A Report
to the
Montana
Legislature

Performance Audit

An Examination of the Montana Department of Transportation's Maintenance Division

Montana Department of Transportation

June 2018

Legislative Audit
Division

17P-07

Performance Audits

Performance audits conducted by the Legislative Audit Division are designed to assess state government operations. From the audit work, a determination is made as to whether agencies and programs are accomplishing their purposes, and whether they can do so with greater efficiency and economy.

We conducted this performance audit in accordance with generally accepted government auditing standards. Those standards require that we plan and perform the audit to obtain sufficient, appropriate evidence to provide a reasonable basis for our findings and conclusions based on our audit objectives. We believe that the evidence obtained provides a reasonable basis for our findings and conclusions based on our audit objectives. Members of the performance audit staff hold degrees in disciplines appropriate to the audit process.

Performance audits are conducted at the request of the Legislative Audit Committee which is a bicameral and bipartisan standing committee of the Montana Legislature. The committee consists of six members of the Senate and six members of the House of Representatives.

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LEGISLATIVE AUDIT DIVISION

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June 2018

The Legislative Audit Committee
of the Montana State Legislature:

This is our performance audit of the Maintenance Division of the Montana Department of Transportation. This audit also addresses the requirements of Chapter 267, Laws of 2017 (House Bill 473) related to the Maintenance Division, including a review of the department's equipment and use of private contracts.

This report provides the legislature information about state road maintenance contracting activities, equipment, work management, and asset security. This report includes information on the department's equipment and outsourcing practices, including a recommendation to conduct formal cost comparison for activities that can be performed by either department staff or contracted labor. It also contains recommendations for improvements to the division's prioritization and assessment of work and for strengthening the department's asset security. A written response from the Montana Department of Transportation is included at the end of the report.

We wish to express our appreciation to Montana Department of Transportation personnel for their cooperation and assistance during the audit.

Respectfully submitted,

/s/ Angus Maciver

Angus Maciver
Legislative Auditor

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Table of Contents

Figures and Tables

Figures

Tables

Appointed and Administrative Officials

			Term Expires
Montana Transportation Commission	Barb Skelton, Chair	Billings	2021
	Daniel Belcourt	Missoula	2019
	Greg Jergeson	Great Falls	2021
	Carol Lambert	Glendive	2019
	District 2	Butte	Open

Montana Department of Transportation

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Montana Legislative Audit Division

Performance Audit

An Examination of the Montana Department of Transportation's Maintenance Division

Montana Department of Transportation

June 2018 17P-07 Report Summary

The Montana Department of Transportation does not conduct formal cost comparisons for maintenance pavement projects to determine whether they should be contracted or performed in-house by maintenance staff. Had the department conducted cost comparison to determine how to perform maintenance crack seal projects in fiscal years 2016 and 2017, it might have been able to undertake over $400,000 in additional project work over those two years. Formalizing other maintenance practices, such as selection of project work, measurement of performance, and security of department assets, would improve department accountability.

Context

The Maintenance Division (division) of the Montana Department of Transportation (MDT, department) is responsible for the maintenance of the state's roadways. It spends approximately $120 million of state special revenue funds each year. State special revenue funding comes from what is currently a $0.315 tax levied on each gallon of gasoline and taxes on other fuels sold in the state. The division spends over 10 percent of its budget on pavement projects. We evaluated how these projects are selected and how the division determines whether they should be performed by contractors or performed in-house. We also reviewed how the division assesses its overall performance, and found a heavy emphasis is placed on the professional judgement of managers and supervisors, rather than on specific policies, formal practices, and the measurement of outcomes.

The division's general outsourcing approach is in line with those of other states, but the division could improve its contracting decisions by performing cost comparisons. Strategic outsourcing can leverage private-sector strengths, but privatization efforts in other states and provinces have been accompanied by service deficiencies and cost overruns.

Statewide, the division uses around 4,000 pieces of equipment and hundreds of various inventoried items in the course of its work. Management of inventory and of fleet composition and size are largely in line with best practices, but standards for annual vehicle usage would better pinpoint equipment that is no longer needed. Likewise, value standards for inventorying high-risk items, such as power tools, would reduce the risk of theft and unauthorized use. Throughout the state, the division's approach to asset security is inconsistent and reactive, leading to heightened risk of theft of state resources.

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Results

Our report resulted in eight recommendations to the department to improve management of its maintenance activities. Our recommendations were in the following areas:

- Developing standards for annual equipment usage to better identify equipment that may no longer be needed.
- Instituting cost comparisons for pavement projects that can be conducted in-house or via contract.
- Systematizing and documenting maintenance pavement project selection.
- Developing formal lines of communication to strengthen coordination between the Maintenance and Highways and Engineering divisions.
- Developing maintenance performance measures and goals.
- Implementing a formal quality assurance process to ensure data integrity.
- Developing standards for inventory.
- Instituting a statewide policy for proactive asset security and theft reporting.

Recommendation Concurrence	
Concur	8
Partially Concur	0
Do Not Concur	0

Source: Agency audit response included in final report.

For a complete copy of the report (17P-07) or for further information, contact the Legislative Audit Division at 406-444-3122; e-mail to **lad@mt.gov**; or check the web site at **http://leg.mt.gov/audit**
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Chapter I – Introduction and Background

Introduction

Montana's highways are constructed and maintained by the Montana Department of Transportation (MDT, department). MDT's mission is to serve the public by providing a transportation system and services that emphasize quality, safety, cost effectiveness, economic vitality and sensitivity to the environment. The department's Maintenance Division (division) is a statewide program responsible for daily upkeep of transportation assets and some larger projects intended to extend the life of the state's roadways. Section 60-1-103(21), MCA, defines maintenance as the preservation of the entire highway, including surface, shoulders, roadsides, structures, and traffic-control devices necessary for the safe and efficient use of the highway.

For 2017, the Legislative Audit Committee prioritized a performance audit of the division. In addition, Chapter 267, Laws of 2017 (House Bill 473) required a performance audit of how the department uses its funding to construct and maintain Montana's highways. We conducted a performance audit to determine how the division makes outsourcing decisions for maintenance activities, how effectively the division manages its equipment fleet, how it prioritizes and assesses maintenance work the division performs, and how the division manages and safeguards its many physical assets located throughout the state.

Program Background

The department's Maintenance Division repairs and maintains public right-of-way assets. In fiscal year 2018, the division had 733.55 full-time equivalent (FTE), including 61.55 seasonal FTE, and an additional 123 FTE in the Equipment Bureau. This represents over 40 percent of the MDT workforce. These employees are charged with maintaining 25,000 lane-miles of the state's interstate, primary and secondary highways, and frontage roads and the equipment used to do so. In fiscal year 2017, the division spent approximately $54.5 million on personal services and $71.5 million on operating expenses, for total expenditures of $126.1 million. Roughly $8 million of the division's annual funding is federal.

Geographically, the division is composed of ten maintenance areas, two each in MDT's five administrative districts. Areas are administered by area chiefs, who report to their respective district administrator, as well as indirectly to the Maintenance Division administrator in Helena. There is some centralized control and review in Helena, but most of the division's staff are located in the state's five administrative districts. The district administrators have the authority and responsibility for the maintenance and equipment functions for field operations within the districts.

Functionally, the division consists of the following bureaus and operations:

- **Maintenance Operations** is the primary program of the division. It consists of a Maintenance Bureau in Helena and field staff in each of the state's five districts. It performs routine road upkeep, winter maintenance such as snow removal and ice prevention, pavement preservation, pavement marking and striping, signing, noxious weed control, rest area maintenance, and traveler information, among other duties. Disaster and Emergency Services reports the status of disasters and emergencies and coordinates recovery activities, among other emergency responsibilities. Between headquarters and field operations, Maintenance Operations is assigned 702.13 FTE and spent around $120.7 million in fiscal year 2017.
- The **Equipment Bureau** manages both the Motor Pool and more than 4,500 vehicles and other pieces of equipment used by MDT. This includes procurement and allocation, fabrication, inventory, service, repairs, and liquidation. Throughout the state, there are 11 primary equipment shops and four satellite shops where equipment is serviced and repaired. There is also a fabrication shop in Helena, where the division assembles some of its equipment. The Equipment Bureau is assigned 123 FTE.
- The **Communications Bureau** coordinates engineering, installation, and maintenance of land mobile communication systems (radios, mobile phones, and base stations). Its staff oversee the installation and maintenance of fuel sites and installs and maintains all communications systems for MDT's field offices. It also maintains the department's statewide Road Weather Information System, as well as traffic signals in three maintenance areas. The Communications Bureau is assigned 15 FTE and spent around $2.3 million in fiscal year 2017.
- The **Facilities Bureau** administers MDT's long-range building and facility repair and maintenance program. It prioritizes facility requests from the maintenance area offices and coordinates long-range building through the Department of Administration. The Facilities Bureau is assigned 16.42 FTE and spent approximately $3.1 million in fiscal year 2017.

Based on audit assessment work and concerns regarding road maintenance contracting activities, work prioritization and assessment procedures, and asset security, the focus of this audit was on Maintenance Operations and the Equipment Bureau.

Audit Scope

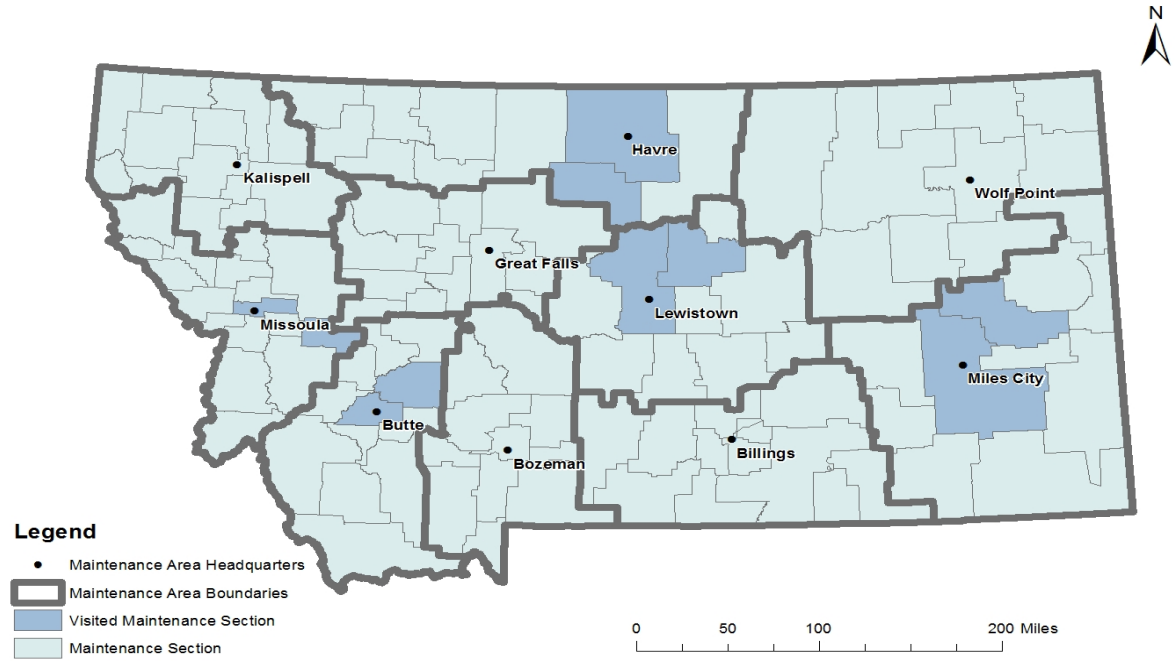
This audit focused on the Maintenance Operations and Equipment Bureau programs from fiscal year 2016 through fiscal year 2018. The audit addressed the division's management processes for determining outsourcing decisions, prioritization and assessment of work, and managing and controlling its assets. In response to HB 473, we reviewed the division's outsourcing practices and the comparative costs of outsourcing, its processes for scheduling, verifying, and assessing work, and its inventory and security processes.

A road's useful life can be extended through preventative crack seals, chip seals, and repaving. We used pavement project information from fiscal years 2016 and 2017 to conduct analysis of project prioritization and to determine how the division makes contracting decisions.

The division has historically used multiple management information systems. There is a maintenance management system (MMS) and an equipment vehicle management system (EVMS.) The MMS is used to track maintenance work completed, and all of the related costs. The EVMS is used to track equipment usage and costs of its maintenance and repair, as well as tracking inventory. During audit fieldwork, the division commenced use of a new MMS. This new system is integrated with the EVMS and is referred to as an EVMMS. Our work included usage and comparative assessment of these systems.

To conduct our work, we visited two sections in each of the state's five districts to ensure appropriate geographic representation of the state. We visited not only area headquarters in larger cities and towns, but also section houses in more rural areas. The map below shows all sections in each maintenance area, the location of the area headquarters, and the sections we visited.

Figure 1
MDT Maintenance Sections and Locations Visited for Audit Fieldwork



Source: Compiled by the Legislative Audit Division from department data.

As shown, we visited five area headquarters and five other sections throughout the state.

Audit Objectives

HB 473 required a comparison of the inventory of the department's equipment to those of other states and to consider whether functions of the department could be performed at the same quality for a lower cost by private entities (additional requirements were taken up by a concurrent audit.) To address these requirements and the risks we identified during audit assessment, we developed the following three objectives to examine how the Maintenance Division manages its assets, its work, and its contracting decisions:

1. Does MDT identify opportunities for and analyze the cost-effectiveness of outsourcing maintenance activities?
2. Does MDT have a statewide process to prioritize and assess routine maintenance work and pavement preservation projects conducted by the Maintenance Division?
3. How does MDT ensure that maintenance resources are safeguarded against theft and unauthorized use?

Audit Methodologies

To address our audit objectives, we completed the following methodologies:

- Obtained and reviewed state laws, rules, and policies related to road maintenance and equipment.
- Performed site visits to five maintenance area headquarters and ten maintenance sections to interview district administrators, maintenance chiefs, maintenance superintendents, shop superintendents, shop stockers, and section supervisors regarding asset security and project selection and outsourcing decisions.
- Conducted inventory and equipment assessments in those ten locations, comparing what was present to what the division's management systems indicated should be there to determine how the division accounts for its inventory.
- Observed the security and tracking of various department assets, such as equipment and stockpiles, to assess consistency.
- Conducted analysis of the equipment fleet using various reports from the equipment management system to determine replacement rates, age, and composition.
- Assessed the division's outsourcing practices and conducted cost comparisons for in-house and contracted crack seals and chip seals to ascertain how contracting decisions are made.

- Compared work reported in the division's management system to observable road assets and determined how maintenance work is verified and assessed.
- Compared pavement data and recommendations to the projects selected in five maintenance areas to determine whether projects were supported by data.
- Reviewed information from the division's biannual statewide review to assess equipment reduction practices and performance management.
- Used multiple management systems to compare system functionality.
- Interviewed various stakeholders, including highway construction contractors, contractor representatives, and county maintenance officials to determine how department practices impact them.
- Interviewed transportation officials from Idaho, South Dakota, Washington, and Wyoming, as well as the Canadian province of Alberta to determine best practices and obtain comparative information.

Issue for Further Study

This audit did not address the specific practices of the division's winter maintenance. Winter maintenance of Montana's highway systems can impact public safety, commerce activities, the environment, and private property and equipment. Future work could assess snow plow route optimization and prioritization, winter staffing levels and shift arrangements, materials usage, and the potential use of plowing contracts to improve the division's winter response.

Report Contents

The remainder of this report includes additional background and details our findings, conclusions, and recommendations. It is organized into three additional chapters:

- Chapter II presents information on the division's equipment, outsourcing practices, cost comparisons, and a review of outsourcing initiatives and outcomes in other states and provinces. It presents information requested by HB 473, and makes recommendations to develop standards for equipment usage and to conduct formal cost comparisons.
- Chapter III discusses the department's maintenance management, including how it prioritizes, coordinates, and assesses the work it performs. Recommendations for strengthening project prioritization practices, department-wide coordination, performance measurement, and management information integrity are advised.
- Chapter IV describes the department's inventory management practices, and highlights opportunities to improve asset inventory and security.

Chapter II – Maintenance Division's Equipment and Outsourcing Practices

Introduction

This chapter addresses our first objective to determine whether the Montana Department of Transportation (MDT, department) identifies opportunities for and assesses cost-effectiveness of outsourcing maintenance activities, as well as aspects of House Bill (HB) 473 related to the Maintenance Division (division). These two topics include the composition and functioning of the equipment fleet, and whether the division's use of contracting is providing the most value per public dollar. We found the department's practices are generally in line with best practices and those of other states. However, we did identify opportunities for improvements to the division's fleet size optimization practices, and to its process for comparing costs of work that can be performed either in-house or via contracts. This chapter discusses these issues in further depth.

Composition of Maintenance Division Fleet

We examined the management and composition of the department's equipment fleet to address one of the concerns of HB 473 and to determine how the fleet's costs relate to outsourcing decisions. Our focus was on the over 80 percent of department equipment assigned to Maintenance Division programs, which include the maintenance program and the equipment program. The Equipment Bureau (bureau) also manages the department's equipment assigned to other programs.

The equipment fleet consists of two general types of equipment. Light-duty equipment includes passenger cars, vans, and pickup trucks and constitutes around 11 percent of all division equipment. Heavy-duty equipment accounts for the remaining 89 percent, and consists of major equipment used for maintenance purposes, including plow trucks, loaders, trailers, and tractors. Plow trucks and their various components, which include sand/deicer bins and plows, and other winter equipment comprise 48 percent of the division's maintenance equipment, which is the largest category of all equipment owned by the division.

Table 1 (see page 8) displays the primary usage of equipment grouped by similar use. Although dump trucks can be used year-round to haul materials, for the purposes of this table we consider their primary purpose to be plow trucks for winter maintenance because that is why the division owns them in such quantities.

Table 1
Maintenance Division Equipment by Type
As of February 26, 2018

Equipment Type	Quantity	Percentage of Equipment
Winter equipment	1,909	48.4%
Light duty	444	11.2%
Trailer and transports	424	10.7%
Loaders	334	8.5%
Mowing/sweeping/cleaning	332	8.4%
Road surface-related	229	5.8%
Message signs	126	3.2%
Other	150	3.8%
Total	**3,948**	**100.0%**

Source: Compiled by the Legislative Audit Division from department data.

As illustrated by the table, the division's equipment fleet appears to be directly relatable to core program functions and mission.

We also conducted a comparison of division equipment to other states' equipment in order to satisfy a requirement of HB 473 and to determine whether the division has an appropriate amount of equipment. The results are shown in Table 2:

Table 2
Equipment Fleet Size and Lane Miles by State

State	Montana	Washington	Idaho	Wyoming	South Dakota
Lane miles as of 2016	25,125	18,478	12,341	15,726	17,921
Maintenance fleet size	3,948	4,800	3,830	4,000	4,782
Equipment per lane mile	0.16	0.26	0.31	0.25	0.27
Public daily vehicle miles travelled (DVMT), in thousands	23,523	91,351	24,873	17,543	17,119
Equipment per thousand DVMT	0.17	0.05	0.15	0.23	0.28

Source: Compiled by the Legislative Audit Division from department, Federal Highway Administration, and other states' reported data.

As shown, Montana's equipment fleet size is consistent with those of other states and is smaller on a per lane-mile basis. Compared on a Daily Vehicle Miles Traveled (DVMT) basis, which is a count of the total miles traveled by all vehicles in the state in a day, Montana is consistent with these other states. States with larger populations and more and larger urban areas, like Washington, will have much higher DVMT measures. This measure indicates the total number of vehicles influenced by the condition of state roads on a daily basis, and might also factor into maintenance needs, as more vehicles traveling the roads will likely result in more road upkeep required. These four

other states also each reported having a quantity of winter equipment similar to that of the division.

Rental Rates Charged for Equipment Possession and Use

To provide more information on equipment in response to HB 473, and to determine how its costs and purchases are assessed, we determined how equipment rental rates are calculated. The MDT Equipment Bureau is an internal service fund program, which means that it is funded by the rates it charges to the department's programs to rent its vehicles and equipment. It receives no general fund or direct state special revenue dollars. The rental rates it charges are calculated annually, and can consist of two components: an assigned rate charged simply for possessing the equipment, and a usage rate, charged on a per mile or per hour basis for the use of the equipment. These rates are calculated independently for every class of equipment the division rents. The assigned rate is composed of indirect maintenance and repair costs, insurance costs, and the depreciation rate for each class of equipment. Equipment depreciation is determined annually.

We determined that this rate structure should discourage programs that rent equipment from keeping unnecessary equipment, because unused equipment still counts as a cost against budgets. Rental rates also enable program users of the equipment to assign the costs of possessing and using equipment directly to the work the program performs, accounting for its costs. The maintenance program occasionally rents equipment from private sector entities. It rents equipment from both equipment rental companies and from construction contractors to conduct out-of-the-ordinary maintenance tasks. The department provided approximate costs of renting equipment from private entities. A comparison of these rates to rates charged by the Equipment Bureau revealed that Equipment Bureau rates are competitive. For example, a backhoe costs around $200 per day of use to rent from the Equipment Bureau and $350 or more per day to rent from an external entity.

Equipment Replacement

The Equipment Bureau purchases new equipment annually. The dollar amount purchased is no more than the total amount of equipment depreciation factored into the rental rates for the previous year. Through this process, the department replaces, in the form of new equipment, the used value of its equipment on an annual basis.

Equipment Bureau staff decide which equipment to replace annually, with input from program staff. The Equipment Vehicle Management System (EVMS), which the bureau uses to manage its equipment, contains built-in reports, one of which is for equipment due for replacement. We ran and analyzed this report for all of the

department's equipment to obtain information on age of equipment and useful life standards. There are two measures by which MDT's equipment can be due for replacement. The first is a measure of the age of the equipment in comparison to the useful life standard for that class of equipment; the second is a mileage standard. The average of all of MDT's equipment's useful life standards is 15.3 years and the average end-of-life mileage standard for MDT's equipment is 261,899 miles. Our analysis determined that over 48 percent of the department's equipment is due for replacement. Given resource limitations, department staff report that they must push equipment past useful life standards.

We also calculated the average age of each class of maintenance equipment, both statewide and by maintenance area, and identified the oldest equipment throughout the state. The analysis revealed that the division's light-duty equipment is significantly newer than its more specialized equipment. The average age of light-duty vehicle classes ranges from 5.5 years for a half-ton pickup truck to 9.5 years for a one-ton pickup. Meanwhile, dump trucks, used to plow in the winter and haul materials year-round, average 13.7 years in service, and several dump trucks have been in service for 32 years. Most of the other heavy-duty equipment has been in service, on average, for over a decade.

Division Proactively Reduces Unnecessary Equipment

Division administration has made active efforts to reduce fleet size. Division staff provided documentation that showed that from 2009 to 2017, the number of MDT equipment items has been reduced from 4,921 to 4,645 items, or by 5.6 percent. This documentation shows that 23 of 38 classes of equipment had unit reductions during this period. This reduction has been more prevalent for specific classes of equipment. For example, pickup trucks of all types have been reduced by 128 units, an approximate 14 percent reduction, and the use of extra-large sport utility vehicles has been eliminated entirely. The process of identifying underused equipment is an ongoing effort the division calls "fleet sizing." We reviewed documents that showed staff use annual mileage and hours to evaluate and identify underused equipment to reduce fleet size where necessary.

Conclusion

The department's equipment fleet is aging, with a significant percentage of equipment past expected useful life standards. The Equipment Bureau has kept pace with replacement of light-duty vehicles, and replaces heavy maintenance equipment as resources allow.

Standards for Annual Usage Could Improve Identification of Underused Equipment

While the division attempts to optimize its fleet by weighing equipment usage against its criticality, we determined that this process could be improved with the development of usage standards.

The department has not developed formal standards for equipment usage when it determines what equipment is no longer needed. Other state and federal government entities use a process called a Vehicle Allocation Methodology (VAM), which is designed to identify and attain an optimum fleet size. The process consists of applying a standard to vehicle classes to identify a pool of potentially underused equipment; this equipment is then assessed for its criticality to the organization's mission. Criticality is weighed against usage to determine whether to retain or sell the equipment. We applied a common VAM standard to the Maintenance and Shop programs' fleets to see how much equipment receives less than 50 percent of the median usage for its class. We applied this standard to a three-year average from 2015 to 2017, and found that 5.5 percent of all maintenance and shop equipment fell under this threshold. This represents 219 pieces of equipment. For example, the median annual mileage of the division's half-ton pickup trucks was 14,857 over the three-year period. One such truck averaged 5,077 miles per year, or 34 percent of median, over that period.

Nonessential Equipment Costs Thousands of Dollars Per Year

The division pays $820,000 per year to the Equipment Bureau to have the 219 pieces of underused equipment in its possession. It is unlikely that all of this equipment can be disposed of, as equipment must also be assessed for criticality to program mission. For example, a loader at a remote stockpile site might receive less use than others do, but be necessary to refill sand in plow trucks from multiple maintenance sections at the end of their plow routes. However, without standards for minimum equipment usage, the department may be paying thousands of dollars annually per piece of nonessential equipment it has not identified. The VAM standard is a relative one, so it does not identify entire classes of equipment that might be underused. Using absolute standards instead (for example, 10,000 miles per year for a pickup truck), would provide a better yardstick for measuring equipment usage.

The Division Has Not Formalized Usage Standards

The department has not identified all potentially underused equipment because it has not developed formal standards for equipment usage. When identifying underused equipment, management makes subjective judgements about usage, without the use of

formal standards to thoroughly and systematically pinpoint underused equipment. This means that despite the division's review of and intention to optimize the department's fleet size, there may be additional opportunities to surplus equipment, potentially resulting in cost savings to the department.

Recommendation #1

We recommend the Montana Department of Transportation develop formal standards for annual equipment usage to better identify equipment no longer needed during its equipment review process.

MDT Assembles Equipment at Lower Cost Than That of Purchasing It

Because HB 473 specified interest in both equipment and the question of public versus private cost, our work included a comparison of the costs of the Maintenance Division assembling equipment against those of purchasing equipment. MDT officials indicated it is one of the few Transportation Departments in the nation that assembles heavy equipment. The fabrication shop in Helena repairs and maintains some of the department's equipment. In addition to repairs, this shop employs five mechanics who spend the bulk of their time building equipment. Much of this fabrication consists of building plow trucks. According to department staff, the bureau builds between 15 and 20 plow trucks per year. The department procures all of the components of the plow and then assembles it to its own specifications. The department tracks all of its costs to purchase and build equipment in the EVMMS; costs include all materials and staff labor, including benefits and leave, to build. Division staff said they periodically do comparisons with their counterparts in other states that purchase equipment to verify that MDT's costs are below purchase price.

We compared total costs to build a plow to cost of purchasing and determined the department building its own plows is cheaper. We compared the costs of assembling plow trucks in-house to a third-party quote for a comparable plow obtained by the department in fiscal year 2018. The most recent model year for which total MDT-built plow costs were available was 2014; MDT-built plows of that model year cost on average $166,562. We calculated the average rate of inflation of MDT's plow assembly costs over the last ten years and used that rate to project a current cost estimation. This amounted to an estimated average cost of $188,400. The quote provided by a third-party plow manufacturer was $245,016 for a comparable plow, or 30 percent more than our estimate of MDT's current cost. Our interviews with other states found

costs to purchase plows were higher than MDT's cost to build them. For example, Idaho reported that the plows it purchases cost $236,000. This indicates that MDT is saving money by building its own plow equipment. There may be additional benefits to doing so, like having more control over the specifications of the equipment and being better able to repair it.

CONCLUSION

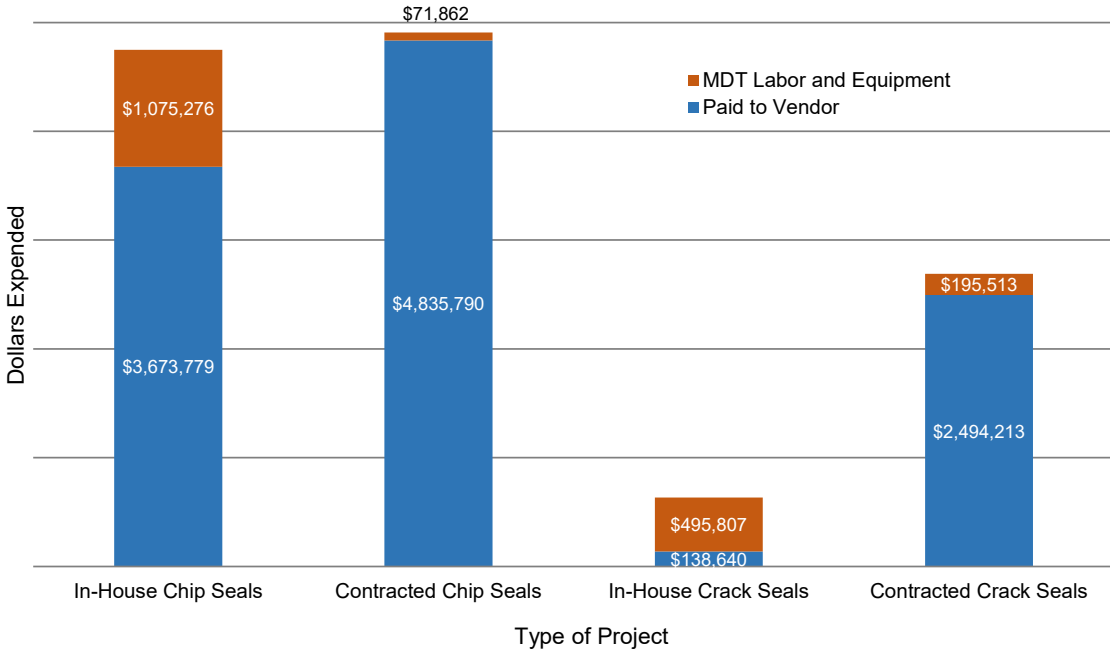
The department compares its cost to assemble equipment to the cost of procurement of pre-built equipment to determine the most cost effective method. Building equipment is a cost-effective use of taxpayer resources.

The Maintenance Division's Contracting Practices

To address another of the requirements of HB 473, we gathered information on the division's current outsourcing practices, best practices for outsourcing, and outcomes of outsourcing initiatives in other states and provinces. We also determined how the division decides what to contract and what to do with in-house labor.

Like most states' highway maintenance programs, the Maintenance Division outsources a variety of work, but performs the majority of its program work with its own labor. In fiscal year 2017, the division contracted for over $22.1 million in services, not including purchases of materials, which are also purchased from private-sector vendors. The pavement projects that the division contracts throughout the state are the most visible and highest-cost outsourced work. Highway construction contractors carry out maintenance projects in addition to the more substantial MDT construction projects that occur each year. All maintenance-based paving projects, which include overlays and mill-and-fills, are performed by contractors. Overlays consist of paving over the current pavement structure, and mill-and-fills involve removing some portion of the existing pavement before repaving. Road sealing projects, which include chip seals and crack seals, are performed to extend the road's life and can be contracted or performed using staff labor. A chip seal is an application of gravel and asphalt over the entire surface of the pavement, and a crack seal is the application of sealant to cracks in the road. Despite the division's performance of many of these sealing projects in-house, the majority of expenditures on these projects are made to external entities, as shown in Figure 2 (see page 14).

Figure 2
Expenditure Composition of Standard Contracted and In-House Seal Projects
Fiscal Years 2016 and 2017



Source: Compiled by the Legislative Audit Division from department data.

As displayed, most of the expenses for the division's chip and crack seal projects, including the projects it performs with its own labor, are paid to external vendors for services and materials. Contracted projects contain in-house costs for contract management. In addition, the division spends a large sum on projects that it does not use in-house labor to perform. For example, in 2016, the division spent around $9.7 million on overlays, mill-and-fills, and other specialized contracted projects.

In addition to road projects, the division's other contracted work includes:

- Epoxy road striping, which is the federally-funded establishment of centerlines and edge lines. Paint striping, on the other hand, is performed by division staff using state funds.
- Custodial maintenance of 34 of 35 state-maintained rest areas.
- Specialized trade work on facilities, such as electrical work.
- Location- and task-specific agreements with local governments.

Based on our discussions with other states' officials and review of federal reports, MDT is similar to other states' transportation departments in terms of approaches to and volume of contracting for maintenance activities. A federal study found that the most common reasons states contract for highway activities were lack of manpower

and specialized expertise. Another reason to contract is to get time-sensitive projects completed faster. Reasons given for not contracting for maintenance activities were to help develop and maintain internal expertise on those activities and to keep costs down. Maintenance staff listed similar reasons, such as capacity and specialization, for the division's approach to what services it contracts.

Outcomes of Highway Maintenance Privatization in Other States and Provinces

We reviewed a number of audits and other evaluations of more aggressive road maintenance outsourcing initiatives in other states and provinces in an effort to understand the outcomes of privatized highway maintenance. In many cases, the attempts have resulted in concerns about service quality, accompanied by unsubstantiated savings, cost overruns, or deferred costs. A recent audit of the Utah Department of Transportation determined that its maintenance costs have increased due to a rise in the amount of contracted work and weak contract oversight, and that the agency could perform the work more cost-effectively itself. Audits and evaluations in Massachusetts, Virginia, Oklahoma, Texas, and Florida all found that early claims of success should be treated with caution, as savings could not be substantiated or were either incorrectly calculated or accompanied by a number of unanticipated service problems. These include the contractor not performing the required work either at all or in required time frames, and measurable declines in performance outcomes. These problems presented risks both to public safety and to the contracting state's transportation infrastructure assets.

Highway Maintenance Privatization Is More Common in Canada

Several Canadian provinces have entirely privatized highway maintenance. After British Columbia privatized its maintenance program, an evaluation found that costs had increased dramatically, and there was no recourse because the province had sold all of its facilities and equipment. The Ontario government reconsidered the privatization of its winter road maintenance after contractors did not comply with contract terms, leading to significant winter public safety concerns. One contractor was fined over $700,000 for poor performance, and in 2015, an audit linked escalating costs and poor service to privatization. Alberta privatized its road maintenance program in 1996. Staff of the province's Ministry of Transportation indicated privatization has saved money and been a viable method of maintaining roads. They indicated using contracts improves flexibility, allowing them to adjust the level of service to available funding. Officials say privatization created a new road maintenance industry, independent of road construction contractors who perform pavement projects. However, an independent research organization determined overall service quality and contract integrity are

impossible to compare to the previous government service due to the province's strict privacy laws for public contracts. Ministry staff report they are considering buying back some of their facilities because at the end of contract terms, many contractors have refused to sell facilities to the incoming contractor. This has resulted in multiple maintenance facilities being built in a single location. Alberta officials indicate the capital investment for new contractors is considerable, meaning contract terms have to be ten or more years to make the contract viable. In January 2018, the international parent company of a contractor responsible for 43 percent of Alberta's highways went bankrupt, and the province had to make $9.4 million available to keep the company solvent enough to avoid service disruption in the province.

Other Factors Important to Consider Regarding Privatization

The federal government produced a report indicating that in almost all states, it is difficult to compare in-house and contracted services for extensive highway maintenance due to the complexity of overall costs and benefits involved. The report also stated that as departments of transportation rely more heavily on contractors, pressure is placed on the departments' oversight and monitoring capabilities, which can lead to lower-quality work and inefficient use of public funds. As contractor use increases, it can lead to a thinning of department expertise over time, resulting in diminished ability to monitor and manage contracts. Market competitiveness is another important factor when considering the viability of large-scale outsourcing. We reviewed the invitations for bid for all contracted maintenance projects conducted in fiscal years 2016 and 2017, and found that four companies won 64 percent of the project bids in those years. Thirty-one percent of all project invitations for bid received only one or two bids. The contractors we spoke to did not express enthusiasm for performing the day-to-day tasks of highway maintenance. It is unclear whether Montana's construction market is large enough to provide comprehensive statewide maintenance services and whether there is contractor interest in performing the day-to-day tasks of road maintenance in addition to the major projects they already perform.

Conclusion

Much of the readily contracted work performed by the Maintenance Division, such as pavement projects, is already contracted out, and it is unclear if there is private capacity for or interest in other maintenance work. Efforts to contract out larger volumes of road maintenance practices present significant service level and cost risks and should therefore be approached with caution and thorough feasibility and cost-benefit analysis.

Cost Comparison of Contracted and In-House Road Projects

The Maintenance Division is responsible for doing road projects each year as part of the department's effort to sustain the state's highway infrastructure. These projects are both preventative and reactive and are intended to extend the useful life of the road. The maintenance program receives no federal funds for these projects. The three broad categories of maintenance pavement projects are repaving, chip seals, and crack seals. Repaving involves putting new pavement on the road. MDT does not own a paver and contracts out all of these projects, which tend to be the larger and more expensive projects. Chip seals and crack seals can be performed with either contracted labor and equipment, or performed by division staff with division equipment. In addition to these major categories of work, division staff also perform pavement work that does not rise to the level of major projects and is not performed by contractors, such as filling ruts in the road surface. Projects have two funding sources: maintenance area pavement preservation funds, which are administered at the district level, and State Funded Construction (SFC) funds, which are administered by division management in Helena. Projects paid for with maintenance area pavement preservation funds can be performed either in-house or by contractors. Maintenance projects funded by SFC funds are contracted.

Comparable Project Quality Is Similar

We asked maintenance staff about differences in quality between in-house and contracted projects. We also spoke to contractors and contractor representatives to ascertain their perspectives on project quality and the division's contracting practices. Maintenance staff stated they believed their work to be of similar quality to that of contractors. Likewise, the contractors to whom we spoke did not express a negative opinion of the work MDT performs. Division staff expressed agreement on the merits of contracted work: contractors are able to work more quickly than MDT staff, and it is in their best interest to complete the work as fast as possible. Division staff also said contractors are able to handle larger and more complicated projects more readily, due in part to lack of MDT capacity and in part to specialization. Division staff stated that in-house projects are usually more modest in scope and are potentially more consistent in quality because they have no profit motive and are unlikely to rush the work. In addition, after the project is complete, staff who worked on the project must continue to maintain that same road on a daily basis. Division officials believe this provides additional incentive to make sure the work is well-performed.

Division's Contracting Decisions Made by Subjective Estimation

Maintenance chiefs in all five districts reported similar processes for how they make decisions about conducting the projects in their areas. They believe it to be cheaper to do the work in-house than to contract it, but also that using contractors is necessary on some projects, mostly due to size. When making decisions on whether to do work in-house or with a contractor, maintenance chiefs estimate their staff's capacity do a project, and consider a number of other factors they think could affect project cost. Examples of other factors include geographic location of a project and whether they have the needed materials on hand. Maintenance officials use judgments and historical knowledge of costs to make a subjective determination about whether to contract a project or perform it in-house.

Opportunity Costs Must Be Considered for In-House Projects

When a project is performed in-house, the project is paid for from two different sources. The area's general operating budget pays for the project's labor and equipment. In this sense, the labor and equipment is what is known as a "sunk cost" because the maintenance area would be paying the salaries and assigned equipment costs of that equipment anyway. Only the materials for the project are purchased with pavement preservation funds. When a project is contracted, the entire cost of the contract, which includes all costs of contracted labor, equipment, and materials, is paid by pavement preservation funds. The only costs paid for by the operations budget are labor and equipment costs for department staff performing contract inspection. This means that it will be cheaper in budgetary terms to do the work in-house. What this does not account for is what is called "opportunity cost." The opportunity cost is the cost of not doing whatever work the maintenance staff would have been doing instead of the project. If maintenance staff spend a week working on a pavement project, that represents a week's worth of routine work, such as mowing or reflector repair, not being done in their sections. The costs of work undone is not easily calculable, but the larger the project, the larger the costs will be, due to the requirement that more staff must be taken away from their normal maintenance activities to perform the work. This cost must be weighed against whatever budget savings are generated by using the sunk costs of labor and equipment. Division management said they have asked area chiefs to take these costs into consideration when making contracting decisions, and the chiefs we spoke to report that they do consider these costs.

Project Process Does Not Include Formal Cost Comparisons

The department has made pavement project contracting decisions without comparative cost information about contracting and in-house methods. While some maintenance chiefs demonstrated tools they use to estimate project cost, chiefs do not formally or consistently conduct cost comparisons when making contracting decisions. In all five districts we visited, staff could not provide documented quantitative estimates for specific projects that were selected for outsourcing or for being undertaken with in-house staff labor. Instead, they stated they made subjective estimations of cost, and weighed a number of other factors, such as the size of the project and the speed with which contractors can work. However, we found no concrete rationale for why each particular project was performed with its respective labor.

Division Management Has Not Conducted Historic Cost Comparison

Division administration personnel acknowledge they have not performed and do not have a process to perform pre-job cost comparisons to determine a course of action for any given project, nor have they analyzed historic project data to determine how to make future decisions. Rather, they have pushed maintenance chiefs to consider the opportunity cost of doing the work in-house in addition to the material costs that will impact their respective pavement preservation budgets. They also acknowledge that they push to contract more projects, even when they believe it to be less cost effective, in an effort to appease both the contractors and perceived political interests.

As part of our work, we conducted a cost comparison of all in-house and contracted crack seals and chip seals that occurred in fiscal years 2016 and 2017. We compared costs for crack seals and chip seals because these are the two types of major projects the division can perform with either department staff or via contract. We obtained from the division a list of all pavement projects that occurred in those two years. It included information on project labor, equipment, materials, and contract costs. We used the Maintenance Management System (MMS) and reviewed purchase orders to verify and obtain other necessary information to compare project costs.

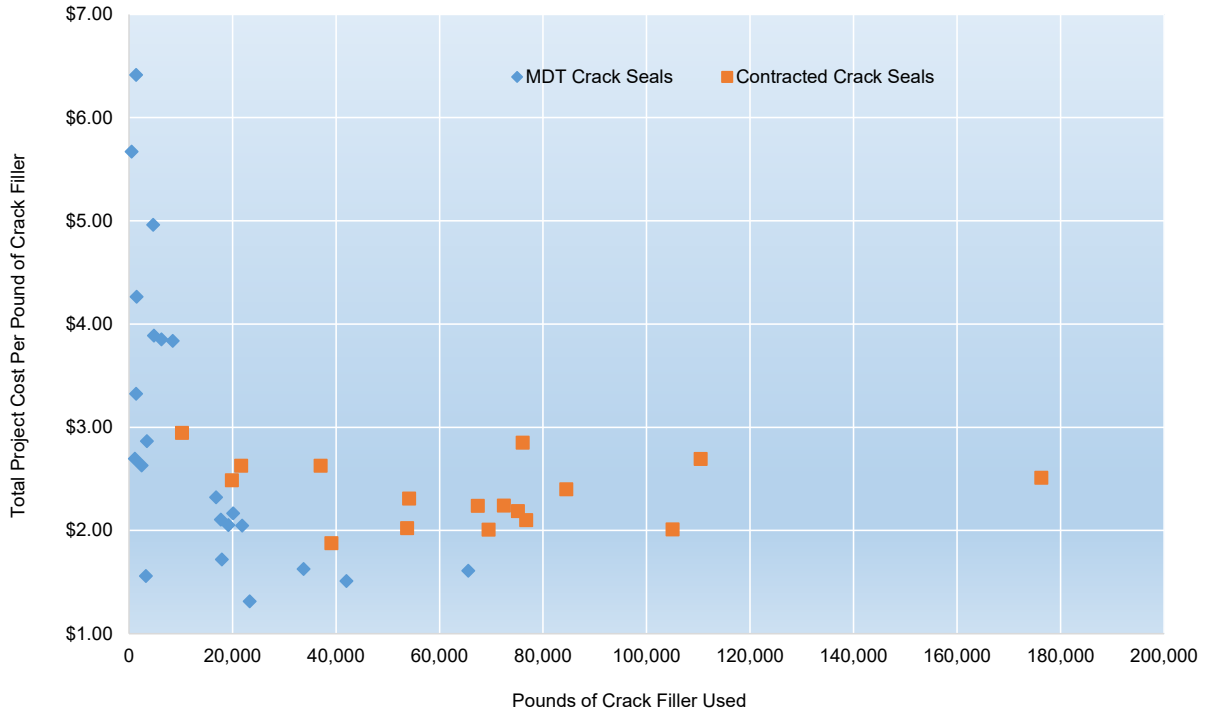
The division's MMS captures all labor, equipment, materials, and contract costs. Projects are assigned a cost center number in the MMS, and all work and costs associated with the project are assigned to this cost center, allowing for total costs and work achieved to be captured. If a project includes any contracted component, the final invoiced amount of the contract is entered as a single value. Materials costs are also direct, with units of material type and total cost of materials both included. Labor cost represents the fully-loaded cost of MDT staff labor, including the cost of benefits. It does not include any labor performed by division management, including

administration, maintenance chiefs, and maintenance superintendents, because these positions do not capture their time in the MMS.

In-House Crack Seals Are Cost-Effective

We found that crack seal and chip seal projects are subject to a significant economy of scale. The bigger the project, the cheaper it is per unit of work, regardless of who performs the work. Small projects have a high cost per unit of work for both crack seals and chip seals. Because the division consistently selects large projects to contract out and small projects to do in-house, any direct comparison needs to account for project size. Accordingly, we limited our selection of compared projects to those that are comparable in scale. These included projects in the range of the smallest contracted project to the largest in-house project. Figure 3 shows total project cost per pound of all crack seals in the two-year period by volume of crack filler used. This is represented by the left-most orange square, which is the smallest contracted crack seal, and the right-most blue diamond, which is the largest in-house crack seal. This figure shows the overall cost of the crack seal per unit of material used plotted against the size of the project.

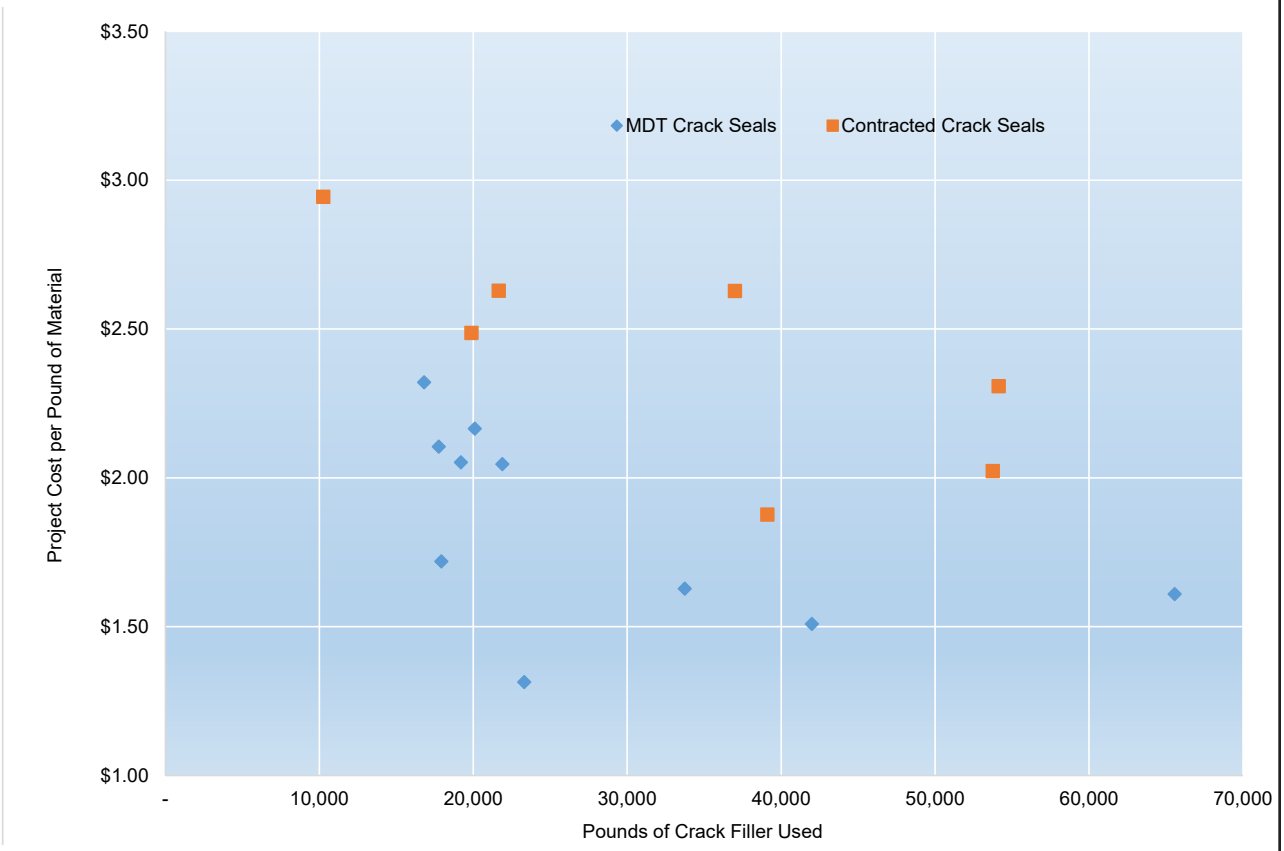
Figure 3
Project Cost Per Pound of Crack Filler by Material Used - MDT vs. Contract Crack Seals
Fiscal Years 2016 and 2017



Source: Compiled by the Legislative Audit Division from department data.

As shown, the division performs many relatively small crack seals in-house, and these projects are more expensive per unit of work. This is because they do not benefit from an economy of scale. As in-house projects get bigger, their costs per unit of work decrease to under the cost of contracted crack seals of similar size. To control for the differences in scale, we limited our comparison to projects of similar scale in terms of amount of material used. This included all projects that used between 10,250 and 65,568 pounds of crack filler, or ten in-house projects and seven contracted projects over the two-year period, shown below.

Figure 4
Crack Seal Projects Comparable in Scale - MDT vs. Contract
Fiscal Years 2016 and 2017



Source: Compiled by the Legislative Audit Division from department data.

This figure excludes all projects for which there is not a project of the other type of comparable scale. These are the projects that can be directly compared to each other because they are of similar size, and consist of seven contracted crack seals and ten in-house crack seals. For these projects, the average cost of crack seal project per pound of crack filler was $1.85 for in-house crack seals compared to $2.41 per pound for contracted crack seals. If the in-house projects within this range had been done by

contracted labor at this rate, these projects would have cost $158,000 more overall. Because of the way in-house MDT projects are budgeted, this would have represented a $557,000 increase to MDT's expenditures, which would not account for the cost of work MDT staff would not be able to complete due to working on these projects instead. Conversely, if the division had performed the contracted projects within this range of scale with division staff, total project cost would have been $134,000 less over the two year period. This would amount to over $400,000 in actual budget savings, which would not account for work not performed by MDT staff because they were doing these projects instead.

Cost Comparison for Chip Seal Projects Was Inconclusive

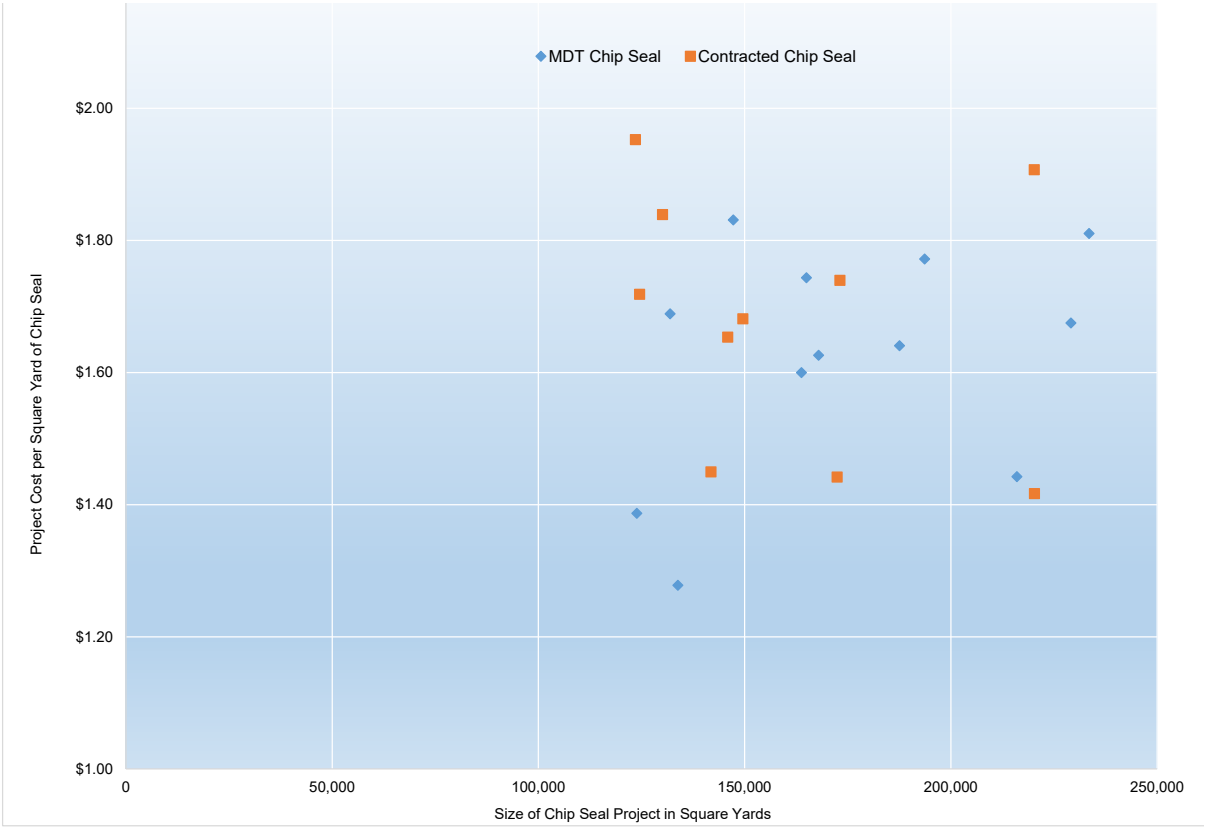
A similar comparison of in-house and contracted chip seals revealed less significant cost disparities. Figure 5, below, shows total cost per project of all standard chip seals undertaken by the Maintenance Division in fiscal years 2016 and 2017.

Figure 5
Project Cost Per Square Yard of Chip Seal - MDT vs. Contract Chip Seals
Fiscal Years 2016 and 2017

Source: Compiled by the Legislative Audit Division from department data.

As displayed by Figure 5, chip seals are also subject to a significant economy of scale, as bigger projects are less costly per square yard than smaller projects. This figure also shows that, as was the case with crack seals, the division contracts out large projects and performs the smaller projects in-house, with some overlap in the middle. Accordingly, we again limited our comparison to projects of similar size to control for economy of project scale, as displayed in the figure below.

Figure 6
Chip Seal Projects Comparable in Scale - MDT vs. Contract
Fiscal Years 2016 and 2017



Source: Compiled by the Legislative Audit Division from department data.

As shown, within the range of chip seals that could be performed via either method, there were 12 performed in-house and 10 contracted chip seals, and there does not appear to be a conclusive pattern between the two. The average project cost per square yard of chip seal for these projects was $1.62 for maintenance staff and $1.68 for contracted projects. Given the relatively small number of comparable projects, and the fact that the average division-staffed project was 9 percent larger than the average contracted project, we cannot definitively conclude that one method is cheaper than

the other. Using data from a greater number of years might provide more useful information.

Cost Comparison Necessary to Ensure Accountability

This analysis is not meant to be prescriptive, and it may be that such a cost comparison will not change the bulk of the division's contracting decisions, which have to take into account other factors, like staff capacity and project time frames. The department could undertake a similar analysis and include more years of data and account for other potential factors, like geographic region or number of locations involved in each project. Potential cost savings that would result in additional project work undertaken may be realized if the department pursues this sort of analysis to make its decisions on whether to contract for projects or to perform them with in-house staff. Without complete information about the results of contracting efforts relative to internal outcomes, management, stakeholders, and elected officials are not able to assess the risk and value of outsourcing, and accountability for results is limited.

RECOMMENDATION #2

We recommend the Montana Department of Transportation institute a formal, quantitative cost comparison between contracted and in-house maintenance pavement preservation projects to improve its decision-making on when to use contracts or Maintenance Division staff for road maintenance projects.

Chapter III – Prioritization, Coordination, and Assessment of Maintenance Activities

Introduction

Our second audit objective focused on the Montana Department of Transportation (MDT, department) Maintenance Division's (division) methods of prioritizing, verifying, and assessing the work it performs. We were interested in both the day-to-day work and the larger projects undertaken by the division. We found there are opportunities to improve pavement project selection by standardizing guidance and requiring supporting information. Agency-wide coordination of work on road assets and communications with stakeholders can be strengthened. We also noted the division should develop performance measures and goals related to the work it performs, and improve monitoring of its work and data entry to ensure accurate recording of work and management information. These issues are discussed in the following sections.

Pavement Project Prioritization and Selection

Maintenance pavement preservation projects occur in all ten MDT maintenance areas in the state on an annual basis. Each area receives an annual budget of approximately $1 million, for a total of around $10 million budgeted for statewide maintenance projects. These projects represent some of the biggest single expenditures of maintenance money. Common examples of projects maintenance areas use this funding for include crack seals and chip seals. The projects funded by maintenance area pavement preservation funds are selected at the area and district level without direct oversight from division management in Helena. Projects funded with State Funded Construction dollars, a separate appropriation of restricted funding, are nominated in the maintenance areas and approved by staff in Helena after limited review.

Pavement Data Collected Annually

Maintenance projects differ from construction projects in that they are smaller and less complex. Construction projects typically involve major changes to the road, such as adding guardrails or extending shoulders, whereas maintenance projects are generally limited to patching, sealing, or repaving the existing road surface. Unlike construction projects, maintenance pavement projects receive no federal funding. Both maintenance and construction staff use information provided by the department's Pavement Analysis Section located within MDT's Highways and Engineering Division. The Pavement Analysis Section employs staff to drive all state-maintained Interstate, National Highway System, primary, and secondary roads in vans equipped with sensors that measure cracking, rutting, and smoothness of ride, which is a measure of

overall surface consistency. These measurements are imported into the department's Pavement Management System (PvMS) and then used to generate recommendations for treatments to be undertaken by either construction or maintenance.

Department staff stated that PvMS recommendations are not intended to be prescriptive, but should be balanced with staff observations made in the field. Maintenance staff reported that PvMS recommendations were useful, but that one of the primary benefits of projects originating in the Maintenance Division is the flexibility and speed with which the division can react to unforeseen road deterioration or damage. Maintenance projects can be planned and completed in a matter of weeks or months, unlike construction projects, which usually require years. After spring thaw, maintenance staff have the ability to assess road condition and make decisions to address reactive and preventative pavement needs. This means that PvMS recommendations, which are generated from data gathered during the previous summer, may be out of date by the time division staff select summer road projects.

Projects Identified and Selected Inconsistently

For the 2016 and 2017 projects completed in the maintenance areas we visited, we obtained and reviewed information from the PvMS regarding all segments of road in each project area. We also obtained data for each project on that road's Annual Average Daily Traffic, which is a measure of how many vehicles on average drive that stretch of road in a day. We tabulated and compared pavement projects conducted in all five districts to their PvMS recommendations. Out of 63 total pavement projects completed in the five maintenance areas we visited, 15 had a PvMS recommendation of "Do Nothing" for all measured road segments in the project area. Every visited area had at least one "do nothing" recommendation for a pavement project that was completed in the two years of projects we reviewed, and the total cost of the projects with "do nothing" recommendations completed in the two years was $3.1 million. Thirteen additional projects were performed in these five areas on road segments not measured by PvMS vans and, therefore, there was no data or recommendation for work. These projects were performed despite PvMS not recommending any work and there was no documentation of why the department decided to complete these projects. Traffic data was also inconsistently supportive of projects.

Department officials stated they consider a number of factors to determine how best to expend their pavement preservation dollars. These included PvMS recommendations; average daily total and commercial traffic; direct observation of the road, which occurs by division staff on a daily basis; projects in the construction pipeline; budget availability; the life-cycle of the road; and road federal funding eligibility. Because the division does not receive any federal funds for pavement projects, projects on roads eligible for federal funding are more likely to be undertaken by the construction program.

Projects Selected Based on Professional Judgment

All MDT staff to whom we spoke asserted that professional expertise and judgment were important factors for selecting projects, in part because the data from the PvMS is close to a year behind actual road conditions. In some cases, department staff indicated that for certain segments of road, they believed the data to be incorrect. Staff expressed variable opinions on the approaches they take to prioritize projects. For example, one staff member indicated a preference for maximizing the lane miles addressed while another said addressing lane miles was not a concern. Beyond our interviews with department staff on how projects are prioritized and chosen, the department was unable to demonstrate why the selected projects were chosen, because documentation related to the prioritization and selection process is not maintained. Only informal lists of potential projects, including potential costs, existed, without accompanying support for why each project should be performed relative to others. While there are department guidelines for when a treatment should be considered, these guidelines do not indicate how needs should be weighed and prioritized against one another.

Given the decentralized process through which projects are selected, the lack of strong guidelines for determining how to prioritize work, and the lack of documented support for projects, there is limited accountability and transparency in how the department selects its maintenance projects. Because of inconsistent project selection criteria, the department cannot readily support all of the projects it has selected and runs the risk of spending funds in locations of lesser need. Given the number of factors that can influence project selection and the variability of weights given those factors, the most pressing projects might not be selected, or inappropriate factors, such as political interests, could influence the selection process. Therefore, it is unclear if the department is fully optimizing and leveraging its pavement preservation funds.

No Formal Procedures or Documentation Requirements for Project Selection

The lack of clear standards for selection, and a decentralized process giving autonomy to the districts and areas to make their own decisions with limited or no centralized review, cause inconsistent approaches to prioritizing pavement projects statewide. Department staff in each location explained their reasoning for doing the projects performed there. They stated that direct observation of the road is usually more important than the PvMS data for making decisions about which projects to prioritize. Maintenance staff indicated their professional judgment of road condition, budget limitations, and coordination with the construction program were the most important factors for deciding how to prioritize their work. This means that the selection of projects is a complicated and relatively subjective process, dependent on staff expertise and experience. There are currently no formal procedures for describing how projects

should be selected and prioritized to ensure consistency throughout the state. Additionally, there are no documentation requirements for project selection decisions to ensure accountability for these decisions.

RECOMMENDATION #3

We recommend the Montana Department of Transportation develop procedures for and document its pavement project selection process to consistently optimize and ensure accountability for these decisions.

Department Communication and Coordination Can Be Improved

We sought to determine whether and how the Maintenance Division coordinates its work with the Highways and Engineering Division, which is responsible for construction projects on state roads. Throughout the course of fieldwork, there were several indications that there is not always comprehensive communication between the two divisions, leading to duplication of efforts and inconsistent messaging to stakeholders. The following sections discuss this issue in further detail.

Coordination Between Divisions Complicated by Centralized Decisions

In 2017, maintenance staff in one area conducted a rut-fill just weeks after center-line rumble strips had been installed by a Highways and Engineering Division contractor at the same location. The Maintenance Division's rut-fill project covered over the recently installed rumble strips on almost three miles of road. In this case, there were direct losses of around $7,000 because the district had to pay to have the contractor reinstall the rumble-strips and have maintenance staff re-stripe the road. This lack of coordination has the potential to damage the department's reputation in the eyes of important stakeholders and the general public.

We heard reports of similar issues in other areas, especially where maintenance area boundaries are not contiguous with district area boundaries. In these instances, Maintenance staff have to coordinate with Highways and Engineering staff from a neighboring district as well as from their own district to ensure their planning accommodates one another. There is potential for more mistakes of this nature to occur.

The risk of uncoordinated work between divisions and districts was most prevalent with striping projects. We reviewed documentation used to track all work done on each segment of road in one area. This documentation revealed that on seven segments of road in the past decade, epoxy had been used to stripe roads instead of paint the year prior to major roadwork. Other department staff mentioned similar planning difficulties. In these cases, paint may have been a better choice; epoxy costs at least four times more than paint per gallon, is applied to the road in greater volume per foot than paint is, and is applied by contractors rather than maintenance staff. Its benefit is that it lasts longer, but when the road is going to be worked on by other entities the following year, long-lasting striping is less necessary. For one area reviewed, over a 7-year period, the department striped 64 miles of road with epoxy instead of paint in the year before road projects began.

Insufficient Coordination Weakens Department's Reputation With Stakeholders

In January 2018, the MDT Highways and Engineering Division distributed a policy to contractors mandating that contractors change their existing signs for work zones to better reflect a law changed in the 2017 Legislative Session. As of March 2018, some of MDT's maintenance crews were still using signs not acceptable for use by contractors. Maintenance staff report the decision to change signage requirements and its timing were made without input from their division. The division is now in the process of replacing all of its obsolete signs with conforming signs. Division management estimates this will cost over $100,000 statewide. Division staff believe that the change to the law did not necessitate a change in signage, but because the directive was given to contractors and is the new policy of the department, the Maintenance Division must now comply as well. The decision also resulted in both the division and the department as a whole appearing to hold contractors to a higher standard than the standard to which the department holds itself. Inconsistent messaging weakens MDT's reputation as a trustworthy, reliable partner.

Department Size and Structure Can Impede Coordination

Insufficient communication between the two divisions of the department has resulted in duplications of effort and inconsistent messaging because the department is a large agency with many divisions and bureaus all working independently of each other. It is a challenge for independent operations to consistently communicate with one another and to understand the potential impacts of any given decision upon the other. Coordination is complicated by the fact that much of the decision-making occurs at the district and maintenance area level without centralized control. When decisions are made by one division in Helena, district staff of the other division may not be immediately informed of the decision or how it could impact them. There is further

risk for insufficient coordination between maintenance and construction staff located in the various districts.

Effective Departments Communicate Internally and Externally

Management should internally and externally communicate the necessary quality information to achieve the department's objectives. Within the organization, communication must cross all levels of the entity. Well-designed management structures outline the specific authority and responsibility of individual employees in carrying out their day-to-day activities to achieve entity objectives. They also serve as a point of reference for employees seeking guidance when unusual situations arise. Additionally, according to a number of management best practices, delivering a consistent message to stakeholders is vital to maintaining strong stakeholder relationships and maintaining an organization's "brand" or reputation.

RECOMMENDATION #4

We recommend the Montana Department of Transportation develop formal lines of communication between its Maintenance and its Highway and Engineering divisions to minimize the risk of project duplication and overlap, and to present a consistent message to its stakeholders and the general public.

The Department Does Not Actively Measure Maintenance Work Completion

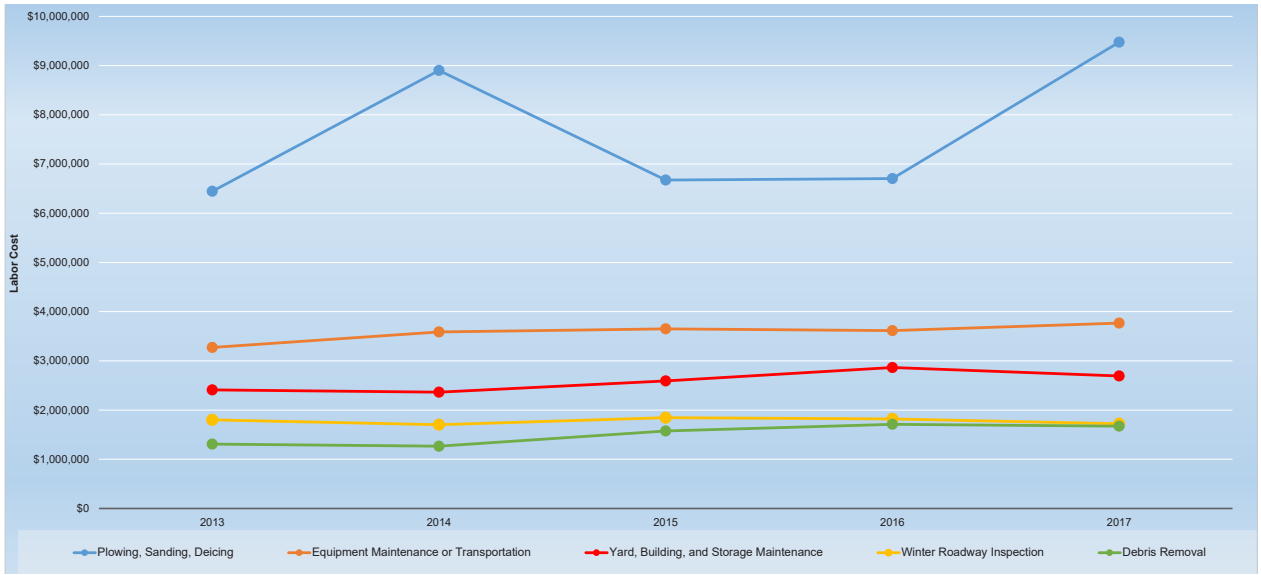
During our visits to maintenance sections, we wanted to verify work reported in the maintenance management system (MMS) had indeed occurred to determine how the division ensures work completion. We evaluated reported work completed during a one-week time frame in July 2017. Prior to visiting maintenance sections, we identified an item of work reported during the week that audit staff could observe and verify had occurred. For example, work items selected for verification included roadway patching and road sign installations. Out of ten visited sections, six reports contained work audit staff could observe (nonobservable work included things like grass mowing, since our site visits took place several months after the work occurred.) In five of these six cases, we found the work was completed as reported. However, in one case, we were unable to substantiate the reported work. For this case, we attempted to verify employee labor spent on road surface patching as reported in the MMS. We were unable to find any evidence of a patched pothole at the reported road location. Upon inquiry, maintenance

staff acknowledged there had never been a pothole in the reported location, and what had actually occurred was work that would have been categorized as an "Equipment Maintenance and Transportation" activity. This activity consistently ranks in the top 5 overall annual maintenance activities. Accordingly division management had asked questions of district staff, creating a perceived incentive for staff to misrepresent their work reporting. Staff indicated that management wants this activity limited, so the section's staff reported they patched a pothole instead of reporting the equipment maintenance that had actually occurred. This raises reasonable questions about how often work reporting misrepresentation occurs, the accuracy of the reporting in the system, and overall work efficiency.

Maintenance Division Labor and Cost Trends

To gain an understanding of the overall work the division performs, we conducted a trend analysis of the labor hours and costs of work performed by the maintenance program over the past five years. There are a total of 82 reportable activities in nine basic categories: roadway; roadside; drainage; bridges; facilities; traffic safety; winter maintenance; material production/handling/stockpiling; and equipment/supervision/overhead. For example, the roadway category includes activities like debris removal and machine patching, while the roadside category includes activities like mowing and litter pickup. The following figure illustrates the five activities with the highest cost and labor hours from fiscal year 2013 through fiscal year 2017.

Figure 7
Top Five Maintenance Activities by Labor Cost
Fiscal Years 2013 through 2017



Source: Compiled by the Legislative Audit Division from department data.

As shown, the labor activity with the highest costs and total labor hours statewide was "Plowing, Sanding, and Deicing." This activity was also one of the most variable work activities by both cost and hours. This is due to variability in winter severity year by year. In some years, this activity accounted for more than double any other activity's hours and costs. The second- and third-most used and costly activities were "Equipment Maintenance or Transportation" and "Yard, Building, and Storage Maintenance." Combined, these two activities represent 15.6 percent of the total labor hours of maintenance staff over the five-year period, as shown in the following table.

Table 3
Maintenance Activities by Labor Hours
Fiscal Years 2013 through 2017

Activity	5-Year Annual Average of Labor Hours	Percentage of Total Labor Hours	Average Annual Labor Cost
Plowing, Sanding, and Deicing	214,409	19.1%	$7,640,859
Equipment Maintenance or Transportation	101,806	9.1%	$3,578,215
Yard, Building, and Storage Maintenance	73,505	6.5%	$2,584,092
Planning, Scheduling, and Supervising	50,716	4.5%	$1,769,865
Winter Roadway Inspection	50,323	4.5%	$1,777,755
Training	42,645	3.8%	$1,495,051
Debris Removal	42,538	3.8%	$1,505,899
Mowing	38,414	3.4%	$1,351,183
Sweeping and Cleaning Pavement	32,221	2.9%	$1,135,407
Machine Patching	30,055	2.7%	$1,045,338
Guardrail Replacement and/or Repair	25,243	2.2%	$885,704
Delineators	20,101	1.8%	$705,427
Pavement Striping	19,683	1.8%	$673,422
Hand Surface Repair	18,918	1.7%	$670,135
Rest Area Maintenance	18,654	1.7%	$655,107
Single Post Sign Installation or Replacement	18,607	1.7%	$652,248
Routine Roadway Inspection	17,492	1.6%	$616,207
Chemical Spraying	15,034	1.3%	$521,987
Hauling Maintenance Supplies	14,625	1.3%	$519,350
Snow Removal	12,534	1.1%	$446,890
61 Other Activities	264,908	23.6%	$9,254,216

Source: Compiled by the Legislative Audit Division from department data.

As shown in the table, even activities that rank in the top 20 maintenance activities in terms of labor represent only small percentages of overall labor. Each activity included in the 61 activities combined at the bottom of the table represents 1.1 percent or less of overall labor performed by maintenance staff. One of the reasons that Equipment

Maintenance or Transportation and Yard, Building, and Storage Maintenance represent such significant volumes of labor and money is that they are relatively general and occur over several seasons, whereas many of the other activities are seasonal and more specific. Nonetheless, relatively large amounts of staff time are spent transporting and maintaining equipment, facilities, and stockpiles. Note that these numbers do not include vehicle maintenance and repair undertaken by equipment shop staff, and only represent hours of maintenance program staff, who do not perform major repairs. Given concerns about how the division verifies work, we attempted to determine how the division assesses performance, which is the subject of the following discussion.

Division's Maintenance Reviews Do Not Objectively Measure Performance

Division management perform formal "Maintenance Reviews" of every maintenance area every two years. One of the components of this review is an examination of the overall work each area and section performs annually. Before meeting with staff, management reviews reports run from the MMS that list the top 15 maintenance activities performed by both total labor hours and by total cost for the last year, similar to the trend analysis we performed. The review also includes information about total work units completed, 4-year expenditure history, and a number of other data.

We reviewed documents and reports related to the most recent maintenance review, conducted for each maintenance area and statewide in 2016. Our review determined data about labor hours and cost cannot easily be compared section to section and area to area due to significant differences between each area and section. These differences include, amongst others, weather, terrain, altitude, urbanity, and road condition. Total work units are similarly difficult to compare, as the work units vary by activity and are not comparable across activities. For example, road surface repair is measured in square feet of road repaired, while vegetation management is measured in hours of labor, so adding the two units together does not result in a meaningful measure. The information from the reports contained no data that would allow the department to complete a performance evaluation at the overall program, area, or section level. As a result, management must subjectively interpret the data based on professional judgment.

Performance Management Is Necessary to Determine Program Success

Without measuring performance against established goals, the Maintenance Division cannot demonstrate that it is meeting its mission or identify where it needs to improve its performance. Division staff generate management data reports, but are unable to interpret them in ways that provide meaningful information about staff performance.

Existing reports are used to monitor budgets, rather than to evaluate performance of provided service. Consequently, division performance is monitored subjectively by management.

Other States Have Developed Ways to Measure Maintenance Performance

The federal government reports that Congress has recognized the value of performance measurement, stating that managers should resist the temptation to decide too quickly that a particular program is unsuitable for measurable goals. A department must ask itself what makes a program successful and well-run. If the success of a program cannot be defined, then it cannot readily be held accountable.

While defining performance for road maintenance appears to be a challenge for many states due to the reactive and dispersed nature of the work, some have done so. The state of Washington, for example, developed a Maintenance Accountability Program (MAP) in 1996, the intent of which is to measure both program performance and the effects of budget and policy decisions on the accomplishment of program goals. This process includes the identification of survey sites of state-maintained road assets using over 20 formalized standards of performance, such as shoulder edge drop-off and the number of obstructed culverts. These are used comparatively and to help measure the results of funding and policy decisions. This approach represents a method of defining quantifiable performance measures for a trade for which those measures are not immediately obvious.

Performance Measures Are Undeveloped Due to Data Limitations and Program Culture

The department has not developed quantitative measurements and goals to assess its performance for two reasons. The first is that it has not historically had access to quality management information. The legacy MMS, replaced in late 2017, was not user friendly and did not enable assessment of work order completion, asset inspection rates, and other measurable performance aspects. It tracked work units, labor hours, and costs associated with materials, labor, equipment, and contracts, but little else. Accordingly, the division has used the system to manage its budget, but not performance. Division management report that in the past, they attempted to implement a program similar to Washington's MAP program. They indicated this was not a success, in part due to the inability of the previous MMS to accommodate the program, and in part due to management opinion that it was not the best use of staff time. The division's new EVMMS enables the quantification of many of these performance measures, such as rates of work order completion and asset inspection.

The other reason the division has not instituted performance goals is that it has not prioritized and has doubts concerning the value of investment in the development of performance measures. It has instead relied upon subjective and professional assessment of performance by supervisors, and upon public complaint. The division's overall approach to performance is that it is not measured as much as it is observed by supervisors. At the local level, section supervisors consistently stated they had expectations for work efficiency. For example, they know how long it should take to mow a certain stretch of road, and expect a certain mileage to be completed in a day. These sorts of expectations are informal and managed by experience at the local level, but should be quantified and measured by management at larger scales. This sort of measurement would be more meaningful than a total sum of labor hours and cost, such as Equipment Maintenance and Transportation representing 9.1 percent of annual work and $3.6 million in labor cost. Because developing performance measures can unintentionally create an incentive to misrepresent work information, such as was the case with the road patching that had never occurred, it is imperative that division supervisors monitor work accordingly.

RECOMMENDATION #5

We recommend the Montana Department of Transportation develop maintenance performance measures and goals to better enable the department to assess performance statewide and at the division and section levels.

Management Data Requires Better Quality Assurance

The EVMMS will provide the division with the ability to use management information to develop performance measures, but the data necessary to do so remains the responsibility of division staff. We did not specifically test the data present in the previous MMS system. However, in the course of fieldwork, when attempting to use the system's data outputs to conduct a cost comparison analysis, we discovered several significant errors in cost center data. A cost center is a defined entity in the system assigned to a given project to assign and track all related costs. Of 82 pavement project cost centers we analyzed, 9, or 11 percent, contained definitive and meaningful errors. Examples include incorrect units used for work units completed, incorrect activity codes used, inaccurate or miscoded information about materials usage, and assignment of costs to the incorrect cost center.

Errors Constrain the Department's Ability to Track Costs

The number of errors in these important management information centers makes the data difficult to use. When there were errors, the data clearly did not make sense. For example, one contracted chip seal showed no contract cost in the legacy MMS, when the final cost was in fact over $650,000. These cost centers are used to track costs related to large projects and are therefore some of the most important management information in the system. Accurate cost comparison was not possible until the correct information was provided. This means MDT staff would have had difficulty using the information meaningfully, or could have arrived at erroneous results had they used it without verifying its accuracy. If data mistakes were to be made in Accounts Receivable Cost Centers, for which the department recoups expenses from external entities, it could result in lost revenue.

Quality Assurance Process Did Not Identify Errors

Errors were present in the data because the process for data quality assurance did not successfully detect and correct the inaccurate data. Data entry is supposed to be verified by the superintendent on a regular basis, and by the maintenance chief when the cost center is completed. Historically, the data then underwent another level of quality check in Helena. This high-level review would not be able to identify errors at the project level. The errors we discovered were data entry errors, the result of confusion or accident. The errors were not corrected by maintenance area staff, indicating that district-level staff did not thoroughly review all of their largest cost centers for accuracy. Division staff were eventually able to provide all of the correct information for our analysis, indicating they have the ability to know when and why something is incorrect. Division management stated the difficulty in using the previous MMS resulted in staff not placing appropriate value on the data and not treating data review seriously enough.

Data Integrity Procedures Will Ensure Quality Data

Best management practices indicate management should use quality information to achieve the organization's objectives and that management should define and implement procedures to ensure the integrity and consistency of all data stored in electronic form. To capitalize on the investment in its new management system, the department must ensure that the system's data is accurate. A lack of data quality assurance reduces the value of whatever management system is in use. While the EVMMS should enable better data quality assurance due to its more intuitive interface and real-time reflection of data entry, a data management system is only as good as the data entered into it. The previous MMS had very few users, as field staff did not enter information into it directly. The new EVMMS now has hundreds of users, including all maintenance field

staff, which could lead to an increase in data entry errors, heightening the necessity for data quality assurance.

RECOMMENDATION #6

We recommend the Montana Department of Transportation develop and implement a formal quality assurance process for maintenance management system data integrity to ensure management decisions are based on accurate information.

Chapter IV – Maintenance Asset Security

Introduction

The Montana Department of Transportation (MDT, department) and the Maintenance Division (division) are responsible for a large number of state-owned assets. These assets include facilities, equipment, and sizable volumes of materials located throughout the state. As part of our third audit objective, we examined how the department ensures maintenance resources are safeguarded against theft and unauthorized use. During our site visits to maintenance locations throughout the state, we conducted interviews, evaluations, and observations related to the division's inventory management and security to determine how the division safeguards its assets. This chapter discusses the division's management systems for its inventoried items and its equipment and presents findings and recommendations to develop standards for tracking high-risk items and to develop a security policy.

Inventory Assessments

The division has two primary types of inventoried items: equipment items and maintenance items. Equipment items are stocks used by shop staff to maintain or repair equipment, such as tires and blades for plows. Maintenance inventory consists of items used by the maintenance program on roadways, such as guardrail and permanent road signs. Each shop throughout the state has a staff stocker, who is responsible for managing and procuring inventory for that shop and maintenance area. All stocked inventory is tracked in the Equipment and Maintenance Management System (EVMMS.) When an item is used, staff indicate in the EVMMS on what equipment or specific road asset it was used. This enables tracking of inventory on hand as well as the total costs to maintain equipment and roadways.

The Accounting Controls Bureau within MDT's Administration Division conducts an annual inventory of all stocked items to ensure that the value of assets is accurately accounted for within allowable limits. Each district's District Financial Officer (DFO) and their staff travels to the two maintenance area headquarters and every section in the district to conduct counts of all inventoried items. If there is a discrepancy of five percent of total value, the area must provide justification to accounting staff in Helena. A selection of stockpiles of materials like gravel and sand are measured separately by MDT survey staff on an annual basis to reconcile and update the system. Maintenance staff indicate that usage of these sorts of bulk materials is difficult to measure, as measurement is reliant upon staff estimation, leading to discrepancies over time.

Materials and Equipment Inventories Accurately Represent Assets

During our site visits, we conducted counts of physical inventory to compare to counts in the system to determine if inventory counts were accurate and inventoried items were well controlled. Prior to visiting an area headquarters or section, we generated a materials report from the EVMMS and then counted either all or a random sample of items, depending on volume, to compare to the reports. Our work found that inventoried items were represented accurately in the system. There were occasional small discrepancies, which were more often due to a stocker having slightly more on hand than the EVMMS indicated, rather than inventory being missing. Usually, stockers had reasonable explanations for these discrepancies, and most inventoried items were kept in locked locations and did not appear to be at high risk of theft. Of the sampled items we counted at maintenance area headquarters, the average counted item was incorrect by 2.2 percent, representing a discrepancy of 1.7 percent more dollar value than was represented in the system. Given MDT's Accounting Controls Bureau's 5 percent discrepancy of value allowable standard, the 1.7 percent discrepancy our work identified is within allowable thresholds.

The section houses we visited had more modest volumes of inventoried items than did the stockers' facilities. Common section house items include sign posts, road signs, and plow blades for snowplows. Because they had such limited inventory, their counts were almost entirely accurate.

In addition to generating reports to verify inventory levels, we performed a similar process with equipment to verify its presence. With few exceptions, equipment was found where the system indicated it would be. In some cases, we were unable to directly observe equipment because it was currently in use by staff or had been temporarily replaced by another piece of the same equipment while the equipment in question received service. There were some small discrepancies in the system, such as one instance in which the system indicated a maintenance area had two sander bins that had in fact been sold for scrap the previous year, as indicated by a record kept by the shop superintendent. By the completion of audit fieldwork, the EVMMS had been updated to represent the disposal of these items.

New Maintenance Management System Improvements

The new EVMMS has improved inventory management. Because it contains inventory information, the department no longer has to rely on its older inventory system, which was outdated and difficult to use. It was external to the MMS and section supervisors could not use it, meaning they could not know what inventory they were supposed to have without asking the stocker. They often worked around this by

tracking their inventory on their own spreadsheets. With the new EVMMS, staff can now see what they should have on hand, as well as the inventory of other sections and stockers. They can also request inventory from the stocker through the system. The system requires that any inventory or materials used in the course of work exist in their inventory, which necessitates system accuracy. This also enables division management to immediately know what inventory each section has, and to know long-term usage rates for inventoried items. It will also improve equipment management because before the new EVMMS was implemented, maintenance staff could not document what specific piece of equipment they were using to conduct their work. Now, the new system requires this information, meaning that specific uses of equipment can better be tracked.

Fuel Is Controlled in Two Ways

One of the items the division considers to be at high risk of theft, and thus goes to thorough lengths to control, is fuel. Our work included obtaining an understanding of how the division controls its use of fuel. The division has two methods of obtaining fuel. The most common means of fueling is via fuel cards at gas stations, all instances of which are indicated in a report run by Equipment Bureau staff in Helena each month and reviewed by staff throughout the state. The second way that fuel is obtained is through the use of bulk fuel tanks, which are used in locations without convenient access to fuel (usually diesel) and measured regularly to reconcile volume against logs of fuel pumping. We reviewed two months' fuel reports and visited three locations with bulk fuel tanks and did not identify any significant deviations from state policy.

Conclusion

The department's approach to managing its inventoried items, its equipment, and its fuel is effective at controlling and tracking resource usage.

Standards for Inventory

Although inventoried items appear to be controlled to appropriate standards, we determined the Maintenance Division does not consistently account for various items routinely used as part of program operations. Inventoried items were largely controlled by a dedicated staff stocker in each area, but there was variability in how nonconsumable inventory items, such as power tools, were inventoried. Four of five maintenance areas we visited had no systems in place to account for tools, including expensive tools like generators and snowblowers. Additionally, ATVs were not in the EVMMS because they cost less than $5,000, so it was unclear if or how the department tracked these items. On the other hand, one of the five areas we visited maintained a comprehensive

tool inventory spreadsheet with an accounting of all the tools present in each section. This area office stored all large, shared tools in a tool shed at the area headquarters, which was controlled by the stocker who also had a log of which section had borrowed what equipment. This inventory started as a tally of all tools, down to inexpensive items like tape measures, but over time, informal dollar standards were applied to new tools added. This list included over 1,200 tools, including generators, air compressors, and other relatively expensive power tools.

Unaccounted Items at Higher Risk of Theft or Misuse

The department's accounting and allocation of tools and other assets is inconsistent, which results in a lack of information about what is on hand. Though not capital assets, some of these noninventoried items cost hundreds or thousands of dollars, and are at high risk of theft or abuse by either trespassers or unscrupulous employees. A lack of relatively expensive items being tracked results in a lack of institutional knowledge of what the division owns. The reason staff at the area that maintains a tool inventory gave for keeping it was it allowed them to better track tool purchases and needs throughout the area. They would also be able to know if a single section frequently requested the purchase of a specific tool. Without this knowledge, the control of inventory is dependent on staff memory and oversight alone.

Other States Track Inventory With Value Standards

Part of management's responsibility encompasses the establishment of policies and procedures designed to safeguard agency assets. Absolute assurance is generally not achievable, as it is prohibitively expensive and impedes productivity. For example, it is not prudent to spend $50 to safeguard a $10 carton of pens. On the other hand, spending $50 to safeguard a tool worth $2,000 is reasonable. Most states we interviewed noted a specific value above which items are tracked. Wyoming, for example, puts property tags on all items over $500 in value. Washington inventories all items including low-value items, but mentioned there is a threshold below which items, such as nuts and bolts, are not inventoried. In addition, state policy requires that agencies track and, when possible, tag items that are sensitive to theft. We believe MDT should improve controls over inventory items at risk of theft or inappropriate usage such as generators, power tools, and ATVs.

Department Has Not Developed Inventory Standards for Sensitive Items

The department has not developed a consistent standard for what should be inventoried aside from capital assets. Stockers and division management alike expressed confusion about why certain items were inventoried and others were not. Generally, consumable items procured through a contracted requisition process are inventoried, while

nonconsumable items like tools and items bought piecemeal from hardware or auto parts stores are not. The development of a standard for keeping track of sensitive and high-risk items would better enable to division to ensure safekeeping of department property.

RECOMMENDATION #7

We recommend the Montana Department of Transportation develop and implement inventory standards and practices for high-risk tools and equipment.

Asset Security

During site visits, audit staff directly observed the physical security of department assets. We found the department inconsistently secures its properties and assets, and inconsistently reports thefts to internal and external state entities.

Statewide Security Is Inconsistent

Throughout the state, audit staff observed inconsistent practices of equipment and inventory security. One maintenance area yard had gates that opened and closed throughout the day as needed, making the yard more secure than others. This was the only district that kept all vehicle keys inside a locked office on a pegboard, despite the relatively strong security of its yard. Other locations, despite containing a high volume of equipment and/or inventory, were entirely unfenced. Some remote stockpile locations were unstaffed and unfenced or open-gated. Stockpiles of sand, gravel, and other materials were often unsecured, leaving them vulnerable to theft or other misuse. In one reported case, a maintenance area fenced and gated a stockpile site because public trespassers were found to be riding dirt bikes on the piles, which could lead to injury liability concerns. In four of five visited maintenance area headquarters, keys were consistently left in vehicle ignitions in the maintenance yard throughout the day. Though fenced and gated, these yards' gates remained open during working hours. The photograph in Figure 8 (see page 44) displays a loader we observed with its key in the ignition in an unsecured, unstaffed remote stockpile site.

Figure 8
Unsecured Equipment Is at Higher Risk of Theft

Source: Photograph taken by Legislative Audit Division staff.

Leaving keys in ignitions, such as in the case of the loader pictured above, heightens the risk of theft, especially when left in vacant, unsecured locations. This unsecured loader cost about $89,000 in 2008, and is currently worth $49,000. Division staff reported anecdotes of instances in the past when pieces of equipment, including plow trucks, were stolen.

Thefts Reported to Variable Entities

We also reviewed the department's theft reporting by obtaining reports of thefts from multiple entities. A comparison of theft reports to the MDT Internal Auditor, MDT Human Resources (HR), and the Legislative Audit Division (LAD) revealed inconsistent reporting of thefts, with three reports to the Internal Auditor and a separate five to MDT's HR in the last three fiscal years. Only five of these eight incidents were reported to LAD, as required by state law. Inconsistency of reporting does not appear to be limited to the Maintenance Division and may apply to other MDT divisions. There was also evidence of some delay in reporting. During one site visit we observed that the daily diary of the section supervisor indicated a break-in and theft had been

discovered on July 10, but other documents indicate it was not reported to the MDT internal auditor until July 31.

Inconsistent Security and Theft Reporting Increases Risk

The variable practices for securing assets and reporting thefts results in an increased risk of theft and limited awareness of it when it occurs. Because of the inconsistent reporting of thefts to different entities, entities that should be aware of all thefts of department property, including MDT's internal auditor and LAD, are not aware of thefts that have occurred in the past three years. This makes it more difficult to identify patterns or address the risk of further loss. Delayed reporting may produce a similar effect.

Proactive Security Reduces Risk of Theft

It is the responsibility of department management to establish policies and procedures designed to safeguard agency assets. The implementation of security measures is considered a basic management practice. The federal government indicates that security should be proactive rather than reactive and that proactive security consists of assessing risk on an ongoing basis and addressing the highest priority issues as resources allow. Other states have developed policies to address some of these specific concerns. For example, South Dakota has a formal policy on removing keys from vehicle ignitions due to past thefts. As for reporting, §5-13-309, MCA, requires all theft of state property to be immediately reported, at the time of discovery, to both the attorney general and the legislative auditor.

Inconsistencies Are the Result of Lack of Statewide Policy

The inconsistencies we observed in asset security and theft reporting have arisen due to the fact that the department's assets and operations are decentralized and widely dispersed, and it has not developed and implemented well-defined standards for security and theft reporting. There appears to be confusion concerning what constitutes a secure location, and a general preference among staff for convenience at the sake of security due to a belief that the risks are slight. As for theft reporting, division staff gave inconsistent answers about to whom thefts should be reported. Most indicated they were unaware of any theft reporting policy, and that they would report the theft up the chain of command and to law enforcement. Division management most frequently cited HR and the Risk Management and Tort Defense Division of the Department of Administration as the state entities to whom they would report thefts. MDT's internal auditor was cited occasionally, and no division staff mentioned the attorney general or LAD.

The division, and perhaps the department as a whole, given the shared nature of some of the locations we visited, takes a decentralized and reactive approach to security. Division staff admit they usually consider improving security only after an incident brings the risk to their attention. There are no policies or practices for assessing risk or attempting to reduce it. It is important to note that the department must weigh the risk of theft against the cost of better securing its equipment, which in many cases may not be cost beneficial. Nevertheless, the department should have priorities for identifying and mitigating risk. A security policy could include definitions of what constitutes a secure property; under what circumstances a property must be secured; equipment and equipment key security; the specific offices, both internally and externally, to which thefts should be reported; and defined time frames for making those reports.

RECOMMENDATION #8

We recommend the Montana Department of Transportation develop a statewide policy for proactive asset security and theft reporting that includes implementing consistent standards for securing department resources and responding to instances of theft.

MONTANA DEPARTMENT OF TRANSPORTATION

DEPARTMENT RESPONSE

VISION ZERO
zero deaths
zero serious injuries

Montana Department of Transportation
2701 Prospect
PO Box 201001
Helena MT 59620-1001

Michael T. Tooley, Director
Steve Bullock, Governor

June 11, 2018

RECEIVED
JUN 11 2018
LEGISLATIVE AUDIT DIV.

Angus Maciver, Legislative Auditor
Legislative Audit Division
State Capitol Rm 160
PO Box 201705
Helena, MT 59620-1705

Subject: Montana Department of Transportation Maintenance Division Audit

Dear Mr. Maciver:

We appreciate the opportunity to respond to the audit recommendations in the Montana Department of Transportation Maintenance Division Audit (17P-07). We have attached our response, including the timeline for implementing the recommendations.

We appreciate your staff's hard work and professionalism during the audit. MDT is committed to complying with state and federal laws, implementing and monitoring effective internal controls, and maintaining the transportation system. MDT views the audit process as an opportunity for improvement and appreciates your input. We look forward to working with your office in the future.

Sincerely,

Mike Tooley
Director

Attachment

MONTANA MDT

Corrective Action Plan
Montana Department of Transportation Maintenance Program (17P-07)

Audit Recommendation #	Management View	Corrective Action Plan	Responsible Area	Initial Target Date
Recommendation #1 We recommend the Montana Department of Transportation develop formal standards for annual equipment usage to better identify equipment no longer needed during its equipment review process.	Concur	MDT will formalize measurement standards that can be used annually during the equipment review process to help identify equipment and vehicles that may no longer be needed.	Maintenance	June 1, 2019
Recommendation #2 We recommend the Montana Department of Transportation institute a formal quantitative cost comparison between contracted and in-house maintenance pavement preservation projects to improve its decision-making on when to use contracts or Maintenance Division staff for road maintenance.	Concur	MDT created a spreadsheet based on historic average contracted bid costs by bid item by area, as well as in-house labor, equipment, and material costs. As we review our projects, we are entering information into the spreadsheet which will compare differences between contractor costs and state forces. This is one of the factors that will be used when determining how to proceed with the project. MDT will update the Chip Seal, Crack Seal, and Maintenance Operations and Procedure Manuals to formalize this process and how the spreadsheet will be used.	Maintenance Maintenance	Implemented December 31, 2018
Recommendation #3 We receommend the Montana Department of Transportation develop procedures for and document its pavement project selection process to consistently optimize and ensure accountability for these decisions.	Concur	MDT will develop a form that will identify the various criteria that should be used in the decision making process. This form will be used during the project election process and will be documented for each project that is completed. MDT will update the Maintenance Manual to formalize this process and how the form will be used and maintained.	Maintenance Maintenance	November 1, 2018 December 31, 2018
Recommendation #4 We recommend the Montana Department of Transportation develop formal lines of communication between its Maintenance and its Highway and Engineering Division to minimize the risk of project duplication and overlap and present a consistent message to its stakeholders and the general public,	Concur	1. MDT will continue to ensure Maintenance is represented at the annual TCP meetings so they are aware of upcoming projects. 2. MDT Maintenance will meet with other divisions such as Traffic Safety to compare upcoming projects and identify any overlap between the various statewide projects. 3. MDT Maintenance, Engineering, and Transportation Planning will create a resource that includes all projects that can be used by staff to identify overlaps or conflicts with projects.	Maintenance Maintenance Maintenance, Engineering, Transportation Planning	November 1, 2018 November 1, 2018 December 31, 2018

Corrective Action Plan
Montana Department of Transportation Maintenance Program (17P-07)

MONTANA

Audit Recommendation #	Management View	Corrective Action Plan	Responsible Area	Initial Target Date
Recommendation #5 We recommend the Montana Department of Transportation develop maintenance performance measures and goals to better enable the department to assess performance statewide and at the division and section levels.	Concur	MDT will identify performance measures and goals and utilize asset and inspection data from the new Maintenance Management system to track and assess performance statewide.	Maintenance	June 30, 2019
Recommendation #6 We recommend the Montana Department of Transportation develop and implement a formal quality assurance process for maintenance management system data integrity to ensure management decisions are based on accurate information.	Concur	Given the nature of the new Maintenance Management System (MMS), MDT is able to monitor data in a more timely manner. MDT will establish periodic review requirements for supervisors and headquarter staff. This review will include analytical measures that will identify any inconsistencies with the data. MDT will update the Maintenance Opearation and Procedures Manual and Maintenance Management System(MMS) Manual to formalize this review process.	Maintenance Maintenance	December 1, 2018 December 31, 2018
Recommendation #7 We recommend the Montana Department of Transportation develop and implement inventory standards and practices for high-risk tools and equipment	Concur	MDT will develop a process to identify high risk inventory items department-wide. MDT will track the high risk inventory items in our existing computer systems.	Maintenance/ Administration Division	December 31, 2018 December 31, 2018
Recommendation #8 We recommend the Montana Department of Transportation develop a statewide policy for proactive asset security and theft reporting that includes implementing consistent standards for securing department resources and responding to instances of theft.	Concur	MDT will create a security assessment form and use it to identify the type and nature of the security needed by location. This information will be used to prioritize our security changes in the future. MDT will create a policy on theft reporting to ensure all thefts are reported to the appropriate sources.	Maintenance Professional Services Division	December 31, 2018 September 1, 2018