



# OHIO DEPARTMENT OF TRANSPORTATION

Financial and Policy Implications on Assuming Primary  
Responsibility for All State Routes Throughout Ohio Regardless of  
Local Government Jurisdiction

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# TABLE OF CONTENTS

<b>EXECUTIVE SUMMARY.....</b>	<b>1</b>
<b>A HISTORY OF OHIO HIGHWAYS.....</b>	<b>2</b>
Highway Financing and Municipal Government before 1912.....	2
Highways and Streets in Ohio from 1803-1947.....	3
Highways in the Present Day.....	4
Home Rule and State Highways.....	5
Summary.....	8
<b>POLICY AND LEGAL CONSIDERATIONS.....</b>	<b>10</b>
Design and Maintenance Standards.....	10
Court of Claims and Liability.....	11
Emergency Operations.....	11
Hauling Permits.....	12
<b>CAPITAL AND OPERATIONAL CONSIDERATIONS.....</b>	<b>14</b>
Pavement Rehabilitation.....	14
Traffic Control.....	15
Bridge Maintenance, Rehabilitation and Reconstruction.....	16
Storm Sewers.....	17
Routine Maintenance and Snow & Ice Removal.....	17
Additional Payroll Costs.....	21
One-time Costs for Facilities and Equipment.....	22
Summary of Additional On-Going Costs.....	23
<b>FUNDING CONSIDERATIONS.....</b>	<b>24</b>
State Motor Fuel Tax Revenue.....	24
Federal Funding.....	25
Other Revenue.....	25
State and Federal Highway Funding Distribution.....	26
Funding Impacts.....	27
<b>CONCLUSION.....</b>	<b>28</b>
<b>APPENDIX.....</b>	<b>31</b>

## EXECUTIVE SUMMARY

The FY 2010/2011 Transportation Budget (HB 2, 128<sup>th</sup> General Assembly) required the Ohio Department of Transportation (ODOT) to compile and produce a report on the financial and policy implications of the Department assuming primary responsibility for all state routes throughout Ohio regardless of local government jurisdiction.

Specifically, HB 2 stated:

**Section 755.50.** The Department of Transportation shall compile and produce a report on the financial and policy implications of the Department assuming primary responsibility for all state routes throughout Ohio regardless of local government jurisdiction. The report shall review the range of possible participation in the paving and maintenance of these routes by the Department. The Department shall submit the report to the Speaker of the House of Representatives, the Minority Leader of the House of Representatives, the President of the Senate, the Minority Leader of the Senate, and the Governor not later than December 15, 2009.

The State of Ohio Highway System is comprised of Interstate Routes, U.S. Routes, and State Routes. There are a combined 49,078 lane-miles on these routes within the State of Ohio. The maintenance responsibility for these routes varies by the type of maintenance activity performed. The different activities performed currently generate a range of responsibility from approximately 39,700 to 42,100 lane-miles on these routes. This report looks at the implications of ODOT assuming responsibility of the U.S. and State Routes that are currently under the jurisdiction of local cities and villages.

There are many policy and legal implications, capital and operational implications, and funding considerations which must be considered in making the determination to shift responsibility for these additional routes from local municipalities to ODOT. This report discusses each of these areas and provides conclusions as to the overall impacts.

Questions of “Home Rule” must be answered as to design standards, liability and how priorities are established. Each of the various areas of the pavements, bridges, and highway right-of-way must be maintained and there are operational and capital costs associated with this work.

Finally, ODOT and local municipalities receive highway funding from a variety of sources. Funding sources will need to be redirected to ODOT in order to maintain these additional routes. Ultimately three possible scenarios exist if this action is taken:

1. Re-allocate state gas tax revenues from local municipalities to ODOT;
2. Raise additional revenues; or,
3. Require ODOT to assume responsibilities with no increase in funds resulting in a decrease of service.

This report details the financial and policy implications to both the local governments and ODOT should ODOT assume the primary role of maintaining US and State Routes located within the municipalities.

# A HISTORY OF OHIO HIGHWAYS

## Highway Financing and Municipal Government Before 1912

From Colonial times and through the first quarter of the nineteenth century, highways were considered a function of general government, primarily of local government, and were financed through property and poll taxes. When Ohio became a state in 1803, it did not contribute toward the maintenance of highways until 1819 when it passed a property tax for roads of ½ cent to one cent per acre of land. Throughout the 1800's, Ohio's agricultural business was its biggest industry and its products were in demand. Ohio needed to find a way to transport these products to the eastern seaboard both for domestic consumption and export to Europe. River transportation ran south and west, canals ran north and south. Local governments could not meet the demand for transportation so private enterprises entered the picture and built toll roads. Hundreds of corporations were chartered in Ohio to finance highway construction, with most having a provision for a 10 percent return on investment until the capital was retired, after which the road became "free." However, toll roads failed for a number of reasons. The two biggest reasons were the rise of rail transportation and the electric railways. Road construction and maintenance financing fell out of favor in the late 1800's and highways reverted to their former status of government responsibility again financed through poll taxes and general property taxation. A report in 1892 on the status of highways in Ohio found that roads would never be more than of local interest and recommended no action on the part of the state to assist in the maintenance of them. No state allotments for roads to local governments were made between 1851 and 1904. When allotments began again in 1905, the state allocated only \$113 to each county for highway purposes.

The development of the automobile in the early 20<sup>th</sup> century restored the importance of highway and in fact revolutionized transportation by changing highways from neighborhood travel routes to arteries of commerce. Highway financing and the role of local government began to change too. Local governments were demanding more independence from the state. Prior to the passage of a constitutional amendment in 1912, all municipal corporations were created directly by the General Assembly through the passage of a special act. The act provided for the form, organization, structure, powers, and functions of each municipal government. Because separate acts were passed for each municipality, the form of government and its accompanying powers varied among the municipalities. Additionally, every time a municipality needed to address an issue affecting their city, the General Assembly had to pass special legislation. This gave the General Assembly a great deal of control over local governments and with this power came political abuses, at least in the eyes of the municipal governments.

As the State grew in population, so did its municipalities. With the increase in population came an increase in the amount of special legislation needed to satisfy each municipality's needs. This became very burdensome for both the General Assembly and the municipalities. In 1851, the voters amended the Ohio Constitution to prohibit the General Assembly from passing any special act conferring corporate powers on a municipality. In addition, the Constitution provided for the organization of municipalities through general laws. The General Assembly began to pass such laws, including the establishment of classes and grades of municipalities according to population. However, in 1902, two Ohio Supreme Court cases found that these classification laws were, in essence, special acts and therefore, were unconstitutional. Without such laws, municipalities were, in

effect, left without a government. The Governor convened a special session of the General Assembly and passed legislation providing for the organization and governance of municipalities. For example, the new laws provided that those municipalities with populations in excess of 5,000 were considered cities and those with populations of less than 5,000 were villages. The majority of these organizational laws are still in effect today.

However, cities like Cleveland, with a population of over 100,000 in 1902, did not like the fact that they had to follow the same laws as the City of Painesville, with its 1902 population of just over 5,000. From this need for local control, the home rule movement took hold and in 1912, became the central issue at the Ohio Constitutional Convention. Many city residents had come to the conclusion that they should have a greater voice in local affairs and they should be able to choose the type of government to meet their specific needs. The home rule amendment was designed to accomplish three things: (1) to make it possible for different cities in the State to have different forms and types of municipal organization; (2) to allow municipalities to have full and complete political power in all matters of local government not prohibited by state law; and (3) to expand the powers of municipalities to acquire and operate public utilities. After much debate, the amendment was submitted to the voters and on September 3, 1912, the voters of Ohio approved Article XVIII, otherwise known as the home rule amendment.

Section 3 of Article XVIII is the most relevant to the remainder of this discussion. It provides:

Municipalities shall have authority to exercise *all powers of local self-government* and to adopt and enforce within their limits such local police, sanitary, and other similar regulations, as are not in conflict with general laws. (Emphasis added.)

This section applies to all municipalities, whether or not they adopted a charter under Section 7 of Article XVIII. Apparently, Ohio is only one of a handful of states that have granted such home rule powers to municipalities who have not adopted charters.

### **Highways and Streets in Ohio from 1803 to 1947**

Even before 1912, matters relating to roads, streets, ditches, and bridges were considered matters of local concern and control. Roads were usually built and maintained by either private individuals (trail roads), private companies (turnpike or toll roads), or local governments such as municipalities, counties, and townships. These entities were primarily interested in only those roads in their immediate vicinity and, on the whole, these roads were not well maintained. Nevertheless, many believed that highways should and always would remain a matter of local concern. By the late 19th century, however, a State commission was formed to investigate the need for good roads throughout Ohio.

In 1904, this State commission became the State Highway Department. The Department was not charged with the construction of any public highways but served more as an advisor to county and township governments. Its initial legislative mandate provided that the department should facilitate a system of state, county, and township cooperation in the permanent improvement of public highways. The Department could only give state aid for highway construction to counties and townships.

Notably absent from this mandate was any requirement to cooperate with municipal corporations in the establishment of municipal streets.

In 1909, the first motor vehicle license fees were introduced as a source of revenue for road maintenance and funds were held in the State Maintenance and Repair Fund. It was not until 1919 that any of these funds were allocated to political subdivisions. In 1912, the same year the home rule amendment was approved, the State Highway Department changed from a mere advisory agency to an active construction department. Its first major undertaking was the construction of a state system of roads that was continuous and connected, including the construction of an inter-county highway system and the main market roads system which consisted of inter-city roads.

In 1919, the State Maintenance and Repair Fund allocated 50 percent of the fees to municipal corporations or counties on the basis of the number of vehicle registrations and retained 50 percent in the Fund. In 1923, the state enacted the motor transportation license fee on carriers which was distributed 50 percent to municipal corporations and counties along the routes of the carriers on the linear miles in each subdivision. That same year, the General Assembly established the county highway system. The intent was to connect all municipalities within a county and also join all such roads to the inter-county highway system. However, construction and maintenance of such roads did not include roads within the corporate limits of a municipality. In 1925, Ohio enacted its first motor fuels tax, becoming one of the last states to do so. The two cent tax specifically required that all revenue from the motor fuels tax be allocated to the maintenance of highways. In 1927, an additional one cent tax was added for construction and reconstruction and the inter-county highway and main market roads system became the state highway system. The General Assembly empowered the State Highway Department with the responsibility of maintaining all roads on the State Highway System at the State's expense, thus relieving the counties and townships of this responsibility. In 1929, the construction tax on motor vehicle fuels was increased to two cents and revenue was deposited in the newly designated "Highway Construction Fund" administered by the Department of Highways. Eighty percent of the fund went to the State with the remaining 20% divided as ½ to townships, ¼ to counties and ¼ to municipal corporations. Also in 1929, the General Assembly passed legislation providing that all state highway extensions through municipalities were to be considered a part of the state highway system. Until 1947, motor vehicle fuel taxes were used not only for highway construction but to "poor relief" during the Great Depression of the 1930's, to school districts and to other needs of local government. In 1947, a constitutional amendment terminated the non-highway use of motor fuel taxes for anything other than highway purposes.

### **Highways in the Present Day**

The gas tax was initially enacted in 1925 at two cents per gallon. By 1959, increases in the existing four levies brought the tax to seven cents, where it remained until 1981. The gas tax was increased to 22 cent in 1992. The tax currently stands at 28 cents per gallon. Discussion of the current distribution of the gas tax revenues is included in subsequent sections of this report.

## **Home Rule and State Highways**

The ambiguity between Home rule and the state highways began once the General Assembly designated certain municipal roads as part of the state highway system. Notably, qualifying language began to appear in the Highway Department statutes limiting the States responsibility for the construction, reconstruction, maintenance, and repair of municipal roads. For example, in Section 5511.01 of the Ohio Revised Code, it states, in pertinent part:

Except as provided in sections 5501.49 and 5517.04 of the Revised Code, *no duty* of construction, reconstructing, maintaining, and repairing such state highways within municipal corporations *shall attach to or rest upon the director*.

\* \* \* \*

With the exception of the authority conferred upon the director by this section, . . [the] chapters . . . of the Revised Code *shall not* in any way *modify, limit, or restrict the authority conferred by section 723.01 of the Revised Code* upon municipal corporations to regulate the use of streets and to have the care, supervision and control of the public highways, streets, avenues, alleys, sidewalks, public grounds, bridges, aqueducts, and viaducts within the municipal corporations and to keep them, subject to division (B)(3) of section 2744.02 of the Revised Code, open, in repair, and free from nuisance. (Emphasis added.)

Similar language can be found in Section 5501.31 of the Revised Code:

Except in the case of maintaining, repairing, erecting traffic signs on, or pavement marking of state highways within villages, which is mandatory as required by section 5521.01 of the Revised Code, and except as provided in section 5501.49 of the Revised Code, *no duty* of constructing, reconstructing, widening, resurfacing, maintaining, or repairing state highways *within municipal corporations*, or the bridges and culverts thereon, *shall attach to or rest upon the director*, but the director may construct, reconstruct, widen, resurface, maintain, and repair the same with or without the cooperation of any municipal corporation, or with or without the cooperation of boards of county commissioners upon each municipal corporation consenting thereto. (Emphasis added.)

Chapter 5521 of the Revised Code deals specifically with State and municipal cooperation in highway matters. In Section 5521.01, the following illustrates the duties of the State towards state highways within municipalities:

*The director of transportation*, upon the request by and the approval of the legislative authority of a village, shall maintain, repair, and apply standard longitudinal pavement marking lines as the director considers appropriate, or *may establish, construct, reconstruct, improve, or widen any section of a state highway within the limits of a village*. The director also may erect regulatory and warning signs, as defined in the manual adopted under section 4511.09 of the Revised Code, on any section of a state highway within the limits of a village. *The director may establish, construct,*

*reconstruct, improve, widen, maintain, or repair any section of state highway within the limits of a city, including the elimination of railway grade crossings, and pay the entire or any part of the cost and expense thereof from state funds, but in all cases the director first shall obtain the consent of the legislative authority of the municipal corporation, except that the director need not obtain the consent of the municipal corporation if the existing highway being changed or the location of an additional highway being established was not within the corporate limits of the municipal corporation at the time the director determines the establishment or change should be made, or if the director is acting pursuant to section 5501.49 of the Revised Code. (Emphasis added.)*

Thus, Section 5521.01 provides that only when the director declares that there is urgent need to establish a state highway, which is to be designated a federal aid highway, or a federal aid interstate highway within a municipal corporation or, in the opinion of the director, any federal aid highway or federal aid interstate highway is in urgent need of repair, reconstruction, widening, improvement, or relocation, so as to accommodate the traveling public, can the director act without the consent of the municipal corporation. This section also provides that such action is still subject to judicial review by a court of common pleas.

The Revised Code provides the director specific authority to enter upon state highways within a municipality for other purposes. Section 5511.01 provides further that:

*The state highway routes into or through municipal corporations, as designated or indicated by state highway route markers erected thereon, are state highways and a part of the state highway system. The director may erect state highway route markers and such other signs directing traffic as the director thinks proper upon those portions of the state highway system lying within municipal corporations, and the consent of the municipal corporations to such erection and marking shall not be necessary. However, the director may erect traffic signs in villages in accordance with section 5521.01 of the Revised Code. No change in the route of any highway through a municipal corporation shall be made except after providing public involvement activities. (Emphasis added.)*

Similarly, Section 5501.41 of the Revised Code limits the director's powers over snow and ice removal within municipal corporations:

*The director may remove snow and ice from the state highways within municipal corporations, but before doing so he must obtain the consent of the legislative authority of such municipal corporation.*

Clearly, the importance of all these provisions is that, with a few specific exceptions, the General Assembly has supported and upheld the past practice of local control over municipal streets as well as the home rule limitations of the Ohio Constitution. Any road work done on a highway, designated as a state route, within a municipal corporation is permissive on the part of the director and requires the director to obtain the legislative consent of the municipality.



For charter municipalities, the term local self-government as found in Article XVIII, Section 3, has been interpreted by Ohio courts to include the regulation of municipal streets. See, *Village of Perrysburg v. Ridgway* (1923), 108 Ohio St. 245, syllabus 2 (the power to establish, open, improve, maintain, and repair public streets within the municipality and fully control the use of them, is included within the term powers of local self-government.) For non-chartered municipalities, Chapter 7 of the Revised Code sets forth general municipal government laws. Included in this Chapter is Section 723.01, which provides, in pertinent part:

Municipal corporations shall have special power to regulate the use of the streets. Except as provided in section 5501.49 of the Revised Code, the legislative authority of a municipal corporation shall have the care, supervision, and control of the public highways, streets, avenues, alleys, sidewalks, public grounds, bridges, aqueducts, and viaducts within the municipal corporation, and the municipal corporation shall cause them to be kept open, in repair, and free from nuisance.

Therefore, both the Ohio Constitution and the Ohio Revised Code provide that the duty to construct, maintain, and repair roads within a municipality rests primarily with the municipality. There are limited exceptions where the General Assembly has specifically placed municipal duties on ODOT, such as inspection of all bridges on the state highway system (R.C. 5501.47), construction, reconstruction, maintenance and repair of bridges inside a municipality (R.C. 5501.49), and maintaining, repairing, erecting traffic signs and pavement markings on state highways within villages (R.C. 5501.21). The most controversial and the only uncodified exception to home rule is the requirement that ODOT maintain the Interstate System within a municipality. It is currently found in H.B. 2, Section 203.40. It provides:

The Director of Transportation *may* remove snow and ice and maintain, repair, improve, or provide lighting upon interstate highways that are located within the boundaries of municipal corporations, adequate to meet the requirements of federal law. When agreed in writing by the Director of Transportation and the legislative authority of a municipal corporation and notwithstanding sections 125.01 and 125.11 of the Revised Code, the Department of Transportation may reimburse the municipal corporation for all or any part of the costs, as provided by such agreement, incurred by the municipal corporation in maintaining, repairing, lighting, and removing snow and ice from the interstate system. (Emphasis added.)

This exception has been included in every budget bill since 1965. The Ohio Supreme Court discussed this uncodified section in the case of *State ex rel. City of Cleveland v. Masheter* (1966), 8 Ohio St. 2d 11.

In *Masheter*, the City of Cleveland sued ODOT for payment of an electric bill for providing lighting upon the interstate system within Cleveland's municipal boundaries. Earlier in 1965, the General Assembly had passed the uncodified section in the budget bill requiring ODOT to, among other things, provide adequate lighting upon the interstate highways to meet the requirements of the federal government. The Ohio Supreme Court held that the determination of policy in relation to the creation and maintenance of public highways is vested primarily in the General Assembly. *Masheter*. Id., at 13. It further stated:

The Director of Highways is a statutory officer whose powers and duties are derived from legislative enactments. Such powers and duties may be imposed, modified, enlarged, or eliminated by the General Assembly. The General Assembly creates policy in regard to public roads and the director executes such policy. *Id.*

The Supreme Court reviewed Section 723.01 and the uncodified language in the budget bill and found that the budget bill language only applied to interstate highways shifting the duty to maintain such highways to the director of transportation. However, such language did not relieve municipalities from their primary duty to keep such roads free from nuisance. In other words, it would not relieve the municipality from liability for failure to maintain such highways. Masheter, at 15. The Court concluded that the duty to maintain the highways was now jointly held, with the primary obligation resting on the State but that the General Assembly had not amended Section 723.01.

In 1965, this uncodified law contained the word “shall” which denotes it was a mandatory duty whereas now the section contains the word “may” which denotes that it may be a permissive duty. Nevertheless, the federal government requires ODOT to maintain the interstates under Title 23 U.S.C. Section 116.

### **Summary**

In summary, the home rule amendment of 1912 did not really change the nature of municipal power over roads and streets. Prior to 1912, roads and streets were considered matters of local concern. After 1912, roads and streets within a municipality remained a matter of local concern. Home rule only confirmed this fact. At the time of the creation of the State Highway Department, now known as ODOT, the General Assembly carefully crafted a set of duties for the department which did not include the duty to construct or maintain roads within a municipality. Once a state highway system was established and the State roads became interconnected, passing through municipalities, the General Assembly very specifically delineated, qualified, and limited the duties of the Director as they related to any roads in and through a municipality.

While it appears that some of the exceptions may cause confusion, the fact remains that ODOT can only perform those duties statutorily granted to it by the General Assembly. Whether or not a road within a municipal corporation has been designated as part of the state highway system does not determine whose statutory responsibility it is to maintain and repair that road. The General Assembly, with the support of the Home Rule amendment of the Ohio Constitution, has made that determination. Clearly, the legislature has not extended the duty to maintain the interstate highway system within a municipality to any other federal-aid routes, United State Routes, or other state routes within a municipal corporation. The duty of construction, reconstruction, maintenance and repair of such routes remains the responsibility of the municipal corporations.

With the current legislative authority, ODOT is responsible for the construction, reconstruction and maintenance of all Interstate Routes and all non-incorporated U.S. Routes and State Routes. Additionally, ODOT is responsible for snow and ice removal and minor routine maintenance for various routes within villages (municipalities with population under 5,000) where a consent ordinance has been established. ODOT is also responsible for the construction, reconstruction, major maintenance and repair, and operation of all bridges located on the state highway system, while routine bridge maintenance falls upon the municipality.

**TABLE 1: Routes Type Breakdown within Ohio**

Route Type	City Lane Miles	Village Lane Miles	Non-Incorporated Lane Miles		Total Lane Miles
Interstate	2,593	211	3,931		6,735
US Routes	2,374	521	8,096		10,991
SR Routes	4,614	1,834	24,904		31,352
Totals	9,581	2,566	36,931		49,078

The table shown above provides a breakdown of the current types of routes within Ohio. A total of 49,078 lane miles of Interstate, U.S., and State Routes exist regardless of jurisdiction. ODOT currently maintains responsibility for all Interstate Routes within Ohio, regardless of jurisdiction. The Interstates consist of 6,735 lane miles. On the current U.S. Routes and S.R. systems, ODOT's primary responsibility is for all non-incorporated portions of these roadways. These systems include 8,096 lane miles of U.S. Routes and 24,904 lane miles of State Routes.

The latest census indicates a total of 588 villages and 234 cities within Ohio. A total of 9,343 lane miles of U.S. and State Routes exist within these villages and cities and are currently the primary responsibility of the municipality.

ODOT currently provides snow and ice removal and minor maintenance for villages through legal agreements, although major maintenance and reconstruction remains the responsibility of the villages. ODOT currently provides minor pavement maintenance services to some cities through legal agreements.

# **POLICY AND LEGAL CONSIDERATIONS**

ODOT possesses and exercises many policy and legal rights over highways for which ODOT currently has “primary responsibility.” These rights include the ability to set design and maintenance standards, enforce limited access and regulate items placed within right-of-ways, maintain emergency oversight and access. In addition, ODOT is legally responsible for all Court of Claims actions resulting from these highways.

Many unintended policy and legal implications would result if ODOT took over primary responsibility of municipal routes. These actions center on the question of who would make and enforce decisions pertaining to these highways – ODOT or the municipality. How would “Home Rule” be affected? These policy and legal implications would need to be resolved between ODOT and each individual municipality. This section outlines some of these implications.

## **Design and Maintenance Standards**

ODOT authors and maintains design standards for all aspects of roadway design. These design standards comply with standards set forth by the Federal Highway Administration. Compliance with Federal standards is required in order for projects to be eligible to receive Federal funding. Many municipalities maintain their own design standards, which may or may not comply with ODOT design standards.

Traffic signals and speed limits are two primary examples where local practices may differ from ODOT standards. ODOT standards require that traffic signals only be placed at intersections where they are warranted. An engineering analysis comparing traffic volumes and crashes with specific thresholds determines if a traffic signal is warranted or not. Traffic signals may exist which are not warranted, and would need to be removed. Similarly, ODOT establishes speed limits for a specific stretch of roadway based upon prescribed roadway classifications and geometrics. Reduced speed limits at some locations within municipalities may need to be re-established if they do not meet the Ohio Revised Code statute requirements. Additional examples of design components that could be impacted include, but are not limited to, lane width, typical pavement types and thickness, storm sewer size, catch basin spacing, traffic signs, guardrail, and street lighting type and spacing.

ODOT also maintains roadways to prescribed standards which may differ from that of individual municipalities. Two teams from ODOT Central office travel every ODOT maintained roadway annually and perform visual inspections of eight maintenance categories: Pavements, shoulders, ditches, pavement markings, guardrail, signs, litter, and vegetation. Maintenance projects are established in the district offices based upon the deficiencies found. Inclusion of the city and village routes to the annual inspections would also require additional factors when prioritizing maintenance projects based on the deficiencies. For these city and village maintenance projects selected, they will need to conform to ODOT’s minimum standards, which may require maintenance that is above and beyond the current minimum standards within the city and village.

ODOT's snow and ice control is prioritized based upon Average Daily Traffic (ADT), airports, commerce, emergency facilities, schools, route cycle time, equipment, etc. Interstate and four lane

divided roadway systems are designated first priority routes. Second and third priority route assignments are determined by the ODOT districts based on the above mentioned items.

With the addition of city and village routes, the expectations of the level of service within a city or village compared to an ODOT maintained highway will require re-evaluation of all routes to determine a revised priority list.

### **Court of Claims and Liability**

An unquantifiable implication of ODOT assuming responsibility for state routes inside of municipalities is the increase in potential liability and litigation in the Court of Claims. For example, potential liability may exist due to snow and ice on sidewalks. Some municipalities have passed ordinances placing the responsibility for snow and ice removal from sidewalks upon the property owner, while some have not. If someone falls on a slippery sidewalk, can ODOT be held liable even if it does not have legislative authority within the municipality? Liability may exist for standing water on pavements due to undersized storm sewers on these portions of State and U.S. routes. Who will pay for upgrading these sewers or be responsible for this liability?

The standard of negligence for the State when compared to cities actually favors plaintiffs. This issue becomes even more complicated when you consider ODOT would be taking on liability for items that may very well not meet our own design standards. The litmus test ODOT faces in the Court of Claims is whether we followed our design standards and used sound engineering judgment. It will be difficult for ODOT to defend a case involving a city traffic signal that does not meet our design standards. As stated previously, the alternative facing ODOT would be to remove unwarranted signals and bring every roadway design element up to our standards. The capital cost of this potential effort is not included in this analysis.

### **Emergency Operations**

The Department of Transportation plays a major role in the State Emergency Operations Plan and is the State Lead for (ESF#1) Emergency Support Function #1 (Transportation). This includes all aspects of monitoring, maintenance, repair and emergency support for transportation related incidents statewide. ODOT also coordinates transportation information sharing with other Emergency Response agencies including Law Enforcement, Fire, EPA, EMA etc. This is accomplished by utilization of the incident command system to liaison with other local responders all the way to maintaining a 24/7 communications center at the State of Ohio Joint Dispatch Center at the State Emergency Operations Center.

ODOT strives to assist local responders by sponsoring the "Ohio Quick Clearance" program developed to train and assist response agencies with the best methods to safely and efficiently clear highway related incidents. The goal is to improve safety for responders and travelers while at the same time reducing the duration of traffic blockages to enhance environmental and economic concerns. This is supported by the Buckeye Traffic information system so motorists have the most up to date travel information possible.

Currently ODOT's efforts are focused primarily on the interstates, rural US highways, and rural SR highways. The existing system, current equipment and staffing are sufficient for most natural or

manmade events with minimal disruption to the flow of traffic. This includes debris clearance, snow and ice control along with detours and traffic control support at incident scenes. Generally the major cities and jurisdictions provide their own traffic maintenance and emergency response support for these types of events. Should ODOT be requested to provide emergency support operations inside municipalities, a significant increase in personnel and equipment would be needed. There would also be need for increased dispatch, communications and support facilities to provide direction and logistical support for this increased work force. The additional costs for the associated increase in equipment and personnel would be proportional to the increased volume of incidents that occur with greater frequency inside our major population centers.

### **Hauling Permits**

While there should not be any significant change to the current practices, for the sake of completeness, it is necessary to mention oversize/overweight vehicle permits. The Ohio Revised Code currently provides jurisdiction to the Department to issue permits within cities. Section 4513.34 ORC allows the director to issue a permit on any State Route, US Route or Interstate Route regardless of the jurisdiction of the route. Specifically, this section states:

"(B) Notwithstanding sections 715.22 and 723.01 of the Revised Code, the holder of a special permit issued by the director under this section may move the vehicle or combination of vehicles described in the special permit on any highway that is a part of the state highway system when the movement is partly within and partly without the corporate limits of a municipal corporation. No local authority shall require any other permit or license or charge any license fee or other charge against the holder of a permit for the movement of a vehicle or combination of vehicles on any highway that is a part of the state highway system."

Under this same section of Revised Code, municipalities enjoy the same authority to issue oversize-overweight permits for routes under their jurisdiction (including Interstate, U.S. and State Routes). Therefore, is it not anticipated that there would be any significant change to the current state of practice.



**Typical State Route within Village**

## CAPITAL AND OPERATIONAL CONSIDERATIONS

The infrastructure of a highway facility is comprised of many different elements such as the pavement; guardrail; barrier and retaining walls; traffic signals, signs, and pavement markings; street lighting; bridges; storm sewers and catch basins; culverts; and curbs and sidewalks. Each of these elements must be maintained to prescribed standards. Maintaining the safety of the facility through the removal of snow and ice is also a major consideration. ODOT expends significant capital and operating resources in the way of labor, materials, facilities, and equipment for system preservation to maintain the operational quality of each of these elements.

ODOT conducts maintenance and rehabilitation/reconstruction activities over highways for which ODOT currently has “primary responsibility”. Total inventory value of ODOT maintained highways, bridges, and associated infrastructure would be in the billions. Potential annual expenditures for rehabilitation and reconstruction of these assets are almost limitless; constrained primarily by available revenue. Reconstruction costs to assume primary responsibility of the additional municipal routes are not included in this report; however ODOT believes that these costs would be significant.

This section of this report attempts to calculate the additional capital and operational costs which would be incurred by ODOT for maintenance activities in assuming responsibility of these additional lane-miles routes within municipalities.

### **Pavement Rehabilitation**

For the purpose of pavement rehabilitation, the state highway system is divided into three policy systems: Priority, General and Urban. The Priority system consists primarily of Interstates and other rural, multi-lane divided highways. The General system consists primarily of rural, two-lane US and State routes. The Urban system consists of US and State routes inside municipalities with populations greater than 5000. As ODOT currently holds primary responsibility for pavement rehabilitation on Priority and General system routes, including US and State routes inside municipalities with less than 5000 population, this portion of the study looks only at the impact of taking on the added responsibility of the Urban system.

The Urban system consists of just less than 2000 centerline miles of highway. This translates into just over 6000 lane-miles. Since the year 2000, ODOT has funded the Urban Paving Program to assist cities in rehabilitating the pavement surface of these 6000 lane-miles. The Urban Paving Program is funded at \$35 million per year, divided among the ODOT districts based on their urban system mileage. Funding for urban paving is provided on an 80-20 basis with the local government responsible for 20% of the construction costs. The Urban Paving Program pays for pavement surface treatments only. Pavement replacement, curbs, utility relocation, and other non-surface items are not funded.

This study follows the Urban Paving Program model by primarily focusing on surface treatments. The treatments considered are mostly overlays with some full depth repair on more major projects. Because of the geometric constraints in urban areas of curbs, catch basins, manholes, etc., no thick overlays are included. Complete pavement replacement is also never considered due to the



complications of utilities, maintaining access to homes and businesses, and the inability to reasonably determine how many lane-miles of pavement may require replacement in a given year. Finally, the study does not consider any widening or addition of turn lanes due to the inability to predict the amount needed.

When the Urban Paving Program was initiated, the funding was intended to provide for a surface treatment on all urban pavements every 10 years. For this analysis it was assumed the 10-year cycle would continue, thus 10% of the lane-miles, or approximately 600 lane-miles, would be rehabilitated each year. In addition, the Department has a goal of treating 5% of the eligible lane-miles with preventive maintenance treatments. Eligible lane-miles means those pavements in sufficiently good condition to benefit from the preventive maintenance treatment. For this analysis it was assumed that 5% of the eligible urban system miles would receive a preventive maintenance surface treatment in addition to the 10% of lane-miles being rehabilitated.

This report considers the cost of preserving the Urban system pavements only. It does not evaluate the costs of major rehabilitation or complete replacement of these routes. Using this methodology, the annual cost to rehabilitate the urban system pavements is \$40.5 million per year. This cost is for the pavement items only such as asphalt concrete, tack coat, pavement planning, etc. It does not include other required contract items such as mobilization, maintenance of traffic, pavement markings, etc., or other roadway attributes that may be included such as curbs, sidewalks, barrier, guardrail, etc. For simple rural resurfacing projects similar to the ones considered here, the non-pavement items typically equal about 10% to 20% of the cost of the pavement items. Because of the additional complexity of urban projects, it can be conservatively estimated the non-pavement items are an additional 25%. Adding in the cost for the non-pavement items, the total cost to rehabilitate the urban system is **\$50.6 million per year**.

## **Traffic Control**

Traffic signals, school flashers, pavement markings, raised pavement markers, traffic signs, and highway lighting are traffic control items required for highway safety. The following section summarizes the additional responsibilities ODOT would incur in assuming the maintenance responsibilities of traffic safety items on State and U.S. Routes inside cities and villages.

### ***Traffic Signals and School Flashers***

ODOT's current traffic signal inventory is 1,445 traffic signals. By comparison, an additional 9,867 traffic signals are located within cities and villages on State and U.S. routes. ODOT does not have an inventory of the number of school flashers inside of villages and cities on these routes. The number of additional school flashers that would have to be maintained has been estimated at 3,040.

### ***Pavement Markings and Raised Pavement Markers***

There is no known inventory of striping and raised pavement markers (RPM's) inside villages and cities. Numerous assumptions must be made including but not limited to: type of striping material used; percentage of divided versus undivided roads; and quantity of auxiliary markings (stop bars, cross walks, transverse lines, etc.).

### ***Traffic Signs***

The cost to ODOT to maintain signs on our existing lane-miles is known to be approximately \$11.7 million annually. From this cost, the additional cost to maintain signs inside of cities and villages has been extrapolated resulting in an estimated annual cost of approximately \$2.55 million.

An additional consideration related to signs is that ODOT for many years has only used highly reflective sheeting in order to improve visibility and safety. Some cities or villages probably specified inferior/less reflective sheeting. An uncalculated cost would be the effort to identify and replace these signs.

A final consideration is that ODOT no longer uses lighting for our signs, and consequentially maintains no sign lighting. Research has shown that specific combinations of highly reflective sheeting perform better than sign lighting. Some cities will undoubtedly object to the removal of sign lighting. In addition, ODOT would need to replace the old signs with the new sheeting combinations before removing the sign lighting and this cost is not reflected in this report.

### ***Lighting***

There is no known inventory of lighting inside cities and villages. A further complication is some cities rent lighting from power companies rather than installing and maintaining their own. Maintenance of highway lighting is a category that requires numerous assumptions in order to estimate the additional maintenance costs to ODOT. These assumptions include but are not limited to: number of luminaires, average cost of power and average cost per luminaire for contract maintenance.

A major logistical consideration will be how to divide power bills for lighting systems that have some luminaires on a State or U.S Route as well as on other roads that are not. Lighting systems have been designed for many years to segregate power services based upon maintenance responsibilities. Shifting responsibility for portions of existing lighting circuits in multiple jurisdictions will make bookkeeping and billing a difficult and complex process for the power companies.

### **Bridge Maintenance, Rehabilitation and Reconstruction**

ODOT was originally responsible for the maintenance, repair, rehabilitation, and reconstruction of all bridges on Interstates and US and State Routes not located within cities and counties. In 2007, Section 5501.49 of the ORC was modified to place responsibility for “construction, reconstruction, major maintenance and repair, and operation of all bridges located on the state highway system within a municipal corporation” with ODOT. It also placed the responsibility for routine maintenance with the public entity responsible for maintaining the pavements and sidewalks on either end of the bridge. This legislation shifted major responsibility of 2,102 bridges with a total deck area of approximately 20.8 Million sq. ft. (an increase of 18%) to ODOT. ODOT is now responsible for 158 Major Bridges with a total deck area of approximately 16.3 Million sq. ft. and another 13,903 bridges with a total deck area of approximately 88.1 Million sq. ft. Therefore this report assumes no net increase in annual costs for the maintenance of bridges as a result of this inquiry.

Prior to 2007, ODOT was only responsible for the annual inspection of these bridges within cities and

counties, while the counties were responsible for the maintenance of these bridges, although maintenance was not well defined. The revisions to the ORC defined major and routine maintenance which further defined responsibilities for these bridges.

At the time this change was made, the average general appraisal for these 2,102 bridges was a 6 (scale of 0 - very poor to 9 – new). A general appraisal of 0 to 4 is considered to be deficient in ODOT's business practices for bridges. So the impact of these 2102 bridges to the Operational Performance Index (OPI) for bridge conditions was minor. In other words, these bridges were in fairly good condition at the time of transfer. Since ODOT already had inspection responsibility of these bridges, this change placed no additional resource needs on the Department's bridge inspection program. In the long term, ODOT gained the major maintenance responsibility for approximately \$3.6 billion dollars worth of assets (present day replacement costs). The change in Section 5501.49 of the ORC did not modify funding allocations at either the City, County, or State level.

If ODOT were to include routine maintenance for these bridges, as defined in the ORC, it would need to categorize them into two groups: bridges that are currently on the U.S. and State Route system, and bridges on local roadways that go over an Interstate, US, or SR system. For those bridges currently on the highway system, routine maintenance can be integrated with the pavement and general maintenance practices that would be generated by the respective offices. However, for those bridges that are on local roadways that pass over the highway system, with or without direct access, it will present a logistical concern for monitoring, maintaining, and accessing a short segment of the local system.

For this report, it is assumed that no additional annual costs will be incurred for bridge maintenance as a result of ODOT assuming responsibility of the additional city and village routes.

### **Storm Sewers**

As stated previously, culverts, storm sewers, and drainage structures located inside municipalities may or may not meet ODOT's design standards. Some of these sewers could possibly be combined sewers. In the long term, ODOT would need to evaluate each of these systems and institute an upgrade program. Cities can charge a storm water fee for all of this work, while ODOT cannot.

Drainage calculations are based upon route-miles rather than lane-miles. Assuming a two-lane highway, this results in 4650 route miles (9300/2). Approximately 25% of the routes (1162.5 miles) are located in villages. Assume these routes are uncurbed and will be drained via roadside ditches and culverts. The other 75% of routes (3487.5 miles) are located within cities. Assume these routes are curbed and drained via storm sewers.

### **Routine Maintenance and Snow & Ice Removal**

ODOT performs routine highway maintenance with its district work forces. The major maintenance functions performed include: snow & ice removal, pothole patching, full depth pavement repair, asphalt paving, sealing pavement cracks, mowing, maintaining aggregate shoulders (berms), cleaning

& re-shaping ditches, guardrail repair and replacement, and litter removal. ODOT also supplements maintenance functions through contracted work. Some maintenance work is also contracted out annually.

ODOT's Transportation Management System (TMS) tracks the Department's labor, equipment, materials, and work functions. The three-year average unit costs for the performance of maintenance work functions were generated from TMS data from Fiscal Years 2007, 2008, and 2009. Average costs were applied to the additional routes to estimate costs to maintain these additional routes,

The remainder of this section evaluates the impacts that would be incurred by ODOT forces for additional staff, materials, equipment and facilities which would be required to support this additional work at current ODOT standards.



**Typical Snow and Ice Operation**

### ***Lane-Mile Maintenance***

Maintenance performed by ODOT forces are recorded in TMS. ODOT's direct cost to maintain its 42,090 lane miles of Interstate, US, and SR routes has averaged nearly \$149.5 million per year over the last three fiscal years. This equates to an average cost per lane mile of \$3,551. Applying the same logic as above, but only including the 33,000 lane miles of US and SR Routes, ODOT's direct cost averages nearly \$119.7 million per year over the last three fiscal years. This equates to an average cost per lane mile of \$3,626.

The linear relationship to maintain the additional 9,343 lane miles of US and SR routes within Cities and Villages would cost on average \$33.9 million per year. However, detailed calculations show that a linear relationship is not accurate. Average costs per lane mile were significantly higher for city routes than for village routes (due to curbs, sidewalks, storm sewers, etc.).

### ***Snow & Ice Control***

Snow removal and disposal from urban areas will require ODOT to obtain equipment types suitable to meet the urban highway characteristics. Examples include: disposal of the snow, curbs, storm sewers, parking stalls, overhead obstructions, sidewalks and ADA ramps, intersecting side streets, etc.

ODOT provides Snow & Ice control, per Consent Ordinance for the majority of Villages in Ohio. Nearly all of these lane miles are high speed roadways. This allows our snow plow trucks to travel at an average speed of 35 mph. Additionally, these roadways have roadway shoulders wide enough to accommodate the displaced snow plowed from the travel lanes.

Review of the Snow & Ice control activity costs for the 33,000 lane miles of ODOT maintained U.S. and State Routes were used to determine the additional costs for the 6,988 lane miles within cities. The overall average cost per lane mile is \$1,599 for the 33,000 lane miles. The overall average cost per lane mile within the cities is \$3,052. These figures do not include adjustments for slower speeds, various overhead obstructions, parking stalls, disposal of snow, etc. The cost does include material costs which includes the purchase of salt. This cost is strictly for the snow and ice control of the additional 6,988 lane miles.

### ***Pavement Maintenance***

Review of specific pavement related activity costs, such as pothole patching, filling and sealing cracks, and repairing curbs and/or gutters, were used to determine the additional costs within the cities and villages. The overall average cost per lane mile with the cities and villages is estimated at approximately \$475 annually.



### **Typical Pavement Maintenance Operation**

#### ***Pavement Marking Maintenance***

Review of specific pavement marking related activity costs, such as maintenance of centerline markings, auxiliary markings, pavement marking removal, etc., were used to determine the additional costs within the cities and villages. The overall average cost per lane mile within the cities and villages is estimated at approximately \$46.

#### ***Sign Maintenance***

Review of specific sign related activity costs, such as inspection, maintenance of signs, delineator maintenance, overhead sign support maintenance, etc., were used to determine the additional costs within the cities and villages. The overall average cost per lane mile within the cities and villages is estimated at approximately \$141.

#### ***Miscellaneous Maintenance Activities***

Review of several additional maintenance activity costs were also considered to determine the additional costs within the cities and villages. The activities generated an overall average cost of \$1,375 per lane mile. The overall average cost per lane mile within the cities and villages is estimated at approximately \$1,410.

### **Additional Payroll Costs**

As mentioned in each of the previous sections, ODOT would require additional staff to perform planning, engineering, and maintenance tasks for these additional lane-miles of routes at our current level of service.

ODOT averages 35 lane miles per snow route. This requires 1203 snow plow drivers per shift. Factoring in the lower speed, intersections, overhead signals, street parking, snow removal, and other incidentals, the average route length would need to be reduced to 20 miles to maintain acceptable cycle times. This equates to a total of 349 additional snow routes, 380 snow plow trucks, and 589 additional snow plow drivers. The average hourly rate for an entry level snow plow driver is \$18.03 which multiplies out to \$22.1 million annually.

Similarly, additional planning and engineering staff will be required to monitor, plan and design maintenance projects for these additional routes. The following two tables provide an estimate of additional payroll costs to maintain these additional routes.

#### **Estimated Personnel for Snow & Ice Control**

<b>ODOT</b>		<b>CITIES</b>
42,090	Lane Miles	6,988
2,027	Snow Plow Drivers	589
35	Miles Per Route	20
1,203	Drivers Per Shift (# of Routes)	349
1,700	Snow Plow Trucks	380
255	Mechanics and Technicians	55
7	Trucks per Mechanic	7

#### **Additional Annual Payroll**

Employee Category	# Employees	Salary	Total Costs
Snow Plow Drivers	589	\$37,500/year	\$22,088,000
Auto Mechanic/Technician	55	\$42,000/year	\$2,310,000
Planners/Engineers	100	\$60,000/year	\$6,000,000
<b>Total</b>	<b>744</b>		<b>\$30,400,000</b>

### **One-time Costs for Facilities and Equipment**

Initial start-up costs would be incurred for purchase of additional equipment (plows, trucks, etc.) and facilities (to house staff and equipment).

Currently, ODOT utilizes 1,700 snow plow trucks and 228 salt storage facilities to maintain the 42,090 lane miles. The additional 6,988 lane miles will require 380 additional snow plow trucks, 101 pieces of specialized snow and ice equipment, and 45 storage facilities.

ODOT's salt storage capacity statewide is 621,000 tons. The additional 6,988 lane miles will require an additional 103,000 tons of salt annually which will necessitate an additional 45 storage facilities. The average cost of a storage facility is \$180,000 which would equate to a total of \$8.1 million. The average cost of a single axle snow plow truck is \$125,000 which multiplies out to \$47.5 million. The average cost of specialized equipment is \$30,000 which multiplies out to \$3 million.

The following tables calculate the initial start-up costs for facilities and equipment. These estimated costs are not tabulated in the additional annual costs summarized in the following section.

#### **Estimated Additional Storage Facilities for Salt**

% increase in County Lane Miles			Counties	Additional Storage Units per County Lane Miles	Total Storage Units
0%	< LM <=	10%	59	0	0
10%	< LM <=	33.33%	20	1	20
33.33%	< LM <=	66.66%	4	2	8
66.66%	< LM <=	100%	4	3	12
100%	< LM <=	133.33%	0	4	0
133.33%	< LM <=	166.66%	1	5	5

#### **Estimated Assets for Initial Startup of Maintenance**

ASSET	Quantity	Direct Cost	Total Cost
Salt Storage Units	45	\$180,000	\$8,100,000
Snow Plow Trucks	380	\$125,000	\$47,500,000
Specialized Equipment	101	\$30,000	\$3,030,000
			<b>\$58,630,000</b>



**Summary of**  
**Additional Annual Maintenance Costs**  
**And Initial Start Up Costs**

CATEGORY	ADDITIONAL ANNUAL COSTS*
Urban Paving	\$50.6 million **
Traffic Controls	\$79.7 million
Storm Sewers	\$159.0 million
Routine Maintenance and Snow & Ice Removal by ODOT	\$40.7 million
Contracted Maintenance	\$42.6 million
Additional Payroll	\$30.4 million
Bridge Maintenance	\$0.0 million
<b><i>Total Annual Costs</i></b>	<b><i>\$422.4 million</i></b>
<b><i>Total Cost of Initial Start Up</i></b>	<b><i>\$58.6 million</i></b>

\* NOTE: For detailed information on calculation of cost estimates, please see appendices.

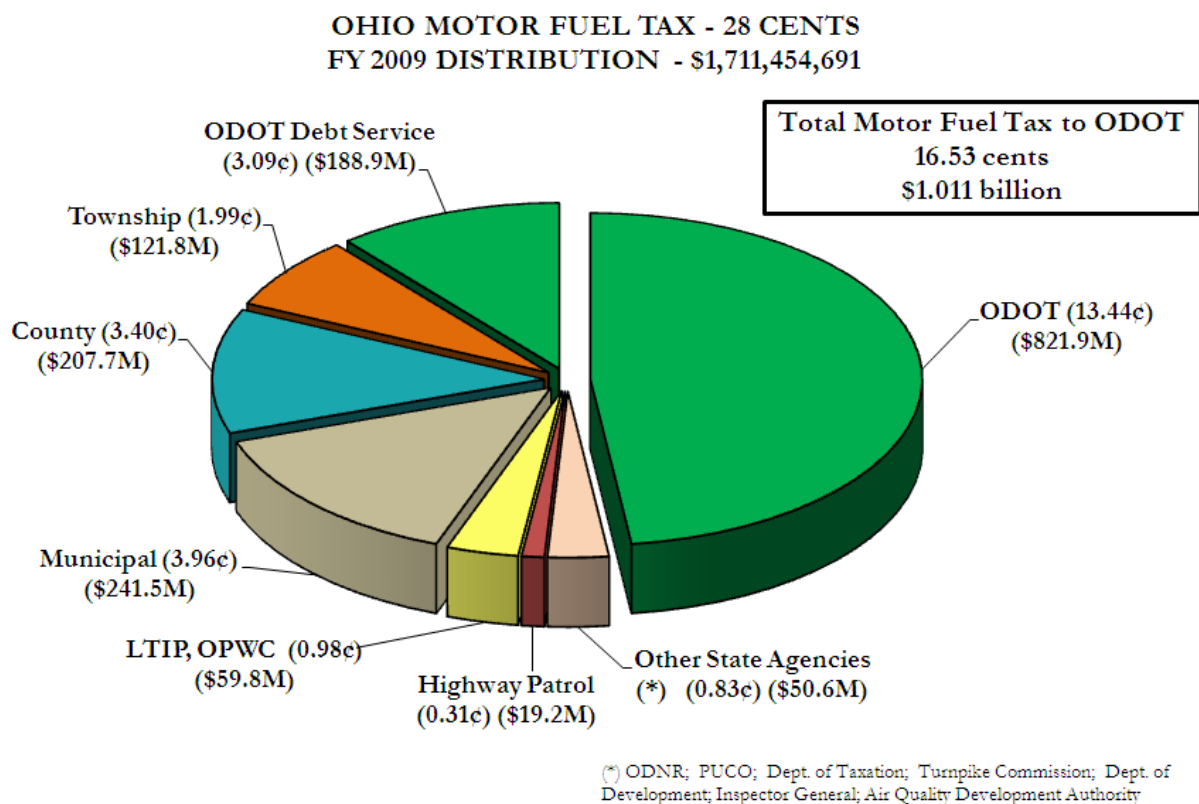
\*\* NOTE: Includes \$35 million for existing Urban Paving Program.

## FUNDING CONSIDERATIONS

Ohio has two primary funding sources for the maintenance and construction of roads and bridges, which are state and federal revenues. The primary source of Ohio's state funding is derived through the Ohio Motor Fuel Tax (State Gas Tax). The tax currently stands at 28¢/gallon generating approximately \$1.7 Billion in 2009. The primary source of Ohio's federal funding is derived through the Federal Excise Tax. The tax currently stands at 18.4¢/gallon for gasoline and 24.4¢/gallon for diesel generating approximately \$1.3 Billion for Ohio in 2009.

### State Motor Fuel Tax Revenue

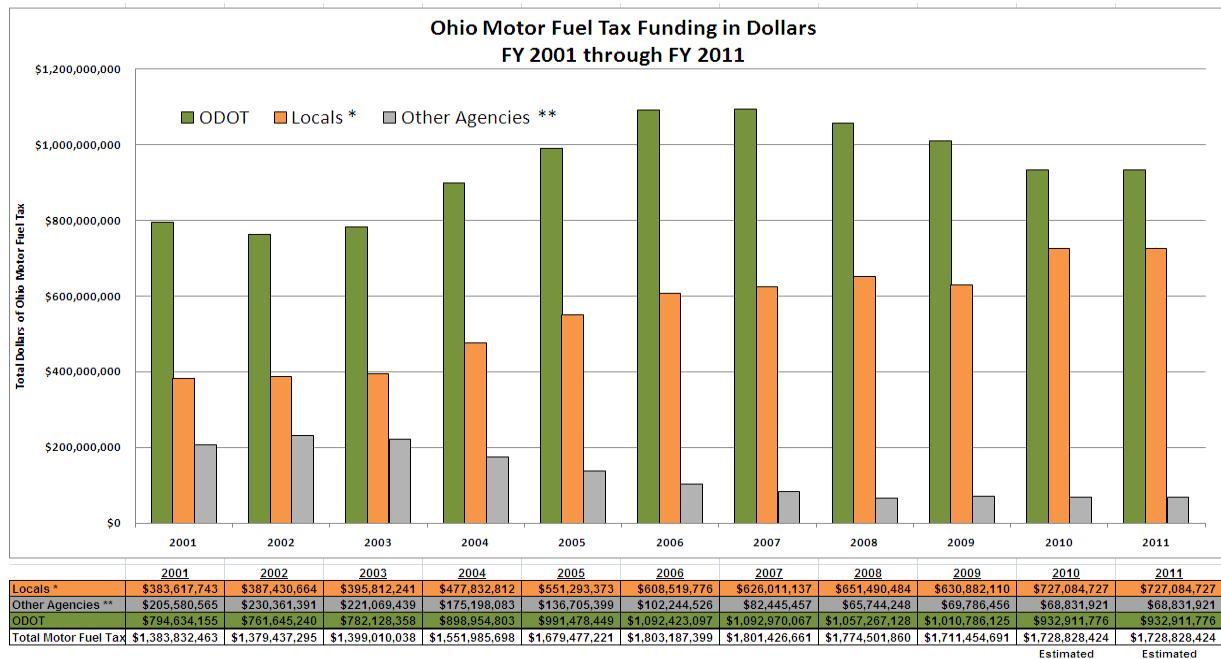
To date, the State Motor Fuel Tax has been the primary funding source for building and preserving Ohio's infrastructure both at the State and Local levels. Of the \$1.7 Billion generated, ODOT dedicated approximately \$822 Million (equivalent of 13.4¢/gallon) for Capital and Operating programs and another \$189 Million (equivalent of 3.1¢/gallon) for state bond debt service. The majority of the remainder of the gas tax revenues is distributed directly to local governments (\$571 Million shared amongst county, municipal and township governments). The chart below depicts the distribution of the \$1.7 billion State Motor Fuel revenue in Ohio for fiscal year 2009.



The State Motor Tax had stood at 22¢/gallon. In the 2004/2005 Transportation Budget, the Ohio Legislature passed an additional six cent state gas tax increase, to be phased in over the next three years ( two cents per year) taking it from 22 cents to 28 cents by 2006. In addition, the Highway

Patrol was to be phased off the state motor fuel tax over the next five years and these revenues were to be dedicated solely to the local governments for maintaining their existing infrastructure.

Overall, the state motor fuel tax revenues allocated to local governments have grown from \$384 million in FY 2001 to an estimated \$727 million in FY 2011. **To date the local governments have seen an 89% increase in funding since 2001. The Department's increase in state motor fuel revenue has grown from \$795 million in FY 2001 to \$933 million in FY 2011, for a 17% increase over the past 11 years.** The chart below reflects the motor fuel tax trend distribution over the past eleven years.



\* Local Governments Share Includes: Municipalities, Townships, Counties, LTIP and OPWC.

\*\* Other State Agencies Share Includes: Ohio Turnpike Commission, PUCO, Department of Taxation, ODNR, Department of Public Safety, Department of Development, Inspector General.

## **Federal Funding**

ODOT receives Federal funding from the Highway Trust Fund as authorized by the current Surface Transportation Act. The Highway Trust Fund is funded through the Federal Excise Tax. Ohio received approximately \$1.3 Billion in 2009 for Capital Programs.

## **Other Revenue**

ODOT receives funding through the issuance of two types of bonds – one retired through state funds and one retired through Federal funds. ODOT budgeted approximately \$383 Million from the issuance of bonds in 2009.

ODOT generates an additional amount of revenue (\$146 Million in 2009) from Special Hauling Permits, truck registration fees, Logos (advertising sign program), etc. ODOT also carries forward

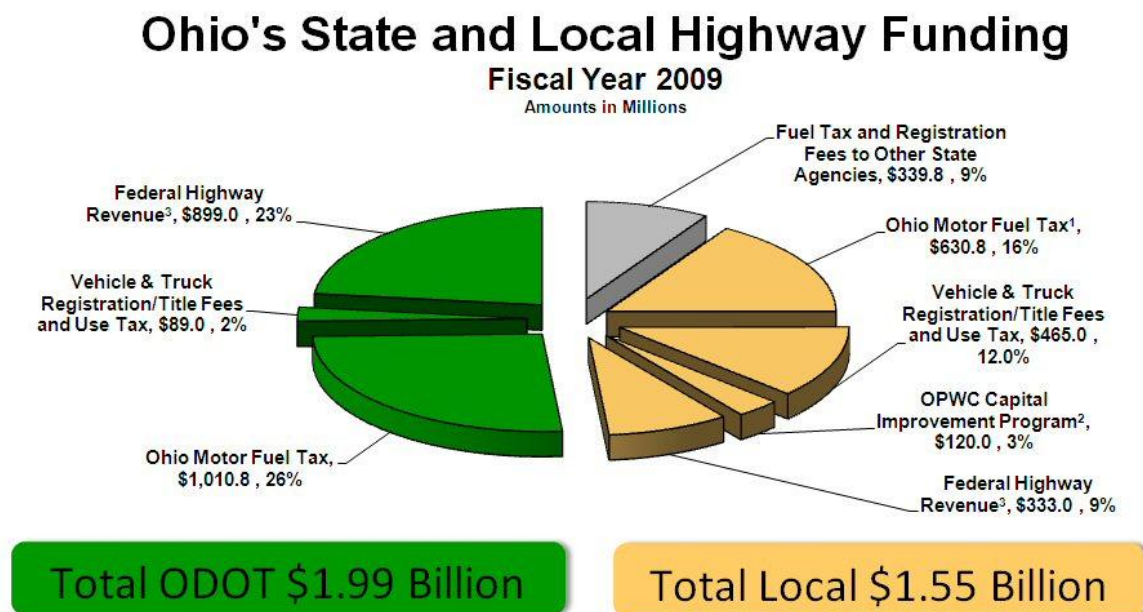
approximately \$144 Million from prior year savings for a grand total of approximately \$2.7 Billion in revenues for Capital and Operating Programs in 2009.

## State and Federal Highway Funding Distribution

In order to understand the full highway funding picture for both the state and local governments, it is important to demonstrate how much of the total highway funding is distributed to each.

In addition to revenue from the State Motor Fuel Tax, local governments receive annual funding from state vehicle and truck registration fees and title fees. In fiscal year 2009 they received \$465 million. In addition, the Department sets aside approximately \$333 million in federal highway funds for local preservation needs.

The graph below gives an overview of how total state and federal highway funding is distributed between local governments, ODOT and other state agencies.



<sup>1</sup> Local Government amount for Ohio Motor Fuel Tax includes approximately \$60 million from the 1¢ per gallon that goes to the OPWC for the LTIP program. Note that in Fiscal Years 2010 and 2011, the LTIP program will receive an additional \$100 million each year on top of the \$60 million already dedicated to the program.

<sup>2</sup> The OPWC Capital Improvement Bond Program provides funding for local infrastructure projects related to Water and Sewer as well as Roads and Bridges. OPWC indicates that historically about 1/2 of the program funding is used for Road and Bridge projects. The Capital Improvement Bond program is typically funded at \$120 million in total each year, however due to Ohio's own economic stimulus initiative, the program funding was doubled in Fiscal Years 2008 and 2009.

<sup>3</sup> There was \$118 million in FHWA funding in FY 2009 associated with SAFETEA-LU High Priority (HP) or earmarks and Appropriation Bill earmarks which were excluded from this analysis. The rationale behind excluding them is that the funds can fund projects that are supported by both the local as well as ODOT. For the Federal Highway Revenue to locals, ODOT is only required to pass through about \$80 million, the remaining balance of the \$333 million, which is \$253 million, is discretionary on the state's part.

## **Funding Impacts**

The Department continues to face its own funding challenges with respect to preservation of our existing assets and the continued demand on our major new construction program. ODOT has met this challenge through various means. Staffing levels have been streamlined to record lows; while we have held our operating budgets at 95% below 2008 levels through fiscal year 2011. These savings are being redirected to our major new construction program.

ODOT would be faced with critical funding concerns should the additional lane-miles become our responsibility without additional funding. ODOT has estimated an initial startup cost of nearly \$59 million. In addition, ODOT has estimated an annual cost of \$422 million to assume these additional lane-miles. The increased cost to maintain and preserve these additional routes will require an increase in both our Operating (payroll and maintenance operations) and Capital programs.

ODOT would look to have the state gas tax shifted from the local governments to the Department to fund both the operating and capital expenses derived from taking over the additional lane-miles. If funding were not shifted, the Department would be faced with very tough decisions, such as a reduction in level of service, elimination all discretionary funding to local governments, and possibly elimination or reduction of our Major New Construction Program.

## CONCLUSION

Since the inception of the State highway system, the responsibility for designing, maintaining and constructing Ohio's bridges and roads has been a partnership between the State and local governments. If Ohio were to alter the balance of this long-standing partnership by shifting primary responsibilities for all municipal routes to ODOT, numerous constitutional, legal and fiscal concerns would need to be carefully considered to determine what impact this policy decision would have on the State, local governments and to the public.

Ohio has a long tradition of upholding the importance of local control. The legislature and Ohio Supreme Court have been very careful to weigh whether new laws conflict with the "Home Rule" provision of the Ohio Constitution. While the powers granted to local governments to act on matters of local concern obviously extend well beyond the scope of this report, requiring ODOT to undertake responsibility for all routes within municipalities may be in conflict with the Home Rule provision. The department would not be supportive of policies that either threaten or are in direct conflict with the constitutional or statutory authorities granted to Ohio's local governments.

Removing local jurisdiction from the upkeep of municipal routes may also result in substantial increases in legal challenges to ODOT. Municipalities enjoy a separate and distinct protection in law for incidents that occur on roads under their jurisdiction while ODOT does not enjoy the same protections as political subdivisions. Assuming responsibilities for routes over which it has not previously had design or maintenance control would place ODOT at a distinct disadvantage in the likelihood of any legal challenge. For example, as a result of the myriad of local ordinances, traffic design and standards often vary by municipality and may not be in compliance with ODOT's design standards. If ODOT were to assume responsibility for all municipal routes, these inconsistencies could pose a significant legal liability for the State since the legal litmus test begins with whether design standards were followed and whether the responsible entity used sound engineering judgment.

In order to place the state on better legal footing, ODOT would be forced to bring every roadway element into compliance with its design standards. This would need to include updating all signage, pavement markings, school flashers, speed limits, and traffic signals to ensure compliance. The capital costs associated with these upgrades are unknown; however, it would be imperative that all municipal routes meet ODOT's strict design standards otherwise the department could be at risk for significant litigation costs. Without necessary resources to bring all local design elements in line with ODOT's standards, the department would not be able to assume responsibility of such municipal routes.

Since maintenance of the roads are vital to meeting the needs of a region, it is equally important to weigh how community expectations would be impacted if the State were to assume control of all municipal routes. The public has deservedly come to expect certain responses from their local officials on road maintenance such as repairs, mowing and snow removal. While ODOT is currently responsible for such maintenance on state routes outside of a municipality, local governments maintain control over rehabilitation and snow removal along their roads. Along with this control are expectations from the public toward the manner and timeframe of when roads are plowed, when streets are repaired, and other maintenance issues that are unique to their respective community. ODOT feels that the local officials are in the best position to be responsive to the local demands.

Shifting responsibility of all municipal routes to ODOT would also pose substantial financial obstacles. Eroding revenues, coupled with increased programmatic demands and inflationary pressures, has forced ODOT to take a critical review of how best to allocate the State's limited transportation resources in order to preserve our existing assets and invest in necessary infrastructure upgrades. In order to meet today's fiscal challenges, ODOT's top priority has been to streamline operations so that any cost-savings can be redirected toward Ohio's major new construction or maintenance programs. As a result of this focus, ODOT's operating expenses are 95% of FY 2008 levels, with staffing levels at its lowest point in years all while ODOT's construction program reached a historic \$2 billion in FY10. By maximizing efficiencies, ODOT is able to free-up more resources to develop or upgrade Ohio's transportation assets.

Shifting responsibility of municipal routes to ODOT would further exacerbate the financial challenges facing the department. In order to maintain the safety of our roads and bridges, the State would need to allocate additional moneys for maintenance for such routes – whether from new or existing revenue sources. Without additional resources, the department's other highway programs would be placed in serious jeopardy. A reduction in the level of services, elimination of all discretionary spending to local governments and reductions or elimination of major new construction would likely be needed to meet the new demands. ODOT's current efforts to maintain adequate pavement conditions would have to be severely reduced to offset the increase in responsibilities for municipal routes.

In order to avoid such program reductions, policymakers would be required to find and provide additional revenues to ODOT. Under the State's current funding mechanisms, this could only be accomplished by either re-directing state motor fuel tax revenues currently dedicated for local municipalities to ODOT or by increasing the state motor fuel tax and dedicating the additional revenue to ODOT only.

Any newly dedicated revenues would likely just cover the department's on-going operating and capital expenses as a result of the expanded municipal route responsibilities. For example, the added responsibilities would require ODOT to hire more full-time employees which would in turn increase the department's payroll considerably.

Further consideration would also need to be made for the significant one-time costs that the State would need to incur. The purchase of additional equipment such as snow plows and trucks, new facilities, upgrades to existing structures and roadways to bring into compliance with ODOT design standards, and infrastructure improvements are just some of the one-time expenses that would be incurred.

Without identifying new, stable funding streams, shifting responsibility for maintenance and repair of municipal routes to ODOT is simply not feasible. If policymakers decided not to provide any new funding, such a move would jeopardize the core mission of the department; this is an outcome which ODOT could not support.

None of these conclusions are meant to ignore the many challenges that our local governments are also facing. During these difficult times, the department recognizes that all levels of government are

trying to do more with less. However, from the State's perspective, ODOT believes absorbing control on municipal routes is simply not feasible considering the current fiscal reality.

As stewards of Ohio's transportation system, ODOT is committed to working with our local government and private partners as we build a safer transportation system. We all share in the same goal of creating a transportation system that spurs economic development and job creation, revitalizes our cities and towns and enhances the resources that are unique to Ohio. The current state-local partnership in building and maintaining our roadways helped lay the foundation to make Ohio one of the transportation and logistical leaders in the country. ODOT believes that this very partnership is critical to creating a modern transportation system that will drive economic growth, provide safe and effective connectivity, enhance our communities and improve the lives for every Ohioan.



# **APPENDICIES**

**APPENDIX A – OHIO REVISED CODE REFERENCES**

**APPENDIX B – PAVEMENT COST CALCULATIONS**

**APPENDIX C – TRAFFIC RELATED COST CALCULATIONS**

**APPENDIX D – STORM SEWER COST CALCULATIONS**

**APPENDIX E – ROUTINE MAINTENANCE AND SNOW & ICE CALCULATIONS**

**APPENDIX F – ADDITIONAL COSTS FOR LABOR, FACILITIES AND EQUIPMENT**

**APPENDIX G – TABULATION OF ROUTES BY COUNTY**

## **Appendix A – Ohio Revised Code References**

### **4513.34 Written Permits for Oversized Vehicles.**

(A) The director of transportation with respect to all highways that are a part of the state highway system and local authorities with respect to highways under their jurisdiction, upon application in writing and for good cause shown, may issue a special permit in writing authorizing the applicant to operate or move a vehicle or combination of vehicles of a size or weight of vehicle or load exceeding the maximum specified in sections 5577.01 to 5577.09 of the Revised Code, or otherwise not in conformity with sections 4513.01 to 4513.37 of the Revised Code, upon any highway under the jurisdiction of the authority granting the permit.

For purposes of this section, the director may designate certain state highways or portions of state highways as special economic development highways. If an application submitted to the director under this section involves travel of a nonconforming vehicle or combination of vehicles upon a special economic development highway, the director, in determining whether good cause has been shown that issuance of a permit is justified, shall consider the effect the travel of the vehicle or combination of vehicles will have on the economic development in the area in which the designated highway or portion of highway is located.

(B) Notwithstanding sections 715.22 and 723.01 of the Revised Code, the holder of a special permit issued by the director under this section may move the vehicle or combination of vehicles described in the special permit on any highway that is a part of the state highway system when the movement is partly within and partly without the corporate limits of a municipal corporation. No local authority shall require any other permit or license or charge any license fee or other charge against the holder of a permit for the movement of a vehicle or combination of vehicles on any highway that is a part of the state highway system. The director shall not require the holder of a permit issued by a local authority to obtain a special permit for the movement of vehicles or combination of vehicles on highways within the jurisdiction of the local authority. Permits may be issued for any period of time not to exceed one year, as the director in the director's discretion or a local authority in its discretion determines advisable, or for the duration of any public construction project.

(C) The application for a permit shall be in the form that the director or local authority prescribes. The director or local authority may prescribe a permit fee to be imposed and collected when any permit described in this section is issued. The permit fee may be in an amount sufficient to reimburse the director or local authority for the administrative costs incurred in issuing the permit, and also to cover the cost of the normal and expected damage caused to the roadway or a street or highway structure as the result of the operation of the nonconforming vehicle or combination of vehicles. The director, in accordance with Chapter 119. of the Revised Code, shall establish a schedule of fees for permits issued by the director under this section.

For the purposes of this section and of rules adopted by the director under this section, milk transported in bulk by vehicle is deemed a nondivisible load.

(D) The director or local authority may issue or withhold a permit. If a permit is to be issued, the director or local authority may limit or prescribe conditions of operation for the vehicle and may require the posting of a bond or other security conditioned upon the sufficiency of the permit fee to compensate for damage caused to the roadway or a street or highway structure. In addition, a local authority, as a condition of issuance of an overweight permit, may require the applicant to develop and enter into a mutual agreement with the local authority to compensate for or to repair excess damage caused to the roadway by travel under the permit.

For a permit that will allow travel of a nonconforming vehicle or combination of vehicles on a special economic development highway, the director, as a condition of issuance, may require the applicant to agree to make periodic payments to the department to compensate for damage caused to the roadway by travel under the permit.

(E) Every permit shall be carried in the vehicle or combination of vehicles to which it refers and shall be open to inspection by any police officer or authorized agent of any authority granting the permit. No person shall violate any of the terms of a permit.

(F) The director may debar an applicant from applying for a special permit under this section upon a finding based on a reasonable belief that the applicant has done any of the following:

(1) Abused the process by repeatedly submitting false information or false travel plans or by using another company or individual's name, insurance, or escrow account without proper authorization;

(2) Failed to comply with or substantially perform under a previously issued special permit according to its terms, conditions, and specifications within specified time limits;

(3) Failed to cooperate in the application process for the special permit or in any other procedures that are related to the issuance of the special permit by refusing to provide information or documents required in a permit or by failing to respond to and correct matters related to the special permit;

(4) Accumulated repeated justified complaints regarding performance under a special permit that was previously issued to the applicant or previously failed to obtain a special permit when such a permit was required;

(5) Attempted to influence a public employee to breach ethical conduct standards;

(6) Been convicted of a criminal offense related to the application for, or performance under, a special permit, including, but not limited to, bribery, falsification, fraud or destruction of records, receiving stolen property, and any other offense that directly reflects on the applicant's integrity or commercial driver's license;

(7) Accumulated repeated convictions under a state or federal safety law governing commercial motor vehicles or a rule or regulation adopted under such a law;

(8) Accumulated repeated convictions under a law, rule, or regulation governing the movement of traffic over the public streets and highways;

(9) Failed to pay any fees associated with any permitted operation or move;

(10) Deliberately or willfully submitted false or misleading information in connection with the application for, or performance under, a special permit issued under this section.

If the applicant is a partnership, association, or corporation, the director also may debar from consideration for special permits any partner of the partnership, or the officers, directors, or employees of the association or corporation being debarred.

The director may adopt rules in accordance with Chapter 119. of the Revised Code governing the debarment of an applicant.

(G) When the director reasonably believes that grounds for debarment exist, the director shall send the person that is subject to debarment a notice of the proposed debarment. A notice of proposed debarment shall indicate the grounds for the debarment of the person and the procedure for requesting a hearing. The notice and hearing shall be in accordance with Chapter 119. of the Revised Code. If the person does not respond with a request for a hearing in the manner specified in that chapter, the director shall issue the debarment decision without a hearing and shall notify the person of the decision by certified mail, return receipt requested. The debarment period may be of any length determined by the director, and the director may modify or rescind the debarment at any time. During the period of debarment, the director shall not issue, or consider issuing, a special permit to any partnership, association, or corporation that is affiliated with a debarred person. After the debarment period expires, the person, and any partnership, association, or corporation affiliated with the person, may reapply for a special permit.

(H) Whoever violates this section shall be punished as provided in section 4513.99 of the Revised Code.

Effective Date: 01-01-2004; 03-29-2005; 2009 HB2 07-01-2009

### **5501.31 Director of transportation - powers and duties.**

The director of transportation shall have general supervision of all roads comprising the state highway system. The director may alter, widen, straighten, realign, relocate, establish, construct, reconstruct, improve, maintain, repair, and preserve any road or highway on the state highway system, and, in connection therewith, relocate, alter, widen, deepen, clean out, or straighten the channel of any watercourse as the director considers necessary, and purchase or appropriate property for the disposal of surplus materials or borrow pits, and, where an established road has been relocated, establish, construct, and maintain such connecting roads between the old and new location as will provide reasonable access thereto.

The director may purchase or appropriate property necessary for the location or construction of any culvert, bridge, or viaduct, or the approaches thereto, including any property needed to extend, widen, or alter any feeder or outlet road, street, or way adjacent to or under the bridge or viaduct when the

extension, widening, or alteration of the feeder road, street, or way is necessary for the full utilization of the bridge or viaduct, or for any other highway improvement. The director may purchase or appropriate, for such length of time as is necessary and desirable, any additional property required for the construction and maintenance of slopes, detour roads, sewers, roadside parks, rest areas, recreational park areas, park and ride facilities, and park and carpool or vanpool facilities, scenic view areas, drainage systems, or land to replace wetlands, incident to any highway improvement, that the director is or may be authorized to locate or construct. Also incident to any authorized highway improvement, the director may purchase property from a willing seller as required for the construction and maintenance of bikeways and bicycle paths or to replace, preserve, or conserve any environmental resource if the replacement, preservation, or conservation is required by state or federal law.

Title to property purchased or appropriated by the director shall be taken in the name of the state either in fee simple or in any lesser estate or interest that the director considers necessary or proper, in accordance with forms to be prescribed by the attorney general. The deed shall contain a description of the property and be recorded in the county where the property is situated and, when recorded, shall be kept on file in the department of transportation. The property may be described by metes and bounds or by the department of transportation parcel number as shown on a right of way plan recorded in the county where the property is located.

Provided that when property, other than property used by a railroad for operating purposes, is acquired in connection with improvements involving projects affecting railroads wherein the department is obligated to acquire property under grade separation statutes, or on other improvements wherein the department is obligated to acquire lands under agreements with railroads, or with a public utility, political subdivision, public corporation, or private corporation owning transportation facilities for the readjustment, relocation, or improvement of their facilities, a fee simple title or an easement may be acquired by purchase or appropriation in the name of the railroad, public utility, political subdivision, public corporation, or private corporation in the discretion of the director. When the title to lands, which are required to adjust, relocate, or improve such facilities pursuant to agreements with the director, is taken in the name of the state, then, in the discretion of the director, the title to such lands may be conveyed to the railroad, public utility, political subdivision, or public corporation for which they were acquired. The conveyance shall be prepared by the attorney general and executed by the governor and bear the great seal of the state of Ohio.

The director, in the maintenance or repair of state highways, is not limited to the use of the materials with which the highways, including the bridges and culverts thereon, were originally constructed, but may use any material that is proper or suitable. The director may aid any board of county commissioners in establishing, creating, and repairing suitable systems of drainage for all highways within the jurisdiction or control of the board and advise with it as to the establishment, construction, improvement, maintenance, and repair of the highways.

Chapters 5501., 5503., 5511., 5513., 5515., 5516., 5517., 5519., 5521., 5523., 5525., 5527., 5528., 5529., 5531., 5533., and 5535. of the Revised Code do not prohibit the federal government, or any individual or corporation, from contributing a portion of the cost of the establishment, construction, reconstruction, relocating, widening, resurfacing, maintenance, and repair of the highways.

Except in the case of maintaining, repairing, erecting traffic signs on, or pavement marking of state highways within villages, which is mandatory as required by section 5521.01 of the Revised Code, and except as provided in section 5501.49 of the Revised Code, no duty of constructing, reconstructing, widening, resurfacing, maintaining, or repairing state highways within municipal corporations, or the culverts thereon, shall attach to or rest upon the director, but the director may construct, reconstruct, widen, resurface, maintain, and repair the same with or without the cooperation of any municipal corporation, or with or without the cooperation of boards of county commissioners upon each municipal corporation consenting thereto.

Effective Date: 06-29-2001; 2007 HB67 07-03-2007

#### **5501.41 Removal of Snow and Ice.**

The director of transportation may remove snow and ice from state highways, purchase the necessary equipment including snow fences, employ the necessary labor, and make all contracts necessary to enable such removal. The director may remove snow and ice from the state highways within municipal corporations, but before doing so he must obtain the consent of the legislative authority of such municipal corporation. The board of county commissioners of county highways, and the board of township trustees on township road, shall have the same authority to purchase equipment for the removal of and to remove snow and ice as the director has on the state highway system.

Effective Date: 09-28-1973

#### **5501.47 Bridge Inspections.**

(A) The director of transportation is responsible for inspection of all bridges on the state highway system inside and outside of municipalities, all bridges connecting Ohio with another state for which the department of transportation has inspection authority, and all other bridges or portions of bridges for which responsibility for inspection is by law or agreement assigned to the department.

Such inspection shall be made annually by a professional engineer or other qualified person under the supervision of a professional engineer, or more frequently if required by the director, in accordance with the manual of bridge inspection described in division (B) of this section.

The director shall cause to be maintained in each district of the department an updated inventory of all bridges within such district that are on the state highway system, including those located within municipalities, and all other bridges for which the department has responsibility for inspection. The inventory record shall indicate who is responsible for inspection and for maintenance, and the authority for such responsibilities.

On those bridges where there exists joint maintenance responsibility, the director shall furnish a copy of reports to each party responsible for a share of maintenance.

“Maintenance” as used in this division means actual performance of maintenance work.

(B)(1) As used in this division:

(a) “Inspection” means the inspection described in the manual of bridge inspection adopted by the department.

(b) “Highway” means those highway systems in section 5535.01 of the Revised Code, highways, streets, and roads within municipalities, and any other highway, street, and road on which the public travels.

(c) “Bridge” means any structure of ten feet or more clear span or ten feet or more in diameter on, above, or below a highway, including structures upon which railroad locomotives or cars may travel.

(2) The director shall have general responsibility for initiating, developing, and maintaining procedures and practices that provide for and promote professional inspection of bridges. The director shall:

(a) Prepare, maintain, and update a manual of bridge inspection that will provide standards applicable to the inspection of all bridges on, above, or below highways. The manual shall include, but is not limited to, standards relating to frequency of inspection, qualifications of persons inspecting or supervising inspections, procedures and practices facilitating professional inspection of bridges;

(b) Develop and furnish inspection forms and other forms relating to inspection, and approve forms used in lieu of the departmental forms;

(c) Assist and cooperate with governmental units, upon request, with inspection, disseminate information to appropriate governmental officials and agencies with regard to responsibility and inspection practices, and confer with public officials and other individuals on inspection of bridges; such assistance may be in the form of contracts with counties or municipal corporations for transportation department inspection services;

(d) Inspect any bridge on a highway, with a designated representative of the owner, where he has reason to believe that the report of inspection does not reflect the condition of such bridge or that the inspection did not accord with the standards contained in the manual of bridge inspection.

Effective Date: 09-28-1973

#### **5501.49 Lift Bridge Inspection.**

(A) The director of transportation is responsible for the construction, reconstruction, major maintenance and repair, and operation of all bridges located on the state highway system within a municipal corporation. The public entity responsible for maintaining the pavements and sidewalks on either end of the bridge is responsible for the routine maintenance of all bridges located on the state

highway system within the municipal corporation.

(B) The director may enter into an agreement with the legislative authority of a municipal corporation or a county, upon mutually agreeable terms, for the municipal corporation or county to operate and perform major maintenance and repair on any bridge located on the state highway system within the municipal corporation or county.

(C) The director is not required to obtain the consent of a municipal corporation prior to the performance of any major bridge maintenance and repair. Except in an emergency, the director shall give a municipal corporation reasonable notice prior to the performance of any work that will affect the flow of traffic. No utilities, signs, or other appurtenances shall be attached to a bridge without the prior written consent of the director.

(D) As used in this section:

(1) Major and routine maintenance and repair relates to all elements of a bridge, including abutments, wingwalls, and headwalls but excluding approach fill and approach slab, and appurtenances thereto.

(2) "Major maintenance" includes the painting of a bridge, and the repair of deteriorated or damaged elements of bridge decks, including emergency patching of bridge decks, to restore the structural integrity of a bridge.

(3) "Routine maintenance" includes without limitation, clearing debris from the deck, sweeping, snow and ice removal, minor wearing surface patching, cleaning bridge drainage systems, marking decks for traffic control, minor and emergency repairs to railing and appurtenances, emergency patching of deck, and maintenance of traffic signal and lighting systems, including the supply of electrical power.

(4) "Operation" relates solely to lift bridges and to those expenses that are necessary for the routine, daily operation of a lift bridge, such as payroll, workers' compensation and retirement payments, and the cost of utilities.

Effective Date: 06-30-1991; 2007 HB67 07-03-2007

#### **5521.01 Establishment and Improvement of State Highways within Municipal Corporation.**

The director of transportation, upon the request by and the approval of the legislative authority of a village, shall maintain, repair, and apply standard longitudinal pavement marking lines as the director considers appropriate, or may establish, construct, reconstruct, improve, or widen any section of a state highway within the limits of a village. The director also may erect regulatory and warning signs, as defined in the manual adopted under section 4511.09 of the Revised Code, on any section of a state highway within the limits of a village. The director may establish, construct, reconstruct, improve, widen, maintain, or repair any section of state highway within the limits of a city, including the elimination of railway grade crossings, and pay the entire or any part of the cost and expense



thereof from state funds, but in all cases the director first shall obtain the consent of the legislative authority of the municipal corporation, except that the director need not obtain the consent of the municipal corporation if the existing highway being changed or the location of an additional highway being established was not within the corporate limits of the municipal corporation at the time the director determines the establishment or change should be made, or if the director is acting pursuant to section 5501.49 of the Revised Code.

Except as provided in section 5501.49 of the Revised Code, when in the opinion of the director there is urgent need to establish a state highway, which is to be designated a federal aid highway, or a federal aid interstate highway within a municipal corporation or, in the opinion of the director, any federal aid highway or interstate federal aid highway is in urgent need of repair, reconstruction, widening, improvement, or relocation, so as to accommodate the traveling public, the director shall submit a written request to the legislative authority of the municipal corporation for its consent to the desired establishment or improvement. The legislative authority, within sixty days after the written request has been received from the director, either shall grant its consent to the establishment or improvement or refuse consent by filing in writing with the director a statement of its reasons for refusing consent and any alternate proposals it considers reasonable. If the legislative authority fails to act or refuses consent, the director, upon consideration of the reasons for rejection, may make a resolution declaring the necessity of the establishment or improvement, and then proceed in the same manner as if consent had been given. A certified copy of the resolution shall be served upon the municipal legislative authority, which, within twenty days from the date of service, may appeal to the court of common pleas of the county in which the municipal corporation is situated, upon the reasonableness and necessity of the action provided for in the resolution. In the hearing upon appeal, the director shall introduce the record of the director's proceedings, including the director's findings with respect to factors referred to in section 5521.011 of the Revised Code, and such other competent evidence as the director desires in support of the director's resolution, and the municipality likewise may introduce competent evidence opposing the resolution, and findings. The court may affirm or revoke the resolution. The decision of the common pleas court may be appealed to the court of appeals and the supreme court as in other cases. If the court affirms the resolution, the director may proceed with the establishment or improvement with or without the cooperation of the municipal corporation. Any such municipal corporation may cooperate with the director in the work and pay such portion of the cost as is agreed upon between the municipal corporation and the director. The legislative authority of any municipal corporation desiring to cooperate, by resolution, may propose such cooperation to the director, and a copy of the resolution, which shall set forth the proportion of the cost and expense to be contributed by the municipal corporation, shall be filed with the director. The director shall cause to be prepared the necessary surveys, plans, profiles, cross sections, estimates, and specifications and shall file copies of them with the legislative authority of the municipal corporation. After the legislative authority has approved the surveys, plans, profiles, cross sections, estimates, and specifications, and after the municipal corporation has provided the funds necessary to meet the portion of the cost of the work assumed by it, the municipal corporation shall enter into a contract with the state providing for payment by the municipal corporation of the agreed portion of the cost. The form of the contract shall be prescribed by the attorney general, and such contracts shall be submitted to the director and approved before the receipt of bids. Section 5705.41 of the Revised Code applies to such contract to be made by the municipal corporation, and a duplicate of the certificate of the chief fiscal officer of the municipal corporation shall be filed in the office of the director. That part of the cost of the work assumed by the municipal corporation shall be

paid from the proceeds of taxes or special assessments, or both, or from the proceeds of notes or bonds issued and sold in anticipation of the collection of the taxes and assessments. For the purpose of providing funds for the payment of that part of the cost of the work assumed by the municipal corporation, the municipal corporation has the same authority to make special assessments, levy taxes, and issue bonds or notes, in anticipation of the collection of the same, as it has with respect to improvements constructed under the sole supervision and control of the municipal corporation. All such assessments shall be made, taxes levied, and bonds or notes issued and sold under such conditions and restrictions as may be provided with respect to assessments, taxes, bonds, or notes made, levied, issued, or sold in connection with improvements of the same class and character constructed under the sole supervision and control of the municipal corporation. The improvement shall be constructed under the sole supervision of the director. The proportion of the cost and expense payable by the municipal corporation shall be paid by the proper officers thereof, upon the requisition of the director, and at times during the progress of the work as may be determined by the director or as may be otherwise provided by law.

Effective Date: 04-05-2001

## **Appendix B – Pavement Cost Calculations**

### **Assumptions and Methodology**

When the Urban Paving Program was initiated, the funding was intended to provide for a surface treatment on all urban pavements every 10 years. For this analysis it was assumed the 10-year cycle would continue, thus 10% of the lane-miles, or approximately 600 lane-miles, would be rehabilitated each year. In addition, the Department has a goal of treating 5% of the eligible lane-miles with preventive maintenance treatments. Eligible lane-miles means those pavements in sufficiently good condition to benefit from the preventive maintenance treatment. For this analysis it was assumed that 5% of the eligible urban system miles would receive a preventive maintenance surface treatment in addition to the 10% of lane-miles being rehabilitated.

To determine the costs of rehabilitation, the urban system lane-miles were divided by pavement type, truck traffic and condition.

The three pavement types are rigid (concrete), flexible (asphalt), and composite (asphalt on concrete). Brick pavements overlaid with asphalt may be categorized as either flexible or composite depending on the base below the bricks.

Truck traffic was divided at 1500 trucks per day. Pavements with 1500 or more trucks per day were defined as high traffic and pavements with less than 1500 trucks per day were defined as low traffic. The 1500 number was selected based on the asphalt mix design specifications for heavy traffic.

Pavement condition was divided based on the current Pavement Condition Rating (PCR). PCR is measured on a scale of 0 to 100 with 100 being the best, based on a visual inspection of pavement distresses. The Department measures the PCR on all Interstate, US and State routes annually including urban system routes. Pavements with a PCR of 90 to 100 were considered not to need any work. Pavements with a PCR of 75 to 89 were considered eligible for preventive maintenance. Pavements with a PCR of 55 to 74 were considered in need of minor rehabilitation and pavements with a PCR below 55 were considered in need of major rehabilitation.

Major and minor rehabilitation strategies were developed for each pavement type and traffic level. This resulted in a total of twelve separate rehabilitation strategies. In all cases, a lane-mile was considered to be one mile long and twelve feet wide. No consideration was given for paved shoulders, parking lanes or other non-driving lane pavement. For high traffic locations, the road was assumed to be four lanes wide. For low traffic locations, the road was assumed to be two lanes wide. Major rehabilitation projects were assumed to be one mile long and minor rehabilitation projects were assumed to be two miles long.

Quantities and costs were determined for the pavement items only for all of the rehabilitation strategies and a cost per lane-mile was determined for each rehabilitation strategy. Unit prices for the pavement items were based on current statewide averages and do not include any inflation. For preventive maintenance, the cost per lane mile was determined based on current statewide averages of thin overlay-type preventive maintenance treatments, primarily microsurfacing and fine graded polymer asphalt overlays. Preventive maintenance costs were applied to flexible and composite

pavements only.

For each pavement type and traffic level, the total lane-miles were divided into the various PCR bands. For pavements in the preventive maintenance band, the total lane-miles were multiplied by 5% then by the cost per lane-mile to determine the total annual cost for preventive maintenance. For minor and major rehabilitation, first, the number of lane-miles to be treated was determined by multiplying the total lane-miles for each pavement type and traffic level by 10 percent. The number of lane-miles to be treated was then divided among major and minor rehabilitation by the same proportion as the lane-miles in the major and minor rehabilitation PCR bands. Then, the major and minor rehabilitation lane-miles were multiplied by the cost per lane-mile for major and minor rehabilitation, respectively, to determine the total annual cost for rehabilitation. The costs for all pavement types, traffic levels, preventive maintenance, minor rehabilitation and major rehabilitation were then summed to determine the total annual cost for rehabilitating pavements on the urban system.

Using this methodology, the annual cost to rehabilitate the urban system pavements is \$40.5 million per year. This cost is for the pavement items only such as asphalt concrete, tack coat, pavement planing, etc. It does not include other required contract items such as mobilization, maintenance of traffic, pavement markings, etc. For simple rural resurfacing projects similar to the ones considered here, the non-pavement items typically equal about 10% to 20% of the cost of the pavement items. Because of the additional complexity of urban projects, it can be conservatively estimated the non-pavement items are an additional 25%. Adding in the cost for the non-pavement items, the total cost to rehabilitate the urban system is **\$50.6 million per year**.

The 25% for non-pavement items is a conservative estimate. Items of work necessary to be covered by this 25% include: maintenance of traffic, curb work, sidewalks, curb ramps, shoulders, drainage, sewers, utilities, manholes, catch basins, bridges, traffic signals, lighting, signing, medians, barrier, guardrail, etc. Some of these items are covered elsewhere in this report, others are impossible to quantify. For example, the Department has no inventory of the length of curbing that exists on the urban system nor any assessment of the condition. Without both of these it is impossible to estimate an annual cost for curb rehabilitation. Furthermore, the costs do not include any beautification items that might be included with a rehabilitation project like brick or simulated brick crosswalks, decorative lighting, decorative landscaping, planters, benches, bike racks, etc. These items are often desired by cities but how they would be handled or funded if the Department took over primary responsibility for the roads is unknown.

This analysis also does not consider the cost of any widening. In developing areas, turn lanes are often added or even additional through lanes to accommodate increasing traffic. These additional lanes come at a price that is not included. They also increase the total lane-miles of the urban system which in turn increases the number of lane-miles to be treated each year and thus the total cost each year.

**FIGURE P-1****Project Scopes Data**

Lane Width	12	feet						
High Traffic	4	lanes	48	feet	width	High/Minor	8	lane-miles
Low Traffic	2	lanes	24	feet	width	High/Major	4	lane-miles
Minor Rehab	2	mile	10560	feet	length	Low/Minor	4	lane-miles
Major Rehab	1	mile	5280	feet	length	Low/Major	2	lane-miles

**FIGURE P-2**

<b>Rigid</b>							
<b>High Traffic</b>							
<b>Minor Rehab</b>							
<b>Item</b>	<b>Description</b>	<b>Unit</b>	<b>Amt</b>	<b>Quantity</b>	<b>U. Price</b>	<b>Cost</b>	<b>Cost/LM</b>
255	Rigid Repair, Class FS	SY	3%	1,690	\$ 115.00	\$194,304	
255	Pavement Sawing	LF		7,603	\$ 1.95	\$14,826	
256	Bonded Patching Type A	SF	5%	25,344	\$ 25.00	\$633,600	
					<b>Total</b>	<b>\$842,730</b>	<b>\$105,341</b>
<b>Major Rehab</b>							
<b>Item</b>	<b>Description</b>	<b>Unit</b>	<b>Amt</b>	<b>Quantity</b>	<b>U. Price</b>	<b>Cost</b>	<b>Cost/LM</b>
255	Rigid Repair, Class FS	SY	10%	2,816	\$ 110.00	\$309,760	
255	Pavement Sawing	LF		12,672	\$ 1.95	\$24,710	
257	Diamond Grinding	SY	20%	5,632	\$ 5.50	\$30,976	
					<b>Total</b>	<b>\$365,446</b>	<b>\$91,362</b>
<b>Low Traffic</b>							
<b>Minor Rehab</b>							
<b>Item</b>	<b>Description</b>	<b>Unit</b>	<b>Amt</b>	<b>Quantity</b>	<b>U. Price</b>	<b>Cost</b>	<b>Cost/LM</b>
255	Rigid Repair, Class FS	SY	3%	845	\$ 125.00	\$105,600	
255	Pavement Sawing	LF		3,802	\$ 2.50	\$9,504	
256	Bonded Patching Type A	SF	5%	12,672	\$ 35.00	\$443,520	
					<b>Total</b>	<b>\$558,624</b>	<b>\$139,656</b>
<b>Major Rehab</b>							
<b>Item</b>	<b>Description</b>	<b>Unit</b>	<b>Amt</b>	<b>Quantity</b>	<b>U. Price</b>	<b>Cost</b>	<b>Cost/LM</b>
255	Rigid Repair, Class FS	SY	10%	1,408	\$ 115.00	\$161,920	
255	Pavement Sawing	LF		6,336	\$ 1.95	\$12,355	
					<b>Total</b>	<b>\$174,275</b>	<b>\$87,138</b>

**FIGURE P-3**

<b>Flexible</b>							
<b>High Traffic</b>							
<b>Minor Rehab</b>							
<b>Item</b>	<b>Description</b>	<b>Unit</b>	<b>Amt</b>	<b>Quantity</b>	<b>U. Price</b>	<b>Cost</b>	<b>Cost/LM</b>
254	Planning	SY		56,320	\$ 1.25	\$70,400	
407	Tack Coat	GAL	0.075	4,224	\$ 2.50	\$10,560	
446	AC Surface, Type 1H	CY	1.5	2,347	\$ 155.00	\$363,733	
					<b>Total</b>	<b>\$444,693</b>	<b>\$55,587</b>
<b>Major Rehab</b>							
<b>Item</b>	<b>Description</b>	<b>Unit</b>	<b>Amt</b>	<b>Quantity</b>	<b>U. Price</b>	<b>Cost</b>	<b>Cost/LM</b>
253	Pavement Repair	SY	5%	1,408	\$ 45.00	\$63,360	
254	Planning	SY		28,160	\$ 1.55	\$43,648	
407	Tack Coat	GAL	0.075	2,112	\$ 2.50	\$5,280	
407	Tack Coat for Int	GAL	0.04	1,126	\$ 2.50	\$2,816	
446	AC Surface, Type 1H	CY	1.5	1,173	\$ 155.00	\$181,867	
446	AC Interm., Type 2	CY	1.75	1,369	\$ 135.00	\$184,800	
					<b>Total</b>	<b>\$481,771</b>	<b>\$120,443</b>
<b>Low Traffic</b>							
<b>Minor Rehab</b>							
<b>Item</b>	<b>Description</b>	<b>Unit</b>	<b>Amt</b>	<b>Quantity</b>	<b>U. Price</b>	<b>Cost</b>	<b>Cost/LM</b>
254	Planning	SY		28,160	\$ 1.55	\$43,648	
407	Tack Coat	GAL	0.075	2,112	\$ 2.50	\$5,280	
448	AC Surface, Type 1	CY	1.5	1,173	\$ 145.00	\$170,133	
					<b>Total</b>	<b>\$219,061</b>	<b>\$54,765</b>
<b>Major Rehab</b>							
<b>Item</b>	<b>Description</b>	<b>Unit</b>	<b>Amt</b>	<b>Quantity</b>	<b>U. Price</b>	<b>Cost</b>	<b>Cost/LM</b>
253	Pavement Repair	SY	3%	422	\$ 55.00	\$23,232	
254	Planning	SY		14,080	\$ 1.75	\$24,640	
407	Tack Coat	GAL	0.075	1,056	\$ 2.50	\$2,640	
407	Tack Coat for Int	GAL	0.04	563	\$ 2.50	\$1,408	
448	AC Surface, Type 1	CY	1.25	489	\$ 155.00	\$75,778	
448	AC Interm., Type 1	CY	0.75	293	\$ 150.00	\$44,000	
					<b>Total</b>	<b>\$171,698</b>	<b>\$85,849</b>

**FIGURE P-4**

<b>Composite</b>							
<b>High Traffic</b>							
<b>Minor Rehab</b>							
<b>Item</b>	<b>Description</b>	<b>Unit</b>	<b>Amt</b>	<b>Quantity</b>	<b>U. Price</b>	<b>Cost</b>	<b>Cost/LM</b>
254	Planning	SY		56,320	\$ 1.25	\$70,400	
407	Tack Coat	GAL	0.075	4,224	\$ 2.50	\$10,560	
446	AC Surface, Type 1H	CY	1.5	2,347	\$ 155.00	\$363,733	
					<b>Total</b>	<b>\$444,693</b>	<b>\$55,587</b>
<b>Major Rehab</b>							
<b>Item</b>	<b>Description</b>	<b>Unit</b>	<b>Amt</b>	<b>Quantity</b>	<b>U. Price</b>	<b>Cost</b>	<b>Cost/LM</b>
254	Planning	SY		28,160	\$ 1.55	\$43,648	
255	Rigid Repair, Class FS	SY	5%	1,408	\$ 115.00	\$161,920	
255	Pavement Sawing	LF		6,336	\$ 1.95	\$12,355	
407	Tack Coat	GAL	0.075	2,112	\$ 2.50	\$5,280	
407	Tack Coat for Int	GAL	0.04	1,126	\$ 2.50	\$2,816	
446	AC Surface, Type 1H	CY	1.5	1,173	\$ 155.00	\$181,867	
446	AC Interm., Type 2	CY	1.75	1,369	\$ 135.00	\$184,800	
					<b>Total</b>	<b>\$592,686</b>	<b>\$148,171</b>
<b>Low Traffic</b>							
<b>Minor Rehab</b>							
<b>Item</b>	<b>Description</b>	<b>Unit</b>	<b>Amt</b>	<b>Quantity</b>	<b>U. Price</b>	<b>Cost</b>	<b>Cost/LM</b>
254	Planning	SY		28,160	\$ 1.55	\$43,648	
407	Tack Coat	GAL	0.075	2,112	\$ 2.50	\$5,280	
448	AC Surface, Type 1	CY	1.5	1,173	\$ 145.00	\$170,133	
					<b>Total</b>	<b>\$219,061</b>	<b>\$54,765</b>
<b>Major Rehab</b>							
<b>Item</b>	<b>Description</b>	<b>Unit</b>	<b>Amt</b>	<b>Quantity</b>	<b>U. Price</b>	<b>Cost</b>	<b>Cost/LM</b>
254	Planning	SY		14,080	\$ 1.75	\$24,640	
255	Rigid Repair, Class FS	SY	3%	422	\$ 155.00	\$65,472	
255	Pavement Sawing	LF		1,901	\$ 2.50	\$4,752	
407	Tack Coat	GAL	0.075	1,056	\$ 2.50	\$2,640	
407	Tack Coat for Int	GAL	0.04	563	\$ 2.50	\$1,408	
448	AC Surface, Type 1	CY	1.25	489	\$ 155.00	\$75,778	
448	AC Interm., Type 1	CY	0.75	293	\$ 150.00	\$44,000	
					<b>Total</b>	<b>\$218,690</b>	<b>\$109,345</b>

# FIGURE P-5

## Data Used

Urban System	6001.54	lane miles	
	0.84	lane miles	No Pavement Type
	32.06	lane miles	No PCR

Treatment cycle	10-year cycle for rehab =	10.00%	Treated per year
	Flexible PM lane miles	5.00%	Treated per year
	Composite PM lane miles	5.00%	Treated per year
	Rigid PM lane miles	0%	Treated per year

## Flexible

ADTT	PCR Range	Total Lane Miles	Cost per Lane mile	LM Treated per Year	Cost per year
>=1500	90-100	62.49	\$0	0	\$0
	75-89	124.79	\$25,000	6.2395	\$155,988
	55-74	52.14	\$55,587	23.942	\$1,330,864
	0-54	0	\$120,443	0	\$0
	Total	239.42			
	% Treated	10.00%			
	LM Treated	23.942			
<1500	90-100	468.74	\$0	0	\$0
	75-89	725.87	\$25,000	36.2935	\$907,338
	55-74	387.96	\$54,765	154.3549926	\$8,453,251
	0-54	13.1	\$85,849	5.21200743	\$447,446
	Total	1595.67			
	% Treated	10.00%			
	LM Treated	159.567			



## Composite

ADTT	PCR Range	Total Lane Miles	Cost per Lane mile	LM Treated per Year	Cost per year
>=1500	90-100	54.62	\$0	0	\$0
	75-89	107.2	\$25,000	5.36	\$134,000
	55-74	55.16	\$55,587	20.98029522	\$1,166,232
	0-54	2.56	\$148,171	0.973704782	\$144,275
	Total	219.54			
	% Treated	10.00%			
	LM Treated	21.954			
<1500	90-100	1001.59	\$0	0	\$0
	75-89	1526.41	\$25,000	76.3205	\$1,908,013
	55-74	966.21	\$54,765	321.3044646	\$17,596,239
	0-54	120.91	\$109,345	40.20753543	\$4,396,493
	Total	3615.12			
	% Treated	10.00%			
	LM Treated	361.512			

## Rigid

ADTT	PCR Range	Total Lane Miles	Cost per Lane mile	LM Treated per Year	Cost per year
>=1500	90-100	14.46	\$0	0	\$0
	75-89	6.05	\$0	0	\$0
	55-74	1.68	\$105,341	2.219	\$233,752
	0-54	0	\$91,362	0	\$0
	Total	22.19			
	% Treated	10.00%			
	LM Treated	2.219			
<1500	90-100	112.24	\$0	0	\$0
	75-89	71.84	\$0	0	\$0
	55-74	76	\$139,656	22.70481537	\$3,170,864
	0-54	16.62	\$87,138	4.965184625	\$432,656
	Total	276.7			
	% Treated	10.00%			
	LM Treated	27.67			

Sub-Total	\$40,477,408
25% Additional for Non-Pavement Items	\$10,119,352
<b>Total</b>	<b>\$50,596,760</b>

## Appendix C – Traffic Related Cost Calculations

### Total Additional Annual Costs for Traffic Safety Items

The following table summarizes the total additional annual costs for traffic safety items for the additional routes.

Item	Cost (Per Year)
Traffic Signals & School Flashers	\$28,774,000
Markings & RPMs	\$7,070,000
Signs	\$2,545,000
Highway Lighting	\$41,310,000
Total	\$79,699,000

Assumptions and calculations for each category are shown as follows:

#### Assumptions and Methodology: Traffic Signals and School Flashers

##### Maintenance Cost:

To get the estimated cost for traffic signals and school flashers on State and US routes, we made the following assumptions:

1. This will be a yearly cost to maintain the traffic signals and school flashers.
2. All traffic signals and school flashers will be maintained by ODOT personnel.
3. The number of traffic signals on State and US routes in cities and villages was obtained from OSIS (Ohio Signal Inventory System).
4. The cost to maintain one traffic signal for one year is \$3000. This cost is what ODOT charges developers to maintain their signals. ODOT is hoping an economy of scale can be derived by maintaining local agency traffic signals. Specifically, ODOT's current signal inventory is far flung over large geographic areas. It is possible that maintaining signals in a city will reduce our travel time (and therefore costs) allowing us to maintain more signals in the same trip. We're optimistically assuming that we might be able to reduce our maintenance costs to \$2,000/year versus the current estimated cost of \$3,000. For the purposes of this analysis, \$2,000/year was used for traffic signals.
5. The current ODOT signal inventory is 1448.

6. The current ODOT school zone inventory is 447.
7. The cost for ODOT to maintain a school zone for one year was estimated to be \$1000.
8. The current number of signal electricians to maintain ODOT's 1448 traffic signals is 44.
9. It was assumed that each District currently has two (2) bucket trucks.
10. The additional number of school zones, signal electricians and bucket trucks was derived by applying the ratio of new signals to current signals, i.e.  $9867/1448 = 6.8$ , to ODOT's current numbers.

ODOT's current traffic signal inventory is 1,445 traffic signals. By comparison, an additional 9,867 traffic signals are located within cities and villages on these routes. ODOT does not have an inventory of the number of school flashers inside of villages and cities on State and U.S. Routes. The number of additional school flashers that would have to be maintained has been estimated at 3,040.

The estimation of the additional cost is calculated by applying known costs to the additional traffic signals and school flashers, summarized in the following table.

**Cost Estimate to Maintain Traffic Signals and School Flashers  
on State and US Routes in Cities and Villages**

<b>Item</b>	<b>Number</b>	<b>Cost</b>
<b>Traffic Signals</b>	<b>9867</b>	<b>\$19,734,000</b>
<b>School Zones</b>	<b>3040</b>	<b>\$3,040,000</b>
<b>Electricity Estimate</b>	<b>--</b>	<b>\$6,000,000</b>
<b>Total</b>	<b>12, 907</b>	<b>\$28,774,000</b>

## **Assumptions and Methodology: Pavement Markings and RPM's**

### **Maintenance Cost:**

To get the maintenance cost for pavement markings and RPMs on State and US routes, we made the following assumptions:

1. This will be a yearly cost to maintain the pavement markings and RPMs.
2. All the pavement markings and RPMs will be installed by contract and no additional equipment and personnel cost will be added.
3. Major Cities –
  - a. All the State and US routes are four lane divided highway with four edge lines and two lane lines.
  - b. 50% Traffic Paint Type 1 (Item 642) and 50% Thermoplastic will be applied to maintain Pavement markings.
4. Average City or Village –
  - a. ½ of all the State and US routes are four lane divided highway with four edge lines and two lane lines.
  - b. ½ of all the State and US routes are two lane routes with two edge lines and one center line.
  - c. 80% Traffic Paint Type 1 (Item 642) and 20% Thermoplastic will be applied to maintain Pavement markings.
5. Minor City or Village –
  - a. All the State and US routes are two lane routes with two edge lines and one center line.
  - b. 80% Traffic Paint Type 1 (Item 642) and 20% Thermoplastic will be applied to maintain Pavement markings.
6. Traffic Paint markings will be reapplied ever year.
7. Thermoplastic markings will be reapplied after four years.
8. To maintain the auxiliary markings, a lump sum 20% cost of Long line markings will be added.
9. Assume RPMs already exist.
10. RPMs will be spaced 80 ft apart on the lane line and center line.
11. One third (1/3) of the RPM Reflectors will be replaced every year.
12. Unit price for the following items is obtained from the 2008 Summary of Contracts Awarded:

<b>Item</b>	<b>Unit</b>	<b>Price</b>	<b>Price/ year</b>
Edge Line, Traffic Paint Type 1	Mile	\$342.12	\$342.12
Edge Line, Thermoplastic	Mile	\$1762.34	\$440.59
Center Line, Traffic Paint Type 1	Mile	\$419.08	\$419.08
Center Line, Thermoplastic	Mile	\$3156.73	\$789.18
Lane Line, Traffic Paint Type 1	Mile	\$178.38	\$178.38
Lane Line, Thermoplastic	Mile	\$900.11	\$225.03
RPMs	Each	\$16.77	\$16.77
Replace RPM Reflectors	Each	\$3.27	\$3.27

**Equipment:**

None - All the pavement markings and RPMs will be installed by contract

**Personnel:**

None - All the pavement markings and RPMs will be installed by contract

The cost to maintain pavement markings and raised pavement markers (RPMs) is well documented through years of bid histories. There is, however, no known inventory of striping and RPM's inside of villages and cities. Numerous assumptions had to be made including but not limited to: type of striping material used; percentage of divided versus undivided roads; quantity of auxiliary markings (stop bars, cross walks, transverse lines, etc.). Applying the known costs to the inventory based upon the various assumptions results in the below estimated costs for ODOT to maintain striping and RPM's inside of villages and cities.

**Maintenance cost for Pavement Markings and RPMs on State and US routes  
Major Cities – Sections Greater than 50 Miles**

Total Center Line Miles	897 Mile
4 - Edge Line Markings	3,588 Mile
Traffic Paint 50 %	1,794 Mile
Thermoplastic 50%	1,794 Mile
2 - Line Markings	1,794 Mile
Traffic Paint 50 %	897 Mile
Thermoplastic 50%	897 Mile
RPM Reflectors on Lane Line are spaced 80 ft	118,440 Each
1/3 RPM Reflectors Replaced each year	39,468 Each

**Cost to Maintain Pavement Markings and replace RPM Reflectors per year**

<b>Item</b>	<b>Quantity</b>	<b>Unit</b>	<b>Price</b>	<b>Cost</b>
Edge Line, Traffic Paint	1,794	Mile	\$342.12	\$613,763
Edge Line, Thermoplastic	1,794	Mile	\$440.59	\$790,418
Lane Line, Traffic Paint	897	Mile	\$178.38	\$160,007
Lane Line, Thermoplastic	897	Mile	\$225.03	\$201,852
Auxiliary Markings	Lump Sum – 20% of Long Line Markings			\$353,208
Replace RPM Reflectors	39,468	Each	\$3.27	\$129,060
<b>Total</b>				<b>\$2,248,309</b>

**Maintenance cost for Pavement Markings and RPMs on State and US routes**  
**Average City or Village – Section Length between 20 and 50 miles**

Total Center Line Miles	1,237 Mile
½ is four lane divided highway	619 Mile
4 - Edge Line Markings	2,474 Mile
2 – Lane Line Markings	1,237 Mile
½ is two lane highway	619 Mile
2 - Edge Line Markings	1,237 Mile
1 - Center Line Markings	619 Mile
Total Edge Line Markings	3,711 Mile
Traffic Paint 80 %	2,969 Mile
Thermoplastic 20%	742 Mile
Total Lane Line Markings	1,237 Miles
Traffic Paint 80 %	990 Mile
Thermoplastic 20%	247 Mile
Total Center Line Markings	619 Miles
Traffic Paint 80 %	495 Mile
Thermoplastic 20%	124 Mile
RPM Reflectors on Lane & Center Line spaced at 80 ft	122,463 Each
1/3 RPM Reflectors Replaced each year	40,821 Each

**Cost to Maintain Pavement Markings and replace RPM Reflectors per year**

Item	Quantity	Unit	Price	Cost
Edge Line, Traffic Paint	2,969	Mile	\$342.12	\$1,015,686
Edge Line, Thermoplastic	742	Mile	\$440.59	\$327,006
Lane Line, Traffic Paint	990	Mile	\$178.38	\$176,525
Lane Line, Thermoplastic	247	Mile	\$225.03	\$55,672
Center Line, Traffic Paint	495	Mile	\$419.08	\$207,361
Center Line, Thermoplastic	124	Mile	\$789.18	\$97,622
Auxiliary Markings	Lump Sum – 20% of Long Line Markings			\$375,974
Replace RPM Reflectors	40,821	Each	\$3.27	\$133,485
<b>Total</b>				<b>\$2,389,330</b>

**Maintenance Cost for Pavement Markings and RPMs on State and US routes**  
**Minor City or Village – Section Length Less than 20 miles**

Total Center Line Miles	1,584 Mile
2 - Edge Line Markings	3,168 Mile
Traffic Paint 80 %	2,534 Mile
Thermoplastic 20%	634 Mile
1 - Center Line Markings	1,584 Miles
Traffic Paint 80 %	1,267 Mile
Thermoplastic 20%	317 Mile
RPM Reflectors on Center Line are spaced 80 ft	104,544 Each
1/3 RPM Reflectors Replaced each year	34,848 Each

**Cost to Maintain Pavement Markings and replace RPM Reflectors per year**

Item	Quantity	Unit	Price	Cost
Edge Line, Traffic Paint	2,534	Mile	\$342.12	\$867,069
Edge Line, Thermoplastic	634	Mile	\$440.59	\$279,158
Center Line, Traffic Paint	1,267	Mile	\$419.08	\$531,058
Center Line, Thermoplastic	317	Mile	\$789.18	\$250,012
Auxiliary Markings	Lump Sum – 20% of Long Line Markings			\$385,459
Replace RPM Reflectors	34,848	Each	\$3.27	\$113,953
<b>Total</b>				<b>\$2,426,710</b>

**Cost Estimate to Maintain Striping and RPMs**

Item	Miles	Cost
Major Cities	897	\$2,250,000
Average City or Village	1,237	\$2,390,000
Minor City or Village	1,584	\$2,430,000
<b>Total</b>	<b>3,718</b>	<b>\$7,070,000</b>



## Assumptions and Methodology: Signs

### Maintenance Cost:

To get the estimated cost for signs on State and US routes, we made the following assumptions:

1. This will be a yearly cost to maintain the signs.
2. The yearly cost for ODOT to maintain its current inventory of signs was taken from the 2007 County Work Plan. This figure includes both CMS and TMS data and is \$11,695,121.
3. ODOT currently maintains approximately 43,000 lane-miles.
4. The additional cost to maintain signs on State and US routes was determined from the following formula:

$$43,000/11,695,121 = y/x$$

y = Additional lane-miles (from table on previous page)

x = Added yearly cost

The cost to ODOT to maintain signs on our existing lane-miles is known to be approximately \$11.7M. From this cost, the additional cost to maintain signs inside of cities and villages has been extrapolated resulting in the following annual costs.

An additional consideration related to signs is that ODOT for many years has only used highly reflective sheeting in order to improve visibility and safety. We also know that some cities or villages probably specified inferior/less reflective sheeting. An uncalculated cost would be the effort to identify and replace these signs.

A final consideration is that ODOT no longer uses lighting for our signs, and consequentially we maintain no sign lighting. Research has shown that specific combinations of highly reflective sheeting actually perform better than sign lighting. Some cities will undoubtedly object to the removal of their sign lights. In addition, ODOT would need to replace the old signs with the new sheeting combinations before we could remove the sign lighting and this cost is not reflected below.

### Cost Estimate to Maintain Signs

Item	Miles	Cost
Major Cities	2628	\$715,000
Average City or Village	3195	\$870,000
Minor City or Village	3520	\$960,000
Total	9343	\$2,545,000

## Assumptions and Methodology: Lighting

### Maintenance Cost:

1. Assumed typical lighting system (number of luminaires, luminaire wattages, city owned or rented and street width) for major, minor and average size cities;
2. Applied the typical lighting system to the known route miles within the cities and villages;
3. Assumed an average cost for power costs;
4. Applied a per lighting unit cost per month to assumed lighting systems for contract maintenance;
5. Assumed necessary ODOT personnel and vehicles to create and administer/inspect contracts

There is no known inventory of lighting inside of cities and villages. A further complication is some cities rent lighting from power companies rather than installing and maintaining their own. Maintenance of highway lighting is a category that requires numerous assumptions in order to estimate the additional maintenance costs to ODOT. These assumptions include but are not limited to: number of luminaires, average cost of power, and average cost per luminaire for contract maintenance.

A major logistical consideration will be how to divide power bills for lighting systems that have some luminaires on a State or U.S Route as well as on other roads that are not. Lighting systems have been designed for many years to segregate power services based upon maintenance responsibilities. Shifting responsibility for portions of existing lighting circuits in multiple jurisdictions will make bookkeeping and billing a difficult and complex process for the power companies.

Based upon these assumptions the cost for power and ODOT to maintain lighting on State and U.S. Routes inside of cities and villages is shown below:

### Cost Estimate to Maintain Lighting

<b>Contract Maintenance Costs</b>	<b>Electricity</b>	<b>ODOT Personnel, Equipment, Vehicles, etc.</b>	<b>Annual Total Cost</b>
\$1.62 M	\$34.8 M	\$4.89 M	<b>\$41.31 M</b>

## Appendix D – Storm Sewer Cost Calculations

Drainage calculations are based upon route-miles rather than lane-miles. Assuming at least a two-lane highway, that results in  $9300/2=4650$  route miles. Approximately 25% of the routes (1162.5 miles) are located in villages. Assume these routes are uncurbed and will be drained via roadside ditches and culverts. The other 75% of routes (3487.5 miles) are located within cities. Assume these routes are curbed and drained via storm sewers. Calculations are shown and summarized in the following table.

### Culverts

$(1162.5 \text{ miles} \times 5280 \text{ l.f.}) / \text{one culvert every } 10,000' = 614 \text{ culverts}$

Assume average culvert length of 60' = 36,840 l.f.

Assume 10% of culverts will require maintenance each year at \$200/l.f.

The annual cost to maintain these culverts is  $36,840 \times .10 \times \$200 = \mathbf{\$736,800}$

### Storm Sewers

$(3487.5 \text{ miles} \times 5280 \text{ l.f.}) = 18.4 \text{ Million linear feet of storm sewer}$

Assume 10% of storm sewers will require maintenance each year at \$80/l.f.

The annual cost to maintain these storm sewers is  $18.4\text{M} \times .10 \times \$80 = \mathbf{\$147.2 \text{ M}}$

### Drainage Structures

$(3487.5 \text{ miles} \times 5280 \text{ l.f.}) \times 3 / 500' = 110,484 \text{ structures (assumes 2 catch basins and 1 manhole)}$

Assume 10% of drainage structures will require maintenance each year at \$1000 each

The annual cost to maintain these drainage structures is  $110,484 \times .10 \times \$1,000 = \mathbf{\$11,048,400}$

## Additional Annual Costs for Storm Sewers

The following table summarizes the total additional costs for storm sewers.

Item	Cost (Per Year)
Culverts	\$736,800
Storm Sewers	\$147.2 M
Drainage Structures	\$11.1M
<b>Total</b>	<b>\$159 Million</b>

## Appendix E – Routine Maintenance and Snow& Ice Cost Calculations

### FIGURE M - ANALYSIS OF COUNTY, CITY and VILLAGE GROUPING

The analysis within a county, city, or village, was viewed from several different perspectives to provide a more representative cost breakdown of individual or group figures. Each analysis resulted in three different categories: Major, Average, Minor. The following charts indicate the various figures that were used in the different areas of the report.

This chart looks at the lane-miles to determine the break point for the three categories.

Group	# of Cities and Villages	Average Miles	Group Breakdown
Major	18	146.00	Cities or Villages with more than 50 total lane miles.
Average	107	29.86	Cities or Villages with 20 to 50 total lane miles.
Minor	697	5.04	Cities or Villages with less than 20 total lane miles.

This chart looks at the Major, Average, and Minor cities and villages from the above chart to determine the breakdown of counties into the three categories.

Group	# of Counties	Average Miles	Group Breakdown
Major	13	590.5	Counties with at least one Major City or Village
Average	45	486.0	Counties with no Major Cities or Villages and at least one Average City or Village.
Minor	30	418.1	Counties with only Minor Cities or Villages.

The following two charts look at the counties that include the Major, Average, and Minor cities and villages from the above chart to determine lane miles within cities and villages for the three categories.

Group	# of Cities	Average Miles	Group Breakdown
Major	125	37.18	City data within Major county category.
Average	89	23.52	City data within Average county category.
Minor	20	12.34	City data within Minor county category.

Group	# of Villages	Average Miles	Group Breakdown
Major	90	5.32	Village data within Major county category.
Average	301	3.74	Village data within Average county category.
Minor	197	3.80	Village data within Minor county category.

Maintenance performed by ODOT forces are recorded and tracked in ODOT's Transportation Management System (TMS). Historical costs expended for various categories were extracted from TMS, shown in the following tables and utilized in the calculations.

## FIGURE M-1

### DIRECT COST OF ODOT MAINTENANCE ACTIVITIES 3 YEAR AVERAGE (FY2007-FY2009)

FIGURES REFLECT ACTIVITY PERFORMED ON "ALL ROUTES"

	TOTAL DIRECT COSTS			
	MAJOR	AVERAGE	MINOR	
Average Cost per Year	\$34,023,910	\$73,523,391	\$41,914,037	\$149,461,337
Number of Counties	13	45	30	88
Average Cost / County	\$2,617,224	\$1,633,853	\$1,397,135	\$1,698,424
Total Miles	7,676.60	21,869.70	12,544.20	42,090.50
AVG Lane Miles/County	590.5	486.0	418.1	478.3
Cost / Lane Mile	\$4,432	\$3,362	\$3,341	\$3,551

FIGURES REFLECT ACTIVITY PERFORMED ON "US AND STATE ROUTES ONLY"

	TOTAL DIRECT COSTS			
	MAJOR	AVERAGE	MINOR	
Average Cost per Year	\$21,036,435	\$61,755,928	\$36,858,187	\$119,650,550
Number of Counties	13	45	30	88
Average Cost / County	\$1,618,187	\$1,372,354	\$1,228,606	\$1,359,665
Total Miles	3,487.40	18,391.30	11,121.80	33,000.50
AVG Lane Miles/County	268.3	408.7	370.7	375.0
Cost / Lane Mile	\$6,032	\$3,358	\$3,314	\$3,626
City Lane Miles	4,647.5	2,093.3	246.8	
CITY COSTS	\$28,034,304	\$7,029,000	\$817,907	\$35,881,212
Village Lane Miles	479.1	1126.6	748.9	
VILLAGE COSTS	\$1,028,427	\$2,175,084	\$1,608,882	\$4,812,391
				\$40,693,603

# MAINTENANCE ACTIVITY COSTS

3 YEAR AVERAGE (FY2007-FY2009)

## DIRECT COST OF SNOW & ICE RELATED MAINTENANCE ACTIVITIES

PGAC	All Routes	US & SR only	UM	Description
6240	\$826,999	\$616,880.39	MILE	LIQUID PRE-TREAT FOR SNOW & ICE
6241	\$1,179,616	\$941,619.53	MILE	ROADWAY PATROL
6242	\$65,310,115	\$51,081,859.72	MILE	PLOWING SNOW AND APPLY. CHEM.
6243	\$33,101	\$31,506.92	LNFT	SNOW FENCE INSTL ,RPR AND REMV
6244	\$835,628	\$91,511.76	EACH	ROAD CRUISERS
	\$68,185,458	\$52,763,378		

## DIRECT COST OF PAVEMENT RELATED MAINTENANCE ACTIVITIES

PGAC	All Routes	US & SR only	UM	Description
6121	\$5,422,332	\$4,375,343.85	TONS	POTHOLE PATCHING
6122	\$3,960,848	\$3,670,156.79	TONS	SURFACE REPAIRS
6123	\$1,239,166	\$1,067,075.84	CUYD	FULL DEPTH REPAIR
6124	\$1,512,260	\$1,340,456.05	LBS	FILLING AND SEALING CRACKS
6125	\$2,164,370	\$2,131,112.52	GALS	SURFACE TREATMENT
6126	\$4,142	\$579.54	BAGS	PAVEMENT JACKING
6127	\$492,178	\$385,614.33	SQYD	PLANING BITUMINOUS PAVEMENT
6129	\$2,466,787	\$1,741,916.38	TONS	SURFACE PAVING
6132	\$33,281	\$27,326.89	LNFT	REPAIRING CURBS AND OR GUTTERS
6136	\$1,498,702	\$1,118,487.75	TONS	PARTIAL DEPTH REPAIR
	\$18,794,066	\$15,858,070		

## DIRECT COST OF PAVEMENT MARKING RELATED MAINTENANCE ACTIVITIES

PGAC	All Routes	US & SR only	UM	Description
6531	\$335,062	\$291,083.85	SQFT	AUXILIARY PAVEMENT MARKING
6532	\$157,980	\$156,296.70	MILE	PAVEMENT CENTERLINE MARKING
6533	\$1,018,597	\$1,006,605.13	MILE	PAVEMENT EDGELINE MARKING
6534	\$7,913	\$5,928.12	MILE	PAVEMENT LANE LINE MARKING
6535	\$275,662	\$255,850.97	EACH	REPAIR RAISED PVMT MARKERS
6536	\$14,618	\$13,488.46	LNFT	PAVEMENT MARKING REMOVAL
	\$1,809,832	\$1,729,253		

## DIRECT COST OF SIGN RELATED MAINTENANCE ACTIVITIES

PGAC	All Routes	US & SR only	UM	Description
6520	\$501,644	\$404,661.86	HOURL	INSPECTION OF SIGNS, MARKINGS, ETC.
6521	\$3,397,406	\$2,891,293.56	EACH	GROUND-MOUNTED FLATSHEET SIGN MAINT
6522	\$443,338	\$336,070.18	EACH	DELINEATOR MAINTENANCE
6523	\$494,321	\$224,237.91	EACH	GROUND MTD. EXTRUSHEET SIGN MAINTEN
6524	\$81,544	\$31,441.07	EACH	OVERHEAD MTD. EXTRUSHEET SIGN MAINT
6525	\$17,390	\$11,899.05	EACH	OVERHEAD SIGN SUPPORT MAINTENANCE
6529	\$25,090	\$9,480.22	EACH	INSP. OF OVERHEAD SIGN SUPPORTS
	\$4,960,733	\$3,909,084		

## DIRECT COST OF MISCELLANEOUS MAINTENANCE ACTIVITIES

PGAC	All Routes	US & SR only	UM	Description
6128	\$3,607,914	\$2,816,675.40	MNHR	HAULING & HANDLING EQUIP & MAT
6130	\$1,928,264	\$1,769,182.74	LNFT	SPOT BERMING
6131	\$3,916,016	\$3,635,342.81	MILE	BLADING-RESTORING UNPAVED BERM
6133	\$505,691	\$426,519.96	SQYD	REPAIRING SLOPES
6134	\$1,242,742	\$1,182,780.53	SQYD	REPAIRING SLIPS AND SLIDES
6135	\$252,121	\$240,492.60	SQYD	DITCH AND SHOULDER RELOCATION
6140	\$238,979	\$215,417.64	EACH	CULVERT INSPECTION
6141	\$3,616,139	\$3,372,968.17	LNFT	CLEANING AND RESHAPING DITCHES
6142	\$329,275	\$307,587.33	LNFT	CLEANING CHANNELS
6143	\$1,697,567	\$1,333,254.22	EACH	CLEANING DRAINAGE STRUCTURES
6144	\$3,508,862	\$3,402,020.21	EACH	REPAIRING DRAINAGE STRUCTURES
6145	\$153,768	\$153,643.08	LNFT	CLEANING DITCHES WITH TIGER DITCHER
6146	\$89,937	\$39,400.76	EACH	UNDERDRAIN MAINTENANCE
6151	\$282,129	\$191,533.63	EACH	BRIDGE CLEANING
6152	\$942	\$782.07	SQFT	BRIDGE PAINTING
6153	\$706,108	\$294,940.23	SQFT	BRIDGE DECK REPAIR
6154	\$101,065	\$40,796.06	LNFT	BRIDGE JOINT REPAIR
6155	\$159,147	\$117,529.44	HOURL	SUBSTRUCTURE REPAIR
6156	\$87,978	\$57,515.53	HOURL	SUPERSTRUCTURE REPAIR
6157	\$19,142	\$10,215.91	LNFT	BRIDGE RAILING REPAIR
6160	\$58,068	\$54,948.46	TONS	ADD CHANNEL PROTECTION FOR BRIDGES
6161	\$12,605	\$10,393.75	SQFT	SEAL DECK,GUTTERS,CURBS & RAILING
6162	\$2,834	\$1,925.97	SQFT	SEAL ABUT.SEATS,BACKWALLS,DECK EDG
6163	\$97,492	\$25,436.99	SQFT	REMOVE LOOSE SPALLS
6165	\$3,784	\$3,699.64	EACH	EXTEND SCUPPERS
6220	\$361,047	\$300,223.23	HOURL	WEED EATING
6221	\$6,041,295	\$5,500,063.30	MILE	MOWING
6222	\$632,675	\$515,164.15	GALS	VEGETATION CONTROL-CHEM SPRAY
6223	\$4,596,100	\$4,066,889.15	MNHR	CARE OF SHRUBS, PLANTS, TREES
6224	\$250,071	\$227,512.42	SQYD	SEEDING SODDING FERTILIZING
6225	\$29,769	\$8,354.60	SQFT	GRAFFITI REMOVAL
6226	\$232,208	\$81,646.25	CUYD	DEBRIS REMOVAL-NATURAL DISASTER/HOM
6228	\$346,447	\$269,861.65	EACH	BARRIER REFLECTOR MAINTENANCE
6229	\$669,717	\$433,643.10	MILE	CLEANING PAVEMENT AND/OR BERM (ACC)
6230	\$449,202	\$230,980.52	EACH	GUARDRAIL END ASSEMBLY MAINT
6231	\$842,084	\$333,532.73	MILE	CLEAN CURBS,GUTTERS & ALONG MEDIANS
6232	\$4,317,463	\$2,500,750.99	BAGS	LITTER PICKUP
6233	\$2,037,748	\$1,435,067.37	LNFT	GUARDRAIL REP., REPLACEMENT OR REMO

6234	\$307,602	\$91,076.95	LNFT	FENCE REPAIR
6235	\$99,115	\$19,308.31	EACH	CRASH ATTENUATOR REPAIR OR REPLACEM
6236	\$1,191,431	\$752,007.54	MILE	LITTER PATROL
6237	\$17,136	\$4,390.43	CUYD	MEDIAN BARRIER REPAIR,REPL.,REMOVAL
6239	\$10,215	\$690.98	LNFT	NOISE BARRIER INSTALL./MAINT./REMOV
6286	\$1,158,979	\$714,500.57	HOUR	TRAFFIC CONTROL
6321	\$174,493	\$153,178.48	SQYD	ROADWAY BETTERMENTS
6331	\$453,931	\$432,213.58	SQYD	BERM-SHOULDER BETTERMENTS
6333	\$37,056	\$34,354.16	LNFT	GUARDRAIL BETTERMENT
6334	\$37,787	\$27,144.26	HOUR	REST AREA-TOURIST INFO BETTER.
6335	\$1,464,919	\$1,318,798.90	HOUR	ROADSIDE BETTERMENTS
6343	\$1,789,372	\$1,766,489.53	LNFT	CULVERT BETTERMENT
6344	\$230,481	\$224,553.68	EACH	CATCH BASIN REPAIR,REPL.OR INSTAL.
6351	\$23,027	\$16,002.38	EACH	BRIDGE BETTERMENTS
6526	\$39,830	\$30,821.84	HOUR	SINGLE LANE CLOSURE
6539	\$124,456	\$85,392.09	EACH	LOCATING ODOT TRAFFIC UTILITIES
6541	\$748,557	\$634,506.14	EACH	UNSCHEDULED TRAFFIC SIGNAL MAINTEN.
6542	\$763,380	\$238,254.73	EACH	HIGHWAY LIGHTING MAINTENANCE
6543	\$436,300	\$377,648.86	EACH	SIGNAL INSPECTION AND RELAMPING
6544	\$46,211	\$41,471.47	EACH	TRAF SIGNAL DET. & LEAD-IN REPLACE.
6545	\$58,718	\$57,499.55	EACH	BEACON AND FLASHING WARNING LI
6546	\$209,448	\$204,389.97	EACH	SCH'L. FLASH./FLASH. WARNING LGHT.M
6547	\$34,545	\$33,373.99	EACH	TEMPORARY ELECTRICAL DEVICE
6548	\$227,373	\$164,883.15	EACH	INTELLIGENT TRAFFIC SYSTEM(ITS)
6550	\$545,549	\$469,401.73	EACH	SIGNAL BETTERMENTS(NEW OR UPGRADE
6551	\$4,820	\$3,518.86	EACH	HIGHWAY LIGHTING BETTERMENTS
6552	\$1,393,620	\$1,287,320.79	EACH	SYSTE. GRND. MTD. FLAT SHEET SIGN M
6553	\$98,796	\$90,112.93	EACH	SYSTE.GRND.MTD.EXTRUSHEET SIGN INST
6554	\$8,105	\$5,566.66	EACH	OVERHEAD MTD. FLATSHEET SIGN MAINT.
6555	\$2,183	\$2,014.11	EACH	SYS.O-H MTD. FLAT SHEET SIGN INSTAL
6556	\$15,557	\$11,202.83	EACH	TRAF.SIGNAL SYS. COORD. OR SET-UP
6557	\$3,761	\$2,256.66	EACH	SYSTE.O-H MTD. EXTRUSHEET SIGNMAIN
6560	\$13,253	\$4,619.34	EACH	WEB CAMERA INSTALL./MAINTENANCE
6591	\$516,848	\$483,107.88	MNHR	TRAFFIC DETOURS

\$55,711,249      \$45,390,766

\$149,461,337      \$119,650,551



## **Snow & Ice Costs**

Review of the Snow and Ice control activity costs for the 33,000 lane miles of ODOT maintained U.S. and State Routes were used to determine the additional costs for the 6,988 lane miles within cities. The overall average cost per lane mile is \$1,599. The cost per lane mile for the three group types were used to determine an estimated cost within the cities. These figures do not include adjustments for slower speeds, various overhead obstructions, parking stalls, disposal of snow, etc. The cost does include material costs which includes the purchase of salt. This cost is strictly for the snow and ice control of the additional 6,988 lane miles. The chart below provides a summary of these estimates.

### **Additional Annual Cost for Snow & Ice Activities in Cities**

	MAJOR	AVERAGE	MINOR	TOTAL
CITY	\$18,058,070	\$2,987,522	\$287,700	<b>\$21,333,292</b>

Note 1: This does not include the required additional personnel, equipment, facilities, or incidentals.

## **Pavement Maintenance Costs**

Review of specific pavement related activity costs, such as pothole patching, filling and sealing cracks, and repairing curbs and/or gutters, were used to determine the additional costs within the cities and villages. The activities generated an overall average cost of \$481 per lane mile. The cost per lane mile for the three group types were used to determine an estimated cost within cities and villages. The chart below provides a summary of these estimates.

### **Annual Cost Estimate for Pavement Related Maintenance Activity**

	MAJOR	AVERAGE	MINOR	TOTAL
CITY	\$2,184,720	\$1,007,835	\$199,030	\$3,311,585
VILLAGE	\$225,218	\$542,407	\$361,190	\$1,128,815

**\$4,440,400**

## **Pavement Marking Maintenance Costs**

Review of specific pavement marking related activity costs, such as maintenance to centerline markings, auxiliary markings, pavement marking removal, etc., were used to determine the additional costs within the cities and villages. The activities generated an overall average cost of \$52 per lane mile. The cost for the three group types were used to determine an estimated cost within cities and villages. The chart below provides a summary of these estimates.

### **Annual Cost Estimate for Pavement Marking Related Maintenance Activity**

	MAJOR	AVERAGE	MINOR	TOTAL
CITY	\$163,813	\$138,048	\$8,731	\$310,592
VILLAGE	\$16,887	\$74,296	\$26,494	\$117,677

**\$428,269**

## **Sign Maintenance Costs**

Review of specific sign related activity costs, such as inspection flat-sheet maintenance of signs, delineator maintenance, overhead sign support maintenance, etc., were used to determine the additional costs within the cities and villages. The activities generated an overall average cost of \$118 per lane mile. The cost for the three group types were used to determine an estimated cost within cities and villages. The chart below provides a summary of these estimates.

### **Annual Cost Estimate for Sign Related Maintenance Activity**

	MAJOR	AVERAGE	MINOR	TOTAL
CITY	\$751,450	\$248,590	\$25,766	\$1,025,806
VILLAGE	\$77,465	\$133,788	\$78,186	\$289,440

**\$1,315,245**

## **Miscellaneous Maintenance Activity Costs**

Review of several additional maintenance activity costs were also considered to determine the additional costs within the cities and villages. The activities generated an overall average cost of \$1,375 per lane mile. The cost of the three group types were used to determine an estimated cost within cities and villages. The chart below provides a summary of these estimates.

### **Annual Cost Estimate for Miscellaneous Maintenance Activity**

	MAJOR	AVERAGE	MINOR	TOTAL
CITY	\$6,876,251	\$2,647,006	\$376,679	\$9,899,937
VILLAGE	\$708,856	\$1,424,593	\$1,143,011	\$3,276,460

**\$13,176,397**

The following chart summarizes the additional annual costs for the various maintenance activities:

**Total Annual Estimated Maintenance Costs**

<b>Maintenance Activity</b>	<b>Cost</b>
Snow & Ice	\$21,333,292
Pavement Maintenance	\$4,440,400
Pavement Marking	\$428,269
Sign Maintenance	\$1,315,245
Miscellaneous	\$13,176,397
<b>TOTAL</b>	<b>\$40,693,603</b>

## **Appendix F – Additional Costs for Labor, Facilities, and Equipment**

### **ADDITIONAL PAYROLL COSTS**

As mentioned in each of the previous sections, ODOT would require additional staff to perform planning, engineering, and maintenance tasks for these additional lane-miles of routes at our current level of service.

ODOT averages 35 lane miles per snow route. This requires 1203 snow plow drivers per shift. Factoring in the lower speed, intersections, overhead signals, street parking, snow removal, and other incidentals, the average route length would need to be reduced to 20 miles to maintain acceptable cycle times. This equates to a total of 349 additional snow routes, 380 snow plow trucks, and 589 additional snow plow drivers. The average cost of a single axle snow plow truck is \$125,000 which multiplies out to \$47.5 million and the average hourly rate for an entry level snow plow driver is \$18.03 which multiplies out to \$22.1 million annually.

Similarly, additional planning and engineering staff will be required to monitor, plan and design maintenance projects for these additional routes. The following two tables provide an estimate of additional payroll costs to maintain these additional routes.

#### **Estimated Personnel for Snow & Ice Control**

<b>ODOT</b>		<b>CITIES</b>
42,090	Lane Miles	6,988
2,027	Snow Plow Drivers	589
35	Miles Per Route	20
1,203	Drivers Per Shift (# of Routes)	349
1,700	Snow Plow Trucks	380
255	Mechanics / Techs	55
7	Trucks / Mechanic	7

#### **Additional Annual Payroll**

<b>Employee Category</b>	<b># Employees</b>	<b>Salary</b>	<b>Total Costs</b>
Snow Plow Drivers	589	\$37,500/year	\$22,088,000
Auto Mechanic/Technician	55	\$42,000/year	\$2,310,000
Planners/Engineers	100	\$60,000/year	\$6,000,000
<b>Total</b>	<b>744</b>		<b>\$30,400,000</b>

## **ONE TIME COSTS FOR FACILITIES AND EQUIPMENT**

Initial start-up costs would be incurred for purchase of additional equipment (plows, trucks, etc.) and facilities (to house staff and equipment).

Currently, ODOT utilizes 2,027 snow plow drivers, 206 mechanics, 1,700 snow plow trucks and 228 salt storage facilities to maintain the 42,090 lane miles. The additional 6,988 lane miles will require 380 additional snow plow trucks, 101 pieces of specialized snow and ice equipment, 589 snow plow drivers, 55 mechanics, and 45 storage facilities.

ODOT's salt storage capacity statewide is 621,000 tons. The additional 6988 lane miles will require an additional 103,000 tons of salt annually which will necessitate an additional 45 storage facilities. The average cost of a storage facility is \$180,000 which would equate to a total of \$8.1 million.

The following tables calculate the initial start-up costs for facilities and equipment. These estimated costs are not tabulated in the additional annual costs summarized in the following section.

### **Estimated Additional Storage Facilities for Salt**

% increase in County Lane Miles			Counties	Additional Storage Units per County Lane Miles	Total Storage Units
0%	< LM <=	10%	59	0	0
10%	< LM <=	33.33%	20	1	20
33.33%	< LM <=	66.66%	4	2	8
66.66%	< LM <=	100%	4	3	12
100%	< LM <=	133.33%	0	4	0
133.33%	< LM <=	166.66%	1	5	5

### **Estimated Assets for Initial Startup of Maintenance**

ASSET	Quantity	Direct Cost	Total Cost
Salt Storage Units	45	\$180,000	\$8,100,000
Snow Plow Trucks	380	\$125,000	\$47,500,000
Specialized Equipment	101	\$30,000	\$3,030,000
			<b>\$58,630,000</b>

## Appendix G– Tabulation of Routes by County

ODOT performs a variety of different functions, and some of these functions may occur within Cities and Villages. The total number of lane miles maintained may vary for each activity performed. The following chart provides a breakdown of lane miles within the ODOT counties.

		(1)	(2)	(1)+(2)	(3)	(4)	(1)+(2)+(3)	$\frac{(3)+(4)}{(1)+(2)}$	(2)+(3)
COUNTY	COUNTY	ODOT Interstate	ODOT US & SR only	ODOT Maintained	US & SR within Villages	US & SR within Cities	ODOT Maintained including Villages	% increase of miles for ODOT to maintain US & SR in Cities and Villages	ODOT Maintained including Villages (US & SR only)
ADA	MNR	0.00	447.72	447.72	34.38	0.00	482.10	7.68%	482.10
ALL	AVG	92.61	343.85	436.46	15.04	37.56	451.50	12.05%	358.89
ASH	AVG	96.91	473.09	570.00	28.25	26.58	598.25	9.62%	501.34
ATB	AVG	114.76	650.16	764.92	59.08	78.78	824.00	18.02%	709.24
ATH	MNR	0.00	468.73	468.73	27.08	34.66	495.81	13.17%	495.81
AUG	AVG	50.08	378.85	428.93	24.10	34.66	453.03	13.70%	402.95
BEL	MNR	143.09	475.10	618.19	54.22	10.20	672.41	10.42%	529.32
BRO	AVG	0.00	410.74	410.74	62.01	0.00	472.75	15.10%	472.75
BUT	MAJ	77.92	379.15	457.07	12.50	192.84	469.57	44.93%	391.65
CAR	MNR	0.00	287.54	287.54	17.55	0.00	305.09	6.10%	305.09
CHP	AVG	0.00	390.00	390.00	17.20	20.24	407.20	9.60%	407.20
CLA	MAJ	140.31	298.26	438.57	17.28	95.17	455.84	25.64%	315.53
CLE	MNR	83.28	529.56	612.84	51.98	11.00	664.82	10.28%	581.54
CLI	AVG	61.32	323.68	385.00	29.14	34.42	414.14	16.51%	352.82
COL	AVG	0.00	570.03	570.03	59.44	56.22	629.47	20.29%	629.47
COS	MNR	0.00	437.57	437.57	10.48	14.96	448.05	5.81%	448.05
CRA	AVG	0.00	396.00	396.00	8.13	47.04	404.12	13.93%	404.12
CUY	MAJ	777.72	2.32	780.04	70.81	1,138.59	850.85	155.04%	73.13
DAR	AVG	0.00	493.80	493.80	38.46	21.42	532.26	12.13%	532.26
DEF	AVG	0.00	285.20	285.20	16.93	39.71	302.13	19.86%	302.13
DEL	AVG	93.68	383.76	477.44	11.26	65.62	488.70	16.10%	395.02
ERI	AVG	0.00	338.64	338.64	15.11	60.42	353.75	22.30%	353.75
FAI	AVG	11.88	370.45	382.33	20.15	60.38	402.48	21.06%	390.60
FAY	AVG	77.50	342.40	419.90	12.64	23.00	432.54	8.49%	355.04
FRA	MAJ	734.94	182.68	917.62	57.38	594.02	975.00	70.99%	240.06
FUL	MNR	0.00	246.46	246.46	27.09	10.48	273.55	15.24%	273.55
GAL	AVG	0.00	410.12	410.12	28.74	0.92	438.86	7.23%	438.86
GEA	MNR	0.00	398.86	398.86	12.32	12.04	411.18	6.11%	411.18
GRE	AVG	106.54	293.83	400.37	13.28	83.49	413.65	24.17%	307.11

ODOT performs a variety of different functions, and some of these functions may occur within Cities and Villages. The total number of lane miles maintained may vary for each activity performed. The following chart provides a breakdown of lane miles within the ODOT counties.

		(1)	(2)	(1)+(2)	(3)	(4)	(1)+(2)+(3)	$\frac{(3)+(4)}{(1)+(2)}$	(2)+(3)
C O U N T Y	C O U N T Y	ODOT Inter- state	ODOT US & SR only	ODOT Maintained	US & SR within Villages	US & SR within Cities	ODOT Maintained including Villages	% increase of miles for ODOT to maintain US & SR in Cities and Villages	ODOT Maintained including Villages (US & SR only)
GUE	MNR	207.76	368.10	575.86	20.84	17.48	596.70	6.65%	388.94
HAM	MAJ	555.28	212.08	767.36	57.58	435.89	824.94	64.31%	269.66
HAN	AVG	100.92	435.88	536.80	19.92	53.58	556.72	13.69%	455.80
HAR	AVG	0.00	319.14	319.14	15.32	25.32	334.46	12.73%	334.46
HAS	MNR	0.00	318.36	318.36	28.66	0.00	347.02	9.00%	347.02
HEN	AVG	0.00	327.86	327.86	19.14	30.98	347.00	15.29%	347.00
HIG	AVG	0.00	481.72	481.72	17.42	23.48	499.14	8.49%	499.14
HOC	MNR	0.00	352.57	352.57	3.86	13.61	356.43	4.96%	356.43
HOL	MNR	0.00	333.36	333.36	17.16	0.00	350.52	5.15%	350.52
HUR	AVG	0.00	419.89	419.89	28.42	44.41	448.31	17.35%	448.31
JAC	MNR	0.00	407.36	407.36	6.84	27.58	414.20	8.45%	414.20
JEF	AVG	0.00	368.47	368.47	62.68	29.94	431.15	25.14%	431.15
KNO	AVG	0.00	362.06	362.06	19.86	33.45	381.92	14.72%	381.92
LAK	MAJ	152.14	173.33	325.47	20.76	303.10	346.23	99.51%	194.09
LAW	MNR	0.00	387.37	387.37	35.90	3.12	423.27	10.07%	423.27
LIC	AVG	133.44	446.45	579.89	52.00	94.01	631.89	25.18%	498.45
LOG	AVG	0.00	458.60	458.60	31.08	27.01	489.68	12.67%	489.68
LOR	MAJ	74.98	365.98	440.96	49.77	267.74	490.73	72.00%	415.75
LUC	MAJ	168.88	203.23	372.11	21.42	371.75	393.53	105.66%	224.65
MAD	AVG	140.20	324.14	464.34	29.78	23.72	494.12	11.52%	353.92
MAH	MAJ	136.83	446.02	582.85	17.00	121.23	599.85	23.72%	463.02
MAR	AVG	0.00	402.37	402.37	14.89	44.47	417.26	14.75%	417.26
MED	AVG	212.63	376.68	589.31	13.76	60.76	603.07	12.65%	390.44
MEG	MNR	0.00	407.96	407.96	18.58	0.00	426.54	4.55%	426.54
MER	AVG	0.00	390.80	390.80	26.08	22.30	416.88	12.38%	416.88
MIA	AVG	101.80	298.39	400.19	24.82	61.41	425.01	21.55%	323.21
MOE	MNR	0.00	399.48	399.48	33.16	0.00	432.64	8.30%	432.64
MOT	MAJ	304.31	142.65	446.96	15.94	368.36	462.90	85.98%	158.59
MRG	MNR	0.00	362.58	362.58	13.81	0.00	376.38	3.81%	376.38
MRW	MNR	80.42	291.90	372.32	24.76	0.00	397.08	6.65%	316.66
MUS	AVG	109.75	505.99	615.74	18.04	41.54	633.78	9.68%	524.03

ODOT performs a variety of different functions, and some of these functions may occur within Cities and Villages. The total number of lane miles maintained may vary for each activity performed. The following chart provides a breakdown of lane miles within the ODOT counties.

		(1)	(2)	(1)+(2)	(3)	(4)	(1)+(2)+(3)	$\frac{(3)+(4)}{(1)+(2)}$	(2)+(3)
C O U N T Y	C O U N T Y	ODOT Inter- state	ODOT US & SR only	ODOT Maintained	US & SR within Villages	US & SR within Cities	ODOT Maintained including Villages	% increase of miles for ODOT to maintain US & SR in Cities and Villages	ODOT Maintained including Villages (US & SR only)
NOB	MNR	75.68	380.22	455.90	13.96	0.00	469.86	3.06%	394.18
OTT	MNR	0.00	283.09	283.09	20.93	12.26	304.02	11.72%	304.02
PAU	MNR	0.00	313.50	313.50	26.62	0.00	340.12	8.49%	340.12
PER	MNR	0.00	329.54	329.54	43.96	0.00	373.50	13.34%	373.50
PIC	MNR	12.64	399.56	412.20	24.16	12.70	436.36	8.94%	423.72
PIK	MNR	0.00	360.64	360.64	21.12	0.00	381.76	5.86%	381.76
POR	AVG	91.92	378.63	470.55	15.94	109.68	486.49	26.70%	394.57
PRE	MNR	70.68	307.86	378.54	28.56	18.90	407.10	12.54%	336.42
PUT	MNR	0.00	371.42	371.42	50.35	0.00	421.77	13.56%	421.77
RIC	MAJ	123.84	417.40	541.24	30.16	133.82	571.40	30.30%	447.56
ROS	AVG	0.00	546.45	546.45	6.78	27.98	553.23	6.36%	553.23
SAN	AVG	0.00	356.92	356.92	19.14	45.24	376.06	18.04%	376.06
SCI	AVG	0.00	425.39	425.39	16.58	40.07	441.97	13.32%	441.97
SEN	AVG	0.00	388.04	388.04	17.18	52.32	405.22	17.91%	405.22
SHE	AVG	82.20	251.21	333.41	23.39	26.73	356.80	15.03%	274.59
STA	MAJ	92.32	559.44	651.76	38.10	193.32	689.86	35.51%	597.54
SUM	MAJ	370.59	104.86	475.45	70.42	432.54	545.87	105.79%	175.28
TRU	AVG	49.63	741.21	790.84	24.32	103.26	815.16	16.13%	765.53
TUS	AVG	139.88	323.61	463.49	38.34	47.44	501.83	18.51%	361.95
UNI	AVG	0.00	401.14	401.14	11.80	34.62	412.94	11.57%	412.94
VAN	MNR	0.00	362.80	362.80	9.77	17.02	372.56	7.38%	372.56
VIN	MNR	0.00	317.81	317.81	12.96	0.00	330.77	4.08%	330.77
WAR	AVG	184.80	281.77	466.57	20.40	128.04	486.97	31.82%	302.17
WAS	AVG	70.56	512.57	583.13	10.95	44.60	594.09	9.53%	523.53
WAY	AVG	42.60	499.23	541.83	37.04	44.47	578.87	15.04%	536.27
WIL	MNR	0.00	333.69	333.69	38.23	15.30	371.92	16.04%	371.92
WOO	AVG	186.20	512.11	698.31	32.58	81.77	730.89	16.38%	544.69
WYA	MNR	0.00	441.12	441.12	19.58	15.52	460.70	7.96%	460.70
Total		6,735	33,000	39,735	2,355	6,988	42,090	23.51%	35,355