define a methodology to anticipate future costs.** This may be developed once the new staff develop familiarity over time with each vehicle or it may involve having trusted outside vendors provide inspections or make recommendations, especially on Police and Fire vehicles. This is needed for vehicles identified as "non-performers" in particular, which can be problematic in daily operations when the vehicle is not dependable. Currently, two large trucks fall into this category.

- **Compile and upload additional fleet data into the vehicle folder.** Over time summarize vehicle data into the fleet model to prepare for an assessment of each vehicle.

APPENDIX A: BEST PRACTICE ALTERNATIVES TO "REPLACEMENT-IN-KIND" CAPITAL INVESTMENT

Municipalities generally have significant investments in vehicles and equipment in order to provide the level of services the community expects. Often, the purchase of capital equipment significantly impacts the operating budget and takes bonding capacity away from other projects. With large equipment replacement cycles typically on the order of 10 to 20 years, many factors internal and external to the municipality may have changed during that period and close review is warranted before an investment of hundreds of thousands of dollars is made in new equipment. As such, the end of a life for major pieces of equipment should be seen as an opportunity to evaluate the scope of services provided by the equipment, along with the opportunities to reduce costs and move to a more sustainable investment model.

Options that could maintain levels of service but in a less expensive manner than a straight "replacement-in-kind" action, may include:

- **Purchase used equipment.** Local commercial auctions often allow a municipality to become certified to bid on used vehicles with other dealers on the floor. ADESA in the Town of Acton or Central Mass Auto Auction in Oxford are examples of such local vendors. This option has been shown to be a good option for smaller administrative fleet vehicles such as sedans, SUVs, and pick-up trucks as they constitute the largest inventory in these auction houses. Savings as high as 25-50% could result if the municipality is willing to purchase a vehicle that is a few years old instead of purchasing new.

- **Utilize the State contract**. "COMMBUYS" is offered by the Commonwealth's Executive Office of Administration and Finance (Operational Services Division), and is available for use by all municipalities. This service pre-qualifies vendors and lists the specifications for a variety of larger equipment, thereby saving time in the bidding process while also adhering to State purchasing regulations. The prices are competitive and often reflect savings through economies of scale by vendors hoping to attract state-wide attention on the equipment offered.

- **Team up with a neighboring municipality.** Most municipalities require the same equipment to accomplish similar services for their communities and some of that equipment may be needed for only a few weeks or months per year. If the work to be accomplished can be scheduled to meet each community's needs, it may be prudent to share in the cost of the equipment. Alternatively, the State Legislation allows for mutual aid between communities and through formal agreements municipalities can provide the service on a reimbursable basis.

- **Outsource the work.** Often the service desired by a municipality is available in the private sector, and it is prudent to conduct a full-cost accounting of the expenses involved in providing the service with municipal employees versus contracting with a private vendor. Such an analysis will allow for a more in-depth conversation with staff regarding the best use of resources, including use of employee time, operating and maintenance costs, and the cost of debt service and impact on the town's bonding capacity available to meet other capital needs.

- **Purchase multi-use equipment.** As the equipment industry evolves, newer models of equipment are released that have greater capability for accomplishing multiple tasks, potentially allowing the use of the vehicle to expand from seasonal to year round use. Not only could this shift consolidate equipment with an obvious savings of a smaller fleet inventory, but such continuous usage often benefits the equipment by keeping its components operational and systems maintained.

- **Negotiate the turn-in of the old equipment for cash credit at the time of sale.** Often commercial vendors are incentivized to make sales for their equipment and will offer better turn-in credit if the used piece of equipment is traded in than if the used equipment was auctioned off separately. This option is market driven and the two options should be evaluated before making a decision, as the result could be a significant reduction in cash out-lay for the new equipment and should be considered when determining the optimal time to replace a piece of equipment.

- **Involve the fleet manager in the purchasing decision.** Annual maintenance of the fleet can be as significant an expense as the original purchase. A fleet manager will likely be familiar with the routine maintenance costs for various models/years of equipment and if some consistency in the makes/models of equipment can be achieved, the fleet manager can also take advantage of the economies of scale when stocking repair parts and training staff. To by-pass the fleet manager's opinion in vehicle purchase decisions may result in a much costlier investment in the long run than originally anticipated.

- **Create an administrative vehicle motor pool.** Often in municipal government, each position requiring the use of a vehicle has a sedan, van, or SUV assigned to it. Depending on the nature of use, such vehicles may need replacement more due to age than accumulated mileage. As such, this practice may be less efficient than having a motor pool where vehicles are signed in/out across multiple departments as needed. In instances when an employee does not use a vehicle throughout day, or a position is vacant due to transition, or an employee is off due to illness or vacation, the creation of an administrative sign-in/out process could potentially reduce the size of the fleet by as much 10-30%.

- **Build small equipment purchases into the General Operating Budget.** The purchase of supporting equipment such as trailers, sedans, sanders, etc. (less than $30,000) should be considered for inclusion in the annual operating budget instead of being added to the capital improvement plan. During capital planning, such modest-sized equipment must compete with other longer term and more significant equipment, while using up municipal bonding capacity and potentially reducing capacity available for longer term investments.

- **Spread out the purchase of costly equipment.** Should costlier vehicles and equipment be requested for replacement at the same time (e.g., the replacement of three large construction trucks in one year can result in a combined cost of nearly $600,000), it would be prudent to try to spread the replacement over several years, thereby creating a more sustainable operations and financial model which can better average out changing economic conditions.

APPENDIX B: LOOK-UP TABLE FOR ASSESSMENT VALUES

The following section provides a summary of the point "bands" for each parameter which defines suggested cut-offs for which points are awarded in order that repeated grading occurs in a consistent manner. It is to be noted that each parameter can be scored on a scale of 1 to 10. The importance of the parameter in replacement determination is reflected by the "weight" assigned to it as a point multiplier.

VEHICLE CONDITION – 110 points maximum		
Parameters to Assess	**Points**	**Criteria for Point Bands**
Age relative to industry standard (weight = 2)	10	More than 3 years older than industry standard
	5	1 year under to 3 years over industry standard
	0	More than 1 year below industry standard
Mileage relative to industry standard (weight = 3)	10	More than 20% greater than industry standard
	5	+/- 20% of industry standard
	0	More than 20% lower than industry standard
Storage location (weight = 1)	10	Outside exposed to elements
	5	Under roof only
	0	Indoors, heated
Vehicle washing, annually (weight = 1)	10	Never washed
	5	Occasionally, less than 5x per year
	0	Frequently, more than 5x per year
Degree of corrosion (weight = 4)	10	Significant rust (>70% with rot on undercarriage)
	5	Modest rust (30%) with some flaking
	0	Little rust (<5%) and only on paint/surface

VEHICLE UTILIZATION – 60 points maximum		
Parameters to Assess	**Points**	**Criteria for Point Bands**
Work Critical (weight = 3)	10	Critical to life safety
	5	Core mission of Town
	0	Aesthetics, not permanent
Skills needed to Operate (weight = 1)	10	Specific license required, limited operators
	0	No special license required
Work Mandated by State/Federal Regulations (weight = 2)	10	Yes
	0	No

VEHICLE OPERATIONS – 70 points maximum		
Parameters to Assess	**Points**	**Criteria for Point Bands**
Alternatives Available to Achieve Result (weight = 2)	10	No dependable alternative
	5	Could be contracted out or borrowed from another community
	0	Have other available pieces
Frequency of Use (weight = 1)	10	Relied on daily, 5+ months per year
	5	Relied upon seasonally, <5 months per year
	0	Used randomly as need arises
Reliability (Downtime) (weight = 3)	10	Down >2x per month or 10 days/month (33%)
	5	Down 3x in 3 months or 14 days in 3 months (15%)
	0	Down 1x in 3 months or <3 days in 3 months (<55)
Environmental (Green) Component (weight = 1)	10	New model with specific green component
	5	No targeted initiative, generally improved mileage

RETURN ON INVESTMENT – 80 points maximum		
Parameters to Assess	**Points**	**Criteria for Point Bands**
Projected repair cost next year (weight = 3)	10	Major costs foreseen (>10% of replacement)
	5	Constant minor repair costs expected (<10%)
	0	No signs of future failure
Depreciation (weight = 1)	10	Turn in value >20% of new
	5	Turn in value 5-20% of new
	0	Turn in value <5% of new
Annualized cost to own ratio (Future Repair Costs+ Depreciation)/(# Years Extended) (weight = 4)	10	Ratio > 0.7
	5	Ratio from 0.5-0.7
	0	Ratio <0.5

OBSOLESCENCE – 50 points maximum		
Parameters to Assess	**Points**	**Criteria for Point Bands**
Evolution of technology (weight = 1)	10	Newer models combine multiple tasks in one vehicle
	5	Significant improvements in efficiency/safety
	0	Small or negligible improvements
Repair parts availability (weight = 4)	10	Repair parts no longer available
	5	Parts only by special order or cannibalization
	0	Parts are readily available

APPENDIX C: MILTON VEHICLE INVENTORY (2018)

Auto Fleet Schedule

Description of Information

Town of Milton

Territory # 17

#	Department	Year	Manufacturer & Model	Vin #	Plate #	GVW	Cost New	Type	Class	ACV RC	Med Pay	$ Comp Deduct	$ Coll Deduct	Effective Date
1	BOARD OF HEALTH	2007	HAULMARK - TRANSPORT	16HCB12197P059107	M2072	2,980	$4,228	L	68499	ACV	N	$500	NO COV	07/01/2017
41	BOARD OF HEALTH	2009	TOYOTA - COROLLA	1NXBU40E59Z100547	M78286	3,704	$16,032	L	73980	ACV	N	$500	NO COV	07/01/2017
223	BUILDING	2005	FORD - CROWN VICTORIA	2FAFP73W35X127970	M90589		$2,000	L	73980	ACV	N	$500	NO COV	07/01/2017
11	CEMETERY	1985	LINDSAY - AIR COMPRESSOR	30250	M6379	1,730	$10,000	L	79650	ACV	N	$500	NO COV	07/01/2017
10	CEMETERY	1998	CHEVROLET - GMT 400	1GBJK34RXWF070060	M62667	11,000	$32,000	M	21499	ACV	N	$500	NO COV	07/01/2017
8	***Deleted***	2002	BANDIT - BRUSH TRAILER	004942	M64311									
7	CEMETERY	2006	JCB - BACKHOE / LOADER	SLP214TC6U0908226	M6376	15,979	$77,959	M	79650	ACV	N	$500	NO COV	07/01/2017
6	CEMETERY	2008	CHEVROLET - CHASSIS TRUCK	1GBJK34K68E207412	M78279	14,000	$34,991	M	21499	ACV	N	$500	NO COV	07/01/2017
5	CEMETERY	2009	CHEVROLET - SILVERADO	1GCHK44K29E126716	M55633	9,200	$24,798	L	01499	ACV	N	$500	NO COV	07/01/2017
4	CEMETERY	2011	CHEVROLET - TRUCK	1GB3KZCG8BF252409	M85120	6,115	$35,717	L	01499	ACV	N	$500	NO COV	07/01/2017
3	CEMETERY	2012	FORD - FOCUS	1FAHP3K25CL326822	M64310		$17,890	L	73980	ACV	N	$500	NO COV	07/01/2017
2	CEMETERY	2014	JCB - BACKHOE	JCB30XPCH02263167	M94465	15,979	$104,864	M	79650	RC	N	DEC 4C	DEC 4C	07/01/2017
219	CEMETERY	2016	CHEVROLET - SILVERADO	1GB3KYCG8GZ344071	M97481		$49,000	M	21499	ACV	N	DEC 4C	DEC 4C	07/01/2017
16	***Deleted***	2007	FORD - E450 VAN	1FDXE45SX7DA47505	M55161									
15	COUNCIL ON AGING	2008	MERCURY - MARQUIS	2MEFM75V28X638595	M82993	3,858	$14,900	L	05230	ACV	N	$500	NO COV	07/01/2017
14	COUNCIL ON AGING	2010	HONDA - ACCORD	1HGCP3F82AA006032	M79673		$16,649	L	05230	ACV	N	$500	NO COV	07/01/2017
13	COUNCIL ON AGING	2011	FORD - E350 VAN	1FDEE3FL2BDB04698	626RD8	4,840	$51,361	L	05230	ACV	N	$500	NO COV	07/01/2017
12	COUNCIL ON AGING	2016	FORD - CUTVAN	1FDEE3FL2GDC02959	M82174	12,700	$55,000	M	05230	ACV	N	$500	NO COV	07/01/2017
90	***Deleted***	1974	CATERPILLAR - FRONT END LOADER (70)	41K4410	M20859									
89	***Deleted***	1975	GENERAL - TRAILER (113)	3TL7568										
88	***Deleted***	1979	FORD - MOWER TRACTOR (83)	C611621	M6370									
87	***Deleted***	1980	BECK 1STD - GENERATOR TRAILER (115)	P532	M37937									
85	***Deleted***	1983	LEROI - COMPRESSOR (103)	3056X700	M6322									
84	DPW	1985	CHEVROLET - PICKUP (6)	1GCGK24MXFJ186943	M45	8,600	$10,618	L	01499	ACV	N	$500	NO COV	07/01/2017
81	DPW	1990	MACK - DUMP TRUCK (41)	1M2P230C3LW008398	M6352	36,180	$47,533	H	31499	ACV	N	$500	NO COV	07/01/2017

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82	DPW	1990	MACK - DUMP TRUCK (45)	1M2P230C5LW008399	M6337	36,180	$47,500	H	31499	ACV	N	$500	NO COV	07/01/2017
78	DPW	1991	CUSTOM - FLATBED TRAILER (110)	1YB321539M1B1T679	M43127	2,100	$2,470	L	68499	ACV	N	$500	NO COV	07/01/2017
77	DPW	1992	CHEVROLET - FLATBED DUMP (46)	1GBP7H1J6NJ100772	M6325		$13,000	H	31499	ACV	N	$500	NO COV	07/01/2017
72	***Deleted***	1995	FORD - L8000 DUMP TRUCK (31)	1FDYK82E3SVA58867	M6317									
73	DPW	1995	DIETZ ARROW BOARD - TRAILER (112)	D002584301964	M43132	1,100	$5,000	ST	69499	ACV	N	$500	NO COV	07/01/2017
71	DPW	1995	BANDIT - BRUSH CHIPPER 250 (84)	008464	M6340	5,850	$17,188	L	79650	ACV	N	$500	NO COV	07/01/2017
70	DPW	1996	CHEVROLET - DUMP TRUCK (43)	1GBP7H1J0TJ100621	M6351	37,600	$69,896	H	31499	ACV	N	$500	NO COV	07/01/2017
69	DPW	1996	CHEVROLET - 3500 SEDAN UTILITY TRUCK (18)	1GBJK34F7TE172665	M978	12,000	$26,837	M	21499	ACV	N	$500	NO COV	07/01/2017
209	***Deleted***	1997	CHEVROLET - TAHK15	1GNEK13R6VJ 340875	M90596									
66	DPW	1997	CHEVROLET - TRUCK CHASSIS (48)	1GBP7H1JXVJ102072	M6361	37,600	$73,186	H	31499	ACV	N	$500	NO COV	07/01/2017
68	DPW	1997	JOHN DEERE - FRONT END LOADER (62)	DW624GB559938	M16408		$106,000	H	79650	ACV	N	$500	NO COV	07/01/2017
64	DPW	1998	WRIGHT - TRAILER	1S9TS1610W1132007	M86246	4,999	$3,000	L	68499	ACV	N	$500	NO COV	07/01/2017
62	***Deleted***	2001	FORD - CROWN VICTORIA	2FAFP71W81X197431	M6360									
61	DPW	2002	CROSS COUNTRY - UTILITY TRAILER	431FS101X22001100	M24236	2,990	$1,299	L	68499	ACV	N	$500	NO COV	07/01/2017
60	DPW	2002	CROSS COUNTRY - UTILITY TRAILER	431FS101722001099	M37928	2,990	$1,299	L	68499	ACV	N	$500	NO COV	07/01/2017
59	***Deleted***	2003	CHEVROLET - SILVERADO	1GCHC24113E221557	M6344									
58	DPW	2003	CHEVROLET - KODIAK	1GBP8J1C83F507384	M6349	37,600	$60,800	H	31499	ACV	N	$500	NO COV	07/01/2017
212	DPW	2004	ALLMAND - UTILITY TRAILER	0060PR005	M28136	2,100	$8,000	L	68499	ACV	N	$1,000	NO COV	07/01/2017
53	DPW	2005	STERLING - L8500	2FZAAWDC95AU31122	M6362	40,600	$115,870	EH	40499	ACV	N	$500	NO COV	07/01/2017
51	DPW	2005	BIG TEX - TRAILER	16VNX142052C58380	M41317	5,000	$1,995	L	68499	ACV	N	$500	NO COV	07/01/2017
50	DPW	2005	FORD - F350	12FTWF30P05EB30197	M6335	10,700	$23,336	M	21499	ACV	N	$500	NO COV	07/01/2017
55	DPW	2005	FORD - BUCKET TRUCK F750	3FRXF75R75V124300	M6372	33,000	$108,410	H	31499	ACV	N	$500	NO COV	07/01/2017
56	***Deleted***	2005	BOBCAT - S185	525021400										
54	***Deleted***	2005	FORD - F750	3FRXF75R35V165913	M6316									
52	DPW	2005	MUTI QUIP - R2000 (100)	250910		2,000	$5,000	L	79650	ACV	N	$500	NO COV	07/01/2017
49	DPW	2006	FORD - F350	1FTWF31Y36EB07246	M6314	10,700	$34,445	M	21499	ACV	N	$500	NO COV	07/01/2017
48	DPW	2006	FORD - F350 DUMP TRUCK	1FDWF37P46EA18540	M6364	10,000	$35,000	M	21499		N	NO COV	NO COV	07/01/2017
44	DPW	2008	FORD - F450	1FDXF47R28EC98277	M46718	16,000	$46,767	M	21499	ACV	N	DEC 4C	DEC 4C	07/01/2017

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47	DPW	2008	CAMOPLAST - SIDEWALK TRACTOR	900200221	M26476	5,925	$112,800	L	79650	ACV	N	DEC 4C	DEC 4C	07/01/2017
45	DPW	2008	FORD - F450 DUMP	1FDXF47R48EC98278	M41307	16,000	$47,407	M	21499	ACV	N	DEC 4C	DEC 4C	07/01/2017
46	DPW	2008	FORD - SRWSUP	1FTSX21578EE04955	M6307	9,200	$24,345	L	01499	ACV	N	$500	NO COV	07/01/2017
43	DPW	2009	TOYOTA - COROLLA	1NXBU40E99Z106318	M78297	3,704	$16,032	L	73980	ACV	N	$500	NO COV	07/01/2017
42	DPW	2009	TOYOTA - COROLLA	1NXBU40E99Z106125	M78296	3,704	$16,032	L	73980	ACV	N	$500	NO COV	07/01/2017
40	DPW	2009	TOYOTA - COROLLA	1NXBU40E09Z104912	M78295	3,704	$16,032	L	73980	ACV	N	$500	NO COV	07/01/2017
37	DPW	2010	FORD - FUSION	3FAHP0JA0AR431631	M83600	43,899	$17,799	L	73980	ACV	N	$500	NO COV	07/01/2017
38	DPW	2010	FORD - FUSION	3FAHP0JA2AR431629	M83590	4,389	$17,799	L	73980	ACV	N	$500	NO COV	07/01/2017
36	DPW	2010	INTERNATIONAL - 4300SE TRUCK	1HTMMAAN1AH271337	M83597	31,000	$196,468	H	31499	ACV	N	DEC 4C	DEC 4C	07/01/2017
39	DPW	2010	FORD - FUSION	3FAHP0JA9AR431630	M81901	4,381	$17,799	L	73980	ACV	N	$500	NO COV	07/01/2017
34	DPW	2011	FORD - ESCAPE	1FMCU9C73BKA87734	M85103		$25,000	L	01499	ACV	N	$500	NO COV	07/01/2017
35	DPW	2011	CARLTON - CHIPPER TRAILER	1J9XF0113B1167135	M85119	9,000	$41,869	L	79650	ACV	N	$500	NO COV	07/01/2017
33	DPW	2012	TENNANT - TRACTOR/SWEEPER	3422A	M81929		$35,000	M	79650	ACV	N	DEC 4C	DEC 4C	07/01/2017
30	DPW	2012	FORD - F250	1FT7X2B62CED19138	M81941	9,700	$41,173	L	01499	ACV	N	$1,000	NO COV	07/01/2017
29	DPW	2012	FORD - F350 PICKUP	1FDRF3B64CED19137	M81940	10,400	$46,380	M	21499	ACV	N	$1,000	NO COV	07/01/2017
31	DPW	2012	INTERNATIONAL - DUMP TRUCK	1HTWDAAR1CJ674869	M83793	40,000	$152,860	H	31499	ACV	N	DEC 4C	DEC 4C	07/01/2017
32	DPW	2012	INTERNATIONAL - TRUCK	1HTWDAARXCJ679374	M83796		$152,860	H	31499	RC	N	DEC 4C	DEC 4C	07/01/2017
28	DPW	2013	TRACKLESS - TRACTOR	MT61579	M81931	6,200	$223,530	L	79650	ACV	N	DEC 4C	DEC 4C	07/01/2017
145	DPW	2013	FORD - EXPLORER	1FM5K8AR0DGA88956	M97454		$28,195	L	01499	ACV	N	$500	NO COV	07/01/2017
26	DPW	2013	MGS - PUMP TRAILER	16MPF1015DD067115	M88839	6,600	$35,000	L	68499	ACV	N	$500	NO COV	07/01/2017
27	DPW	2013	CAM - UTILITY TRAILER	5JPBU2325DP032810	M86236	18,400	$7,990	M	68499	ACV	N	$500	NO COV	07/01/2017
25	DPW	2014	FORD - F350	1FTRF3B6XEEA68020	M88842	10,400	$43,128	M	21499	ACV	N	$500	NO COV	07/01/2017
21	DPW	2015	AMERICAN - TRAILER	1A9UG18A1F1668087	M93700	14,000	$20,000	M	68499	ACV	N	$500	NO COV	07/01/2017
23	DPW	2015	FORD - F350 PICKUP	1FTRF3B63FEC37960	M93699	10,400	$40,000	M	21499	ACV	N	$500	NO COV	07/01/2017
24	DPW	2015	SULLAR - TRAILER	201505080063	M92565	2,130	$17,995	L	68499	ACV	N	$500	NO COV	07/01/2017
22	DPW	2015	DEERE - LOADER TRACTOR	1DW544KZAFF672091	M94695	35,008	$195,000	H	79650	ACV	N	DEC 4C	DEC 4C	07/01/2017
18	DPW	2016	FORD - F450	1FDUF4HY9GEB43961	M95497	16,500	$50,174	M	21499	ACV	N	DEC 4C	DEC 4C	07/01/2017
20	DPW	2016	TRACKLESS - TRACTOR	MT62017	M94697	6,420	$177,000	L	79650	RC	N	DEC 4C	DEC 4C	07/01/2017

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17	DPW	2016	FORD - F350	1FDRF3H69GEB43957	M95496	14,000	$57,753	M	21499	ACV	N	DEC 4C	DEC 4C	07/01/2017
214	DPW	2016	747 - FR2000 ECO	159522122GD381052	M97248	14,000	$97,851	M	68499	ACV	N	DEC 4C	DEC 4C	07/01/2017
19	DPW	2016	TOW NASTER - TRAILER	4KNFT2026GL161368	M94685	21,960	$10,900	H	68499	ACV	N	$1,000	NO COV	07/01/2017
210	DPW	2016	FREIGHTLINER - HU0040	3ALACYDT7GDHU0040	M95480	35,000	$180,000	H	31499	ACV	N	DEC 4C	DEC 4C	07/01/2017
225	DPW	2017	FORD - SDTYF	1FDUF5HY1HED87353	M98991		$93,567	M	21499	ACV	N	$500	NO COV	09/07/2017
206	DPW	2017	PETERBUILT - 348	2NP3HJ8X6HM388632	M95484	37,230	$177,833	H	31499	ACV	N	DEC 4C	DEC 4C	07/01/2017
220	DPW	2017	JOHN DEERE - LOADER	1DW544KZPGF678791	M97456	31,800	$184,500	H	79650	ACV	N	DEC 4C	DEC 4C	07/01/2017
232	DPW	2017	ATLAS - 185	4500A1013HR053932	M99850	2,491	$17,995	T	68499	ACV	N	$1,000	NO COV	10/27/2017
211	DPW	2017	WRIGHT - UTILITY	1S9TS2020H1132015	M93731	7,300	$7,300	L	68499	ACV	N	$1,000	NO COV	07/01/2017
222	DPW	2017	CROSS - 4HD16 FLAT TRUCK	431FS1621H1000531	M98982	9,985	$6,450	L	01499	ACV	N	NO COV	NO COV	09/25/2017
235	DPW	2017	MONSTER - UTILITY	4M9BU0717HM045089	M99844	2,000	$6,500	T	68499	ACV	N	$1,000	NO COV	12/05/2017
227	DPW	2017	VER-MAC - TRAILER	2S9U52113HS132475	M98892	1,260	$18,759	SUT NC	69499	ACV	N	$500	NO COV	10/12/2017
226	DPW	2017	VER-MAC - TRAILER	2S9US2115HS132476	M98893	1,260	$18,759	SUT NC	69499	ACV	N	$500	NO COV	10/12/2017
237	DPW	2018	FORD - EXPLORER	1FM5K8D82JGA04974	M99829	6,600	$37,000	L	73980	ACV	N	$1,000	NO COV	01/09/2018
229	DPW	2018	INTERNATIONAL - 7400SB	3HAWDTAR4JL484977	M98993	41,000	$173,577	H	31499	ACV	N	DEC 4C	DEC 4C	07/12/2017
240	DPW	2018	INTERNATIONAL - 7400 SBA	3HAWDTAR8JL215706	M99067	40,780	$170,577	H	31499	ACV	N	$500	NO COV	03/05/2018
236	DPW	2018	FORD - FOCUS	1FADP3E24JL231854	M77207		$19,000	L	73980	ACV	N	$1,000	NO COV	01/08/2018
233	DPW	2018	INTERNATIONAL - 7000	3HTGSSNT0JN484979	M99847	69,000	$199,960	EH	40499	ACV	N	$1,000	NO COV	11/09/2017
228	DPW	2018	INTERNATIONAL - 7400SB	3HAWDTAR25L484976	M98994	41,000	$173,577	H	31499	ACV	N	DEC 4C	DEC 4C	07/12/2017
239	DPW	2018	INTERNATIONAL - 7000	3HAWDTHR6JL215606	M99052	40,780	$170,577	H	31499	ACV	N	$1,000	NO COV	02/08/2018
112	FIRE	1919	OLDS - ECONOM MODEL T	5442		4,832	$16,800	L	96200	ACV	N	$500	NO COV	07/01/2017
111	FIRE	1934	MAXIM - FIRE TRUCK	776	MF2049	9,625	$9,000	L	79090	ACV	N	$500	NO COV	07/01/2017
110	FIRE	1986	CHEVROLET - PICKUP	1GCGD34J5GF360265	MFA115		$500	L	79090	ACV	N	$500	NO COV	07/01/2017
108	FIRE	1997	EMERGENCY ONE - CYCLONE #H224 (E2)	4ENFAAA8XV1007235	MF20M	39,200	$218,800	H	79090	ACV	N	$500	NO COV	07/01/2017
107	FIRE	2000	EMERGENCY ONE - FIRE ENGINE (E4)	4ENFAAA8XY1001342	MF40M	39,200	$250,575	H	79090	ACV	N	$500	NO COV	07/01/2017
105	FIRE	2003	INTERNATIONAL - TRAVEL TRAILER	1UK500E2231041725	MF9199	7,000	$10,000	L	68499	ACV	N	$500	NO COV	07/01/2017
104	FIRE	2004	FORD - E450	1FDXE45P44HA98207	MF4651	14,050	$32,760	M	79090	ACV	N	$500	NO COV	07/01/2017

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103	FIRE	2005	EMERGENCY ONE - CYCLONE 100' LADDER	4ENGABA8651009251	MF11M	64,000	$599,854	EH	79090	ACV	N	$500	NO COV	07/01/2017
102	FIRE	2005	FORD - 500 SEDAN	1FAFP27115G194106	MF45	5,000	$23,588	L	79080	ACV	N	$500	NO COV	07/01/2017
101	FIRE	2006	E ONE - TYPHOON RESCUE PUMPER	4EN6AAA8361001762	MF10M	40,000	$413,854	H	79090	ACV	N	DEC 4C	DEC 4C	07/01/2017
99	FIRE	2010	FORD - EXPEDITON	1FMJU1G53AEB68893	MF7232		$27,840	L	79080	ACV	N	$500	NO COV	07/01/2017
100	FIRE	2010	CROSS COUNTRY - TRAILER	431FS1214A1000574	MF2048	2,990	$1,900	L	68499	ACV	N	$500	NO COV	07/01/2017
98	FIRE	2012	E ONE - TYPHOON PUMPER	4EN6AAA8XC1007330	MF5046	42,000	$450,000	H	79090	RC	N	DEC 4C	DEC 4C	07/01/2017
97	FIRE	2013	FORD - EXPLORER	1FM5K8AR8DGB08001	MF4663		$35,000	L	79080	ACV	N	$500	NO COV	07/01/2017
96	FIRE	2014	FORD - PICKUP	1FTFW1ET9EFA94854	MF6725		$32,835	L	79090	ACV	N	$500	NO COV	07/01/2017
95	FIRE	2015	FORD - F250 PICKUP	1FT7W2B61FEB32674	MFA597	10,000	$35,000	M	79090	ACV	N	$500	NO COV	07/01/2017
230	FIRE	2017	E-ONE - FIRE TRUCK TYPHOON	4EN6AAA86H1000978	MFC548	42,000	$485,015	H	79090	ACV	N	$1,000	NO COV	10/31/2017
188	FACILITIES	2000	CHEVROLET - CHEVY VAN	1GCHG35R3Y1270207	M64274	9,500	$20,724	L	05650	ACV	N	$500	NO COV	07/01/2017
94	FACILITIES	2005	FORD - EXPEDITION	1FMPU165X5LA11651	M87498		$27,561	L	01499	ACV	N	$500	NO COV	07/01/2017
93	FACILITIES	2008	DODGE - SPRINTER VAN (133)	WD0PE745585254310	M20808	8,550	$37,399	L	01499	ACV	N	$500	NO COV	07/01/2017
92	FACILITIES	2013	FORD - TRACON	NM0LS6ANXDT166953	M85915		$25,585	L	01499	ACV	N	$500	NO COV	07/01/2017
193	FACILITIES	2014	FORD - F250 PICKUP	1FTBF2B66EEA35110	M85907	10,500	$33,025	M	21499	ACV	N	DEC 4C	DEC 4C	07/01/2017
204	FACILITIES	2016	FORD - F250	1FTBF2B62GEB55053	M81565	10,000	$49,876	M	21499	ACV	N	$1,000	NO COV	07/01/2017
203	FACILITIES	2016	CARMATE - TRAILER	5A3U4814D5GL001173	M95-489	1,900	$4,685	L	69499	ACV	N	$1,000	NO COV	07/01/2017
113	FOOD SERVICE	2016	FORD - TRANSIT CONNECT	NMOLS6E73G1241312	M70444	5,020	$23,046	L	01499	ACV	Y	$1,000	$1,000	07/01/2017
114	INSPECTIONS	2016	FORD - FUSION	1FA6P0H76G5112893	M94418		$18,998	L	73980	ACV	N	$500	NO COV	07/01/2017
178	POLICE	1997	FORD - ECO VAN	1FTHE24L2VHB99579	MP13		$18,861	L	79120	ACV	N	$500	NO COV	07/01/2017
179	POLICE	1997	KUSTOM SIGNAL - UTIL TRAILER W/EQUIP	1K9BS0811VK118724	MP3329		$16,000	L	69499	ACV	N	$500	NO COV	07/01/2017
176	POLICE	2001	DODGE - CRCAR	1B4G924391B201943	5054RR	4,013	$22,000	L	79110	ACV	N	$500	NO COV	07/01/2017
174	***Deleted***	2002	FORD - NEIGHBOR	1FABP205620104514										
175	POLICE	2002	CENTER - BOAT TRAILER	1ZJBA20183M014282	MP2437	1,350	$700	L	69499		N	NO COV	NO COV	07/01/2017
171	POLICE	2003	FORD - DRWSUP TRUCK	1FDAF57P63ED34779	MP4E		$30,000	L	79120	ACV	N	$500	NO COV	07/01/2017
170	POLICE	2003	TRAFCON - UTILITY TRAILER	0303ADS5852	M67408		$19,500	L	69499	ACV	N	$500	NO COV	07/01/2017
173	***Deleted***	2003	FORD - CROWN VICTORIA	2FAFP71W23X142914	110866									
169	POLICE	2004	ACURA - SEDAN	19UUA66214A0066309	754WV6		$2,000	L	79110	ACV	N	$500	NO COV	07/01/2017

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167	POLICE	2005	TOYOTA - COROLLA	1NXBR32E8SZ366132	797ZK8		$5,000	L	79110	ACV	N	$500	NO COV	07/01/2017
164	POLICE	2006	HARLEY DAVIDSON - MOTORCYCLE	1HD1FHW116Y677813	M4259	723	$15,225	L	79420	ACV	N	$500	NO COV	07/01/2017
163	POLICE	2006	FORD - EXPEDITION	1FMPU16586LA97513	735XW4		$10,000	L	79120	ACV	N	$500	NO COV	07/01/2017
162	POLICE	2007	CHEVROLET - IMPALA	2G1WS55R479215656	242AG8		$23,120	L	79110	ACV	N	$500	NO COV	07/01/2017
161	POLICE	2007	FORD - EDGE	2FMDK46C87BB28429	25TK30		$26,186	L	79120	ACV	N	$500	NO COV	07/01/2017
159	POLICE	2007	FORD - INTERCEPTOR	2FAHP71W27X100175	MP380C		$20,940	L	79110	ACV	N	$500	NO COV	07/01/2017
160	POLICE	2007	FORD - EDGE	2FMDK46C87BA66143	7761LW	5,490	$26,237	L	79110	ACV	N	$500	NO COV	07/01/2017
224	POLICE	2008	CADILLAC - STS	1F6DZ67A980169361	5HW997		$10,000	L	79110	ACV	N	$500	NO COV	09/08/2017
158	POLICE	2008	HARLEY DAVIDSON - MOTORCYCLE	1HD1FHM1X8Y647604	MMC7298		$16,600	L	79420	ACV	N	$500	NO COV	07/01/2017
154	POLICE	2010	FORD - EXPEDITION	1FMJU1G51AEB67452	MP2		$28,698	L	79120	ACV	N	$500	NO COV	07/01/2017
156	POLICE	2010	FORD - FUSION	3FAHP0JA9AR431627	410BRB		$17,799	L	79110	ACV	N	$500	NO COV	07/01/2017
155	POLICE	2010	FORD - FUSION	3FAHP0JA0AR431628	9515ED		$17,799	L	79110	ACV	N	$500	NO COV	07/01/2017
153	POLICE	2010	ATS - MESSAGE BOARD TRAILER	1B9AF5119AP825297	MP6221	1,000	$15,000	L	69499	ACV	N	$500	NO COV	07/01/2017
151	POLICE	2011	FORD - TAURUS	1FAHP2JW2BG118659	19WC90		$25,680	L	79110	ACV	N	$500	NO COV	07/01/2017
150	POLICE	2012	HARLEY DAVIDSON - MOTORCYCLE	1HD1FHM12CB665588	MMC7300	723	$15,850	L	79420	ACV	N	$500	NO COV	07/01/2017
149	POLICE	2013	FORD - TRANSIT VAN	NM0LS6AN2DT151380	MP71		$25,384	L	79120	ACV	N	$500	NO COV	07/01/2017
148	POLICE	2013	DOOSAN - UTILITY TRAILER	4FVGNBCB4DU449126	M86227	4,285	$34,229	L	68499	ACV	N	$500	NO COV	07/01/2017
144	***Deleted***	2013	FORD - TAURUS	1FAHP2M83DG143490	MP3200									
147	POLICE	2013	FORD - ESCAPE	1FMCU9G99DUA54627	344NW9		$28,000	L	79110	ACV	N	$500	NO COV	07/01/2017
146	POLICE	2013	FORD - INTERCEPTOR	1FM5K8AR1DGA09150	1294XW		$27,480	L	79120	ACV	N	$500	NO COV	07/01/2017
137	POLICE	2014	FORD - TAURUS	1FAHP2MK2EG185632	MP74		$28,000	L	79110	RC	N	$500	NO COV	07/01/2017
207	POLICE	2014	HARLEY DAVIDSON - MOTORCYCLE	1HD1FHM13EB637706	MMC7372		$19,000	L	79420	ACV	N	$500	NO COV	07/01/2017
138	POLICE	2014	FORD - TAURUS	1FAHP2MK4EG185633	MP56		$28,000	L	79110	ACV	N	$500	NO COV	07/01/2017
140	POLICE	2014	FORD - EXPLORER	1FM5K8ARXEGC02303	MP3518		$27,890	L	79120	ACV	N	$500	NO COV	07/01/2017
142	POLICE	2014	FORD - EXPLORER	1FM5K8F87EGC26283	3AWR30		$28,000	L	79120	ACV	N	$500	NO COV	07/01/2017
141	POLICE	2014	FORD - EXPLORER	1FM5K8AT5EGB96244	MP24		$26,000	L	79120	ACV	N	$500	NO COV	07/01/2017
143	POLICE	2014	FORD - PICKUP	1FTFW1EF8EFA94855	1LY786		$28,000	L	79120	ACV	N	$500	NO COV	07/01/2017
208	POLICE	2014	HARLEY DAVIDSON - MOTORCYCLE	1HD1FHM11EB625165	MMC7107		$19,000	L	79420	ACV	N	$500	NO COV	07/01/2017

Auto Fleet Schedule

Description of Information

Town of Milton

Territory # 17

#	Department	Year	Manufacturer & Model	Vin #	Plate #	GVW	Cost New	Type	Class	ACV RC	Med Pay	$ Comp Deduct	$ Coll Deduct	Effective Date
139	***Deleted***	2014	FORD - EXPLORER	1FM5K8AR0EGA18147	MP64									
136	POLICE	2014	FORD - TAURUS	1FAHP2MK2EG100854	MP58		$26,210	L	79110	ACV	N	$500	NO COV	07/01/2017
132	POLICE	2015	FORD - TAURUS	1FAHP2H81FG112591	2DE935		$27,000	L	79110	ACV	N	$500	NO COV	07/01/2017
133	POLICE	2015	FORD - TRANSIT VAN	1FBAX2CG2FKA96090	183YZB		$38,525	L	79120	ACV	N	$500	NO COV	07/01/2017
134	POLICE	2015	CHEVROLET - TAHOE	1GNSK2KC1FR619739	MP45		$33,721	L	79120	ACV	N	$500	NO COV	07/01/2017
135	POLICE	2015	JOHN DEERE - GATOR	1M0825GFVFM101650	MP256G		$17,000	L	79650	ACV	N	$500	NO COV	07/01/2017
130	POLICE	2016	FORD - EXPLORER	1FM5K8AR1GGA01506	MP3		$30,775	L	79120	ACV	N	$500	NO COV	07/01/2017
131	POLICE	2016	FORD - PICKUP	1FT7X2B64GEA04377	251BHR		$41,390	L	79120	ACV	N	$500	NO COV	07/01/2017
205	POLICE	2016	FORD - EXPLORER	1FM5K8AR1GGA27913	MP6E		$27,855	L	79120	ACV	N	$500	NO COV	07/01/2017
213	POLICE	2016	FORD - F-250	1FD7X2AG5GEC25175	MPA315		$64,887	M	21499	ACV	N	$500	NO COV	07/01/2017
215	POLICE	2017	FORD - FUSION	3FA6P0T92HR159622	811NW9		$24,650	L	79110	ACV	N	$500	NO COV	07/01/2017
218	POLICE	2017	FORD - EXPLORER	1FM5K8AR5HGA36244	MP41		$28,690	L	79120	ACV	N	$500	NO COV	07/01/2017
221	POLICE	2017	FORD - EXPLORER	1FM5K8AR3HGA36243	MP44		$28,690	L	79120	ACV	N	$500	NO COV	07/01/2017
238	POLICE	2017	FORD - EXPLORER	1FM5K8AR3HGE13315	MP64		$29,010	L	79110	ACV	N	$500	NO COV	01/18/2018
217	POLICE	2017	FORD - EXPLORER	1FM5K8AR1HGA36242	MP14		$28,690	L	79120	ACV	N	$500	NO COV	07/01/2017
242	POLICE	2017	FORD - EXPLORER	1FM5K8ARXHGE13313	MP2		$29,010	L	79110	RC	N	$500		03/21/2018
231	POLICE	2017	DODGE - CHARGER	2C3CDXKTXHH533986	MPC216		$41,328	L	79110	ACV	N	$500	NO COV	11/01/2017
241	POLICE	2017	FORD - UTILITY	1FM5K8AR1HGE13314	MP3200		$29,010	L	79110	RC	N	$500		03/16/2018
129	PARKS	1998	HARVEY RAMPGATE - L716 TRAILER	5A2L71626WB000037	M56548	7,000	$2,495	T	68499	ACV	N	$500	NO COV	07/01/2017
128	PARKS	2002	FORD - NEIGHBOR	1FABP205520104505	M64312		$7,108	L	79420	ACV	N	$500	NO COV	07/01/2017
127	PARKS	2004	CHEVROLET - SILVERADO	1GBJK34U74E318482	M36843	11,000	$33,388	M	21499	ACV	N	$500	NO COV	07/01/2017
126	PARKS	2006	UTILITY - TRAILER	4ZEHH101X610169957	M72386	2,995	$2,000	L	68499	ACV	N	$500	NO COV	07/01/2017
125	PARKS	2006	UTILITY - TRAILER	159TS162861132083	M72385	7,000	$2,000	L	68499	ACV	N	$500	NO COV	07/01/2017
124	PARKS	2008	CHEVROLET - SILVERADO	1GBJK34K48E148733	M80653	12,000	$32,369	M	21499	ACV	N	$500	NO COV	07/01/2017
122	PARKS	2013	CHEVROLET - SILVERADO	1GB3K7CG3DF142368	M81937	13,200	$37,472	M	21499	ACV	N	DEC 4C	DEC 4C	07/01/2017
123	PARKS	2013	WRIGHT - TRAILER	1S9TS1628D1132050	M81938	7,000	$3,725	L	68499	ACV	N	$500	NO COV	07/01/2017
216	PARKS	2016	CHEVROLET - SILVERADO	1BC3KYCG1GZ276370	M96090	10,700	$43,128	M	21499	ACV	N	DEC 4C	DEC 4C	07/01/2017
117	PARK/REC	1996	JOHN DEERE - TRACTOR	M01145X160201		2,773	$14,500	L	79650	ACV	N	$500	NO COV	07/01/2017

Auto Fleet Schedule

Description of Information

Town of Milton

Territory # 17

#	Department	Year	Manufacturer & Model	Vin #	Plate #	GVW	Cost New	Type	Class	ACV RC	Med Pay	$ Comp Deduct	$ Coll Deduct	Effective Date
116	***Deleted***	1999	FORD - CHAS/CAB 450 DUMP TRUCK	1FDXF46S3XED19608	M61280									
120	PARK/TREE	1987	CUSTOM - TRAILER	B11074	M16525	9,750	$2,875	T	68499	ACV	N	$500	NO COV	07/01/2017
118	PARK/TREE	1997	CHEVROLET - PICKUP	1GCGL24R0V2129823	M56069	19,000	$21,570	M	21499	ACV	N	$500	NO COV	07/01/2017
186	SCHOOL	2002	FORD - NEIGHBOR	1FABP215420105319	M64313		$7,777	L	79420	ACV	N	$500	NO COV	07/01/2017
185	SCHOOL	2006	FORD - F350 PICKUP	1FDWF31596EA41111	M73617	10,100	$39,840	M	21499	ACV	N	$500	NO COV	07/01/2017
184	SCHOOL	2012	FORD - F350 PICKUP	1FTRF3B64CEB84701	M87047	10,400	$35,000	M	21499	ACV	N	DEC 4C	DEC 4C	07/01/2017
183	***Deleted***	2014	TOYOTA - CAMRY	4T4BF1FK2ERE392227	M74203									
182	SCHOOL	2015	TOYOTA - COROLLA	2T1BURHE4FC248882	M78282		$18,790	L	79260	ACV	N	$500	NO COV	07/01/2017
181	SCHOOL	2016	FORD - TRANSIT	1FBAX2CG1GKA68346	M9367	5,020	$38,000	L	05650	ACV	N	$500	NO COV	07/01/2017
234	SCHOOL	2018	FORD - FUSION	3FA6P0G72JR139868	M78282	3,310	$17,990	L	79260	ACV	N	$500	NO COV	11/17/2017
192	SEWER	1997	SRECO - RODDING MACHINE	4H5W31729TL962256	M6328		$25,983	L	79650	ACV	N	$500	NO COV	07/01/2017
191	***Deleted***	1998	SRECO - RODDING MACHINE (85)	4H5HB1617WL982337	M6342									
190	***Deleted***	1998	CHEVROLET - 1 TON PICKUP 3500 (4)	1GCGC34R7WE111429	M6369									
202	WATER	1993	INGERSOLL - RAND AIR COMPRESSOR (60)	218039UJC308	M2103		$11,744	L	79650	ACV	N	$500	NO COV	07/01/2017
201	***Deleted***	1993	GMC - DUMP TRUCK (39)	1GDP7H1J8NJ525871	M48470									
199	***Deleted***	1996	CHEVROLET - 1 TON UTILITY 3500 (7)	1GBJK34F8TE231769	M6365									
198	WATER	1999	JOHN DEERE - BACKHOE 410E (64)	T0410EX855713	M6319	16,000	$71,033	M	79650	ACV	N	$500	NO COV	07/01/2017
196	WATER	2003	CHEVROLET - SILVERADO	1GCHC24113E132992	M55666	9,100	$29,865	L	01499	ACV	N	$500	NO COV	07/01/2017
197	WATER	2003	INGERSOLL RAND - COMPRESSOR	334333VAN221	M6347	2,310	$16,921	L	79650	ACV	N	$500	NO COV	07/01/2017
195	WATER	2004	FORD - PICKUP	1FTNX21L94EB85776	M6350	8,800	$23,780	L	01499	ACV	N	$500	NO COV	07/01/2017
194	WATER	2009	FORD - F350	1FTWX315X9EA93417	M6353	10,200	$42,374	M	21499	ACV	N	$500	NO COV	07/01/2017

ABOUT THE CENTER

The Edward J. Collins, Jr. Center for Public Management in the McCormack Graduate School of Policy and Global Studies at the University of Massachusetts Boston was established in 2008 to improve the efficiency and effectiveness of all levels of government. The Center is funded by the Commonwealth and through fees charged for its services.

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