



# Fleet Management Tools for Local Agencies

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The following members comprise the project's Technical Advisory Panel (TAP) that contributed to this project:

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## INTRODUCTION

The increasing cost of both buying and maintaining equipment and vehicles is changing the ways that local agencies manage their fleets. Budget constraints and rising costs require agency staff to employ tools and strategies for fleet management. This includes managing routine and emergency maintenance, replacement of old vehicles and the purchase of new ones. A vehicle that, at one time may have been scheduled for replacement is now being kept in service and maintained for longer periods. This approach may not always be a good thing, because extended vehicle life may result in increased maintenance and overall life cycle cost. There must be a way to balance all these considerations!

The most effective way to optimize the life of vehicles and equipment is through good fleet management. The goal of this guidebook is to describe what that is, and assess and describe the types of software and tools available for agency staff. The project included a survey of local agencies to first identify the types of equipment that make up their fleets, and then to quantify how long they are keeping equipment and vehicles before replacement. Lastly, the survey asked agency staff to list the tools they use for fleet management. A matrix comparing various software tool used in MN is included, as well as a series of cases studies.

To begin, an agency must define their own fleet components. Fleet can include both vehicles and equipment. Note that fleet and asset management are often tied together, both in process and software tools.

According to the APWA's *Public Works Management Practices Manual* (8th Edition), equipment and fleet management includes maintaining equipment and parts inventories, performing equipment inspections, scheduling preventive and normal maintenance, recording maintenance history, analyzing equipment costs and defining replacement cycles, drafting specifications, and procuring and maintaining all mechanized equipment. Automated or manual equipment or fleet management systems allow management to maintain cost accounts for personnel and equipment and control daily maintenance workflow.

APWA refers to fleet using both “equipment” and “vehicles” as descriptors. Because a fleet component can vary so much from agency to agency, it would be impossible to list all the pieces of equipment or types of vehicles used by a public works department. In this document, the word “unit” will be used to describe a piece of equipment or vehicle that is part of a fleet. This document will focus on fleet vehicles that have a motor or require an operator, and outline ways to manage maintenance and replacement of fleet units efficiently and effectively. Other equipment can be added as desired.



## GETTING STARTED

Fleet management is most effective when the user identifies the goals and outcomes that are most useful for their agency before initiating a process or beginning to use a management program. There are many ways to manage fleet data, including software tools or spreadsheets (these are covered later in the document). One of the first steps an agency should take is determining how the fleet management tool will be used and the specific output information and data that will be most useful for making decisions.

Before developing a plan for fleet management, consider goals and needs. Questions to consider include:

- What equipment or vehicles should be included? (First, define what “fleet” is to your agency.)
- Is the objective to plan for expenditures, so management of budget and cash flow is most important?
- What is the main goal: is it managing the maintenance budget, hours, and resources? Or is to determine life cycle costs and optimal replacement timing?
- Is the objective documenting performance measures and life cycle costs so that data can be used for future purchases and sales?

Each question will help narrow the path to a different type of management tool and output values. As evidenced later, different tools are appropriate for a variety of fleet sizes and data needs.

A good way to start is with a simple spreadsheet. Find out what information is already being tracked through other tools, databases, or spreadsheets. And, go for the easy stuff first: what information is available and easily attainable and quantifiable? Assign a staff person to collect data surrounding fleet management, including:

- Fleet composition by equipment type, year acquired and purchase price
- Hours or effort that are currently budgeted or allowed for each routine maintenance task
- Routine maintenance activities, along with dates if available
- Maintenance or repair activities that are conducted in-house, and those that are sent out
- Parts and supply inventory for each piece of equipment
- Any forms or standardized data collection methods already being used
- Service life history for each vehicle, along with dates, costs, and results
- Specialized equipment or fleet units that require special consideration

If identifying cost of fleet ownership is the goal, use real agency history, data and numbers. And, if actual costs and timing have not been tracked, begin now. Do not use estimated maintenance numbers from suppliers; ask staff how much each maintenance operation really costs, broken down by supply costs and labor effort required. This up-front work is important: really work at identifying all costs associated with ownership, including time and materials for obtaining supplies and using outside resources. It's a required first step, and important to determining how much owning a specific fleet unit costs.

After identifying the information that is already being collected and the tools being used to track, it may be clear that a fleet management tool could be useful. Reviewing the information, you have may also make clear that which is missing and could be more useful. Fleet management software tools require an investment in software, training and staff time, but can be effective in tracking or determining the type of data needed for some agencies. That data output may include:

<ul style="list-style-type: none"> <li>• life cycle costs</li> </ul>	<ul style="list-style-type: none"> <li>• safety features</li> </ul>
<ul style="list-style-type: none"> <li>• optimal replacement schedules</li> </ul>	<ul style="list-style-type: none"> <li>• performance</li> </ul>
<ul style="list-style-type: none"> <li>• maintenance schedules</li> </ul>	<ul style="list-style-type: none"> <li>• emissions</li> </ul>
<ul style="list-style-type: none"> <li>• fuel consumption</li> </ul>	<ul style="list-style-type: none"> <li>• warranty information</li> </ul>
<ul style="list-style-type: none"> <li>• recall information and follow-up</li> </ul>	<ul style="list-style-type: none"> <li>• incidents</li> </ul>
<ul style="list-style-type: none"> <li>• repairs</li> </ul>	

More information about these software tools is available later in the guidebook.

## TOOLS FOR CONSIDERATION

Agencies responding to our survey track and manage data in one of two ways: they use a spreadsheet or a software tool designed for fleet management. Typical use and the benefits and disadvantages of each are reviewed in the following sections.

### Spreadsheets

The use of Microsoft Excel spreadsheets to manage and track expenditures is common; almost half of all survey respondents indicated that they use a spreadsheet for fleet management. Excel is widely available, easy to use, and easy to implement. With the advent of shared documents, such as Google Drive multiple users can edit one document without concern for maintaining changes in one document. Both benefits and disadvantages are listed below.

## BENEFITS OF USING A SPREADSHEET:

- For Excel users, no additional software or training is needed
- Spreadsheets can be easily tailored to local shop equipment and tracking information
- Costs and input variables are easy to customize
- Anyone who knows Excel can enter data
- Widely available user access
- Lower cost
- Good for small data sets

## DISADVANTAGES OF USING A SPREADSHEET:

- Analysis/reporting features may not be as robust as a software tool
- User access may be limited to maintain the data's integrity
- Data may not be secure
- Spreadsheets are easily copied, so keeping one up-to-date copy may be difficult
- Spreadsheets are easily corrupted, and data can be erased
- Inconsistent data entry among multiple users
- Spreadsheets are not easily sorted or queried
- The complexity or power of the spreadsheet is dependent on the developer
- Limited fields
- Spreadsheets get large and maybe too complicated to be efficient
- Training may be required
- Data may not generate desired results

A 2015 report published by the Indiana Department of Transportation (IDOT) and Purdue University created an excel spreadsheet for IDOT, that allows users to categorize parts and perform average life analysis. It offers one example of a large, comprehensive database that may be reviewed for ideas and insight into how a spreadsheet can be applied in your agency. A link to that report and spreadsheet is provided here: [IDOT spreadsheet tool](#).

Spreadsheets can be used as an inventory tool to track fixed data, such as acquisition information and purpose, as well as maintenance and repair records. Fixed data includes things like the unit number and description, year acquired and source, purchase price and depreciation, replacement and salvage values, annual and current mileage, user, and purpose or route assigned. Macros can be added that flag the users when a unit reaches a certain age, mileage, or annual maintenance cost threshold. They can be extremely



simple or complicated, depending on the user and developer and are an easy first-step in managing fleet units.

Lake County uses a spreadsheet, and a description of it is included in Appendix B.

## Software Tools

There are many software tools available for fleet management. So many, that it can be difficult to compare the various software tools available and know which will best fit an agency's needs. Below is a summary of some of the benefits and disadvantages of using a software tool, as well as a matrix comparing some of the more commonly used software tools in Minnesota that were mentioned in the report survey.

### BENEFITS OF USING A SOFTWARE TOOL:

- |   |   |
|---|---|
| <ul style="list-style-type: none"><li>• Software may link to other systems, such as fuel, or financial tracking systems</li></ul>                   | <ul style="list-style-type: none"><li>• Special and customizable reporting is easy</li></ul>                                |
| <ul style="list-style-type: none"><li>• Report output is easily generated</li></ul>   | <ul style="list-style-type: none"><li>• Younger staff are attracted to software and technology</li></ul>                    |
| <ul style="list-style-type: none"><li>• Report input summaries are easily generated</li></ul>   | <ul style="list-style-type: none"><li>• Cutting-edge technology is automatically updated by the software provided</li></ul> |
| <ul style="list-style-type: none"><li>• Other agencies may use the software, resulting in an opportunity of inter-agency cooperation</li></ul>      | <ul style="list-style-type: none"><li>• Data is secure</li></ul>  |
| <ul style="list-style-type: none"><li>• The software tool is program to prompt a user for required input data</li></ul>                             | <ul style="list-style-type: none"><li>• Consistent data entry and field components</li></ul>                                |
| <ul style="list-style-type: none"><li>• Data output can be extremely useful (like number of tires replaced in one month for a given unit)</li></ul> | <ul style="list-style-type: none"><li>• Agencies can share training materials and resources</li></ul>                       |

### DISADVANTAGES OF USING A SOFTWARE TOOL:

- |  |   |
|--|---|
| <ul style="list-style-type: none"><li>• A champion is needed within the agency to maintain ownership and updates</li></ul> | <ul style="list-style-type: none"><li>• Software may be intimidating to some users</li></ul>              |
| <ul style="list-style-type: none"><li>• Cost of acquiring the software</li></ul>   | <ul style="list-style-type: none"><li>• Effectiveness and speed are impacted by internet access</li></ul> |
| <ul style="list-style-type: none"><li>• Staff training is required to optimize the software's features</li></ul>           |   |

## Matrix Comparing Commercially Available Fleet Management Software Tools

Many fleet management software tools are available for tracking and managing fleet data. Fleet management is often a module as part of a larger asset management software program that helps agencies manage all their assets. Several agencies reported using just one module of a software, or more typically, only a fraction of the capabilities their software offered.

To provide a comprehensive review of Fleet Management Software tools available, a matrix was developed to compare various attributes of the most used software tools (based on survey results list above) in Minnesota. The software tools included in this matrix are:

- CFAWin (CFA Software)

- Fleet Management Software (Dossier Systems)

- Fleet Maintenance (Pubworks)

- Fleet Maintenance (IMS)

- FleetFocus (Asset Works)

- Fleet Management (Cartegraph)

- Fleet Maintenance Programs (ManagerPlus)

- RTA Fleet Management (Ron Turley Associates)

A series of case study interviews were conducted with local agencies in Minnesota. A summary of the interviews are included in Appendix B:

- Fleet Management Tool and Spreadsheet use for Lake County, MN

- "RTA Fleet Management" Software for City of Hopkins

- "Fleet Management Software" (Dossier) for City of Woodbury

- "CFA Win" Software for Dakota County

- "Cartegraph" Software

- "Manager Plus" Software for Itasca and Olmsted County

- "Asset Works" Software used by a consortium of local agencies

FLEET MANAGEMENT SYSTEM - SOFTWARE MATRIX				FLEET MANAGEMENT SYSTEM - SOFTWARE MATRIX			
User Provided Information				Software Representative Provided Information			
Software (Provider)				Software (Provider)			
Fleet Management (Cartograph)	Fleet Maintenance Programs (ManagerPlus)	RTA Fleet Management (Ron Turley Associates)	CFAWin (CFA Software)	Fleet Management Software (Dossier Systems)	Fleet Maintenance (Pubworks)	Fleet Maintenance (IMS)	FleetFocus (AssetWorks)
<a href="https://www.cartograph.com/">https://www.cartograph.com/</a>	<a href="http://www.managerplus.com/solutions/industries/fleet">http://www.managerplus.com/solutions/industries/fleet</a>	<a href="http://www.rtafleet.com/">http://www.rtafleet.com/</a>	<a href="http://www.cfawin.com/">http://www.cfawin.com/</a>	<a href="http://dossier-systems.com/">http://dossier-systems.com/</a>	<a href="https://pubworks.com/">https://pubworks.com/</a>	<a href="http://www.mtcpro.com/">http://www.mtcpro.com/</a>	<a href="https://www.assetworks.com/fleet/fleetfocus/">https://www.assetworks.com/fleet/fleetfocus/</a>
City of Waconia - Public Services, City of Lakeville - Public Works, City of Prior Lake - Public Works, City of Rosemount - Public Works	City of Oakdale - Public Works, Olmsted County - Highway Department, Itasca County - Road & Bridge	City of Andover - Public Works, City of Hopkins - Public Works	City of Brooklyn Park - Operations & Maintenance, Polk County - Public Works, Dakota County - Fleet Management	City of Eden Prairie - Public Works	City of Cottage Grove - Public Works, City of Roseville - Public Works	Lake County - Highway Department	Carver County - Operations, City of Minneapolis - Public Works Fleet Services
<b>1.0 COST</b>							
Initial Cost of Software							
1 License/User/Unit							
Base/Entry Level							
All Options Included							
10 Licenses/Users/Unit							
Base/Entry Level	Pricing starts at \$33/user/month for basic package (minimum 3 users).						
All Options Included	Plans start at \$125/user/month for Enterprise Package. Contact ManagerPlus for additional pricing information						
Annual Technical Support Cost							
1 License/User/Unit							
Base/Entry Level							
All Options Included							
10 Licenses/Users/Unit							
Base/Entry Level							
All Options Included							
Users Surveyed Reported Costs	\$1,000 to \$9,500 Annual Cost Reported	\$200 to \$1,050 Annual Cost Reported	\$1,000 to \$3,000 Annual Cost Reported	\$5,600 to \$6,500 Annual Cost Reported	\$2,500 to \$5,500 Annual Cost Reported	\$4,000 to \$60,000 Annual Cost Reported	

- Capability/feature available in base/entry level package  
 - Capability/feature available in upgraded package  
 - Available, but unknown if base, or upgrade

\*Attribute definitions provided after the table

FLEET MANAGEMENT SYSTEM - SOFTWARE MATRIX									
User Provided Information					Software Representative Provided Information				
Software (Provider)					Software (Provider)				
Fleet Management (Cartograph)	Fleet Maintenance Programs (ManagerPlus)	RTA Fleet Management (Ron Turley Associates)	CFAWin (CFA Software)	Fleet Management Software (Dossier Systems)	Fleet Maintenance (Pubworks)	Fleet Maintenance (IMS)	Fleet Focus (Asset Works)		
<b>2.0 TOTAL PIECES OF EQUIPMENT THAT CAN BE TRACKED</b>									
Base/Entry Level	No Limit		No Limit	No Limit	No Limit	No Limit	No Limit	No Limit	No Limit
All Options Included	No Limit		No Limit	No Limit	No Limit	No Limit	No Limit	No Limit	No Limit
<b>3.0 USER CAPABILITIES*</b>									
Access for Multiple Facilities	✓	?	✓	✓	✓	✓	✓	✓	✓
Access for Multiple Agencies	✓		✓	✓	✓	✓	✓	✓	✓
Network Support Available	✓		✓	✓	✓	✓	✓	✓	✓
Web based System & Support Available	✓		✓	✓	✓	✓	✓	✓	✓
Import/Export Data	✓		✓	✓	✓	✓	✓	✓	✓
Integration w/ Telematics Data	✓		✓	✓	✓	✓	✓	✓	✓
Auto Email Notifications	✓		✓	✓	✓	✓	✓	✓	✓
Integrated w/ Computer Aided Dispatch (CAD)									
Mobile Wireless Handheld Capabilities	✓		✓	✓	✓	✓	✓	✓	✓
Customizable/Expandable	✓		✓	✓	✓	✓	✓	✓	✓
Bar Code Reader Integration	✓	?	✓	✓	✓	✓	✓	✓	✓
<b>4.0 PERFORMANCE TRACKING*</b>									
Telematics Integration to Dashboard & Reports			✓	✓	✓	✓	✓	✓	✓
Inspection Records	✓	?	✓	✓	✓	✓	✓	✓	✓
Incident Reports	✓		✓	✓	✓	✓	✓	✓	✓
Fuel Consumption & Costs	✓		✓	✓	✓	✓	✓	✓	✓
Track Historical Data	✓	?	✓	✓	✓	✓	✓	✓	✓
Unit Performance Analysis	✓	?	✓	✓	✓	✓	✓	✓	✓

✗ - Capability/feature not available

✓ - Capability/feature available in base/entry level package

⬆ - Capability/feature available in upgraded package

⬆ - Available, but unknown if base, or upgrade

\*Attribute definitions provided after the table

FLEET MANAGEMENT SYSTEM - SOFTWARE MATRIX					FLEET MANAGEMENT SYSTEM - SOFTWARE MATRIX				
User Provided Information					Software Representative Provided Information				
Software (Provider)					Software (Provider)				
Fleet Management (Cartograph)	Fleet Maintenance Programs (ManagerPlus)	RTA Fleet Management (Ron Turley Associates)	CFAWin (CFA Software)	Fleet Management Software (Dossier Systems)	Fleet Maintenance (Pubworks)	Fleet Maintenance (IMS)	FleetFocus (AssetWorks)		
<b>5.0 INVENTORY*</b>									
Parts Inventory	✓	?	✓	✓	✓	⬆	✓		
Equipment Log Reporting	✓		✓	✓	✓	⬆	✓		
Equipment Tracking	✓		✓	✓	✓	⬆	✓		
Tires Tracking	✓	?	✓	⬆	✓	⬆	✓		
Integration w/ Purchase Order Systems	⬆	?	✓	✗	✓	⬆	✓		
<b>6.0 WORK ORDER GENERATION*</b>									
Maintenance Scheduler	✓	?	✓	✓	✓	⬆	✓		
Work Order/Request Generator	⬆		✓	✓	✓	⬆	✓		
Work Pending/Deferred Maintenance Tracking	✓		✓	✓	✓	⬆	✓		
Preventive Maintenance check sheets	⬆		✓	✓	✓	⬆	✓		
Warranty Tracking	✓	?	✓	✓	✓	⬆	✓		
Recall Tracking			✓	✓	✓	✗	✓		
Unit Maintenance Tracking			✓	✓	✓	⬆	✓		
<b>7.0 FINANCIAL ANALYSIS</b>									
Cost Tracking/Control	✓		✓	✓	✓	⬆	✓		
Depreciation Calculations	⬆		✓	✓	✓	⬆	✓		
Life Cycle Cost Analysis	⬆		✓	✓	✓	✗	✓		
Vehicle Equivalence Calculation			✓	⬆	✓	✗	✓		
Equipment Replacement Calculation	✓		✓	✓	✓	✗	✓		
Risk Management w/ accident tracking			✓	✓	✓	✗	✓		
Labor Tracking	✓	?	✓	✓	✓	⬆	✓		
Vendor Cost Tracking	✓		⬆	✓	✓	⬆	✓		

\*Attribute definitions provided after the table

✗ - Capability/feature not available  
 ✓ - Capability/feature available in base/entry level package  
 ⬆ - Capability/feature available in upgraded package  
 ? - Available, but unknown if base, or upgrade

# Software Matrix Definitions

## 3.0 USER CAPABILITIES

- **Access for Multiple Facilities** – information about the fleet is available to all locations within a company or agency
- **Access for Multiple Agencies** – information about the fleet is available to all agencies that use the same fleet
- **Network Support Available** – technical support is available for the fleet computer network
- **Web based System and Support Available** – technical support is available for the fleet computer network online
- **Import/Export Data** – fleet data can be imported to or exported from the software
- **Integration with Telematics Data** – incorporates the captured GPS fleet tracking data, which keeps tabs on everything from the current dispatch situation to long-term driving patterns, into the fleet management software
- **Auto Email Notifications** – once notifications set to “on”, software automatically sends email notifications when action is required (such as maintenance on a fleet unit)
- **Integrated with Computer Aided Dispatch (CAD)** – fleet management software works with or includes CAD software
- **Mobile Wireless Handheld Capabilities** – provides access to fleet management data on handheld mobile devices such as smart phones and tablets
- **Customizable/Expandable** – the ability to adapt the software to meet specific company needs by changing existing parameters or adding additional features
- **Bar Code Reader Integration** – software has the feature that allows any mobile device with a camera to be used to read bar codes with the results going into the software application



## 4.0 PERFORMANCE TRACKING

- **Telematics Integration to Dashboard and Reports** – the ability for the captured GPS fleet tracking data to be accessed on the dashboard of fleet vehicles, as well as the ability to download reports related to telematics data
- **Inspection Records** – ability to track vehicle inspection data
- **Incident Reports** – software tracks vehicle incidents and generates reports regarding any incident, including accidents, maintenance issues or other incident
- **Fuel Consumption and Costs** – software tracks fuel consumption and costs associated with maintaining fleet units
- **Track Historical Data** – collected information is stored for future access. Also, can add past fleet information to set up a historical database

## 5.0 INVENTORY

- **Unit Performance Analysis** – Use historical data to analyze performance of an individual fleet vehicle
- **Parts Inventory** – track what vehicle parts are owned by the fleet manager and where they are located
- **Equipment Log Reporting** – reports from the journal kept to record equipment owned by the fleet
- **Equipment Tracking** – monitor what equipment is owned by the fleet, maintenance records on the equipment, and where the equipment is located
- **Tires Tracking** – monitor mileage and other items regarding fleet vehicle tires
- **Integration with Purchase Order Systems** – software can connect with existing purchase order system so that information is shared between the two systems

## 6.0 WORK ORDER GENERATION

- **Maintenance Scheduler** – routine maintenance is tracked and scheduled automatically
- **Work Order/Request Generator** – work orders or work requests or automatically generated when maintenance is due
- **Work Pending/Deferred Maintenance Tracking** – monitor when maintenance is deferred or when work is delayed while parts are ordered, or labor becomes available to do the work
- **Preventive Maintenance check sheets** – listing of items to complete for preventive maintenance, such as oil changes, tire replacement, etc.
- **Warranty Tracking** – monitor when warranties are to expire on fleet units and vehicles, parts, and equipment
- **Recall Tracking** – monitor any recalls on fleet vehicles, parts, and equipment
- **Unit Maintenance Tracking** – chart and follow when maintenance should happen and allows for tracking when it is complete for fleet vehicles

## 7.0 FINANCIAL ANALYSIS

- **Cost Tracking/Control** – monitor costs for fleet purchases, maintenance, repairs, etc., and use data to make decisions to minimize future costs
- **Depreciation Calculations** – use standard formulas to determine how vehicles and other owned equipment decrease in value over time
- **Life Cycle Cost Analysis** – Determine total cost of an item, such as a fleet vehicle, by determining a present or future value of the sum of initial purchase, maintenance and other costs over time, minus the value at the end of its useful life.
- **Vehicle Equivalence Calculation** – calculation of equivalence of effort involved in maintaining fleet unit based on the equivalent vehicle identified by the fleet manager
- **Equipment Replacement Calculation** – ability to track when a fleet unit is to be replaced, based on subjective input variables from the user

- **Risk Management with accident tracking** – Ability to track relative risk of operating a fleet unit based on historical accident data
- **Labor Tracking** – monitor labor and costs associated with labor in maintaining the fleet
- **Vendor Cost Tracking** – monitor how much is paid to each vendor

## INTERPRETING THE DATA

Each software tool has its own data output. Interpreting the data correctly is critical for optimizing the investment of both time and resources into the software. As shown in the matrix, many of the software programs share capabilities, and potential users should seriously consider which ones are a priority as they evaluate options. The primary considerations when buying a software tool are listed in the first column of the matrix, under cost and capabilities. Each agency has its own set of concerns, including the number of users to be accommodated, and the structure and cost for adding more to the program.

### Key Considerations when Selecting a Software Tool

The use of Microsoft Excel spreadsheets to manage and track expenditures is common; almost half of all survey respondents indicated that they use a spreadsheet for fleet management. Excel is widely available, easy to use, and easy to implement. With the advent of shared documents, such as Google Drive multiple users can edit one document without concern for maintaining changes in one document. Both benefits and disadvantages are listed below.

- Costs include the initial purchase price, but annual maintenance cost is also a very important consideration.
- Ease of use and implementation.
- Customer support and ongoing assistance are also extremely important, and vary across the programs. That kind of information is available by talking to the users. Local agencies that use each of these tools are provided, and each can provide additional insight into how the software has worked for them.
- Options for each software tool are typical, and vary in their capabilities. As noted earlier, several users reported not using their software to its full capabilities; the time to fully research and exploit each tool may be prohibitive or not intuitive to a typical user. The matrix identifies each option that is available, and if it is a standard item included in the base/entry level package, or available only as an upgrade.

- Counties with large fleets may have very different needs than a small city or township. As agency size increases, having access at multiple locations and by multiple agencies is also important, as is the ability to put the entire tool on a local network. More complicated programs will provide integration with telematics and CAD, as well as mobile phone capabilities. Several programs generate alerts or email messages when maintenance are due, helping users to keep on top of maintenance schedules.

- In addition to tracking maintenance and repairs, agencies have a need to inventory parts and supplies. All programs do that, but some require an upgrade for integration with a bar code reader. Additional inventory components include equipment log reporting and tracking, tire tracking, and integration with an agency's purchase order system.

- Performance tracking is also important, and software tools can track inspection and incident records, fuel consumption and costs, and historical data for each unit. One agency reported the availability of this data being very important when selling or trading vehicles, as a full unit history is easily generated when looking for buyers.

- Generating a work order is an important feature, as is generating a "pending work order" for when parts are on order. Maintenance schedulers, preventative maintenance check sheets, warranty and recall tracking, and unit maintenance tracking may be very important when considering a software purchase. The ability to make this software component available to all unit drivers could be an important consideration as well.

- Lastly, some tools allow for a financial analysis of individual fleet units. Cost tracking and control, depreciation and life cycle cost analysis, equipment replacement calculations, and vehicle equivalence calculations are all excellent tools that can help with budgeting and decisions for when a unit should or should not be replaced.

As noted earlier, users of each software tool are identified in the matrix and can provide additional insight into specific experiences with each.

## FLEET REPLACEMENT PLAN

Developing a fleet replacement plan is one of the most widely used outcomes from a fleet management system. For this, a manager will need to create an inventory of units along with a set of replacement parameters. A software tool or spreadsheet can be used to do both. Inventory is easier to determine objectively, and includes unit type and class, age, maintenance and repair costs and records. The replacement parameters are dependent on each agency's specific policies and budget. The inventory should include class, age, service records, and costs spent for acquisition and maintenance. Replacement planning parameters include expected service life, current purchase price, an estimated inflation rate, and expected salvage value. Each agency should also assemble other data, such as number of vehicles, description and composition, etc.

To develop a replacement plan, apply the replacement or planning parameters for each unit type. Then, select an analysis period (at least 15 years is recommended), and determine costs that will occur for each vehicle over that period. This will also yield recommended replacement date, estimated replacement cost (based on the estimated inflation rate), and approximate salvage value for each fleet vehicle. If a unit is replaced before the analysis period is complete, new purchase costs and salvage value for the unit being replaced is considered (and input as many times as needed to meet the analysis period).

A fleet management plan can also be used to review the condition of the fleet as a whole. A user can evaluate the data and consider: for the base year entered, does the plan show that a large percentage of the fleet is due or overdue for replacement? If so, use the plan to identify ways that the backlog can be eliminated. The plan can also be used to even out costs if the agency has significant changes from year to year in estimated fleet replacement costs. Consider ways those changes be smoothed out through accelerating or delaying fleet replacements, and how an agency can plan for future replacement spending needs.

Once the initial plan is developed, an agency can adjust the input variables as needed. That might include lengthening replacement periods for some types of vehicles, deferring the initial replacements of certain units, reducing maintenance costs overall through targeted efforts, or reducing purchase prices by acquiring lower-cost or a different type of vehicle. Unfortunately, adjusting the input variables has limited impact. No amount of adjustment will completely eliminate year-to-year peaks and valleys, or overcome a large backlog of replacement needs. But, having the plan output available will help in decisions for the future. (Source: APWA)

## FLEET REPLACEMENT RATING SYSTEM

Dakota County uses a Fleet Capital Equipment Program (Fleet CEP) Points Replacement Guideline System. Its components are outlined below, and the system assigns weights to a variety of input variables to determine unit condition. Those variables include very simple-to-track data such as age, reliability and mileage. This system allows the user to easily determine a Vehicle Condition Index (VCI) that can be used to rate equipment and determine relative condition to other units in the fleet. This is one example of how to develop an objective system for replacement parameters used in a fleet replacement plan.

As an example of the application of the points system shown in the table below, a five year-old police patrol sedan has 90,000 miles on it, is in poor condition, has poor reliability, has repair costs equal to 70% of its purchase price and the replacement police sedan will be E85 compatible. Points would be assigned as follows:

CATEGORY	POINTS
Age	5 points
Mileage	9 points
Type of service (severe)	5 points
Reliability	5 points
M&R Costs	3 points
Condition	5 points
Energy Efficiency	1 point
<b>Total</b>	<b>33 points</b>

As noted in the row showing a description of “Point Ranges”, this vehicle would then qualify for replacement, as it falls within the point range for Condition IV.



## Fleet Capital Equipment Program (Fleet CEP) Points Replacement Guidelines

FACTOR	POINTS	
Age	One point for each year of chronological age, based on in-service date. <i>Based on in-service date</i>	
Miles/Hours	On Road Vehicles and Equipment one point for each 10,000 miles or one point for each 20,000 miles with 7 liter or larger size diesel engines. Off Road Equipment one point for each 1000 hours of use on over 150 horsepower diesel engines or one point for each 200 hours of use on under 150 horsepower diesel engines <i>Based on Class of Vehicle or Equipment by four different criteria</i>	
Type of Service	1, 3 or 5 points are assigned based on the type of service that vehicle receives. For instance, a police patrol car would be given a 5 because it is in severe duty service. In contrast, an administrative sedan would be given a 1. <i>Based on Class of Vehicle or Equipment</i>	
Reliability	1 to 5 points are assigned depending on the frequency that a unit was in for repairs last year. A 5 would be assigned to a unit that is in the shop three or more times per month on average, while a 1 would be assigned to a unit in the shop an average of once every three months or less. <i>Based on each individual Equipment # looking at the Closed Repair Order Count for (Last Year)</i> <ul style="list-style-type: none"><li>• 1 for 4 or less</li><li>• 2 for 5 to 15</li><li>• 3 for 16 to 25</li><li>• 4 for 26 to 35</li><li>• 5 for 36 or more</li></ul>	
Maintenance & Repair Costs (M&R)	1 to 5 points are assigned based on total M&R costs (not including repair of accident damage). A 5 is assigned to a unit with life to date M&R costs equal to or greater than the vehicle's original purchase price, while a 1 is given to a unit with life to date M&R costs equal to 20% or less of its original purchase cost. <i>Based on each individual Equipment # comparing the Standard Maintenance Costs to the (Purchase Price + Non-Maintenance Costs)</i> <ul style="list-style-type: none"><li>• 1 for 20% or less</li><li>• 2 for 21% to 48%</li><li>• 3 for 49% to 75%</li><li>• 4 for 76% to 99%</li></ul>	
Condition	This category takes into consideration body condition, rust, interior condition, accident history, anticipated repairs, etc. A scale of 0 to 5 points is used with 5 being poor condition. <i>This will be filled in by Fleet staff based on condition evaluation</i>	
Energy Efficiency	0 to a maximum of 6 points are assigned based on energy efficiency categories. Points from each category are added together to get total points. <ul style="list-style-type: none"><li>• 2 for utilization or sharing across Fleet groups</li><li>• 2 for right sizing of replacement unit</li><li>• 1 for flex fuel unleaded compatible or bio diesel fuel compatible engines</li><li>• 2 for hybrid, electric or alternative fuel engine</li><li>• 2 for alternative power unit or anti idle technology</li></ul> <i>These points are awarded based on the recommended replacement unit and will be filled in by Fleet staff</i>	
Point Ranges		
Under 18 points	Condition I	Excellent
18 to 22 points	Condition II	Good
23 to 27 points	Condition III	Qualifies for replacement
28 points and above	Condition IV	Needs immediate consideration

## TOTAL COST OF OWNERSHIP (LIFE CYCLE COST)

Another benefit of a fleet management system is quantifying the life cycle cost of equipment. This life-cycle cost will help identify the point at which the costs of ownership exceed the benefit. Determining the life-cycle cost analysis allows a fleet manager to plan equipment repair, maintenance, replacement, and retention based on a vehicle or equipment's economic life. Several costs are input into the analysis, including purchase price, maintenance and repair costs, fuel costs, parts, and salvage value. By optimizing the service life and understanding the life cycle costs, a manager can effectively plan and make informed decisions regarding when it is good to keep a piece of equipment, when it is worth maintaining and repairing it, and when it is time to replace it. This information is also useful in developing capital improvement plans, budgets, and managing cash flow.

Costs associated with a vehicle's life can be viewed in three ways:

1. **Physical life** – the service life of the equipment
2. **Profit life** – the time period in which it is profitable to own equipment
3. **Economic life** – the time in which the ownership costs are less than the operating costs

Life-cycle costs for equipment consider both ownership and operating costs. Ownership costs include purchase costs, insurance and depreciation, taxes, storage, and investment costs. Operating costs include repair and maintenance, tire and tire repair, parts, fuel, operator, and any other consumable equipment cost. Except for the one-time initial capital cost of purchasing the machine or vehicle, ownership costs are fixed costs that are incurred each year, regardless of whether the equipment is operated or idle. Operating costs are the fixed costs incurred only when the equipment is used. On average, initial cost makes up about twenty-five percent of the total cost that will be invested during the equipment's useful life.

Operating costs vary based on the number of operating hours, type of equipment, location, use of the equipment. Maintenance and repairs are the largest factor in operating expenses, and generally increase as the equipment gets older. Good maintenance practices can extend the life of equipment, and can reduce operating costs over time. Other operating costs include replacement and consumable parts (such as tires, fuel and oil). Some equipment requires much higher cost parts, such as blades and tips, which are impacted even more by use and application.

## VEHICLE EQUIVALENCY UNITS

The Vehicle Equivalency Units (VEU) is a measurement tool used that allows managers to determine the maintenance resources required to complete varying maintenance tasks within an organization. Assigning each unit in the fleet allows for a manager to compare the maintenance required with a single unit: each agency can determine its own “equivalent vehicle” based on its fleet components. Other examples are available from APWA, the National Association of Fleet Administrators (NAFA), or Government Fleet Magazine. To determine your own “equivalent unit”, first determine the number of labor hours is required to maintain one unit for one year. That might include the following:

Other costs of ownership are listed below:

- Vehicle purchase price

- Capital/financing

- Vehicle disposal

- Maintenance performed in house and by others

- Contract maintenance

- Parts and supplies

- Tires

- Maintenance overhead

Some costs vary with fleet size and some are stable. Examples of fixed costs include personnel and shop facilities. To effectively use any fleet management tool, costs associated with the fleet must be identified and allocated.

### Sample VEU Calculation for a Passenger Sedan

Total annual labor hours	979
Total passenger sedans in fleet	93
<b>Average labor hours/unit</b>	<b>979/93 = 10.53</b>

For this agency, one VEU based on a passenger sedan as its equivalent unit is equal to 10.53 (rounded up to 11 for easier math). Now, that agency can compare the number of labor hours required to maintain each vehicle in the fleet, and compare that to the sedan VEU. For example:

- Passenger sedans - 1 VEU
- Solid Waste truck - 17.8 VEU

**So, it takes 17.8 times as much labor effort to maintain a Solid Waste truck**

Another useful way to use the VEU is to determine the required labor hours to maintain the entire fleet, or to determine if adequate labor hours are available before purchasing something. For example:

- VEU for the entire fleet = 3,541.2
- One VEU = 11 labor hours

**Total labor hours to maintain this entire fleet = 3541.2 VEUs x 11 hours = 38,953.2 labor hours**

- If one mechanic is available an average of 1,650 hours/year, then:
- $38,953.2 \text{ labor hours} / 1,650 \text{ labor hours/mechanic} = 24 \text{ mechanics required}$

The US Air Force first developed the system for determining agency VEUs in the 1970s, and it is still used today in both the private and public sectors. (Source: Dennis Hogan, City of Cedar Rapids, IA)

Note that VEU calculations only consider routine maintenance. Non-routine work is not included in the computation. That might include crash damage repair, customizing new vehicles, modifications, etc. It's also important to note that not all mechanics operate at the same speed, or have the same abilities. So, assigning VEUs might not work across a large and diverse mechanic pool.

## SUMMARY

As automation and electronic documentation becomes more common, agencies will be challenged to find the management tool that best works for them. An agency's fleet size and components are key considerations in whether an automated management tool will be worth the investment of time and resources. And, once a decision is made to purchase a software program, the features, cost, and effort to maintain vary greatly.

It's important for an agency to first prioritize their goals and needs for considering a fleet management software and set a budget for both initial and ongoing support costs. Then, consider all the options available, talk to other users in the area to get personal testimony regarding how the software works for them, and review the other resources provided in this guidebook. Many software tools offer an impressive list of capabilities, but understanding an agency's limitations for personnel and IT support is another important factor. Ideally, the software tool or spreadsheet you choose should meet all of your requirements, fit within your budget, and be easily maintained with current staff. A good tool will increase efficiency and aid in budgeting and management decisions for years. Taking the time to make the best decision is well worth the effort.

## RESOURCES:

- National Association of Fleet Administrators <https://www.nafa.org/>
- Construction Equipment Maintenance Program <https://cempcentral.com/book>
- Automotive Fleet magazine and website <http://www.automotive-fleet.com/>
- Report from Indiana Department of Transportation and Purdue University Joint Research Program on Predicting Fleet Maintenance Costs: [Development of Standardized Component Based Equipment Specifications and Transition Plan into a Predictive Maintenance Strategy](#)

Note: this includes link to sample spreadsheet that computes life-cycle costs for fleet vehicles







## APPENDIX A – SURVEY RESULTS SUMMARY

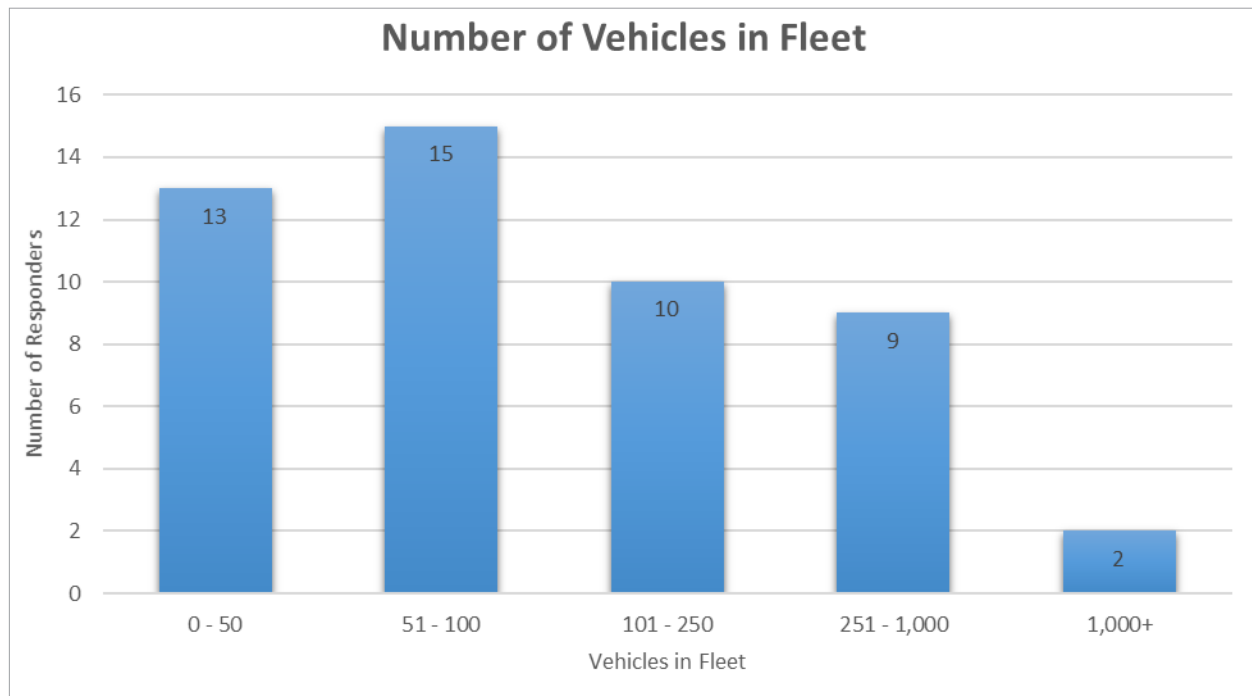
### FLEET MANAGEMENT TOOL USE – SURVEY SUMMARY

#### Survey Date: October/November 2016

The following is a summary for the answers provided to the Survey Monkey online survey *Fleet Management Tool Use*. 49 responses were received between 10/20/16 and 11/7/16. Responders were representatives of cities and counties throughout Minnesota.

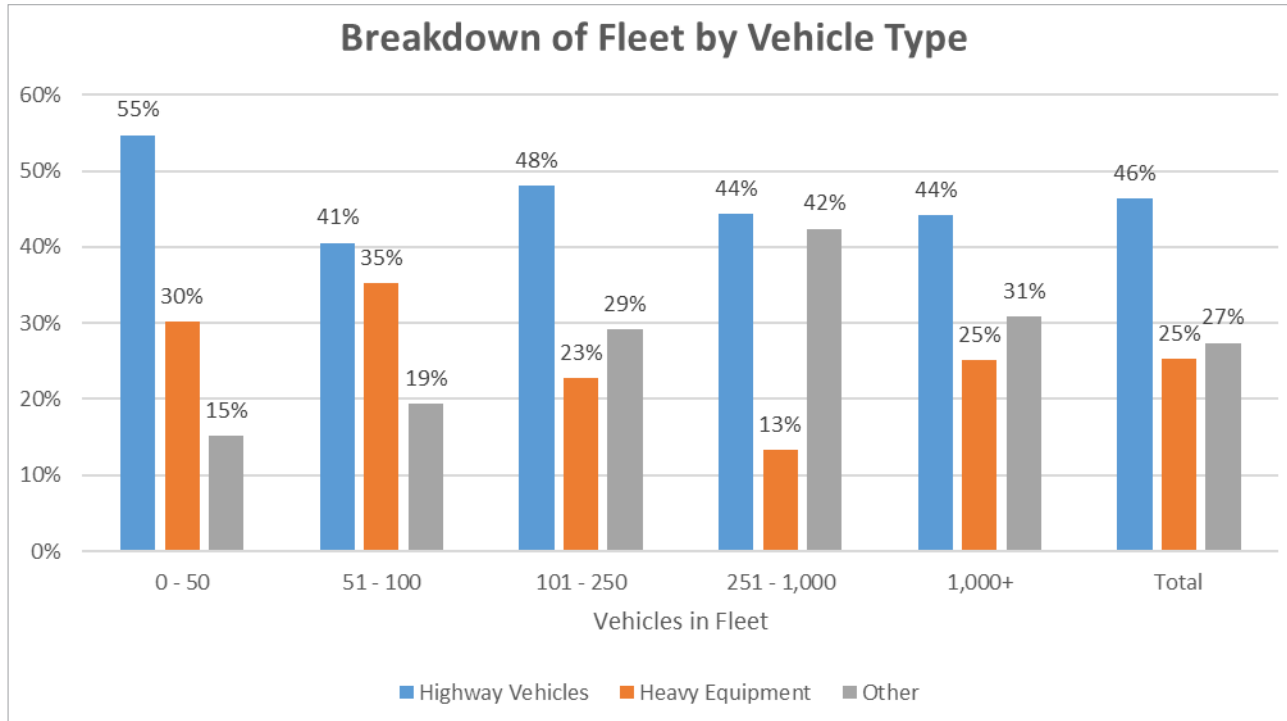
## Question 2: What is the size of your fleet (total and breakdown)?

Responders were grouped by number of vehicles and equipment managed. Fleet sizes ranged from 17 to 1,850 vehicles.



### ANALYSIS:

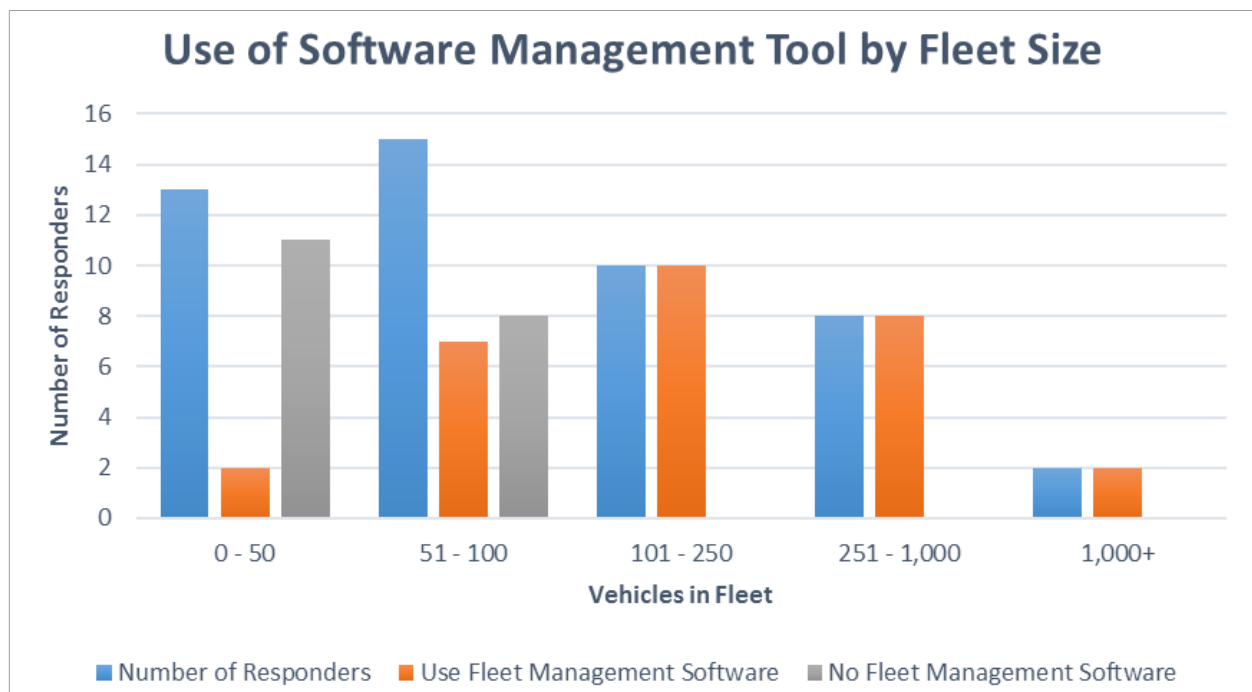
- More than half of responders had fleet sizes less than 100 vehicles.



#### TRENDS:

- All groups have highway vehicles and heavy equipment to manage.
- Proportions for highway vehicles to heavy equipment seem independent of fleet size.

### Question 3: Does your agency use a fleet management software tool?



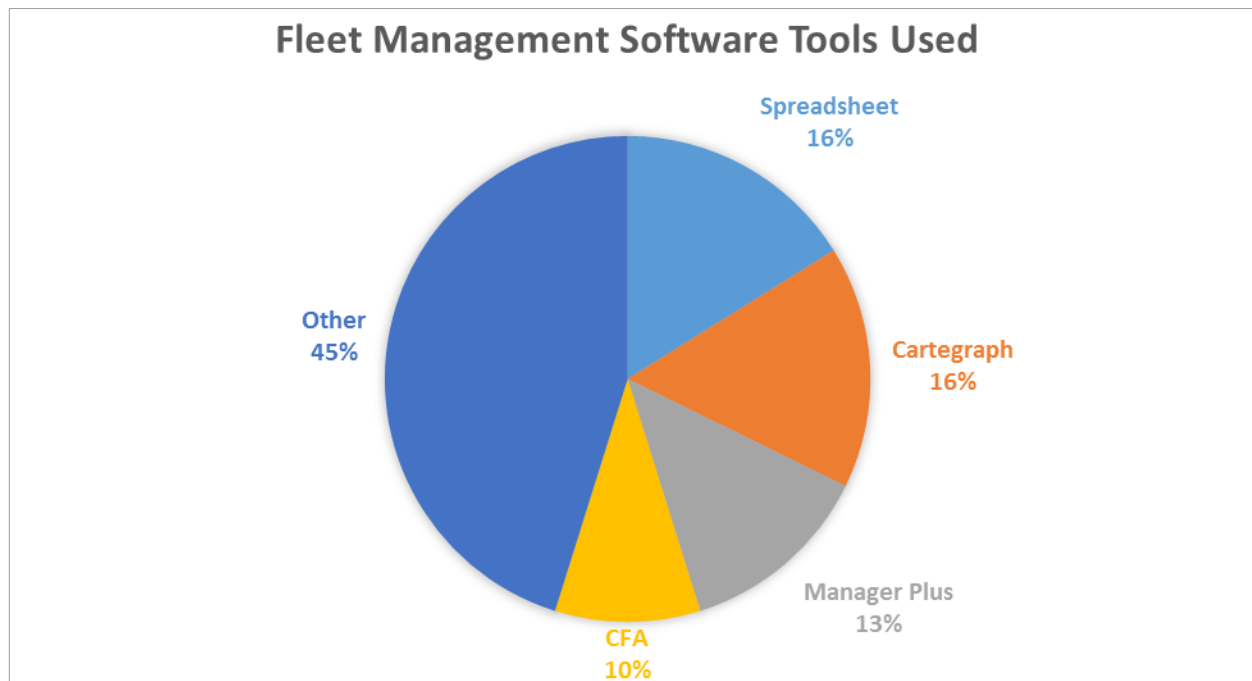
#### ANALYSIS:

- 60% of respondents are using a fleet management software tool.
- 50% of respondents are using a fleet management software tool other than a spreadsheet.
- 22 vehicles was the smallest fleet size to use a fleet management software tool.
- 88 vehicles was the largest fleet size not using a fleet management software tool.

#### TRENDS:

- The transition to the use of a fleet management software tool appears to be when fleets are within 50-100 vehicles.

#### Question 4: What fleet management software tool are you currently using?



#### SOFTWARE TOOLS USED:

- Spreadsheets (5)

- Manager Plus (4)

- Cartegraph (5)

- CFA Software (3)

- Other (2 or less respondents using):

- Dossiero PubWorks
- RTA Fleet Management
- IMS Fleet Maintenance
- Fleetmate

- JD Edwards
- Chevin Fleet Solutions
- AssetWorks
- Mainsaver

#### TRENDS:

- All agencies with fleets larger than 100 vehicles used a software management tool other than a spreadsheet.
  - Large number of software management tools are available and being utilized
  - No clearly dominate fleet management software tools was identified.

## MN2050 ASSET MANAGEMENT SURVEY

MN2050 is a not-for-profit collaborative partnership that advocates for increased investment in public infrastructure, while at the same time emphasizing the good management of that infrastructure. MN2050 was created by our Minnesota APWA chapter and 17 other professional partners to provide information and media tools to professionals to convey to the public the message of the importance of infrastructure investment.

In 2016, MN2050 conducted the first [statewide survey](#) of the Asset Management practices of Minnesota cities, counties, Met Council and MnDOT. This survey covered all assets that local agencies manage, including fleet. The [survey results](#) (page 107) highlight the number of agencies that use an asset management tool and the various software tools that they use.





## APPENDIX B – CASE STUDIES

1. Fleet Management Tool and Spreadsheet use for Lake County, MN
2. “RTA Fleet Management” Software for City of Hopkins
3. “Fleet Management Software” (Dossier) for City of Woodbury
4. “CFA Win” Software for Dakota County
5. “Cartegraph” Software
6. “Manager Plus” Software for Itasca and Olmsted County
7. “Asset Works” Software used by a consortium of local agencies

## 1. CASE STUDY: FLEET MANAGEMENT TOOL AND SPREADSHEET USE FOR LAKE COUNTY, MN

Lake County generates its maintenance costs using IMS Fleet Maintenance Pro, and uses a five-year plan spreadsheet for communication amongst mechanics and Commissioners. County Engineer Krysten Foster reports that, as equipment is proposed for the County's annual budget, a closer look is given to each piece of equipment already in their fleet. In other words, Lake County doesn't replace equipment based on one factor (being its age, mileage, or hours). They may choose to trade a lower mileage unit that's in worse mechanical condition and keep a higher mileage vehicle in good order. They use the spreadsheet as a tool for forecasting out the next 5-years when determining their annual budget.

Together with the spreadsheet, the County has been using IMS software to manage this fleet for the last several years. When choosing which to purchase, they evaluated several software systems, and met with salespeople before determining that IMS offered the best initial and annual costs, along with the services and options offered. Their primary goal was to keep track of preventive maintenance on all units, maintain documentation of repair histories during staff transitions, and help their mechanics manage that. Prior to using the software, they had been relying on individuals to remember the records, which wasn't very reliable. Using a software program makes their department more resilient, able to deal with personnel changes and attrition, and access documentation quickly and easily.

IMS also facilitates proactive management of fleet units by allowing for programming of preventative maintenance windows. With those, maintenance reminders can be programmed routinely, and work orders automatically generated. According to Krysten, the program is very easy to use and user-friendly. It cost less than \$5,000 to buy the software, which she considers "affordable". There is also a low-cost maintenance fee that is affordable as well. To set up the software, County employees worked directly with the vendor, and it was relatively easy to do. The initial support to get up and running was good, as has the continued support since. Lake County has not had any significant issues since implementing the program. Krysten would definitely recommend IMS to other counties, saying that "it has really helped us manage all of our fleet in a more efficient manner. The software helps our mechanics enter all of the data into the system and maintain records more efficiently."

IMS offers several different packages that accommodate a variety of users and fleet sizes. Lake county has chosen to assign just one "user" who is responsible for entering data. With just one staff member responsible for data entry, they find it is entered consistently and accurately.

Lake County's fleet contains approximately 150 units.

With the spreadsheet, the County logs all history and records from IMS into the system, which they can access to analyze maintenance costs and issues. Using the two tools, they're able to catch problems quicker than they would otherwise notice, and if they see something pop up in IMS that might seem out of the ordinary, they can compare it to the estimated life cycle in the spreadsheet and make adjustments.

Headings and sample data from their spreadsheet are included on the project website: <https://lrrb.org/fleet-management-tools-for-local-agencies/>. The spreadsheet is comprised of 5 sheets, and each is described below.

## 1. RECORDKEEPING – LOG OF UPDATES

The first sheet in the spreadsheet is meant for record-keeping, and includes a history of updates and entries into spreadsheet. This allows multiple users to keep track of who has been entering data and using the spreadsheet, as well as any changes to assumptions or input values. Google docs easily allows multiple users to share one spreadsheet and enter data simultaneously, or this spreadsheet can be maintained by one employee on a limited basis.

## 2. ALL FLEET INVENTORY/MAINTENANCE PLANNING

The second sheet is a general Highway Department “cheat sheet” that allows Lake County to track their plan for each fleet unit. This is the sheet that mechanics use to assist planning their repairs considering the number of years a unit is expected to remain in service. This page includes an inventory of all pickups, dump trucks, and equipment. It lists unit number, the primary user and a description of each type of vehicle or equipment. The anticipated sale is grouped into four categories: 1-2 years, 3-5 years, 6-9 years, and over 10 years. The comments column allows for input on maintenance, repairs, and where the unit is going to be used next.

The next three sheets are used for communications with the Board of Commissioners and County Administrator. The County Engineer holds semi-annual meetings with Lake County’s Superintendent and mechanics to update forecasted lifecycles based on breakdowns, irregular use, or other factors. The County Engineer then supports the department’s annual budget requests with this information. In the case of major breakdowns, these stakeholder groups provide input as to whether a piece of equipment’s lifecycle should be reduced (as a result of the breakdown) or if the county should invest in a costly repair to extend its life as much as reasonable. This collaborative chain of communication seems to work well for a rural county with a relatively small fleet.

## 3. PICKUP TRUCK/VEHICLE TRACKING

The third spreadsheet sheet is for pickup trucks and other similar vehicles only, and lists the primary user, unit number, description, current mileage, average annual mileage and any comments. Those comments include information about how the vehicle will be re-allocated once the highway department is done using it. It is updated each year to include information about how each unit is to be kept (and for how long), sold, replaced using state bid contract, and the budget for replacement. It also allows for the user to show short-term forecasted life cycles (indicating if vehicles will be replaced in the next 2-4 years). Those forecasted lifecycles are based on general assumptions considering forecasted mileages; hours; major investments; or upcoming repair needs. There is also a column for estimated cash value and the estimated replacement cost.

## 4. PLOW/DUMP TRUCK TRACKING

The fourth sheet includes information about all plow units, such as snowplows and dump trucks. They are listed by unit number, plow route, description, and mileage. Like the pickups, it is updated each year to include information about how each unit is to be kept (and for how long), sold, replaced using state bid contract, and the budget for replacement. Short-term forecasted life cycle is on this sheet as well. There is also a column for estimated cash value and the estimated replacement cost. Each unit is listed with an

estimated replacement year or service period. Notice that the mechanics' "cheat sheet" lists employees' names associated with each snowplow while the spreadsheet for public communications identifies each plow by its primary route.

## 5. OTHER FLEET TRACKING

The fifth sheet includes an equipment summary for all other Highway Department fleet units. They are listed by category (multi-tasking skid steers and forklifts, excavators, graders, loaders, etc), unit number, and description. All maintenance and repairs are listed in the "comments" column. Each year, the County determines if the unit will be kept, sold, replaced. A general plan is updated for what to do with each unit, and that information is recorded in the spreadsheet (for example: "replacement beyond 10 years".) Each unit's estimated value and replacement costs are also listed, as well as a total for those two columns.

Estimated cash values should be periodically checked alongside a county's equipment and automobiles insurance schedule for updates to either dataset.

The Lake County 5-year planning spreadsheet is included on the project website: <https://lrrb.org/fleet-management-tools-for-local-agencies/>.

## 2. CASE STUDY: “RTA FLEET MANAGEMENT” SOFTWARE FOR CITY OF HOPKINS

The City of Hopkins chose RTA for their fleet management after reviewing several others. Their package allows them to include up to 150 units in the system without upgrade, so they are careful with the units they include in the system, and only include items that have a motor. However, an upgrade to include 25 more vehicles is not expensive (\$375). Their package cost \$7,700 to purchase, and they pay an annual maintenance fee of \$1,150. The City of Hopkins is very happy with the software.

When selecting RTA, their main criteria was ease of use and input, as well as customer support. When interviewed, City staff reported that RTA has excellent customer service. They also noted that the program was very easy to initiate and enter their fleet data. Their RTA package can be used in multiple facilities, or by regional office by up to five users. They have it loaded on one computer, and several staff use it from the same workstation.

RTA allows the user to track a variety of fleet vehicles, including automobiles, medium and heavy trucks, and equipment. Any item can be tracked, as long as it has a tag number input as data. The program does include a barcode reader, but they don't use it. They noted that this feature is probably only useful for parts inventory, and they don't have that many parts to track (and it costs \$600 to add the barcode feature.) Note that the parts inventory feature is available without the bar code reader. Another useful feature is a bin locator, which tells the user the number of parts that are in stock, as well as their location.

The RTA software does track performance, although the City of Hopkins has not used that feature. RTA will also track vehicle use and labor. Each fleet unit has a history of work that can be printed and used when they sell it. Hopkins uses RTA mostly for work order processing for vehicle maintenance. It is also a good decision-making tool for determining when a vehicle is requiring too much maintenance, and it is time to sell it. Most of those decisions are done by the staff, and not automatically generated by the program. RTA also includes a maintenance reminder, which can be set up to automatically flag the staff that activity is required.

In summary, they like RTA because it is easy to use, easily to set up, and they get great customer support and service. It does everything they want it to do.

### 3. CASE STUDY: “FLEET MANAGEMENT SOFTWARE” (DOSSIER) FOR CITY OF WOODBURY

Sometimes a specific software does not meet the needs of an agency and a change is required. For example, the City of Woodbury used Fleet Management Software (Dossier) to manage their fleet for over ten years. They are currently changing software suppliers, and have not implemented the new system yet.

Their prime motivation for changing software was to find one that was more flexible. They are now working with new software developers that will allow the City to enter in their own custom work codes. They will also be able to create a vehicle equivalency value and determine labor and manhour requirements for each unit, which is important to them. And, it was also important that work pending tasks would interface/auto-create from the work order screen and interface with parts receiving. Work pending is defined as work and/or parts that are needed but not necessary to keep the vehicle out of service for.

Dan Solheid, the City’s Fleet Services Manager also reported that it was very important that individual users and stakeholders have access to the management system. That allows someone like a police officer to initiate a write-up/work pending order during or after their shift, which the fleet technician can see when they begin work themselves. This eliminates the possibility that maintenance needs are missed or not communicated, and facilitates the work starting sooner. Dan also noted the importance of remote access to the software, since the City has vehicles housed in many locations. They are looking forward to their new software being implemented very soon.



## 4. CASE STUDY: “CFA WIN” SOFTWARE FOR DAKOTA COUNTY

Kevin Schlangen with Dakota County reported that they use Computerized Fleet Analysis software (CFAWin) to assist with their fleet management. He has been with the county for 27 years, and they have been a long-time user. They purchased the software in 1992 as a DOS-based program, and he noted that in 1992 there weren't many other choices. When the software was converted to a windows platform, many more reporting functions were made available. Although Kevin doesn't recall the initial purchase costs, he did note that the County has a maintenance agreement, which costs them less than \$2,000/year.

CFAWin works well for Dakota County and performs every feature they need it to. In 2007, when Dakota county merged all fleet operations into one system, they hired a fleet consultant group who recommended that Dakota County stay with this software. They've upgraded several times since their initial purchase, and have reviewed the product several times. With each review, they've decided to stick with CFAWin.

Dakota County likes CFAWin because it is a relatively inexpensive program with many capabilities. They offer great customer support, and users can call in and get help remotely. There are many training opportunities, with significant continued support. In Kevin's opinion, CFAWin is a premium product for low cost

Currently, they mainly use the program for its reporting functions. The standard report forms give them flexibility, and everything they need. For example: on each fleet unit, they can track every fuel transaction, every maintenance activity, initial purchase price, and all other costs. Another great feature is that the County can supplement records with photos and other files, so each fleet unit has a complete record including photos.

In addition, all their accident reports and related repairs are catalogued with both photos and written documentation. Users can upload data, so the program provides a clearinghouse of all information needed about a specific fleet unit. This data can be used to determine costs/mile, track repair history, and prepare for capital programming. It integrates with the Crystal reports mainframe, and users can export reports into other customizable formats. The software can also combine several reports into one, which works very well with the documentation for the entire county. It is also compatible with the financial services and reporting, which provides for entry by one user, tracking by individual departments, and report generation across the agency.

The CFAWin program allows users to track their entire parts inventory. Dakota County doesn't use that feature, although they use it to track costs for each repair. They are also able to generate Preventative Maintenance check sheets for each type of equipment and each operation which tracks parts and allows for technician labor tracking. They can also track emergency repairs, effort, and productivity for each staff member.

CFAWin does allow for multiple users to enter data real-time, but Dakota county has determined that having an administrative staff person do all of the entry by paper is much more efficient, and only takes a total of 6-7 hours/month. Their fleet consists of about 700 units, and this software is able to track an infinite number of units. They are very happy with the software.

## 5. CASE STUDY: “CARTEGRAPH” SOFTWARE

Justin Hansen, at WSB, works with local public agencies to assist them with their asset management platform. Several use Cartegraph, which offers fleet management as one feature. Justin’s role is to assist his clients with the strategic planning and offer training and support for their Cartegraph systems.

According to Justin, Cartegraph is an organizational-wide asset management solution, and not just used for Fleet Management. It is web-based and allows the users to implement the platform locally on their own IT infrastructure, or have the system be hosted by Cartegraph, so it is great for agencies with varying levels of IT infrastructure. It features an established mobile application for smartphones or iPads.

Cartegraph focuses on ease of use and for both users (mechanics) and administrators (Fleet Managers and IT staff). The program allows agencies to do the following:

- |   |   |
|---|---|
| <ul style="list-style-type: none"><li>• Track estimated and actual costs of work</li></ul>                                | <ul style="list-style-type: none"><li>• Optimize their budget</li></ul>   |
| <ul style="list-style-type: none"><li>• Associate costs against individual fleet assets and/or groups of assets</li></ul> | <ul style="list-style-type: none"><li>• Extend the life of fleet infrastructure and assets</li></ul>  |
| <ul style="list-style-type: none"><li>• Predict fleet asset performance</li></ul>   | <ul style="list-style-type: none"><li>• Communicate planned and completed maintenance and inspection activities throughout the organization</li></ul> |
| <ul style="list-style-type: none"><li>• Manage and priorities maintenance activities</li></ul>                            | <ul style="list-style-type: none"><li>• Allow staff to submit request for fleet asset maintenance</li></ul>   |
| <ul style="list-style-type: none"><li>• Schedule/maintain preventative maintenance</li></ul>                              |   |

Cartegraph is very easy to use and administer, and with a web-based program, there is no need to install or maintain software locally. The mobile apps work well, and are also easy to use. It offers fleet equipment inspection capabilities, the ability to create a Vehicle Replacement Rating, built-in notifications for tasks and integration with agency fuel systems. The program will also work with fleets of various sizes; the agencies that Justin works with have fleets ranging from 80-1,000 units. It is very scalable.

Note that the effort required to implement Cartegraph is dependent on if an agency already has a fleet management in place. If an existing system has been implemented and there’s a required conversion from it to Cartegraph, the work is significant. The effort to implement the fuel system integrations is also significant. For organizations starting from scratch, the effort to get up and running with Cartegraph is minimal if they chose to use the web-based version. Installing the program on-site requires effort from an agency’s IT staff to deploy and manage the software.

Also note that Cartegraph requires implementation services as part of every contract, and 100% of the implementation is handled by Cartegraph staff working directly with the organization’s staff. Customer support is average.



## 6. CASE STUDY: “MANAGER PLUS” SOFTWARE FOR ITASCA AND OLMSTED COUNTY

Jerry Eldwin, Equipment Maintenance Coordinator at Itasca County reported that they use ManagerPlus for Fleet Management. When purchasing, their primary need was for a program that would allow generation of both a work and purchase order number that could be easily tracked with monthly statements. The program also allows them to coordinate activities between their shop and accounting/budgeting operations. They have been using it for ten years, and it cost \$8,720 for the whole program, plus some annual maintenance costs. Now that they know how to use the program, they don't routinely pay for a service contract. The program is easy to use.

At the time of initial purchase, the program was a challenge to get going without staff who were knowledgeable in ManagerPlus. Now that they are up and running, they have little problems with it. They are able to enter the data on five desktops, and they can have multiple users. Itasca County's fleet has 425 units; they use the Manager Plus software in conjunction with the Jet Fleet Management program. They each serve different purposes, but work well together.

Itasca County manages all equipment maintenance through the Jet Fleet program, which allows them to have the entire history of all units readily available. The ManagerPlus software doesn't allow for them to access that information as easily, which is why Jet Fleet is needed. They do not pay for maintenance on Jet Fleet either.

Manager Plus offers great customer support if they need it, and Itasca County recommends this program for others who want to be able to track maintenance and purchases, and to compare fleet unit records for decisions about purchasing and long-term planning. It offers a good check for them to balance with subjective decision making.

With their contract, they are limited to ten users that they pay for individually, and they are not aware of a limit on the number of units that can be entered. The Jet Fleet program is used to track parts and inventory.

Chad Schuman, from Olmsted County reports that they began using ManagerPlus several years ago, when their current shop manager started working at the County, and had used it at his previous employer. Their main goal is to help organize maintaining highway equipment and motorpool vehicles. They do not use the software to track the cost of repairs or document the repairs that have been completed, although ManagerPlus can do that in addition to much more. He noted that gathering and organizing and entering the vehicle information requires a bit of effort, but once the information is entered, it is very easy to use to run work orders and maintain a running inventory of parts, filters and lubricants.

Olmsted county has over 300 units across all departments. Customer support has been very helpful for them.

## 7. CASE STUDY: “ASSET WORKS” SOFTWARE USED BY A CONSORTIUM OF LOCAL AGENCIES

A truly innovative solution was initiated in Scott county that brought together a consortium of several local agencies to purchase AssetWorks as a group. Their partnership is beneficial for many reasons. The program is contracted through the Scott County Association for Leadership and Efficiency (SCALE) program, which includes representatives from every law enforcement branch, several school districts, government agencies, and elected officials who meet on a regular basis to find efficiencies in government. Coordinating the needs of several agencies for one fleet management software purchase was one of their great initiatives.

Troy Beam, the County Transit and Fleet Manager reported that the AssetWorks software contract is administered through Scott County and, the consortium includes Apple Valley, Burnsville, Shakopee, Carver County, and the city of Carver. When advertising for a fleet management program, Scott County required all potential bidders to allow for multiple agency users. Troy reported that they had 4 bidders willing to work with them in this way, and it seemed to offer little barriers to getting bids.

Creating a consortium has been advantageous for several reasons. First, Scott County is large enough to manage the costs, but having others in the program allows for cost-sharing and other benefits. Each user has their own website with logos and forms, separate logins and permissions. The program is web-based, so users can access data and entry from anywhere, using mobile phones or work stations with laptops. Several of the smaller agencies in the consortium have the benefit of access to software they might not be able to afford on their own. And, they each get to see and use each other's data, which helps in several ways. They can make assumptions about costs and service lives with bigger data sets. Also, each agency provides a trained administrator for the team. So, if one agency's administrator is unavailable, another can be accessed for help or direction. Lastly, they can see each other's inventory, so if a part is unavailable at one user's garage, they can work with the others to secure a part quickly.

Most of the agencies in the consortium have fleets between 200 and 400 units, although some of the smaller agencies have just a fraction of that number. Many of these agency partners are not part of SCALE, but this agreement allows them to share other resources since they are located in a similar geographic area. They share the same vendors, customers, and can share equipment. All of their fleet mechanics and supervisors are trained on the same software, so they could share staff if needed. Each agency has their own individual parts rooms, and they can share inventory as well.

They would like to expand this partnership beyond fleet management. AssetWorks software can be purchased to manage facilities and other assets. The partnership makes them unique because they can collaborate and cooperate with their partners and learn better ways of managing resources from each other. They also benefit from volume purchasing (on tires and other parts, for example). And, this partnership may expand to finding ways to share equipment that is managed through the AssetWorks program.

Scott County works with each partner to help them manage their fleet units and system. If an agency needs more help that Scott County can provide, they will contact AssetWorks. It's important to note that Scott County is not charging partners for their work as an administrator or leader in the group. They benefit by learning from the other users, and can work together to solve questions. It has been a great solution for them!

As noted above, Scott County chose AssetWorks through the competitive bid process, and they specified to potential bidders that they be allowed to partner with other agencies. They were looking for software that could manage motor pool vehicles, which is a capability of AssetWorks. However, they use AssetWorks for fleet maintenance and ended up using something else for pool vehicles (Agile software). The consortium mainly uses AssetWorks for tracking fleet maintenance and equipment and maintaining records of mechanic's time. They are very happy with AssetWorks and the customer support they receive.

The original contract for software was about \$167,000, and the member agencies share in annual support costs. The Consortium is willing to add new partners if it makes sense geographically and logistically.



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