

OHIO AUDITOR OF STATE  
KEITH FABER



Ohio Department  
of Transportation

# Performance Audit

December 31, 2019

OHIO AUDITOR OF STATE  
**KEITH FABER**



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# Letter from the Auditor

**To the Governor's Office, General Assembly, Director and Staff of the Ohio Department of Transportation, Ohio Taxpayers, and Interested Citizens:**

The Auditor of State's Office recently completed a performance audit for the Ohio Department of Transportation (ODOT or the Department). This service to ODOT and to the taxpayers of the state of Ohio is being provided pursuant to Ohio Revised Code §117.46 and HB 62 of the 133<sup>rd</sup> General Assembly, which required the AOS to provide for the provision of a performance audit by January 1<sup>st</sup>, 2020. The AOS decided to take a two phase approach to this audit, and as such, this report contains the recommendations from the first phase of this audit. A second report will be forthcoming in late 2020. The review was conducted by the Ohio Performance Team and provides an independent assessment of selected areas of operations in relation to industry standards and recommended or leading practices.

This performance audit report contains recommendations, supported by detailed analysis, to enhance the Department's overall economy, efficiency, and/or effectiveness. The report has been provided to the Department and its contents have been discussed with the appropriate staff and leadership within the Department. The Department is reminded of its responsibilities for public comment, implementation, and reporting related to this performance audit per the requirements outlined under ORC §117.461 and §117.462. In future compliance audits, the Auditor of State will monitor implementation of the recommendations contained in this report, pursuant to the statutory requirements.

It is the Auditor's hope that the Department will use the results of the performance audit as a resource for improving operational efficiency as well as service delivery effectiveness. The analysis contained within are intended to provide management with information and in some cases, a range of options to consider while making decisions about their operations. Additional resources related to performance audits are available on the Ohio Auditor of State's website.

This performance audit report can be accessed by visiting the Auditor of State's website at [ohioauditor.gov](http://ohioauditor.gov) and choosing the "Search" option.

Sincerely,



Keith Faber  
Auditor of State  
December 31,  
2019

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# Introduction

Whether you are planning a trip out of town or just running to the corner store to buy groceries, you depend on efficient and effective transportation systems. The Ohio Department of Transportation (ODOT or Department) ensures Ohio's transportation system meets the needs of the public. To do so, ODOT maintains more than 43,000 miles of highway and more than 14,000 bridges in Ohio, with more than 5,500 employees and annual expenses of nearly \$3.2 billion in fiscal year ending (FYE) 2018.

Taking care of the roadways you drive on is a joint effort between ODOT, Ohio's counties, and local governments. About 40 percent of passenger vehicle traffic and more than 60 percent of freight traffic in the state travel on roads under ODOT's purview. Keeping these roadways and bridges in safe and navigable condition is an important, costly, and year-round job. ODOT employees are tasked with duties ranging from mowing along highways in warmer months, to clearing snow and ice in the winter, to overseeing large construction projects to ensure compliance with building plans and federal regulations. This work requires specialized equipment and vehicles, a significant number of workhours, and sophisticated technology systems.

In 2019, the Ohio General Assembly passed House Bill 62 (HB62), the state transportation budget, which increased the gas tax in order to provide ODOT with additional revenue to carry out its mission. This was the first increase in the gas tax in more than 14 years. As a part of the legislation, ODOT was required to undergo several reviews of efficiency and effectiveness including a performance audit conducted by the Auditor of State's Ohio Performance Team (OPT).

## Department Structure

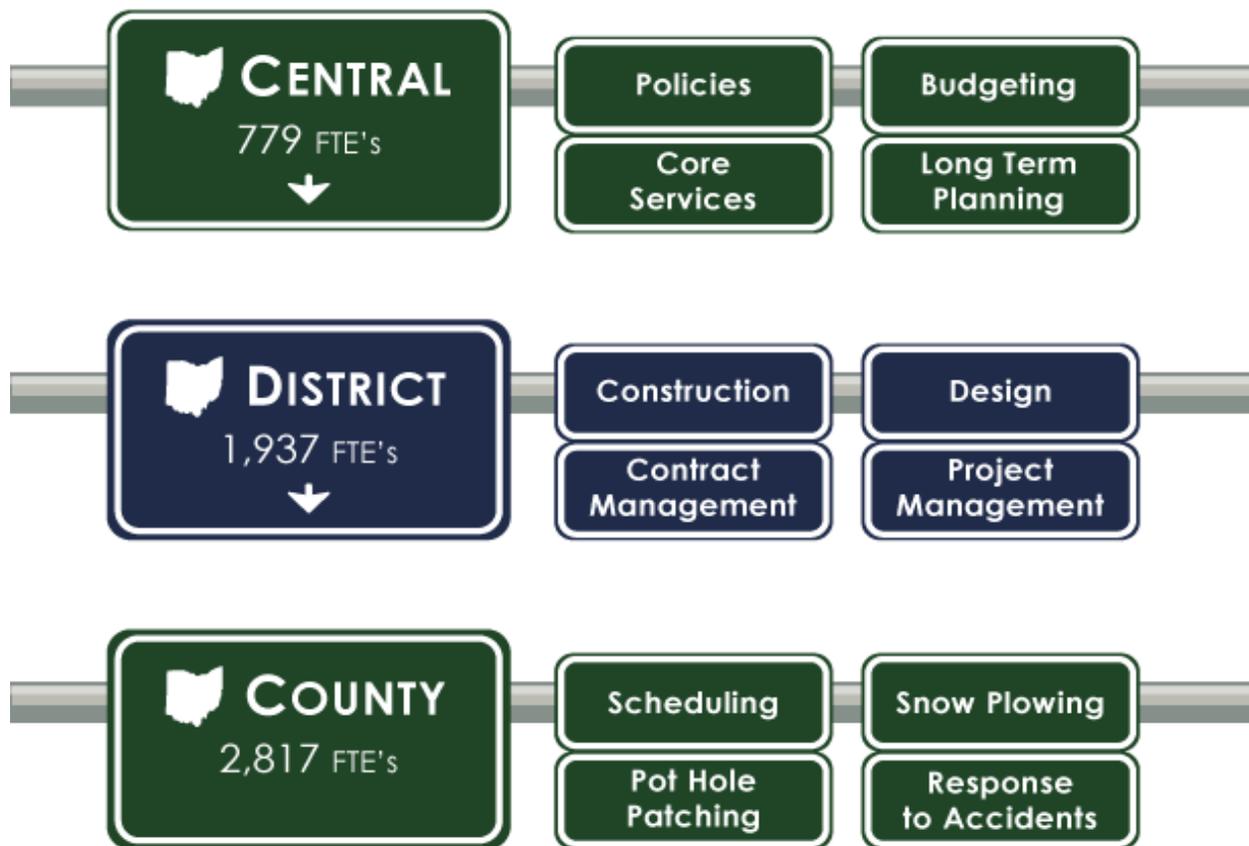
As an agency with more than 5,500 employees, the Department has a complex organizational structure which allows it to provide critical services across the state. The Director of Transportation is appointed by the Governor and is tasked with ensuring that ODOT is working towards achieving the mission of the Department and meeting the needs of motorists on Ohio's roadways.

The Department has three levels of organization – the Central Office, District Offices, and County Garages. The Central Office is located in Columbus and is responsible for providing long-term, strategic planning for the Department. It provides several critical functions such as Information Technology, Legal, and Public Relations.

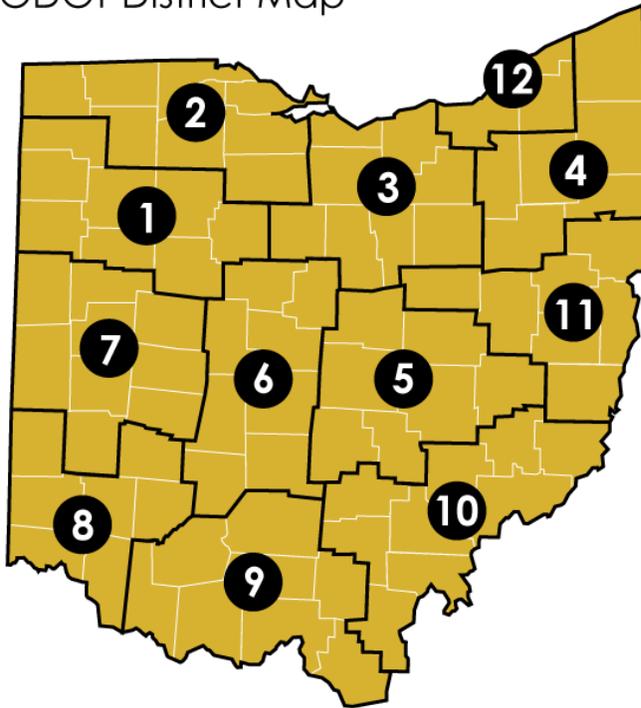
The Districts work with the Central Office to plan and prioritize construction projects. District team members are responsible for the planning, engineering, construction, and maintenance of the state transportation system in their regions.

Each of Ohio's 88 counties also has a County Garage where equipment is housed and maintained. Operational decisions may be made on the county level, particularly in regards to staffing needs. The County Garages work with Central Office and Districts to conduct maintenance activities on roadways within a given county.

While the Department does have a distinct hierarchy of divisions and offices, ODOT works to encourage cooperation throughout the Department.



## ODOT District Map

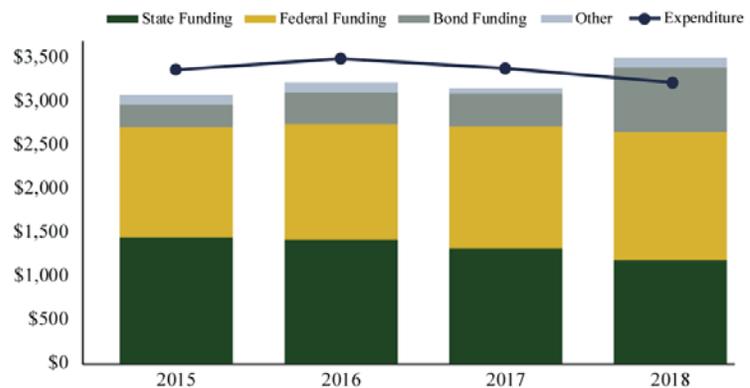


The current organizational structure allows the Department to provide services to all parts of the state. The structure also allows for some autonomy within the Districts in regards to decision making. District needs may vary based on the geographic location and the population density of the area – a Northern district may require additional wintertime staff for snow removal, and the needs of an urban district with heavy traffic patterns will differ from those of a more rural district.

## Department Budget

The majority of funding for the Department is from state and federal gas taxes. Over the past four years state and federal funding for ODOT has remained relatively flat. In three of the past four fiscal years, the Department has relied on carry over appropriation authority in order to meet expenditures.<sup>1</sup> ODOT is facing increasing personnel costs and increasing construction costs, with construction costs increasing by 5.9 percent between the end of the third quarter of CY 2015 and the third quarter of CY 2019. Through an increase in the gas tax authorized by HB62, ODOT will

ODOT Expenditures and Revenue



<sup>1</sup> Carry over appropriation authority allows ODOT to spend fund balances that exceed current year appropriations.

receive an additional \$390 million of state funding in FYE 2020, which is an increase of 12.5 percent from the previous state transportation budget.

As a part of the performance audit, OPT worked with Department leadership in order to identify areas for review which would result in recommendations that could assist ODOT in achieving its mission in an efficient, effective, and transparent manner. The performance audit reviewed the following scope areas:

- **Fleet Management:** ODOT spends more than \$40 million annually on vehicle and equipment purchases for its fleet. We reviewed several areas within fleet management in order to identify potential cost savings. The audit concentrates on an analysis of options relating to leased vehicles and equipment.
- **Construction Inspection and Seasonal Staffing:** In addition to permanent staff, ODOT employs a combination of private-sector contractors and seasonal staff in order to complete tasks related to highway construction and maintenance. We reviewed the use of supplemental staffing, including consultant and seasonal staffing, in order to identify potential areas of increased efficiency and cost savings.
- **Information Technology:** We reviewed ODOT’s use of consultants within the IT Department in order to identify potential cost savings related to the hiring of additional full-time employees. We also reviewed areas where ODOT could more efficiently plan staffing for IT related projects.

## Section 1: Fleet Management

The word fleet conjures images of a large number of vehicles. On the road you might think of a fleet of trucks shipping goods across the country or a fleet of taxicabs ferrying people around a city. When thinking about ODOT's fleet, you might first think of snow plows or heavy duty trucks with flashing lights. However, the Department maintains a fleet which is far more expansive than snow plows, or even just road vehicles. In order to execute its mission ODOT owns and maintains a fleet of approximately 16,000 items.

ODOT organizes its fleet into 232 different categories. These categories include passenger vehicles, pickup trucks, and cargo vans.<sup>2</sup> They also include heavy machinery like tractors, dump trucks, and excavators. Items used for vehicle modifications, such as snow plows, trailers, or brush chippers are also counted as categories for fleet management. Each category was looked at and 30 were flagged for further review. Of these 30 categories, 21 had sufficient data for detailed analysis.

### Why We Looked At This

OPT staff worked directly with ODOT leadership to identify scope areas that would provide relevant and useful recommendations to the agency. In addition to undergoing a performance audit, HB62 of the 133<sup>rd</sup> General Assembly required ODOT to conduct a cost-benefit analysis of leasing vehicles and construction equipment. To help the Department efficiently meet the requirements of HB62, we reviewed the Department's fleet as a part of the performance audit.

### What We Looked At

HB62 required a cost-benefit analysis of leasing vehicles weighing more than 12,000 pounds and construction equipment that has a lifespan of five years or more. The categories which we analyzed comprised nearly 80 percent of all heavy equipment with an average purchase price over \$25,000. We additionally reviewed several light passenger vehicles at the request of ODOT, including passenger vehicles and half ton trucks.

### What We Found

The audit produced three recommendations related to fleet management as well as one issue for further study. They are as follows:

- ODOT should not move to a leasing model for the vehicle categories analyzed in the audit;

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<sup>2</sup> The full list of active fleet categories used by ODOT are listed in Appendix A.

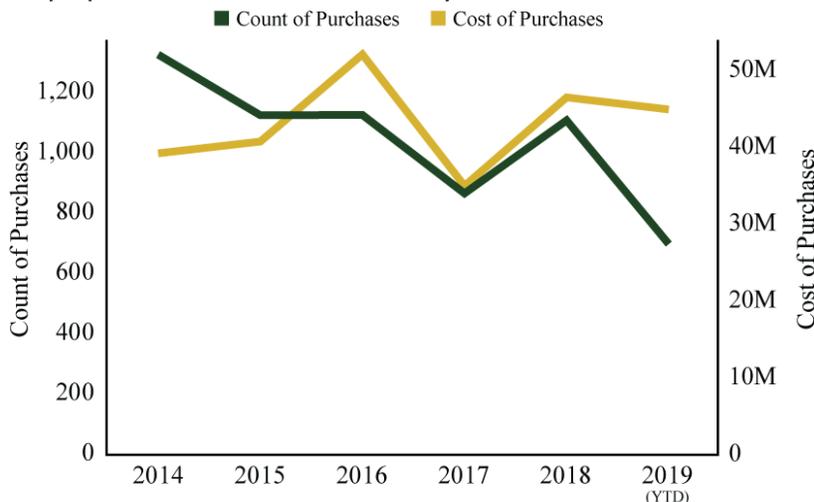
- ODOT should consider using rental vehicles for seasonal/low usage equipment;
- ODOT should improve data collection and storage efforts related to fleet management to allow real time, data-driven management of fleet operations; and
- Upon collection of further data, ODOT should consider examining if there are opportunities for right-sizing its fleet.

## Recommendation 1.1 Equipment Leasing

- ODOT should not move to a leasing model for the vehicle categories analyzed in the audit.
- While ODOT would realize a one-time cash benefit from the sale of its existing fleet, moving to a leasing model would result in approximately \$22 to \$42 million in additional costs annually. Any benefit resulting from the cash influx would be eliminated within four to eight years.

ODOT spends approximately \$43 million annually on fleet purchases. This budget allows the Department to pay cash for all purchases and avoid interest costs related to loans on vehicles or

Equipment Purchases by Year



equipment. Historically, purchases have remained fairly consistent year over year, with costs ranging between \$35 and \$55 million per year.

From 2014 to 2018 the Department purchased between 800 and 1,400 vehicles or equipment. These purchases are primarily used to replace items that have been salvaged or sold at auction due to age or loss of functionality.

Annual fleet purchasing is a large expense. We analyzed available data in categories identified by the Department and legislation in order to determine if leasing could provide a less expensive alternative to ODOT and reduce the cost of fleet management.

## Methodology

Available data enabled a cost-benefit analysis of 21 vehicle categories. These categories include those required by legislation, categories with a high vehicle count, categories with a high cost, and those categories requested by ODOT.

Three factors were considered in the cost of ownership of fleet vehicles: depreciation, maintenance expense, and usage. To determine depreciation, we first adjusted purchase and sales prices for inflation to standardize data comparisons. The *Sum of Years Digits* depreciation method, which is an accelerated model, was used to estimate the depreciation incurred in each

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year. Maintenance cost was then added to identify the total cost of ownership by year of ownership.

Leasing estimates were developed by using industry formulas. Factors included in identifying the cost of lease payments include sales price, money factor, lease term, and residual value of the vehicle. Industry formulas typically include taxes; this was excluded from our analysis because ODOT is not subject to sales tax. To provide a range of cost options we reviewed leasing models for a term of two, four, and six years. While the goal of this analysis was to determine if leasing would be an economically beneficial option, our models did not consider if a lease would be available.<sup>3</sup> The models were hypothetical cost estimates used to make a cost-benefit analysis.

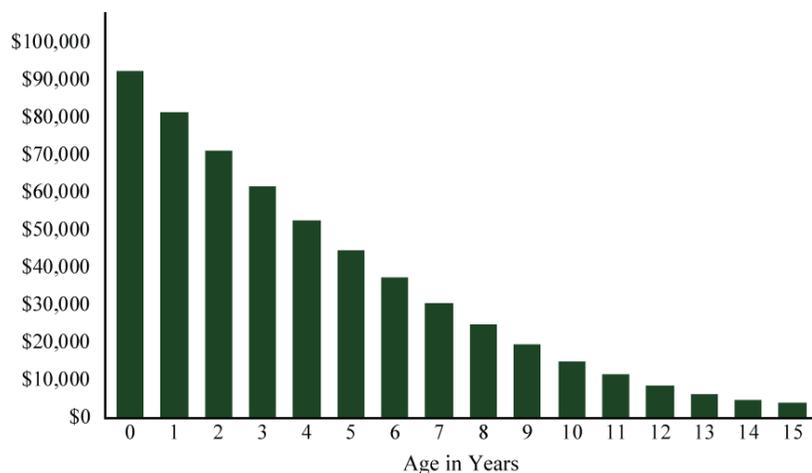
## Analysis

We conducted analysis on each of the 21 vehicle types independently to determine if leasing would be a viable option for any category. Each analysis followed the same procedure of identifying an average total cost of ownership over the life of the fleet category and identifying a potential lease payment for a variety of money factors and years, with a total potential five lease agreements compared for each category. Analysis for each category can be found in Appendix A.

## Ownership

The cost of depreciation was determined to identify the residual value of the vehicle or piece of equipment in any given year of its lifecycle. Depreciation was reviewed for each category based on the most frequent age of disposal. A Single Axle Dump Truck, which is used as a snow plow in the winter, is most often sold after 15 years of use. As shown in the chart to the right, the price to purchase a dump truck is just over \$90,000 and it loses value quickly during the first years of use, leveling off to approximately \$4,000 at the point of sale at year 15.

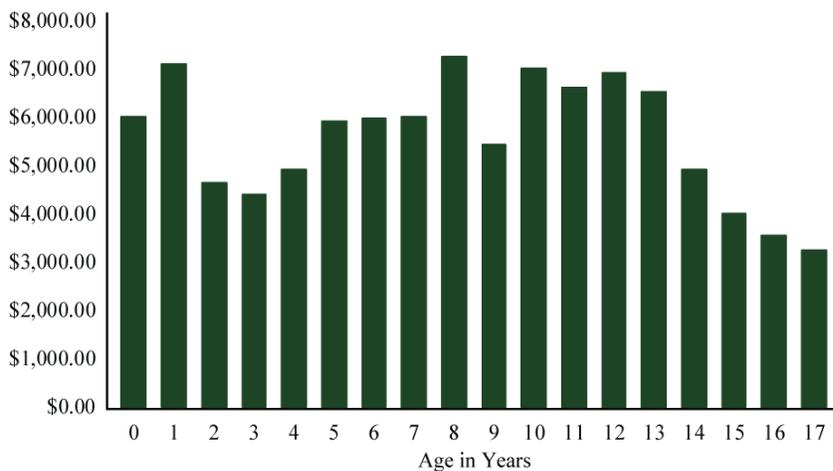
Single Axle Dump Truck Depreciated Value



<sup>3</sup> While the model does not consider if a lease would be available for any category of equipment, our research identified that both the Utah and Florida Departments of Transportation lease some heavy equipment.

Depreciation is combined with maintenance costs to provide a full understanding of the total cost of ownership. Some categories of fleet, including the Single Axle Dump Truck, as seen in the chart, incur maintenance expenses during “year zero.” Year zero expenses are tracked as maintenance activities, which are required prior to fleet being deployed into the field. In the case

Single Axle Dump Truck Maintenance Costs



of the Single Axle Dump Truck, this could include affixing the hitch and controls required for a snow plow, which would be used in the winter, or attaching the truck bed which is reused from truck to truck if still viable.

It should be noted that the annual maintenance costs over the life of the dump truck does not increase as expected, and in fact tapers

off during the final years of life. Generally, maintenance costs increase over time due to age and vehicle use. However, when maintenance costs were reviewed for the categories used in this analysis we found that maintenance expense did not increase as expected. While maintenance costs per mile increased with age, ODOT tends to use their fleet less as it ages, opting to utilize it for other purposes such as a mobile headquarters or in reserve for peak demand.

Maintenance expenses are added to depreciation to obtain a total annual cost of ownership by category, which can be compared to our calculated costs of the leasing models for the same piece of equipment.

## Leasing

We used the industry standard in order to obtain an estimated cost for leasing in each category. A basic monthly lease payment consists of a depreciation component and a rent charge for the use of a vehicle. The leasing model identifies annual cost of ownership by applying a money factor to the combined purchase price and residual value of the vehicle post-lease and assessing an annual depreciation fee. For example, the monthly and annual cost of a 2-year lease for a Single Axle Dump Truck was calculated using the method on the following page.

# Single Axle Dump Truck

Annual Lease Cost: \$14,773

$$\begin{array}{ccccccc}
 \$10,689 & + & \left( \$92,373 + \$70,995 \right) & \times & \left( \frac{.05}{24} \right) & \times & 12 \\
 \text{Depreciation} & & \text{Average} & & \text{Money} & & \text{Months} \\
 \text{Component} & & \text{Purchase Price} & & \text{Factor} & & \\
 & & \text{Estimated} & & & & \\
 & & \text{Residual Value} & & & & \\
 & & \text{Annual Rent Charge} & & & & 
 \end{array}$$

We reviewed the model using a 5, 10, and 15 percent rate<sup>4</sup> and for a 2, 4, and 6 year lease<sup>5</sup>. In addition to the base lease cost, we added in the appropriate maintenance cost incurred given the duration of the lease. This includes the initial setup cost of a new vehicle.

In no scenario was leasing a less expensive option when compared to ownership. This was due primarily to:

- Low end of life maintenance cost due to reduced usage in later years, effectively avoiding the benefits obtained from shorter life cycles under a leasing model;
- Expensive setup cost of new vehicles, which would be repeated more frequently if the piece of equipment is owned for a shorter duration;
- High depreciation in the first few years of vehicle ownership, which would be recovered by the lessor; and,
- Lease/finance fees, which are currently being avoided by ODOT paying cash for its vehicles.

## Conclusion

In all categories where there was sufficient data to conduct an analysis, leasing was more expensive for all scenarios reviewed. It is reasonable to assume that the categories which were left out of the analysis due to incomplete data would yield similar results, due to the large cost differential seen in the analysis.

<sup>4</sup> A two year lease was reviewed for a 5, 10, and 15 percent rate. The 4 and 6 year lease options were reviewed using only the 5 percent rate.

<sup>5</sup> ODOT does not appear to have authority to lease vehicles or equipment for a period longer than two years. However, it appears that ODOT could enter into a two year lease with an option to renew so long as the terms of the lease expressly state that the renewal of the lease is contingent on future appropriations from the General Assembly and is subject to OBM approval. This increased risk factor for the lessor may increase the cost of leasing.

If ODOT were to move to a leasing model it would experience a one-time cash benefit of approximately \$168 million due to the sale of the existing fleet vehicles in the 21 categories examined. However, leasing fleet vehicles would cost an additional \$22 to \$42 million annually.<sup>6</sup> Further, if ODOT would ever seek to return to a purchasing model, it would be difficult to do so, as all vehicle equity used to offset new purchases would be lost at this time.

Maintenance costs are not expected to decrease under the leasing model because a significant portion of maintenance costs are experienced prior to vehicle deployment with modifications and set-up. Under a leasing model ODOT would experience these expenses on a more regular basis instead of spreading the cost out over the life of a vehicle, which is owned by the Department. Additionally, the Department currently does not experience significant late-in-vehicle-life expenses due to limited usage of older fleet vehicles and the practice of selling vehicles prior to significant issues arising.

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<sup>6</sup> OPT analyzed annual lease rates of 5 percent, 10 percent, and 15 percent. For purposes of identifying a financial implication, a 5 percent rate was used as it was the most conservative option.

## Recommendation 1.2 Equipment Renting

- ODOT should consider renting low usage or seasonal vehicles.
- District 4 currently rents paving machines and street sweepers. These types of deployment strategies could be adopted by other Districts.

While conducting the primary analysis regarding leasing vehicles, OPT staff identified several categories of equipment which are used seasonally by ODOT. We reviewed all 21 categories used in **R1.1** to determine the availability and benefit of rental agreements.

### Methodology

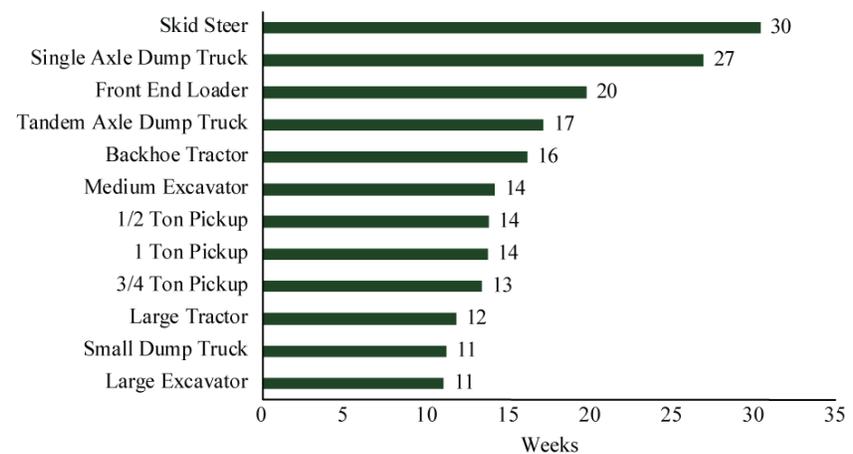
We reviewed the 21 categories used for **R1.1** to determine if any of the Districts had existing rental contracts. The rental rate was compared to the cost of ownership of the same vehicle to determine if ODOT could save money by renting low usage vehicles, and how long ODOT would need to use that piece of equipment in a single year before the rent or own breakeven point would occur.

### Analysis

The annual cost of ownership was compared to the annual expense of renting for those categories where a rental contract already exists in order to determine a breakeven point.

The breakeven point varied greatly depending on the category examined. For example, if ODOT needs to use a skid steer for less than 30 weeks out of a given year, it may be beneficial to rent this particular piece of equipment instead of owning it. The breakeven point is as few as 11 weeks for large excavators and small dump trucks.

Maintenance Cost Breakeven



### Conclusion

For certain low usage or seasonal vehicle categories, ODOT may be able to save money by renting as needed instead of owning. Savings would result from the avoided purchase and maintenance costs incurred from owning a vehicle for an entire year, even if it is only used seasonally. Typically these categories involve high cost machines used for only a few months a

year, and under a rental agreement maintenance costs would be the responsibility of the renting agency rather than ODOT. While there would certainly be a financial benefit to moving to this model, data limitations prevent a specific calculation of the potential savings.

Additionally, Districts could consider sharing more expensive pieces of equipment when possible. Based on information observed in fueling data, it is possible that some Districts already loan equipment to other districts, although rarely. This is a practice that could be reviewed and potentially improved upon, whenever the data shows it is not cost beneficial to own a piece of equipment.

## Recommendation 1.3 Equipment Data

- ODOT should improve data collection and storage efforts related to fleet management to allow real time, data-driven management of fleet operations.

ODOT's fleet size, combined with the decentralized manner in which it is deployed, makes it difficult to collect and maintain critical data regarding daily usage. In conducting this audit we encountered incomplete, incorrect, and inconsistent data. Additionally, data is not kept in a system which allows for efficient reporting processes. These issues create roadblocks when attempting to make strategic decisions regarding fleet management, particularly in real-time.

Problems arising from poor data management can result in increased expenses and missed opportunities for cost savings. Accurate tracking of information would allow for a more efficient decision making process relating to fleet management. In particular, ODOT should track vehicle and equipment usage in a more effective manner including:

- Tracking mileage for vehicles through more accurate odometer readings at fueling stations and identifying a more controlled method of collecting usage rates for heavy machinery;
- Identify any loss of productive work hours due to vehicle downtime;
- Collect consistent information regarding the deployment of vehicles and machinery so that strategic decisions can be made regarding the size of ODOT's fleet.

One method for collecting data could be through the use of a telematics system. Effective implementation of telematics could allow ODOT to track usage and better identify vehicle downtime. Additionally, telematics could allow for more efficient fleet maintenance by sending alerts when routine maintenance is required.

## Conclusion

Data management is critical to making informed decisions relating to business practices. ODOT should work to improve its data collection and storage methods in regards to fleet operations so that the Department can plan strategically for future fleet needs.

## Issue for Further Study: Fleet Right Sizing

ODOT maintains a fleet of approximately 16,000 vehicles and equipment. Fleet size fell outside the scope of this audit, and each piece of equipment was assumed to be needed to achieve ODOT's mission. It is possible that the Department could reduce its fleet size, which would lead to reduced costs for the purchase and maintenance of vehicles. In order to fully optimize fleet operations, the fleet size should be reviewed. As the Department improves upon data collection and management it should review vehicle and equipment categories to ensure optimization of usage and to eliminate unneeded vehicles or equipment as they are identified.

## Section 2: Construction Inspection

On the site of every active highway construction project, ODOT assigns one or more workers to the role of construction inspection. Construction inspectors conduct quality assurance on the work performed by third party contractors and ODOT construction crews. Inspectors ensure the work conforms to plans, measure quantities of material inputs for contractor payments, and produce documentation to fulfill regulatory requirements. ODOT staffs the construction inspection role with a mix of Department employees and private-sector consultants.

Because road construction activity in Ohio peaks in the warmer months, construction inspection is a job function with a seasonal aspect to staffing. At the same time of the year demand for construction inspection is waning, another seasonal ODOT responsibility begins ramping up—snow and ice control. Similar to the Department’s use of private-sector consultant inspectors to supplement inspection during the summer, ODOT hires seasonal employees in the winter to meet peak demand for snow and ice control. The full-time ODOT employees assigned to construction inspection generally transition to snow plowing responsibilities in the winter.

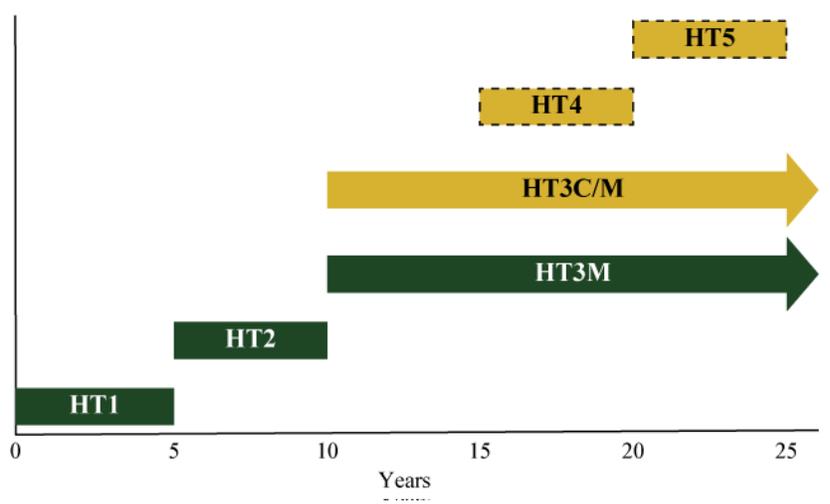
In evaluating ODOT’s approach to staffing construction inspection we considered the seasonal nature of the workload, the variety of internal & consultant staffing options, and how inspectors’ job responsibilities overlap with other maintenance tasks such as snow and ice control.

### Highway Technicians

The Highway Technician (HT, or Highway Tech) job classification series is ODOT’s primary full-time field employees. Highway Techs carry out the majority of both construction inspection and snow and ice control. Highway Techs are based out of County Garages. As of late 2019, ODOT employed approximately 2,000 HTs.

Full-time ODOT employees are promoted through the Highway Tech series as they meet longevity and training milestones. The progress from the entry level HT1 position to the HT3 position occurs automatically (as long as requirements are met) over the course of 14 years, although many employees progress more quickly than this. At the HT3 level

Highway Technician Series



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employees choose either a Construction/Maintenance (C/M) or a Maintenance (M) track. Those in the Construction/Maintenance track receive additional training related to construction inspection and are eligible for further promotions to HT4 and HT5. Unlike the progression to HT3, which is guaranteed as long as requirements are met, employees must competitively apply for HT4 and HT5 positions as vacancies arise.

Highway Technicians' job duties are divided into two main functions: highway maintenance and construction inspection. Maintenance includes activities such as mowing, pothole patching, snow & ice control, and guardrail repair. Construction inspection is a separate discipline in which ODOT employees observe and record construction activities on active job sites. Personnel assigned to construction inspection are fulfilling two main purposes: ensuring the quality of work conforms to plans and specification, and recording the quantities of materials used in order to calculate payments to the general contractor.

## Staffing Alternatives

In addition to full-time employees, ODOT hires private-sector consultants to assist with construction inspection in the summer and seasonal HT1 employees to assist with snow and ice removal during the winter season. Consultant contracts allow ODOT to purchase inspection services by the hour, which allows Districts to respond to fluctuating inspection needs throughout the construction season. Seasonal HT1 employees are hired for the season and have a standard 40 hour work week. These individuals are available when needed to clear snow and ice from Ohio highways and assist with general maintenance duties. Hiring decisions for both consultant inspectors and seasonal HT1 are made on the District level at the discretion of District leadership.

## Why We Looked At This

Staffing decisions related to the hiring and use of full-time, seasonal, and contract employees are largely conducted at the District level. We reviewed the deployment of Highway Tech staffing at the request of ODOT to determine if Districts were using seasonal employees and construction inspection contractors in an efficient manner.

## What We Looked At

We reviewed how Districts used existing staff for highway maintenance and construction inspection as well as the manner in which existing staff was supplemented by both seasonal staff and contract inspectors.

ODOT also requested we review the efficiency and effectiveness of the hiring and assignment of winter seasonal HTs. During the review, it became apparent that there was an opportunity to consider how seasonal HTs could be optimized and deployed in such a way so as to support the redirection of more senior HT C/M labor hours toward construction inspection.

## What We Found

After reviewing the use of seasonal staffing and consultant contract inspectors as well as the overall deployment of HT series full-time employees, we identified three recommendations and two areas for further study:

- Based on the current cost structure, ODOT should deploy qualified internal staff before hiring consultant inspectors;
- ODOT should optimize the use of seasonal HTs;
- ODOT should collect and maintain data related to the use of consultants in an easily retrievable electronic format;
- ODOT should routinely evaluate project demands and costs in order to make strategic staffing decisions, and;
- ODOT should review the variation in training practices to determine if there is an opportunity to optimize across districts.

## Recommendation 2.1 Construction Inspection Staffing

- Based on the current cost structure, ODOT should deploy qualified internal staff before hiring consultant inspectors.
- By reducing the number of consultant inspector hours, ODOT could save between \$10 and \$21 million annually.

Any time there is an active highway construction site, a construction inspector will generally be engaged on location. Larger projects may have 5-10 inspectors distributed across different zones on the job site. Inspectors perform real-time quality assurance by ensuring construction work is complying with plans and specifications. They are also recording quantities of materials used by contractors, a function which feeds directly into ODOT's vendor payment process.

Within ODOT, construction inspection is performed primarily by the HT3C/M, HT4, and HT5 classifications. Employees in the HT2 classification also assist in inspections as a part of routine on the job training. The Department also contracts with private-sector consultant inspection services to supplement existing staff at the District level on a regular basis. Although responsibilities, oversight, and job-knowledge requirements do not materially differ between in-house and consultant inspectors, consultant inspectors are approximately three times as expensive.

HT3C/M employees are trained to conduct construction inspection but can also be tasked with general highway maintenance activities. The decision to use consultant inspectors is made at the District level as are decisions related to the deployment of internal HT3C/M staff to either inspection or maintenance duties. The primary questions related to consultant inspectors are whether or not they are being used in lieu of qualified internal staff for construction inspection activities and, if so, at what additional cost.

## Methodology

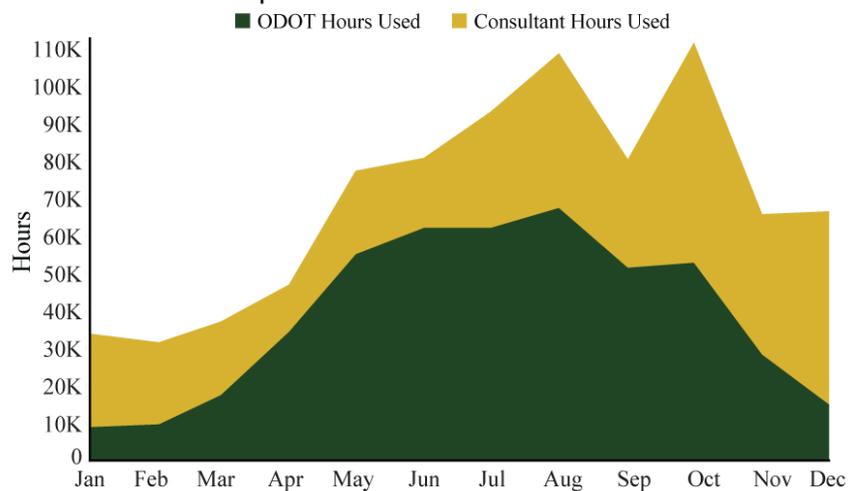
We identified the average cost per hour for consultant inspectors and determined that they are nearly three times more expensive than ODOT employees in the HT3C/M classification on a production hour basis.<sup>789</sup>

The use of consultant inspectors was then mapped at a Statewide and District level by using monthly invoice data. ODOT in-house employees' inspection hours were also mapped in the same manner, using data from ODOT's cost accounting system. The combined ODOT and consultant inspection hours constitute the total construction inspection demand in a given district.

To identify opportunities to replace the more expensive consultant inspection hours with qualified existing ODOT staff, a detailed dataset of Highway Tech daily task activity was built. Analysis identified past instances where HT3 C/Ms and HT4s were performing non-inspection maintenance tasks at the same time

consultants were being paid to perform construction inspection in that same district. We then calculated the financial impact of replacing consultant inspectors with existing ODOT staff under a variety of scenarios.

Statewide Inspection Demand



<sup>7</sup> Consultant hourly rate used in analysis is \$95.16/ hour. This reflects the cash amount ODOT is actually paying consultants per hour, and is based on three components: the average raw rate billed by the Inspector II discipline (\$33.85); the average overhead rate of the 43 inspection consulting firms that have worked for ODOT over the last 5 years (155%); and the standard profit rate (aka net fee) ODOT allows in consultant inspector agreements of 10%.

<sup>8</sup> HT3 hourly rate used as a production hour in analysis is \$36.30/ hour. This rate is based on three components: HT3s' average base hourly wage and employee paid benefits (\$34.37); An annual deduction of \$11,879 equal to the state average paid to a seasonal HT1 over the course of a season, because every HT3's presence on staff mitigates the need for hiring an additional winter seasonal; and an escalation of 21%, to account for the average amount of annual leave used by HT3s, i.e. hours they are not available to work.

<sup>9</sup> The consultant rate does not include the additional charge they bill to ODOT for daily use of a vehicle, currently \$49 per diem. As such, for comparability, analysis did not add a vehicle-related overhead charge to the ODOT employee rate.

## Analysis

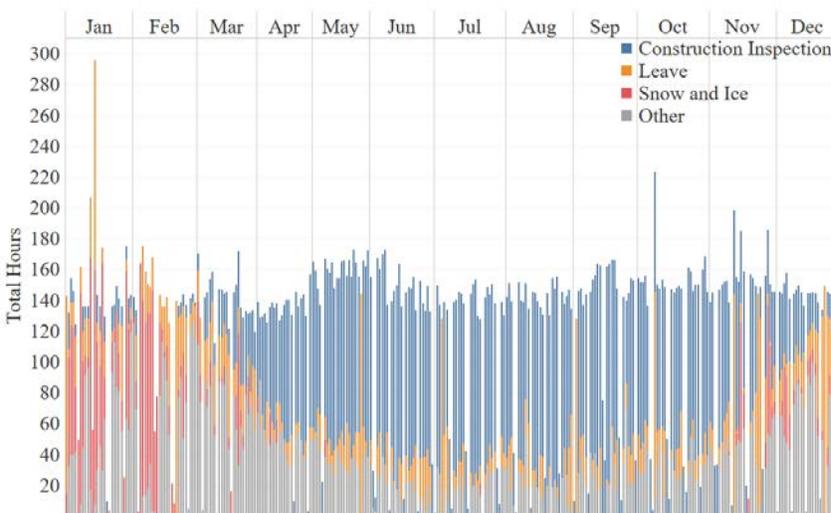
A District’s strategy for the use of consultant inspectors can broadly be characterized as falling into one of two categories:

- **Augmentation:** At times during construction season the peak demand for construction inspection exceeds a District’s internal capacity of qualified in-house inspectors. In these cases Districts can augment existing HT3C/M, HT4, and HT5 staff by hiring consultant inspectors. This allows a District to complete inspection activities without adding additional permanent staff that may not be needed at other points during the year.
- **Substitution:** Districts choose which activities HT3C/M employees are assigned to perform. In some cases a District may choose to assign these employees to highway maintenance activities instead of construction inspection. In these cases the District would need to hire consultants to conduct inspection activities while qualified internal employees are completing other non-inspection duties.

We analyzed data from all 12 Districts to quantify the extent to which their use of consultants fit a pattern of augmentation or substitution of the HT series. To demonstrate this framework, two contrasting Districts are described below.

## Augmentation

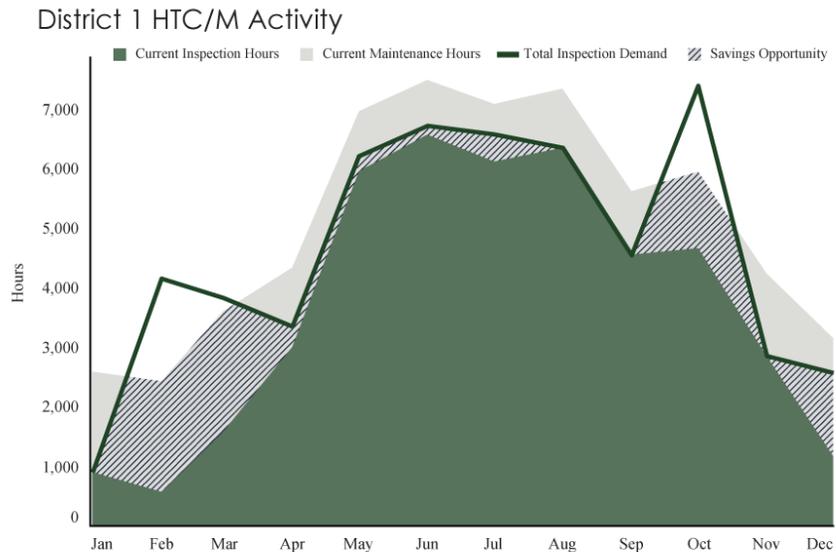
Districts can hire consultants in order to supplement existing staff when inspection demand



exceeds internal capacity. District 1 currently operates in this manner. The chart to the left shows the daily activity of HT3C/Ms in District 1. These activities are broken down into four categories: Construction Inspection, Leave, Snow and Ice, and Other. The chart indicates, in District 1, that HT3C/Ms are using the majority of their available hours on construction inspection projects during the summer

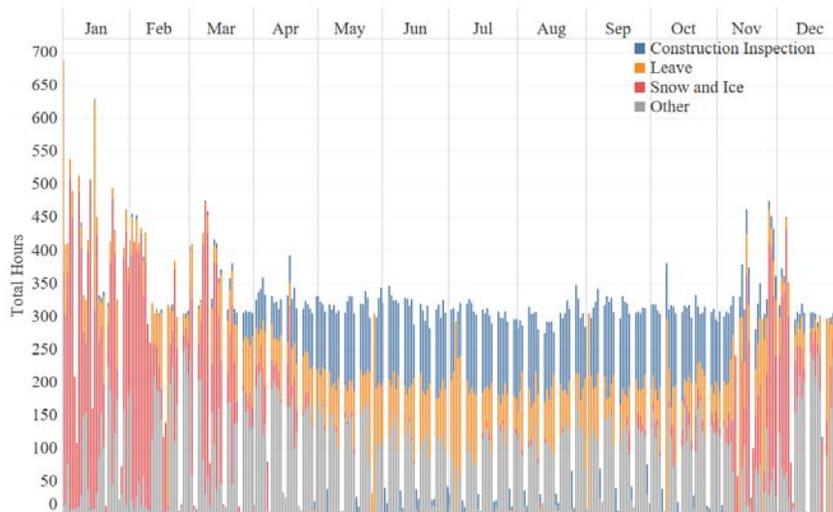
months. Use of consultants in this scenario would be based primarily on demand exceeding capacity.

While District 1 minimizes the need for consultant inspectors there are still opportunities to optimize existing staff. Specifically the shaded portions of the gray band which fall below the demand line in the chart to the right represent HT3C/M hours spent on non-construction inspection related activities. These hours could be converted to inspection hours. However, in this scenario the District is still using internal staff to conduct the majority of construction inspection activity.



## Substitution

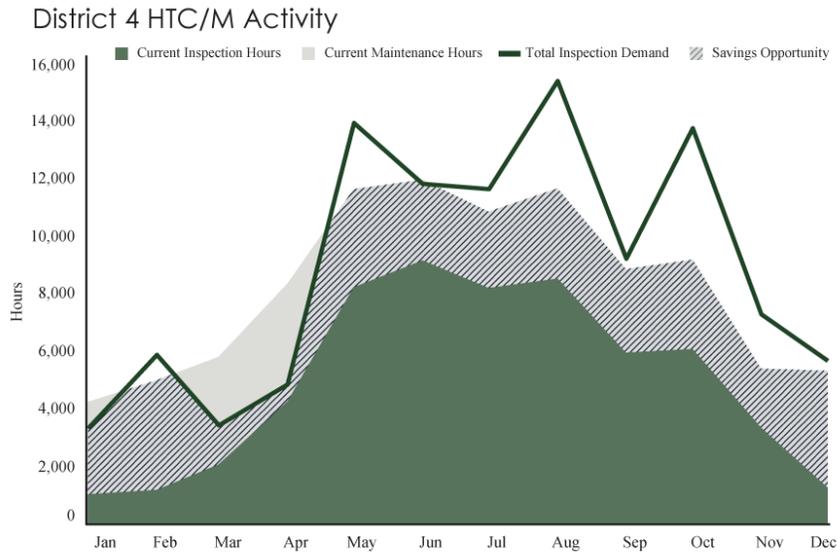
Districts can also use consultant inspectors as a substitute for qualified internal construction inspection staff. District 4 operates in this way. As on the previous page, the chart below shows the daily activities for HT3C/Ms in the District broken down into the categories of Construction Inspection, Leave, Snow and Ice, and Other. Where District 4 differs is that during peak construction months



HTC/Ms spend significantly less time on construction inspection activities. This can lead to a District needing more consultant inspector hours to complete inspection related activities.

Trained inspection staff in District 4 only spend about a third of their time during peak construction season on inspection related activities.

There is also a significant portion of time spent on other activity which would include general maintenance activities and other jobs which could be performed by less tenured and therefore less costly Highway Techs.



The total number of consultant hours needed in District 4 could be greatly reduced if HT3C/M were reassigned to inspection tasks when possible. The shaded portions of the gray band which fall below the demand line are available hours being spent on non-inspection related tasks. In some cases District 4 would eliminate the need for consultant hours if existing staff were used.

## Deployment Options

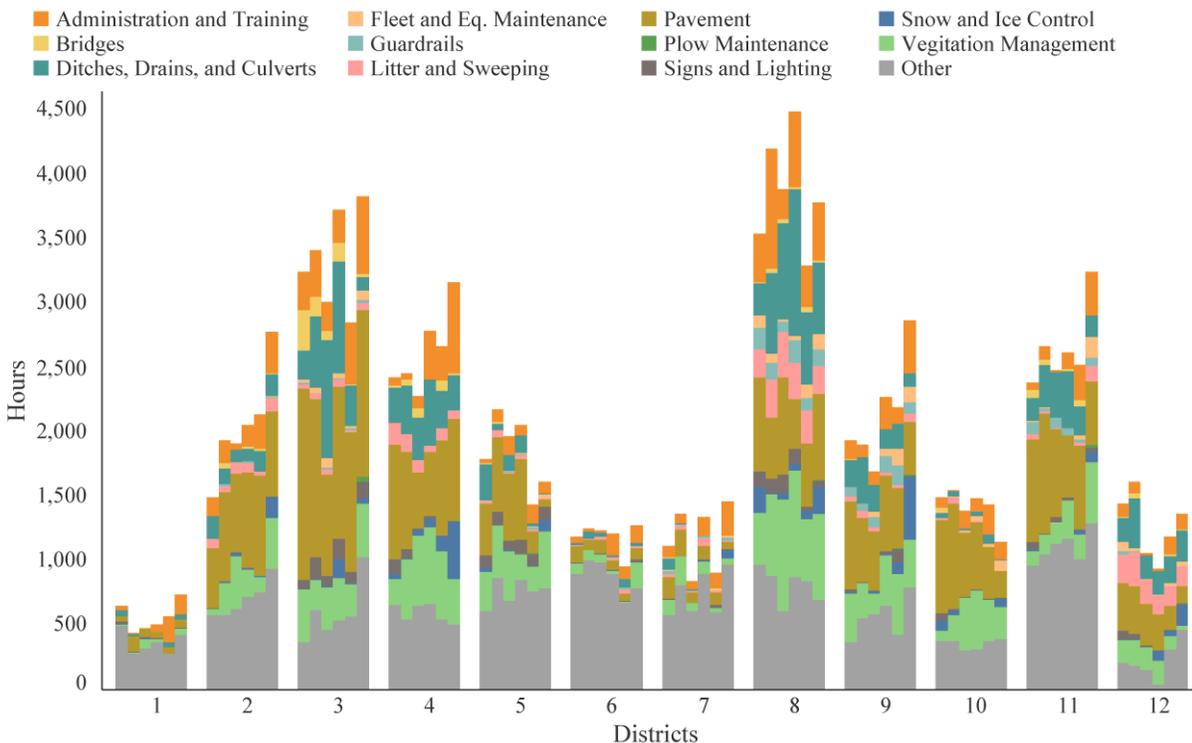
We identified available HT3C/M hours in each District. That is to say, in each District HT3C/Ms had hours being spent on general maintenance activities while the District was also using consultant inspectors. These hours, if converted to inspection activities would result in cost savings associated with a reduction in hiring of consultant inspectors. While Districts varied in their makeup, there were approximately 220,000 HT3C/M hours statewide in 2018 that could have been available to replace the more costly consultant hours.

The chart on the following page provides additional detail regarding the non-construction activities HT3C/Ms are assigned to during the summer season. Some maintenance tasks which HT3C/M are engaged in during summer months are activities which can also be, and are, completed by less tenured Highway Techs. Examples include mowing grass and litter pick-up. HT1 and HT2 employees may be able to complete these maintenance tasks, which would allow HT3C/Ms to spend a greater portion of their time on inspections.<sup>10</sup>

<sup>10</sup> It is possible that some maintenance activities are critical to public safety and must be handled in an expedited manner. ODOT was not able to quantify the portion of maintenance activity that falls within an expedited public safety category for the purposes of this report.

## HT3M Non-Inspection Activities

During the months of May to October



We analyzed four options related to the non-inspection activities being completed by HT3C/Ms. We assumed that HT3C/Ms currently assigned to highway maintenance can be reassigned to construction inspection during periods where demand exists, which allows ODOT to displace consultant hours. The need for consultant inspectors will still exist at times due to periodic peaks in demand for inspection.

To address the displaced maintenance hours, ODOT should consider the following:

- ODOT could determine that the maintenance activities are not critical and can either be avoided or delayed to a time where they would not conflict with construction inspection activities. In this case ODOT would be able to realize the full benefit of avoiding unnecessary consultant hours by moving existing HT3C/M staff to inspection activities and reallocating existing staff time to address maintenance needs. (\$21M Annually)
- ODOT employs seasonal staff for snow and ice control in the winter season. This staff could be used for general maintenance activities in the summer instead of HT3C/M workhours. The maintenance work would be done at the same time as inspection work, but by significantly less costly seasonal employees. The savings achieved by avoiding consultants would be offset by the additional seasonal employee hours. (\$17M Annually)

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- If ODOT determined that the maintenance activities currently completed by HT3C/Ms are necessary and require a similarly tenured employee to conduct the work, the Department could opt to hire additional HT3C/M or HT3M employees. These would be new full-time staff and ODOT would still need to use seasonal employees to assist during peak demand times for general maintenance activities. However, there would still be significant cost savings by avoiding consultant hours. (\$14M Annually)
- Finally, if in the scenario above, ODOT determined that all maintenance tasks currently performed by HT3C/M must continue to be performed by HT3C/M, the Department could, during peak demand periods, move HT3C/M staff back to maintenance activities and hire consultant inspectors to address inspection needs. Hiring additional HT3C/M and using consultant inspectors as needed would still provide savings to the Department. (\$10M Annually)

## Conclusion

If Districts were to reassign HT3C/Ms to construction inspection activities as opportunities arise, ODOT could save between \$10 and \$21 million annually on avoided consultant fees.

ODOT, both at the Central and District offices, would need to determine what non-inspection maintenance activities were critical and what level of training is required to conduct those activities. The range of savings is based on how non-inspection activities are treated once HT3C/M employees are no longer performing them on a routine basis.

If the activities were deemed non-essential and no existing staff were assigned to them, ODOT would save \$21 million annually. If it were determined that all activities were essential and must be completed by similarly trained individuals, the cost savings would be \$10 million. The true cost savings is likely somewhere in the middle of this range depending on the general maintenance activities being performed by HT3C/Ms.

## Recommendation 2.2 Seasonal Highway Technicians

- ODOT should optimize highway maintenance work assignments by using HT1 seasonal employees to the full capacity.
- The financial impact of optimization will come through using additional HT1 seasonal staff to allow for the more efficient deployment of HT3C/M staff for construction inspection duties.

HT1 seasonal employees are allotted up to 1,000 work hours in any given fiscal year.<sup>11</sup> These employees are traditionally hired in the fall and separated from ODOT in the spring with the express purposes of assisting Districts with snow and ice removal during the winter season. Seasonal HTs are typically assigned a standard 40 hour workweek at a county garage during snow and ice season. Seasonal HTs are members of the bargaining unit, are paid at a rate equal to an entry level HT1, and are not eligible to for the standard fringe benefit package.<sup>12</sup> When there is no snow or ice removal needed, seasonal employees assist with general maintenance activities such as patching potholes, mowing grass, or removing litter from highways. While HT1 seasonal employees are generally hired for the winter months, there is no limit on when the 1,000 hours of work can be performed during the fiscal year.

### Methodology

We reviewed how Districts recruited, hired, and deployed seasonal staffing to determine whether there were any opportunities for increased efficiency. Data on payroll and leave use was obtained from the Ohio Administrative Knowledge System (OAKS) and data on activities was taken from the Equipment & Inventory Management System (EIMS). This information was combined with training and hiring data obtained through a survey of ODOT District offices. We determined a cost per task hour by taking the total annual salary of a seasonal employee and dividing by hours worked after accounting for training and leave.

By identifying the cost per task hour and the average hours worked by seasonal staff in a District, we were able to identify optimized staffing scenarios which use seasonal employees to provide assistance for general highway maintenance.

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<sup>11</sup> Seasonal HT work rules, including the 1,000 hour limit, are established in the collective bargaining agreement..

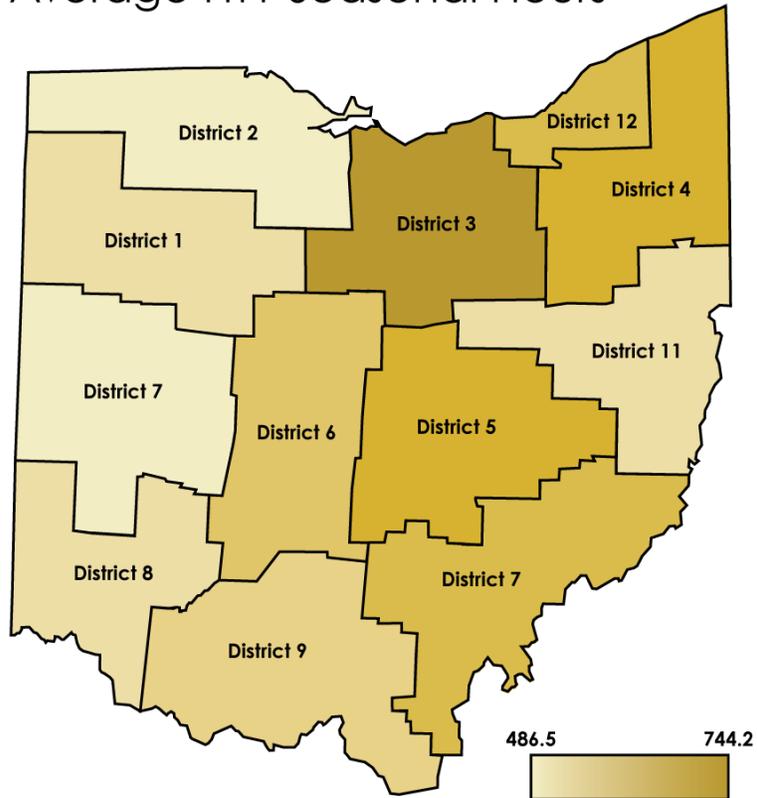
<sup>12</sup> In FYE 19, seasonal HTs received an average wage of \$17.06 per hour. The standard fringe benefit package includes, Ohio Public Employee Retirement System (OPERS) contributions, Medicare, health insurance, and paid vacation, sick, and personal leave. Seasonal HTs receive only OPERS and Medicare contributions, equal to 14.0 percent and 1.45 percent of their salary, respectively.

## Analysis

On average, HT1 seasonal employees worked 603 hours in FYE 19. However, District deployment rates varied significantly from a low of 486.5 hours to a high of 744.2 hours per individual HT.

Our review showed that there was a significant underuse relative to the 1,000 allowable hours. If ODOT were able to maximize the number of hours each seasonal HT1 employee worked it would increase the value of the employee from a cost per task hour perspective, because the fixed costs of employee onboarding would be spread over more hours of productive work. Additionally, increasing seasonal HT1 hours would free up more tenured full-time employees to complete tasks requiring more advanced competencies.

Average HT1 Seasonal Hours

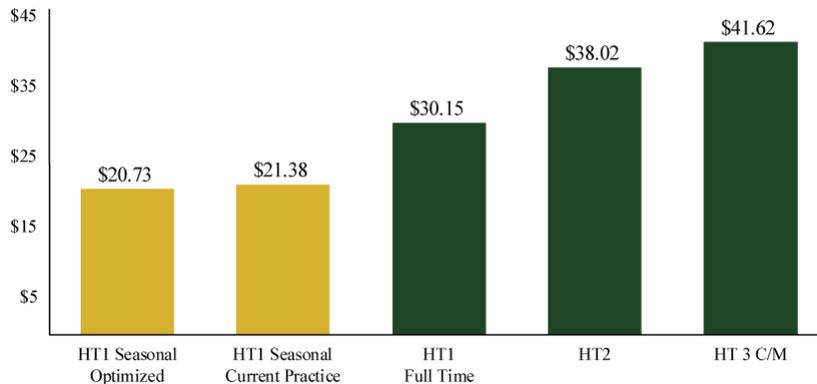


In particular, seasonal staff have a significant number of hours available in the spring and summer seasons, which is when construction inspection is most prevalent. As discussed in **R2.1** we determined that during these time periods HT3C/M employees were performing routine tasks such as mowing instead of performing construction inspections. In several districts ODOT employs contractors to perform inspections while full-time employees conduct maintenance that could be completed by less tenured employees. If ODOT were to increase the hours of seasonal employees and extend their term through the summer months, it could free up man hours for HT3C/M to conduct inspections and reduce the need for consultants.

## Conclusion

If seasonal employees worked for a full 1,000 hours the average rate per task hour would be

Highway Technician Series Average Cost per Hour



\$20.73. The current, non-optimized practice results in an average rate per task hour of \$21.38, which is still significantly lower than the cost of a full-time HT1 of \$30.15, and about 50.0 percent below the cost per task hour for an HT3.

As stated in **R2.1**, ODOT could reduce expenditures by deploying HT3C/M for

inspection tasks prior to hiring consultants. The general maintenance tasks currently performed by HT3C/M could in part be taken up by HT1 seasonal employees who had not yet used the full 1,000 hours of the contracted term of employment for the fiscal year.

## Recommendation 2.3 Consultant Data

- ODOT should collect and maintain data related to use of consultant construction inspectors in an easily retrievable electronic format.
- While no financial implication is directly associated with this recommendation, the lack of easily accessible, centralized data related to consultant inspectors impairs ODOT's ability to make strategic business decisions in real-time.

During our review of consultant inspector usage by District we encountered several issues related to data accessibility. Key pieces of information which are available for ODOT employees are not kept in a database format for consultants including cost per hour, hours worked, and job classifications. This information is generally available on individual invoices which are kept in PDF format or paper copies at the District level. In order to provide data-driven analyses elsewhere in this report it was necessary for our staff to extract and transcribe data from paper records stored across multiple ODOT locations. This process was burdensome and time consuming, and prevents well-informed decision making.

## Conclusion

The lack of accessible data has prevented ODOT from completing historical cost-benefit analyses and limits the Department in its ability to formulate a well-informed strategy for the Highway Tech series in general. ODOT should seek to centralize data maintenance associated with consultant inspectors in a format which is easy to access, search, and use in modeling for decision making purposes.

## Issue for Further Study: HT Series Strategic Staffing

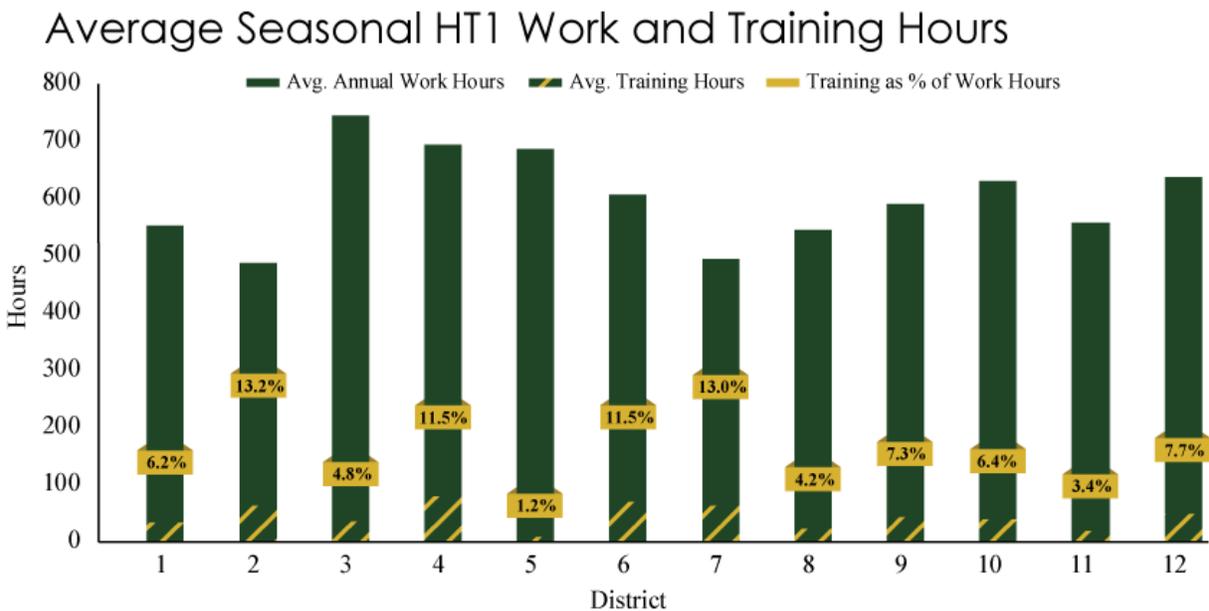
Once ODOT collects and maintains information regarding District use of consultant inspectors it can create a model which will provide a range of optimal staffing levels for the Highway Technician series. This model can include several constraints which ODOT determines are critical to the operations of the Department, but should, at minimum, include the following:

- Expected demand for snow and ice removal, and other maintenance activities;
- Expected demand for construction inspection;
- Hourly cost for HT3C/M;
- Hourly cost for consultant inspectors, and;
- Hourly cost for HT1 seasonal employees.

The Department should review this information on a regular basis to ensure staffing plans meet actual expected needs. By optimizing staffing at all levels of the HT series ODOT can continue to move towards the lowest cost option.

## Issue for Further Study: Seasonal HT Training

HT1 seasonal staff are hired at the District level. These individuals are generally hired in the fall to assist with snow and ice removal throughout the winter season. A portion of their time must be spent on training. During our review we identified significant variations in the amount of time that was used for training purposes as reported by the Districts, from a low of 8 hours to a high of 79 hours per employee.



One consequence of the district-to-district variation in training hours is that the total amount of hours available for other tasks also varies significantly by district. The chart above shows variation in the average hours worked by a seasonal HT, the average training hours per seasonal HT, and the percent of work year spent training.

While some amount of training variation is to be expected based on difference in local conditions, ODOT should seek to identify best practices related to the training of seasonal employees and deploy those practices across districts.

## Section 3: IT Consultant Management

Information Technology touches nearly every aspect of ODOT’s operations. From internal business processes like managing timesheets and issuing payroll to systems that help manage highway operations, the Department’s Division of Information Technology (DoIT) works to ensure everyone on Ohio’s highways has a smooth trip. In addition, evolving technologies such as autonomous vehicles are likely to increase demands on DoIT in the foreseeable future.

The Technology Council, a decision-making group within ODOT, is responsible for decision making regarding the direction of the Department’s strategic deployment of technology. The Technology Council includes representatives from ODOT’s major operational units and advises the Department’s executive leaders who then set strategic goals for all of ODOT. DoIT then executes on those goals as they relate to technology.

DoIT’s staff is comprised of a mix of full-time permanent ODOT employees and IT consultants. Consultants are typically contracted to work for a full year and work side-by-side with full-time employees, typically doing the same tasks on the same projects. As of FYE 2019, ODOT employed 60.3 FTE<sup>13</sup> full-time employees and 46.8 FTE consultants (see chart below).

DoIT hires consultants to augment its permanent staff. The use of consultants in this role is due to a perception that consultants provide a good value, from a financial and operational perspective, as an alternative to hiring permanent employees. In addition, ODOT also uses contractors for specific projects, such as setting up a major new system; however, this section focuses only on contractors used for staff augmentation.

### Why We Looked At This

IT staffing has increased annually since 2016. While the total number of full-time employees has increased by approximately 25 percent during this time period, the number of consultants has more than doubled. ODOT uses full-time employees and consultants to perform the



<sup>13</sup>An FTE is typically set based on a standard 40 hour workweek for the entire year, or 2,080 hours. According to an article entitled *Full Time Equivalent Positions* (2019) published on TheBalanceCareers.com, FTE is useful as a metric because “...it helps budget analysts and project managers estimate labor costs.”

same types of work. At the request of ODOT we reviewed the use of IT consultants in order to provide relevant and useful recommendations regarding an efficient mix of employees.

## What We Looked At

We examined the total cost of an employee compared to the full cost of a consultant in order to conduct an analysis including economic and operational impacts for staffing purposes. For consultants we included ODOT's hourly cost and for full-time employees we included their hourly pay and fringe benefits.<sup>14</sup> While reviewing the costs associated with consultants we also reviewed the length of time consultants were employed by ODOT and how consultant tenure affects the overall economic and operational impacts of consultant use.

## What We Found

Based on our analysis we identified three recommendations for ODOT in regards to DoIT:

- ODOT should incorporate staffing into the planning process for DoIT in accordance with best practices. As a part of the plan, DoIT should develop a decision-making mechanism to evaluate under what circumstances roles should be filled by full-time employees or consultants. Additionally, it should formally designate the priority of key systems in relation to business continuity and recovery;
- ODOT should collect consultant data in order to continue to evaluate the relative costs and benefits associated with their use; and,
- ODOT should make future decisions about the use of consultants based on an analysis of strategic needs, the full costs of hiring a consultant, as well as the needed skill set and market availability of such personnel vs. a permanent employee.

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<sup>14</sup> State employees receive retirement and health insurance. The exact costs vary by employee, but benefits costs will typically be equal to 40-50 percent of the employee's salary.

## Recommendation 3.1 IT Staffing Plan

- ODOT should incorporate staffing into the planning process for DoIT in accordance with best practices. As a part of the plan, DoIT should develop a decision-making mechanism to evaluate under what circumstances roles should be filled by full-time employees or consultants. Additionally, it should formally designate the priority of key systems in relation to business continuity and recovery.

Organizations should have some sort of planning process which help to determine how to allocate resources in an efficient and effective manner. Currently, DoIT manages its operations and project-related work using a multi-year planning document that tracks specific projects, milestones, and budgets for a period of three fiscal years. DoIT tracks using quarterly metrics with a dashboard containing high level data on DoIT's progress on various projects connected to the three-year plan.

Additionally, in order to prioritize business continuity operations and related service levels, DoIT has designated primary, secondary and tertiary (third tier) systems. However, the prioritization of systems has not been formalized, nor has it been tied to the business needs identified in the State of Ohio's business continuity plan. Further, staffing is not allocated in a way which will ensure the continuity of systems in the event of an outage or disaster. For example, one key set of systems is exclusively staffed by consultants and DoIT has no permanent staff currently overseeing operations.

Having a strategic plan and informal prioritization of systems is a good first step for successfully managing ODOT's technology workforce. However, DoIT should consider the additional following factors when identifying opportunities for continuous improvement related to its strategic planning and staffing processes:

- **Future staffing needs:** According to Technopedia, "An IT plan needs to make sure that the organization is able to manage its human assets with the help of technology, hardware and software." The role of technology in transportation is likely to continue to increase over time, therefore, a long term plan should take future staffing into account.
- **Business continuity:** The average employee in DoIT has about 15 years of service with the State of Ohio. This means about one half of DoIT's workforce may be eligible to retire within the next decade. ODOT is staffing key positions with a mixture of consultants and employees (see **R3.2** and **3.3**). Without a long term strategic plan, DoIT will not be in position to make informed decisions about which positions should be replaced by a consultant and which positions should be filled by a full-time employee on a career track.
- **System criticality:** As part of an overall IT strategy, DoIT should consider which critical systems need to be staffed with a full-time employee. The Department should consider that consultant contracts can change quickly (see **R3.3**) so having full-time staff fully trained on all critical systems can help mitigate risk.

By incorporating a staff elements into the future planning process and system prioritizations for IT, DoIT will be better prepared to staff its operations in order to meet the challenges of the coming decade.

## Recommendation 3.2 IT Consultant Data Collection

- ODOT should collect consultant data in order to continue to evaluate the relative costs and benefits associated with their use.

State agencies generally have two options when it comes to staffing their IT departments: hire a permanent employee or contract for the services of an IT consultant. The State of Ohio Department of Administrative Services (DAS) has a contract with a 3<sup>rd</sup> party vendor (Knowledge Services) that helps state agencies source qualified IT consultant candidates.<sup>15</sup> If an agency, such as ODOT, wishes to hire an IT consultant, Knowledge Services maintains a list of qualified subcontractors to provide services. Knowledge Services posts the position and collects and filters responses from its subcontractor, then sends the agency resumes for qualified candidates, and the agency conducts interviews to select the best candidate for the position. In addition to assistance with recruiting, Knowledge Services also bills DoIT for the consultant's services.

### Consultant Data Collection

In order to accurately measure a workforce, an organization's leadership and managers should consider the number of full-time equivalent (FTE) in an organization. Each month, ODOT receives an invoice for consultant labor hours worked during the previous month. These invoices include the consultant's name, their position, and the hours worked over the course of that month. While this information is helpful in the short term for determining the amount owed for services, the invoices are stored in Portable Digital File (PDF) format and data on actual hours worked is not stored in a way that makes it easy to calculate a consultant FTE.

The chart on the following page shows a comparison between a consultant headcount and FTE for FYE 2016-2019. The relatively large variation between the FTE and actual headcount is caused by individuals who left part way through the year or who started work after the beginning of the measured time period. The key takeaway from this variance is that a headcount, while a necessary component of staffing, is not in and of itself sufficient to gain a full understanding of current staffing, because an individual may not work a full year. Further, the headcount does not show how many hours a given employee worked nor if that employee is full-time or part time.

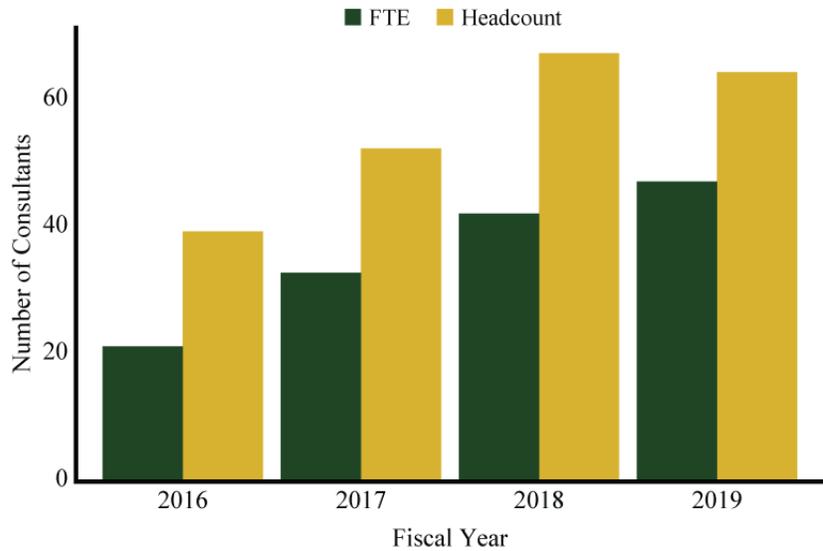
Payroll data for state employees is stored in OAKS. Compared to calculating labor hours in OAKS, which allows for a quick comparison and exclusion of leave and administrative time, the consultant labor hours maintained by ODOT in PDF format are not in a format that allows for easy comparison.

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<sup>15</sup> The Ohio Revised Code (ORC) § 125.02 states that the Ohio Department of Administrative Services (DAS) shall establish contracts for state agencies to purchase services. DAS negotiated the contract with Knowledge Services.

Near the conclusion of the audit, ODOT leadership mentioned that it is possible that either the contract vendor or DAS may keep electronic copies of the invoices, however, ODOT has not been given access to any databases of invoices that might exist. Regardless of whether this information is obtainable from DAS or must be obtained from Knowledge Services, ODOT should seek access to any existing databases that contain sufficient data to calculate a consultant FTE.

### Consultants FTE vs. Headcount



## Conclusion

The lack of a data system, or access to a data system which holds consultant payroll data and can be easily searched, filtered, and categorized makes it difficult to make strategic staffing decisions related to the use of IT consultants (see **R3.1**). A data system sufficient to calculate an FTE should track, at minimum:

- Actual consultant hours worked;
- Consultant cost per hour; and,
- Consultant job description.

This information can be used to make regular comparisons based on a FTE basis for both consultants and permanent staff.

## Recommendation 3.3 IT Consultant Cost/Benefit

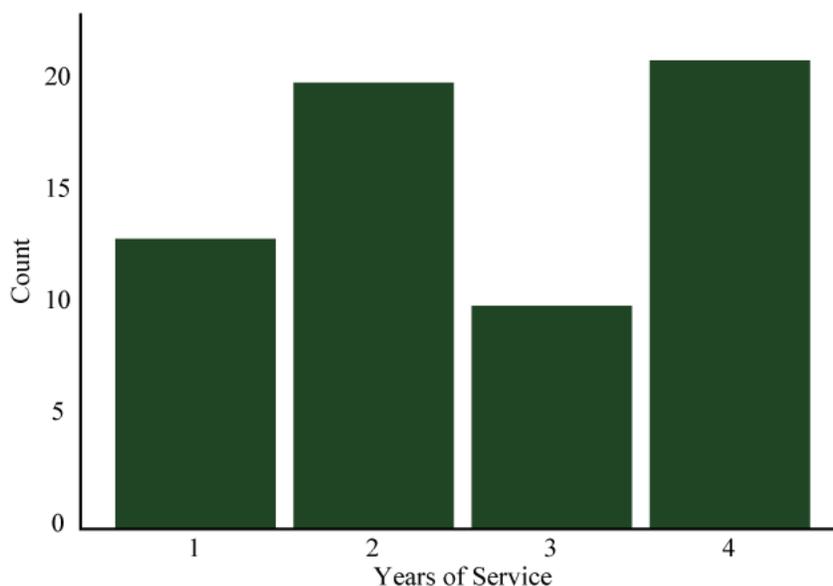
- ODOT should make future decisions about the use of consultants based on an analysis between the full costs of hiring a consultant, as well as the needed skill set and market availability of such personnel vs. a permanent employee.
- ODOT could save more than \$450,000 annually in consultant fees by transitioning long tenured consultants into a permanent position, assuming these positions are continuously needed.

DoIT permanent employees and IT consultants often perform many of the same tasks and in some instances there are consultants and permanent employees who have the same job title and function. Further, although ODOT initially began using consultants to meet immediate staffing needs, as of FYE 2019 there were 21 individual consultants who had been working within DoIT for at least four years.<sup>16</sup>

Our review found that there are three reasons which are generally cited regarding ODOT's use of consultants instead of hiring full-time employees: a hiring cap, a pay gap, and a skills gap. Of the three major reasons cited for the use of consultant, we found the following:

- **Hiring Cap:** DoIT stated that one of the reasons for the use of consultants was that there was a hiring cap in place that prevented the Department from adding full-time positions. We found that DoIT can work with ODOT executive leadership and OBM to add staff if they can show that adding staff is necessary (see **Analysis** section below and **R3.1**).

IT Consultant Head Count



<sup>16</sup> Information on consultants hired under prior DAS contracts was not available to OPT analysts.

Controls on hiring are meant to control growth in expenditures; however, if hiring controls lead to an increased use of relatively more costly consultants, hiring controls should be reexamined.

- **Pay Gap:** DoIT stated that another reason for the use of consultants were market conditions that make it difficult to hire qualified candidates for the rates of pay available for state employees, because there is a perception that consultants make significantly more money. For example, the average hourly cost of a consultant is \$73.13 per hour compared to an average hourly wage of \$45.56 for an ODOT employee working in an equivalent position, a difference of \$27.56 per hour.<sup>17</sup> When the full costs of employment are considered, ODOT employees cost an average of \$62.29 per hour, which is \$10.83 per hour below the average cost of a consultant.<sup>18</sup> However, OPT conducted a survey of consultants and found that, on average, individual consultant take home pay is \$18.93 an hour below the rate that ODOT pays to the subcontractor, meaning that the actual average wage received by an individual consultant is \$54.20 an hour, an average gap of \$8.63 per hour. This comparison shows that the pay gap between a state employee and consultant may not be as wide as it appears, and, if need be, ODOT may be able to work with DAS to develop a competitive compensation package (see **Analysis** section below) to attract qualified candidates for full-time employment.
- **Skills Gap:** DoIT also stated that it was easier to hire a more highly skilled consultant candidate relative to a full-time employee. Some consultants fill highly skilled positions in which it may be difficult to find appropriately trained personnel, for example, there are 13 current consultants that have 9 years or more of prior professional experience in advanced areas including software development and policy planning. However, there are consultants currently filling positions that would be considered entry or mid-level in terms of skill and experience. For example, there are currently 16 consultants in the roles of Information Technologist, which is customer support role which, at an entry level, could be filled by someone at the beginning of their career in IT. This is another area where DoIT may be able to work with DAS to review current position descriptions and requirements (see **Analysis** below).

Because of their increasing use of consultants, a review of the costs and benefits was conducted to provide guidance on how to determine if DoIT should hire consultants or permanent staff when new employees are needed.

## Methodology

We reviewed the median cost paid per consultant work hour to the median cost of a permanent employee by position type to determine at what length of service it becomes more beneficial to

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<sup>17</sup> The gap between full-time employee costs and hourly wages is caused by the costs of fringe benefits.

<sup>18</sup> Costs include pay and fringe benefits for full-time employees compared to consultant costs per hour.

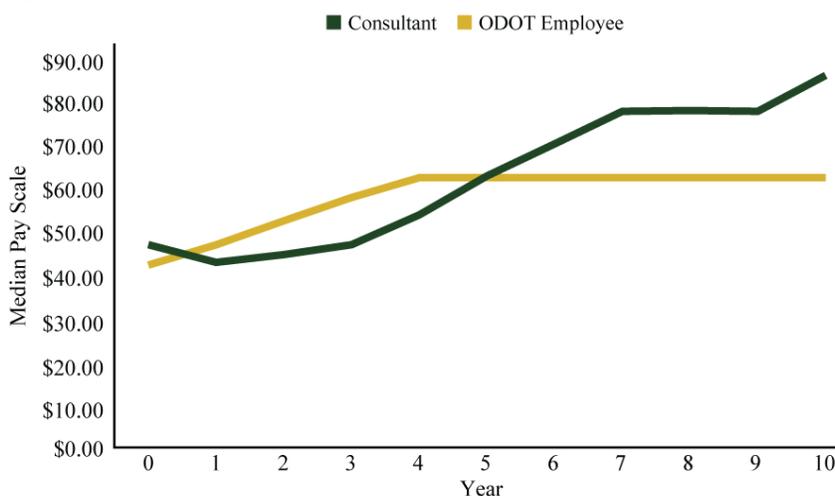
hire a permanent employee. As our data set only included a limited number of years, we extrapolated trends over a ten year time span.

## Analysis

There can be several factors that influence the decision to hire a full-time employee or a consultant. The chart shows the crossover point at which a full-time employee becomes less expensive than a consultant

based on the median fully-loaded hourly pay of a full-time employee vs the median hourly cost of consultants.<sup>19</sup> Based on hourly cost, it may be cost beneficial for ODOT to hire a full-time employee if there is a reasonable expectation that the position will be needed for at least five years. While this chart shows the median for all positions, the concept of a crossover

Consultant Breakeven



holds generally true for the positions we examined. However, ODOT should also consider other factors as a part of strategic planning regarding hiring decisions, including:

- **Consultant continuity:** Any contract should be periodically renegotiated, typically every 2-6 years. The Department should consider the risk that individual consultants could no longer be available as a result of routine contract changes.
- **Other costs:** In addition to the hourly costs shown above, it may also be useful to consider the cost of recruitment, hiring, and training. Furthermore, it could also be useful to consider the cumulative cost of a position over the long term, including any anticipated costs of wage inflation or need for ongoing training to keep an employee's skill set current.
- **Institutional knowledge:** There may be key management or technical positions where the Department deems that it's important to hire and develop a full-time employee due to the desirability of having someone in the position with a working knowledge of the unique challenges of state government generally or ODOT in particular. For example, DoIT currently fills the Program Administrator role with a consultant; however, such key

<sup>19</sup> Fully-loaded hourly pay includes wages and benefits.

leadership roles are generally fulfilled by permanent employees in comparable organizations.

- **Key systems:** The Department may find it desirable to have full-time employees with expertise in key systems that are critical for ODOT's operations and public safety, such as Buckeye Traffic (see **R3.2**).<sup>20</sup>
- **Job market conditions:** The Department may find that the job market for certain skill sets occasionally makes it difficult to hire highly qualified individuals as full-time employees.

All of these factors should be considered in light of the short, medium, and long term needs of the Department and future plans for IT. All staffing should be done in accordance with, and in support of, DoIT's long term plan (see **R3.1**). In addition, and also as part of a long term planning process, DoIT should work closely with DAS to assess how often and under what circumstances current job descriptions and compensation packages may need to be reviewed to keep pace with changes in technology and current conditions in the job market.

## Conclusion

ODOT should strategically plan IT related staffing based on an analysis of strategic need and the actual costs associated with using IT consultants vs. permanent employees. Based on available data, our model showed ODOT could save more than \$450,000 by converting 18 current consultants who have been employed more than 4 years to full-time positions.<sup>21</sup>

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<sup>20</sup> Buckeye Traffic provides travelers with up-to-date information on road conditions, traffic, construction, and other activity affecting roadways managed by ODOT.

<sup>21</sup> For consultant positions where the same individual has been in the position since FYE 2016 and was still in the position as of November of 2019.

# Appendix D: Other Documents

## Performance Audit Overview

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.

## Methodology

Audit work was conducted from September 2019 to December 2019. OPT worked with ODOT to obtain data and conduct interviews to establish current operating conditions. Each section of this audit report contains the specific criteria used for comparisons and detailed methodology.

The performance audit process involved sharing preliminary information with the client, which included status meetings with the client. Input from the agency was considered and taken into account, as appropriate. This audit report contains recommendations that are intended to provide ODOT with options to enhance its operational efficiency and effectiveness.

## Engagement Purpose, Scope, and Objectives

ORC §117.46 requires that the Auditor of State (AOS) shall conduct performance audits of at least four state agencies each biennium. Further, House Bill 62 of the 133<sup>rd</sup> General Assembly required the AOS to provide for the provision of a performance audit by January 1<sup>st</sup>, 2020. This performance audit will fulfill the requirements of both ORC §117.46 and HB62.

OPT engaged in a collaborative planning and scoping process with ODOT leadership, which included interviews and a high-level review of data. Information Technology (IT) Consultants, Equipment and Vehicle Acquisition, Construction Inspection, and Seasonal Staffing were selected for evaluation.

Based on the agreed upon scope, OPT developed the following objective designed to identify improvements to efficiency and/or effectiveness:

### Information Technology (IT) Consultants

- What opportunities exist to improve the efficiency, effectiveness, and transparency of the use of contractors in the provision of IT services?

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Efficient • Effective • Transparent

**Equipment and Vehicle Acquisition**

- What opportunities exist to improve the efficiency and effectiveness of vehicle and equipment acquisition practices?

**Construction Inspection**

- What opportunities exist to improve the efficiency and effectiveness of construction inspection activity in relation to industry standards and leading practices?

**Seasonal Staffing**

- What opportunities exist to improve the efficiency and effectiveness of seasonal staffing practices?

Although assessment of internal controls was not specifically an objective of this performance audit, internal controls were considered and evaluated when applicable to scope areas and objectives. This performance audit did not identify internal control deficiencies which would have required a separate communication to be issued, as control deficiencies are noted in the recommendations.

## Client Response

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Audit standards and AOS policy allow clients to provide a written response to an audit. The letter that follows is the Ohio Department of Transportation's official statement in regards to the performance audit. Below is a statement from the AOS regarding the Agency's response:

- ODOT leadership was informed of audit progress throughout the project. The exit conference, which included all recommendations and analysis, was held on December 12<sup>th</sup>. When written copies of the report were distributed to ODOT on Dec 20<sup>th</sup> and 23<sup>rd</sup>, OPT agreed to receive ODOT's written response by December 27<sup>th</sup>.
- This analysis uncovered a situation where ODOT chooses not to deploy qualified internal staff and instead uses consultant inspectors, which this report has identified as being a more costly option. Given this condition, **R2.1** provided a range of staffing options to consider when attempting to replace more expensive consultant construction inspectors with less expensive internally qualified staff. The AOS recommendation explicitly addresses the need to continue appropriately staffing highway maintenance activities, and each option presented would still provide significant savings when compared to the current deployment method. The AOS understands that there are additional management considerations that may need to be addressed when attempting to implement recommendations contained within this report.
- ODOT noted that HT3s have an annual option to change their designation between HT3M and HT3C/M, introducing variability into staff planning. If ODOT's MOU with its Highway Technician series inhibits their ability to conduct the work necessary in the most efficient manner, then ODOT should work to change that agreement. Analysis only considered reallocating employees who had already elected into HT3C/M at that point in time.
- ODOT suggested in their response letter that we should have used a rate of \$55.15 per hour as a fully loaded cost for HT3s (rather than the \$36.30/hour used in the report). ODOT derived their figure by applying an overhead rate of 150.3% (FHWA allowable recovery rate) to HT3 base wages. This cost allocation plan, an accounting tool intended for ODOT to recover indirect cost from federal grant funding, includes many fixed costs that will not vary in proportion to hiring (or firing) incremental HT3C/Ms. The AOS stands by the rate of \$36.30 as a more accurate reflection of the incremental cost associated with additional internal labor hours, however, were the AOS to use the rate of \$55.15, while it would reduce the cost savings, it would not affect the report conclusions when compared to the consultant rate of \$95.16.

The Auditor of State provided this performance audit to ODOT to provide data-driven analysis for management to consider when making operational decisions while offering transparency, credibility, and communication to all of the Agency's stakeholders. The analysis provided is intended to provide ODOT Leadership with options to consider as they decide how to meet their mission in the most efficient, effective, and transparent way possible.



**Division of Facilities & Equipment Management**  
**Division of Construction Management**  
**Division of Information Technology**  
**Division of Human Resources**  
**ODOT Performance Audit Phase 1 Response**  
**December 2019**

The Ohio Department of Transportation (ODOT) would like to thank Auditor Keith Faber and his staff for the completion of phase one of our recent performance audit. The audit was a mandate of section 755.90 of House Bill 62 and will allow ODOT leadership to make more informed, efficient and transparent decisions in the areas of Information Technology Consultants, Fleet Procurement, Construction Inspection and Seasonal Staffing.

Nicole Bent, Director of the Ohio Performance Team (OPT) and her staff were professional, thorough and engaging throughout the process. ODOT would also like to convey its appreciation to section leads Brent Grace, Aaron Shaw, and Zach Kromer for their involvement and contributions.

ODOT received Section 1 the final draft report for phase one of the performance audit on Friday, December 20, 2019. Sections 2 and 3 were received on Monday, December 23. A subsequent review of the report was conducted by leadership presiding over the audited divisions to prepare a formal response required to be submitted to the OPT on Tuesday, December 24, 2019.

**Section 1: Fleet Management**

**Recommendation 1.1 – ODOT should not move to a leasing model for the vehicles categories analyzed in the audit.**

- Equipment Management is pleased that this recommendation confirms that our current practice results in decreased costs to the agency.

**Recommendation 1.2 – ODOT should consider renting low usage or seasonal vehicles.**

- As part of an effort to further reduce costs, ODOT is reviewing utilization of ODOT equipment. If utilization of equipment is below the goal, other methods of procurement will be evaluated. ODOT values the analysis and will utilize this information moving forward.

**Recommendation 1.3 – ODOT should improve data collection and storage efforts related to fleet management to allow real time, data-driven management of fleet operations.**

- To improve data collection and storage, ODOT is investigating the acquisition of a Fleet management system. ODOT is also currently in the final stages of implementing a GPS/AVL system on the snow and ice truck

fleet. Combining ODOT's GPS system with a comprehensive equipment management system will allow ODOT to capture a more complete view of equipment utilization and drive equipment management decisions across the agency.

### **Issue for Further Study: Right Sizing the Fleet**

- ODOT agrees with the assessment regarding fleet sizing. ODOT currently reviews and analyzes fleet size, numbers of assigned vehicles, utilization history and rental equipment to optimize the fleet. Existing tools require reviewing each piece of equipment individually. It is our desire that a new equipment management system will provide more detailed information.

### **Section 2: Construction Inspection and Seasonal Staffing**

The Division of Construction and Management has reviewed Section 2 of the Performance Audit and will be proactive in identifying opportunities for districts to benchmark and share best practices related to staffing construction projects, specifically their approaches to augmentation and substitution. The Division understands the report and additionally understands there is room for improvement in the approach to staffing projects to maximize efficiency and spending. There are additional items and approaches that must be considered outside of the vacuum of the analytics. Those challenges and thoughts are outlined below for each recommendation.

The ability to hire seasonal employees varies greatly by district. In a good economy, it is very challenging to hire seasonal employees. If we are successful, there is real potential that they may find permanent employment somewhere else during their temporary employment with ODOT. In the last two years, ODOT has gone to great lengths in its recruitment efforts to hire temporary HTs to handle snow and ice duties. Even with these increased efforts, not all the temporary positions have been filled. However, this does not preclude ODOT from attempting to use temporary staff to backfill needs in maintenance during peak construction season. This is simply noting the real challenge of recruiting for temporary positions in a tight labor market.

#### **Recommendation 2.1 – Deploy qualified internal staff before hiring consultant inspectors:**

- While we may be able to move Highway Technician 3 (HT3) C/M employees (C/Ms) to Construction, this recommendation does not address the location of the work. Depending on where the work is located, significant, increased amounts of travel may be required to use internal staff on such work. This is likely to result in decreased efficiency and increased costs.
- Additionally, it appears that, although HT3 C/Ms may be motivated to perform construction work to meet certification, experience, and training milestones required for progression in the HT series, after meeting the HT3 requirements, they ultimately may elect a maintenance track, performed primarily in ODOT garages, for the remainder of their careers. In addition, HT3s have an annual choice to either be a HT3M and perform maintenance only duties or to be a HT3C/M and perform both construction and maintenance duties. This volatility can make long term planning more challenging.
- Most counties do a significant amount of Force Account work out of their garages. This recommendation does not address the need to have experienced staff in the garage to lead these efforts.
- This recommendation may result in a void if internal staff are moved from maintenance to construction inspection. Accordingly, it should be noted that the ability to hire seasonal employees varies greatly by district, and this problem is compounded in times of good economic growth, with abundant employment opportunities. Additionally, even in cases where we do successfully obtain sufficient temporary/seasonal staff, there is the

potential that they may find permanent employment somewhere else during the course of their temporary employment with ODOT.

- One recommendation appears to be that, during peak maintenance activities in the garages, ODOT could move HT3 C/Ms from assigned projects back to maintenance. However, this does not address the consistency issues that would be introduced when changing staff midway through a project.
- While the Division agrees that the \$95.16 per hour represents an accurate “loaded rate” for a consultant inspector, the Division believes the rate of \$36.30 for and HT3 is understated. For the purpose of this audit, the appropriate rate to use would be more in line with the Actual Construction Engineering (CE) Rate, which is reviewed and accepted by FHWA as acceptable and in compliance with 2 CFR 200. Using that rate, the appropriate hourly rate would be \$55.15. To arrive at that number, we multiply the average hourly rate of an HT3 (\$22.03) by the CE ICAP Rate of 150.33% and add back the \$22.03.
- In the HT series, ODOT can only hire externally at the HT1 level and the HT3C/M level due to the Classification Specifications and Memorandum of Understanding.

**Recommendation 2.2 – Optimize seasonal highway maintenance work assignments by using HT1 Seasonal employees to full capacity.**

- This recommendation does not consider that the seasonal employees may terminate their employment with ODOT if a better opportunity comes along.
- This recommendation also assumes that the work is concentrated, instead of being dispersed geographically. Depending on where the work is in each district, maximizing the hours a seasonal employee works may result in increased travel time and associated costs. Thus, the AOS recommendation does not necessarily translate to maximizing efficiency or minimizing costs.
- There are also some employees that only want to work during the snow and ice events. As a result, they work fewer hours.
- There would be a lull between snow and ice activities and construction season. As a result, there is not a need for year-round lower level work.
- Depending on when a temporary employee starts, using the employee during winter and summer could cause the Affordable Care Act insurance coverage to commence. This would be additional cost.

**Recommendation 2.3 – Collect and maintain data related to use of consultant construction inspectors in an easily retrievable electronic format.**

The current process for Consultant invoicing is accomplished through offline spreadsheets. While data is collected to track and allocate all costs for projects, the offline approach presents challenges in data recovery. ODOT has developed system requirements for the preparation and submission of invoices online by automating the functionality of spreadsheets as well as:

- Prime and sub-consultant invoices;
- Support for review, approval, or other related actions on invoices from Prime Consultants and ODOT Staff;
- Integration with the ODOT accounts payable function to create vouchers and initiate voucher processing;
- Support for DBE/EDGE subconsultant payment reporting;
- Interface with financial data (e.g., prior consultant payments, when payments are made), including the transfer of financial data when invoices are approved for payment;
- Recording dates when sub-consultant payments are complete;
- Integration with DBE/EDGE goals information; and
- Reporting.

It also should be noted that ODOT currently is pursuing a project to automate professional services, to replace the current, aging system. The new system will include functionality to automate all of the processes that currently are performed on spreadsheet, manually, within aging applications or without the aid of an integrated, automated system.

**Further Study – Training for Seasonal Staff**

- In spring of 2019, ODOT created a Seasonal Training committee made up of representatives from each district. The committee’s goals were to gain consensus on a standardized Seasonal Training Curriculum for use in all districts. The committee reviewed the current state of training each district provided for HT1 Seasonal hires. See the recommendation in the table below. This format has not been formally deployed, as more discussion on on-the-job training and tracking needs to be explored.

BLOCK ONE (MINIMUM)	BLOCK TWO (IN ADDITION OPTIONAL)	BLOCK THREE (OPTIONAL OJT)
New Hire Orientation	All of Block one	OJT (example truck seat time)
New Employee Learning Plans (compliance)	Chipper and/or Chainsaw	
Safety SOP	Basic First Aid/CPR/AED	
Flagging	Equipment Assessments or Training	
Loader (assessed or trained)		
Truck checklist		

**Section 3: Information Technology Consultants**

**Recommendation 1.1 – ODOT should develop a long-term planning process for DoIT in accordance with best practices. Additionally, it should formally designate the priority of key systems in relation to business continuity and recovery.**

- The Division of Information Technology (DoIT) understands the importance of long-term planning, prioritization and recovery as cited in the audit report. The Division will add a section for long-term planning process in the Systems architect design. To address future staffing needs and business continuity, DoIT is in the process of obtaining a project portfolio management system. This system will allow DoIT to address both long- and short-term staffing needs and assist with maximizing decision making for both. About system criticality, DoIT is in the process of putting together a disaster recovery plan. Part of that plan involves meeting with all business group leaders to prioritize systems from an operational need and strategizing accordingly.
- As it relates to the *9 Steps to Successful Strategic Planning*, the recommendation suggested a 2-year time horizon. The Division currently incorporates a 3-year timeline and also has plans to incorporate a staffing aspect to that plan when the project portfolio management tool is online.

**Recommendation 2.1 – ODOT should collect consultant data in order to continue to evaluate the relative costs and benefits associated with their use.**

- ODOT IT leadership agrees with the value this data provides and will work with DAS to obtain access to the data referenced in this section in order to track consultant hours worked, consultant costs per hour and consultant job descriptions.

**Recommendation 3.1 – ODOT should make future decisions about the use of consultants based on an analysis between the full costs of hiring a consultant, as well as the needed skill set and market availability of such personnel versus a permanent employee.**

- DoIT acknowledges and appreciates the break-even analysis between consultants and full-time employees as it relates to tenure. Moving forward, DoIT will address this analysis in the HR portion of our strategic plan. When appropriate, DoIT will make a concerted effort to retain consultants as FTE's. Leadership will establish a decision-making matrix as part of the analysis. Although DoIT has a personnel position cap of 61 FTE's, when necessary, leadership will work with HR to increase that number when the matrix dictates.

Jack Marchbanks  
Director  
DoIT