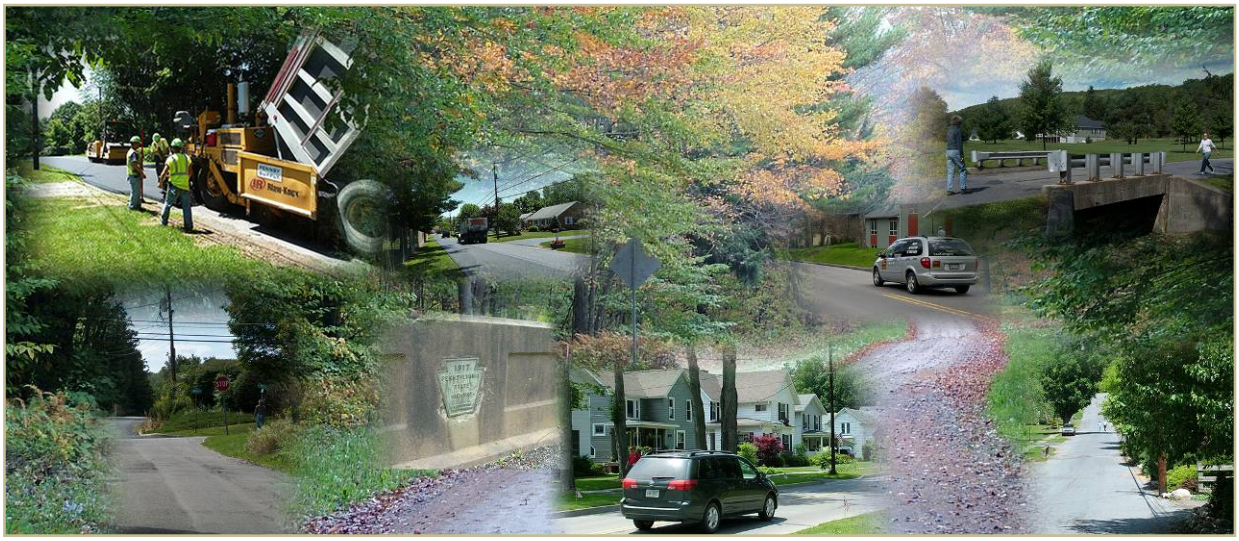
PENNSYLVANIA STATE
TRANSPORTATION ADVISORY COMMITTEE

FINANCIAL NEEDS OF COUNTIES AND MUNICIPALITIES FOR HIGHWAYS AND BRIDGES



FINAL REPORT

DECEMBER 2011

The Pennsylvania State Transportation Advisory Committee

The Pennsylvania State Transportation Advisory Committee (TAC) was established in 1970 by Act 120 of the State Legislature, which also created the Pennsylvania Department of Transportation (PennDOT). The Advisory Committee has two primary duties. First, the Committee "consults with and advises the State Transportation Commission and the Secretary of Transportation on behalf of all transportation modes in the Commonwealth." In fulfilling this task, the Committee assists the Commission and the Secretary "in the determination of goals and the allocation of available resources among and between the alternate modes in the planning, development, and maintenance of programs, and technologies for transportation systems." The second duty of the Advisory Committee is "to advise the several modes (about) the planning, programs, and goals of the Department and the State Transportation Commission." The Committee undertakes in-depth studies on important issues and serves as a valuable liaison between PennDOT and the general public.

The Advisory Committee consists of the following members: the Secretary of Transportation; the heads (or their designees) of the Department of Agriculture, Department of Education, Department of Community and Economic Development (DCED), Public Utility Commission, Department of Environmental Protection, and the Governor's Policy Office; two members of the State House of Representatives; two members of the State Senate; and 19 public members—seven appointed by the Governor, six by the President Pro Tempore of the Senate, and six by the Speaker of the House of Representatives.

Public members with experience and knowledge in the transportation of people and goods are appointed to represent a balanced range of backgrounds (industry, labor, academic, consulting, and research) and the various transportation modes. Appointments are made for a three-year period and members may be reappointed. The Chair of the Committee is annually designated by the Governor from among the public members.

Acknowledgements

TAC Members

Chair

Mr. Louis C. Schultz, Jr.
Transportation Consultant
Cumberland County

Members

Hon. Barry J. Schoch, P.E.
Secretary
Pennsylvania Department of Transportation

Ms. Jennifer Branstetter
Secretary of Planning and Policy
Office of the Governor

Mr. Roy E. Brant, Ph.D.
Edinboro University (ret.), Crawford County

Mr. Brad J. Cober
Somerset County Court Administrator

Mr. Thomas C. Geanopulos
Marketing Consultant (ret.), Allegheny County

Hon. George Greig
Secretary
Pennsylvania Department of Agriculture

Hon. Anthony V. Herzog
Commissioner, Wayne County

Hon. David S. Hickernell
Pennsylvania State House of Representatives
District 98

Hon. Richard A. Kasunic
Pennsylvania State Senate, District 32

Hon. Michael Krancer
Secretary, Pennsylvania Department of
Environmental Protection

Mr. Joseph Mangarella
Carol Ann Fashions (ret.), Cambria County

Mr. Joel B. McNeil
Brookville Equipment Corporation
Jefferson County

Ms. Fran O'Brien
Delaware River Port Authority
Philadelphia County

Hon. Robert F. Powelson
Chairman, Public Utility Commission

Hon. John C. Rafferty, Jr.
Pennsylvania State Senate, District 44

Mr. Robert T. Regola, III
McCormick Taylor, Inc.
Westmoreland County

Mr. Sean M. Reilly, Esq.
Roscommon International Inc.
Philadelphia County

Mr. John (Jack) Rutter, P.E.
IA Construction Corporation (ret.)
York County

Mr. Gustave Scheerbaum, III, P.E.
Consultant, Philadelphia County

Mr. Jeffrey J. Stroehmann
JDM Consultants, Union County

Hon. Ronald Tomalis
Secretary
Pennsylvania Department of Education

Mr. Michael W. Untermeyer, Esq.
William-Michael Associates
Philadelphia County

Mr. Ronald G. Wagenmann
Manager, Upper Merion Township
Montgomery County

Hon. C. Alan Walker
Secretary, Pennsylvania Department of
Community and Economic Development

Mr. Charles F. Welker, P.E.
EADS Group, Inc. (ret.), Blair County

Ms. Mary Worthington
Wellsboro Area Chamber of Commerce
Tioga County

Acting Executive Secretary

Ms. Julie Harmantzis
Office of the State Transportation
Commission and Transportation Advisory
Committee

Study Task Force

Chair

Ronald Wagenmann
TAC

Members

Louis Schultz
TAC Chairman

Dr. Roy Brant
TAC

Brad Cober
TAC

Elam Herr
PA State Association of Township Supervisors

Anthony Herzog
TAC

Doug Hill
County Commissioners Association of PA

Joe Mangarella
TAC

Bob Regola
TAC

Jack Rutter
TAC

Gustave Scheerbaum
TAC

Amy Sturges
PA League of Cities & Municipalities; PA State Association of Township Commissioners

Ed Troxell
PA State Association of Boroughs

PennDOT Partners

James Arey
Center for Program Development and Management

Jessica Clark
Center for Program Development and Management

Bryan Kendro
Policy Office

Tammy McElfresh
Bureau of Municipal Services

James Ritzman
Deputy Secretary for Planning

Natasha Schock
Policy Office

Michael Schultz
Center for Program Development and Management

Larry Shifflet
Center for Program Development and Management

Ashley Shultz
Center for Program Development and Management

Consultant Staff

Brian Funkhouser
Gannett Fleming, Inc.

Nicole Hendrickson
Delta Development Group, Inc.

Julia Johnson
Wordsworth Communications

Dennis Lebo
Project Manager, Gannett Fleming, Inc.

Lisa Olszak
Olszak Management Consulting

Coleen Terry
Delta Development Group, Inc.

Table of Contents

List of Figures

List of Tables

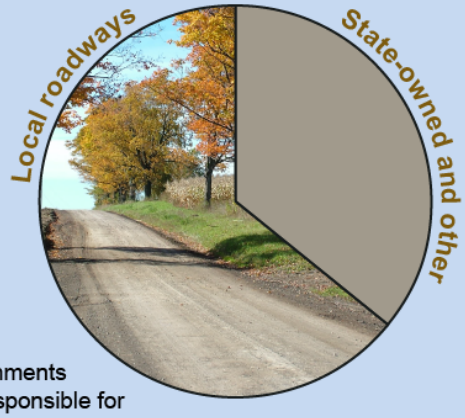
Executive Summary

The Pennsylvania Transportation Advisory Committee (TAC) performed this study to better understand the needs and requirements of the system of local roads and bridges in relation to the financing of the system. This was a more comprehensive analysis of the local system than has been done in the past.

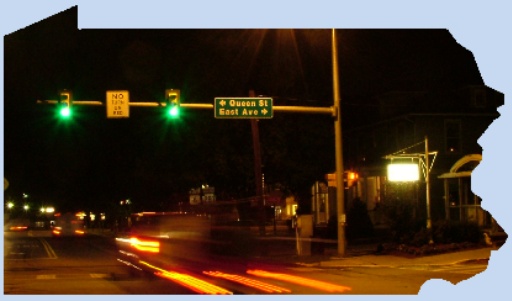
Local Governments are Responsible for Extensive Transportation Infrastructure

Local governments are responsible for more than 77,500 miles of highway, or 64 percent of all public road mileage, in Pennsylvania. There are also an estimated 12,000 bridges greater than eight feet long at the local level. The state's 14,000 traffic signals on state and local roads are owned and operated by local governments. These local roads and bridges are an important segment of the total transportation system, and they provide critical links to homes and businesses.

Responsibility for this vast system is divided among 2,562 local municipalities and 67 counties. Nearly all road mileage is owned by municipal governments, while counties have a greater responsibility for bridges, owning 42 percent of local bridges. Many local governments struggle to provide basic maintenance on this system and lack the resources to adequately plan for the long-term capital needs on the system.

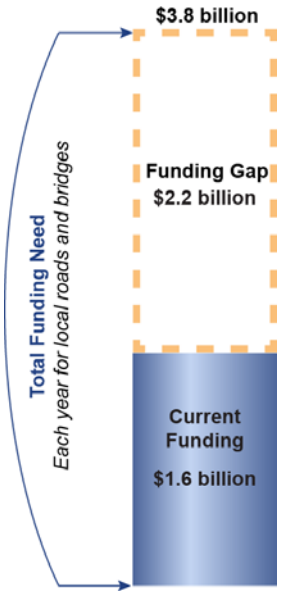


Local governments are responsible for more than 77,500 miles of highway, or 64 percent of all public road mileage, in Pennsylvania.



Pennsylvania's 14,000 traffic signals on state and local roads are owned and operated by local governments.

Statewide, local governments are responsible for an estimated 12,000 bridges greater than eight feet long.



Local Governments Face a $2.2 Billion Transportation Funding Gap

The study found that local governments spend approximately $1.6 billion on their roads and bridges. The local share of statewide liquid fuels revenue and other state revenue provided to municipalities and counties account for only $375 million of this spending. State and federal project grants and municipal general funds make up the difference.

The study estimated total needs to maintain and repair local roads and bridges to be $3.8 billion. This leaves an unmet need of more than $2 billion.

To fill this gap in funding for the local system, the TAC makes the following recommendations:

Recommendation #1:

The General Assembly, PennDOT, and local governments must each take actions to raise the revenue needed to address the growing backlog of local roadway and bridge needs.

Local government can play a larger role in overall mobility within each region and locale across Pennsylvania. However, the estimated $2 billion in unmet needs on the local system must be addressed. An adequate share of any new transportation revenue initiative in Pennsylvania should be provided to local governments for their transportation system needs. The Transportation Advisory Committee supports the Transportation Funding Advisory Commission's recommended revenue package which would provide more than $300 million in new annual state revenue for local highways and bridges.

Beyond that, local governments need to raise additional revenue for transportation, but they have limited options available to them. The General Assembly should provide enabling legislation so that local governments can have greater options to raise revenue (implement a tax) to support local transportation investment.

Recommendation #2:

PennDOT should take a more prominent role in the operations of traffic signals across the Commonwealth.

Traffic signal improvements can provide the most cost-effective investments to improve the flow of traffic. While traffic signals are owned by local governments, PennDOT should partner with local governments to oversee modernizing and optimizing their operation. This would provide a faster transition to more consistent, updated signal systems statewide. PennDOT involvement would range from technical assistance for individual signal operations to coordination of multiple signals along highway corridors and across municipal boundaries. PennDOT should take the lead to integrate signal operations along key corridors into regional traffic management centers to allow for better rerouting of traffic during major incidents and emergencies.

Recommendation #3:

PennDOT should take steps to expand the information available on the condition and needs of the local system.

While PennDOT has knowledge of the *extent* of Pennsylvania's locally-owned roadway network, there is limited information available on the *condition* of those assets. This is particularly true for locally-owned roadways and locally-owned bridges that are less than 20 feet long. This study developed an analytical approach to calculate statewide needs on the local system, but there is no substitute for actual reliable information upon which to make decisions. PennDOT has initiated efforts with its planning partners across the state to collect additional information on the local system. These efforts need to continue and be expanded statewide to provide more information about this 77,500-mile local system.

With regard to spending for transportation, local governments electronically report revenue and expenditures to DCED on an annual basis. DCED asks for data on a number of line items under spending for "public works: highways and streets," such as winter maintenance, lighting, storm sewers and drains, etc. However, this data is not made available in a form that can be used for statewide planning or analysis. PennDOT and DCED should collaborate to make this data available and accessible.

Introduction

Local government is responsible for more than 77,500 miles of public highways in Pennsylvania. The responsibility for operations and maintenance of these roads is split among 67 counties and 2,562 municipalities throughout the state. Unlike PennDOT highways, there is limited reliable data available regarding the condition of local roads, the needs on this system, and the financial picture, including available funding and unfunded needs.

This study had its origins in the Transportation Funding Study which the Transportation Advisory Committee completed in May 2010. That report included a $432 million estimate of unmet needs for local highways and bridges. However, it was acknowledged that there was limited information about the 77,500 miles of local roads, and this estimate was largely based on available information on local bridges and traffic signals. The Committee decided to undertake this study to develop a more comprehensive analysis of local needs.

The purpose of this study was to investigate the operation and maintenance of local roads, including highway pavements, bridges, signing and markings, traffic signals, winter maintenance, and stormwater management. This study looked at the needs on the local system and developed methods to quantify these needs. It also assessed the current funding levels and funding sources to address these needs, and considered the adequacy of the current funding sources.

The study relied on the collection of available information and data on the local highway system from public sources including PennDOT, DCED, and local government organizations. To assist in closing information and data gaps, a survey was undertaken to collect information from counties and municipalities across the state. To the extent possible, results were used to extrapolate data to estimate statewide values.

In addition, needs on the local system were analyzed based on sound asset management concepts and acceptable local government practices. Methodologies developed for the 2010 Transportation Funding Study were employed to the extent possible.

The report is organized into the following chapters:

- Local Government Structure
- Existing Trends and Conditions for Locally-owned Roadways and Bridges
- Municipal Survey
- Local Revenue and Expenditures
- Local Highway and Bridge Needs
- Funding Options for Local Transportation
- Study Findings and Recommendations

1. Local Government Structure

This section provides information on the composition of local government in Pennsylvania.

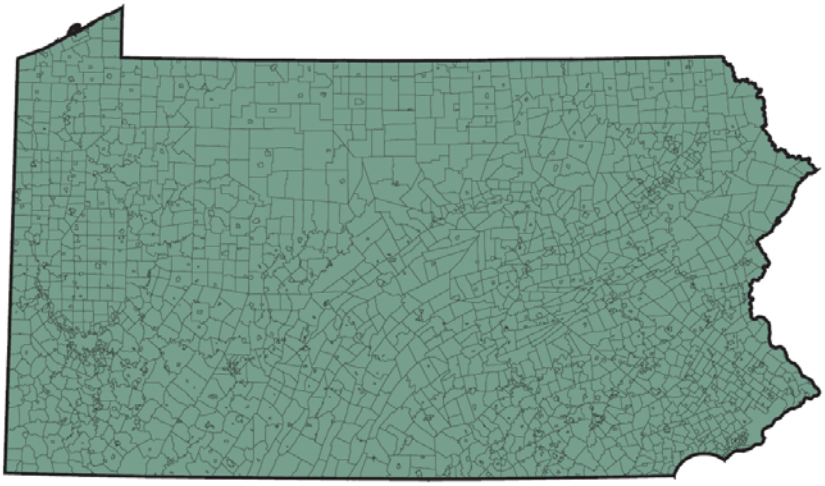
1.1 Pennsylvania's Municipal Structure

The Commonwealth of Pennsylvania has one of the highest numbers of general purpose units of local government in the U.S.; 2,562, or one unit of local government for every 4,792 persons. Municipal size ranges from the City of Philadelphia, with more than 1.5 million persons, to Centralia Borough, which in 2010 had only seven residents. Among the 50 states, only Illinois and Minnesota have more general purpose government entities. According to the Governor's Center for Local Government Services, 80 percent of Pennsylvania's municipalities govern fewer than 5,000 people, while 60 percent govern fewer than 2,500.

These units of local government are part of 67 counties that comprise the Commonwealth of Pennsylvania. The counties function as agents of the state for some functions. Legislation enacted in recent years has granted the county boards of commissioners greater control of and responsibility for county government. The size of counties enables them to deal with functions that can be better performed on an area-wide basis, such as public transportation services.

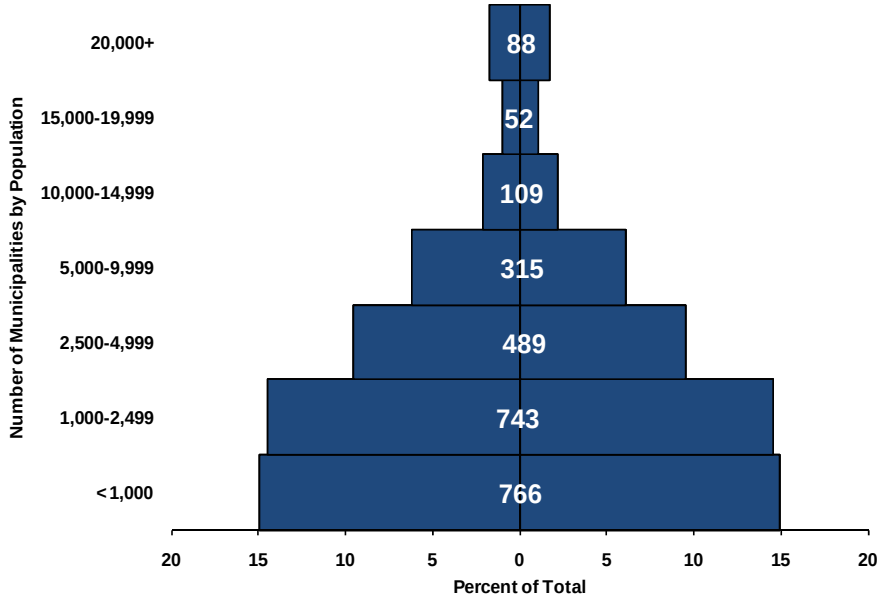
Figure 1 spatially shows the magnitude of Pennsylvania's local governmental structure, while Figure 2 demonstrates the state's array of municipalities by size of total population.

Figure 1: Pennsylvania has 2,562 Units of Local Government



Source: The Brookings Institution

Figure 2: Pennsylvania Municipalities by Population (excludes counties)



Source: Governor's Center for Local Government Services

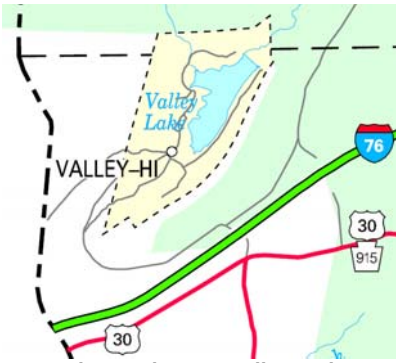
This number of local governments does not include other units, such as counties (Pennsylvania has 67) or school districts (501). Local municipalities in the state are generally classified as cities, boroughs, or townships of the first or second class. (The Town of Bloomsburg is unique in Pennsylvania in that it is the only community classified as a "town.")

Table 1 below shows the general composition of the state's local municipalities, by classification.

Table 1: Number of Municipalities by Classification (excludes counties)

	Number	Examples
Cities	56	Philadelphia, Allentown
Boroughs	958	Carlisle, West Chester
First Class Townships	93	Hampden Township, Cumberland County
Second Class Townships	1,454	Sandy Township, Clearfield County
Town	1	Bloomsburg
Total	**2,562**	

Source: Governor's Center for Local Government Services, 10/2010

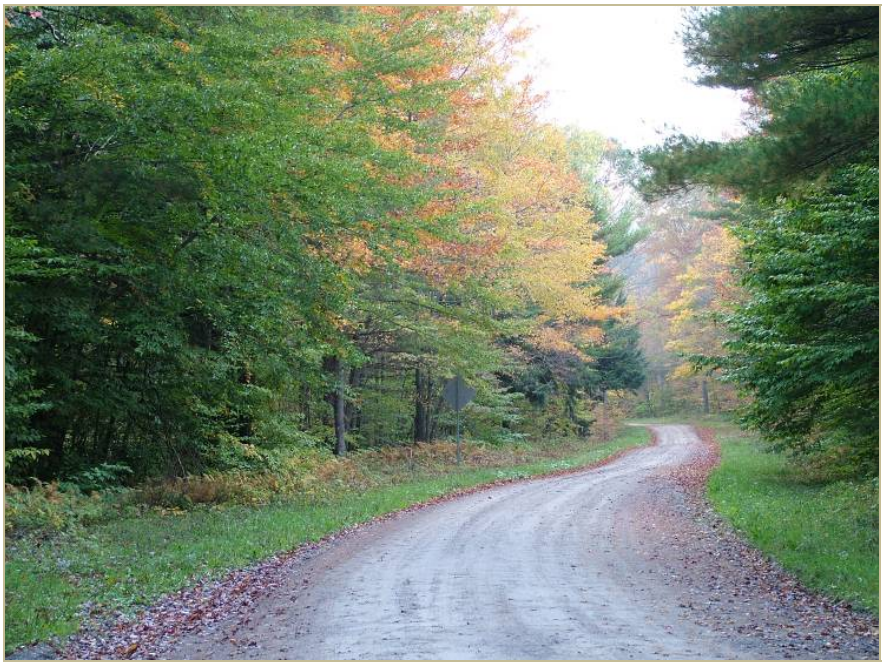


Boroughs can be as small as Fulton County's Valley-Hi Borough, which has only 15 residents.

Among Pennsylvania cities, there are four classifications indicating size: first class, second class, second class A, and third class. Philadelphia is classified as the sole first class city in the Commonwealth, while Pittsburgh is the only second class city. Among the state's larger cities, the City of Scranton has a unique classification, "Second Class A." The remaining cities in the Commonwealth are classified as cities of the third class.

Among the state's townships, there are two classifications: first and second class. First class townships are generally suburban communities located within the state's metropolitan areas, while the second class townships range from suburban to rural. To become a township of the first class, a second class township must have a population density of 300 persons per square mile, and voters must approve of the change of classification in a referendum. It should be noted that many of Pennsylvania's second class townships meet the density requirements yet have remained second class.[1] Most first class townships are clustered around cities and boroughs because they elected to change their status to dissuade annexation by a city or borough (second class townships didn't receive this protection until 1968). Municipalities could reorganize under the Home Rule Act, but there has been very little use of that practice over the past decade. Townships of the first class can also have a civil service commission which can test and appoint certain municipal employees.

Counties also have classifications, and since the 1950s have been categorized by one of nine classes "for the purposes of legislation and the regulation of their affairs." Results of the 2010 Census have been used to certify changes in class.



[1] Source: The Pennsylvania Manual

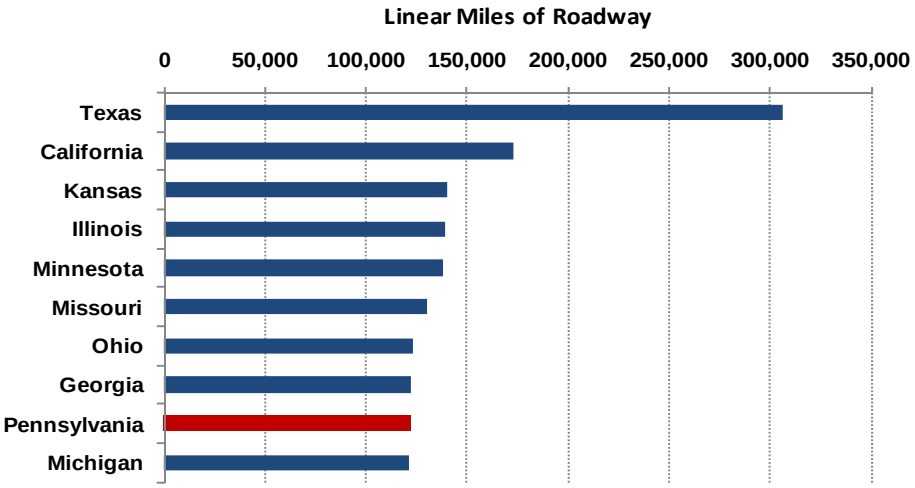
2. Existing Trends and Conditions for Locally-owned Roadways and Bridges

This section highlights what is known regarding the extent and condition of the state's locally-owned transportation assets, including its roadway, bridges, and traffic signals. ***Because data has been gathered from different sources, statistics such as local highway mileage may vary***. In some cases, there are reasons for that which are explained. In other cases, it is a matter of slight differences between sources.

2.1 Overview of Pennsylvania's Roadway and Bridge Inventory

Among the 50 states, Pennsylvania has one of the most expansive roadway networks. According to 2008 data from FHWA, Pennsylvania ranks ninth in the nation, with a total of 121,770 miles of roadway. This includes roadway owned and maintained by a variety of owners, including: PennDOT, the Pennsylvania Turnpike, other state agencies, and county and local governments. Figure 3 shows how Pennsylvania compares to states with the nation's largest highway networks.

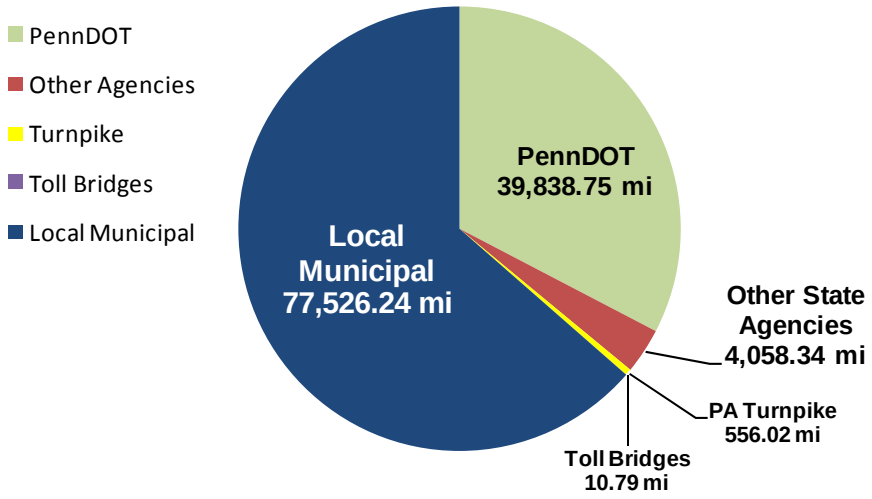
Figure 3: Total Public Road Length, 2008



Source: Federal Highway Administration, Table HM-10, October 2009

While Pennsylvania has one of the nation's largest roadway networks, a majority of this network is owned and maintained by local government, as shown in Figure 4.

Figure 4: Pennsylvania Linear Miles of Roadway by Owner, 2009



Source: PennDOT Bureau of Planning and Research

PennDOT's Bridge Management System (BMS) is an information tool for asset management as well as monitoring the progress of Pennsylvania's bridge program. In accordance with federal requirements, all bridges greater than 20 feet long are inspected every two years, regardless of ownership, and inspection data is included in BMS. Therefore, there is considerable information about all local bridges over 20 feet long.

In addition, PennDOT inspects and includes data on all state-owned bridges between 8 and 20 feet in length. There are no requirements for local bridges under 20 feet. While BMS contains some information on 762 local bridges less than 20 feet, the information is voluntarily reported and is far from complete. According to PennDOT's BMS, there are 6,332 locally-owned bridges greater than 20 feet in length throughout the state. Table 2 shows the number of bridges in Pennsylvania by length and by ownership. Prior to this study, there has been no basis for estimating the number of local bridges less than 20 feet in length.

Table 2: Bridges in Pennsylvania by Total Length, 2011

System	Span Length		Total
	Eight to 20 feet	Greater than 20 feet	
State	9,867	15,446	25,313
Local (non-state)	**	6,332	**

Source: PennDOT Bureau of Design, 6/29/11

** Unknown

2.2 Ownership of the Local System

Ownership of local roads and bridges is a function of Pennsylvania history and the timeframes for development of different portions of the system. The result is that the system is owned and maintained by a combination of the different municipal types along with Pennsylvania's 67 counties. The following provides additional details for roads and bridges.

2.2.1 Local Roadway Ownership

According to data from PennDOT's Bureau of Planning and Research, more than 77,500 linear miles of roadway in Pennsylvania—or 64 percent of the state's total roadway miles—are owned by municipalities. Nationally, local governments own about 77 percent of all roadway miles.

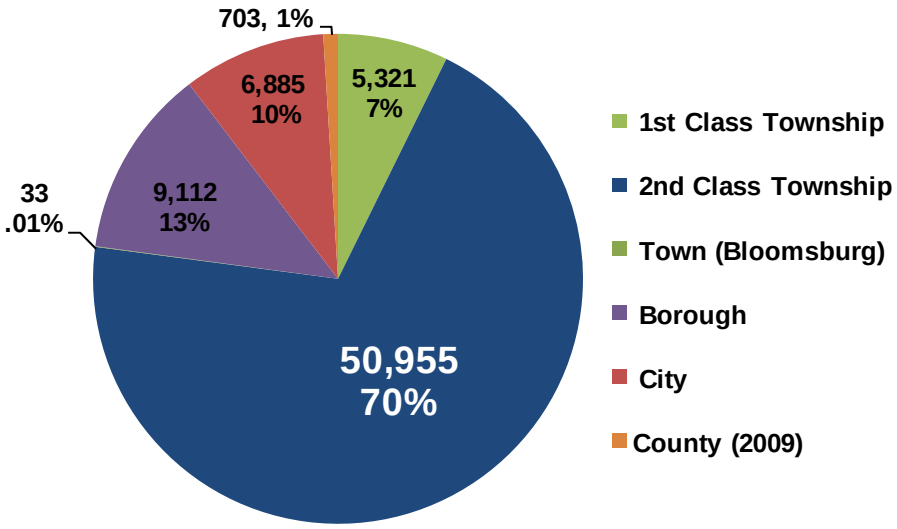
Of the more than 77,500 linear miles of municipally-owned roadway, a majority are owned and maintained by second class townships, as shown in Figure 5. Boroughs own and maintain the second-largest inventory of such facilities, at 9,112 miles, while cities and first class townships own 6,885 and 5,321 miles, respectively. Counties also own some roadway mileage, totaling 702.7 linear miles. Thirty-seven of the state's counties do not own any roadway mileage. Table 3 shows the counties with the largest county-owned roadway network. Finally, the Town of Bloomsburg is the only community classified as such in Pennsylvania. It owns and maintains 33 miles of roadway.

Table 3: Counties with the Largest County-owned Roadway Network

County	Miles
1. Allegheny	355.4
2. Luzerne	117.2
3. Montgomery	72.8
4. Westmoreland	52.3
5. Beaver	23.3
6. Washington	19.5
7. Lackawanna	17.5
8. Blair	11.0
9. Berks	6.0
10. Lancaster	4.6

Source: PennDOT Bureau of Planning and Research

Figure 5: Non-state-owned Linear Miles by Municipal Type, 2010



Note: These figures do not include turnback miles, which are not categorized by municipality in the database.
Source: PennDOT Bureau of Planning and Research

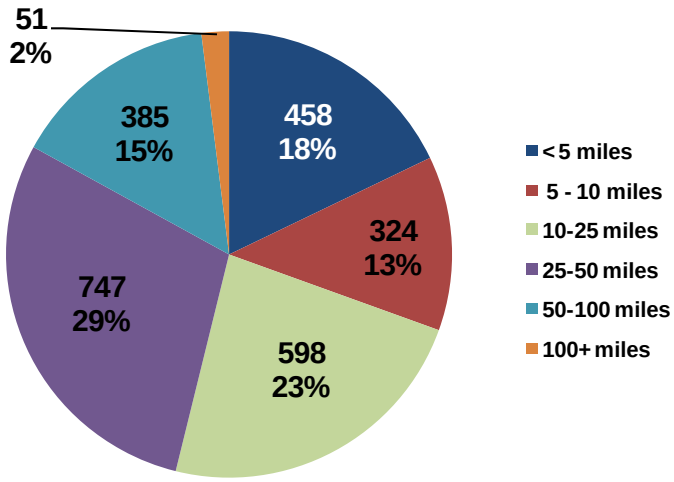
Table 4: Municipalities with the Largest Municipally-owned Roadway Network

County	Miles
1. Philadelphia	2,213
2. Pittsburgh	895
3. Erie	309
4. Allentown	269
5. Scranton	262
6. Hempfield Twp, Westmoreland Co.	222
7. Millcreek Twp, Erie Co.	207
8. Lower Merion Twp, Montgomery Co.	205
9. Bethlehem	205
10. Lower Paxton Twp, Dauphin Co.	197

Source: PennDOT Bureau of Municipal Services

Figure 6 shows the distribution of municipalities by miles of locally-owned roadway. The figure shows that nearly one-third of all municipalities in the Commonwealth own and maintain a network smaller than 10 miles in size, while 54 percent maintain a network 25 miles in size or smaller. With more than 2,200 linear miles of municipally-owned roadway, the City of Philadelphia has Pennsylvania's largest locally-owned roadway network. There are at least five municipalities that do not own any roadway at all. The average Pennsylvania municipality owns and maintains 30 miles of roadway.

Figure 6: Municipalities by Miles of Municipally-owned Roadway, 2010



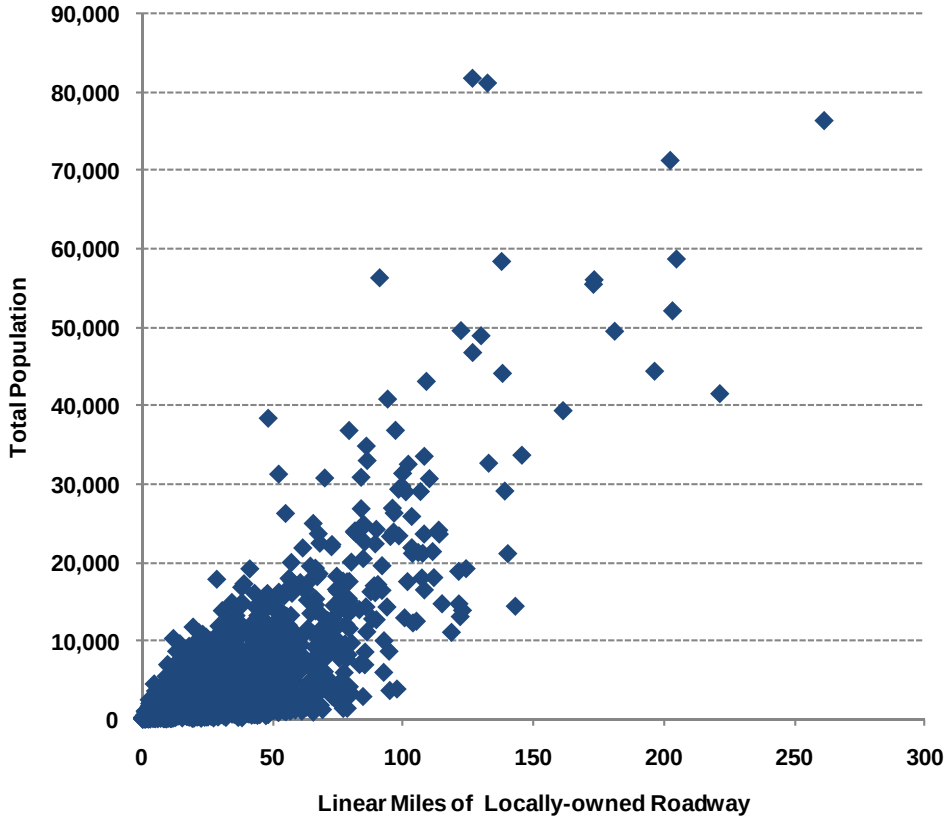
Source: PennDOT Bureau of Municipal Services

Shown another way, Figure 7 depicts the state's distribution of municipalities by total linear roadway miles and total population. The figure shows that the vast majority of Pennsylvania municipalities own fewer than 100 miles of roadway. Note that, due to their larger size and potential for "washing out" data from the state's smaller municipalities, data for the cities of Philadelphia, Pittsburgh, Allentown and Erie is not shown.

The figure shows a fairly strong correlation between the size of a municipality's total population and locally-owned roadway network. Some notable exceptions include Westmoreland County's Hempfield Township,[2] which ranks sixth statewide in the size of its locally-owned roadway network, yet had a 2010 population of only 43,241 persons. By contrast, the City of Reading's population is nearly twice that amount, yet maintains a roadway network nearly half the size of Hempfield Township's.

[2] Suburban Greensburg, PA

Figure 7: Municipalities by Locally-owned Miles of Roadway and Total Population

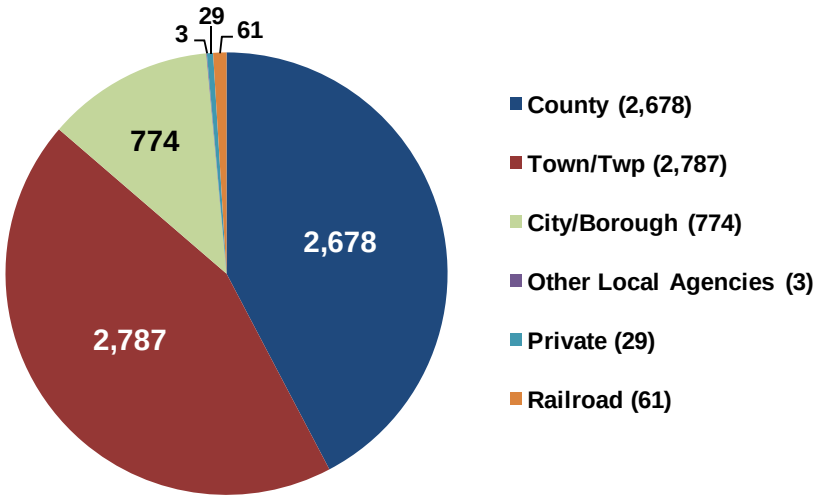


Source: PennDOT Bureau of Municipal Services
Note: Municipalities of Philadelphia, Pittsburgh, Allentown, and Erie not shown.

2.2.2 Local Bridge Ownership

The state's bridges that are longer than 20 feet are owned by nearly 20 different types of entities, although most are owned by townships, counties, and cities/boroughs. Ownership of the state's 6,332 non-state-owned bridges greater than 20 feet long is broken down as shown in Figure 8. It is important to note that while most counties do not own roads, counties own 42 percent of local bridges. Only five counties do not own any bridges: Centre, Erie, Juniata, Potter, and Warren.

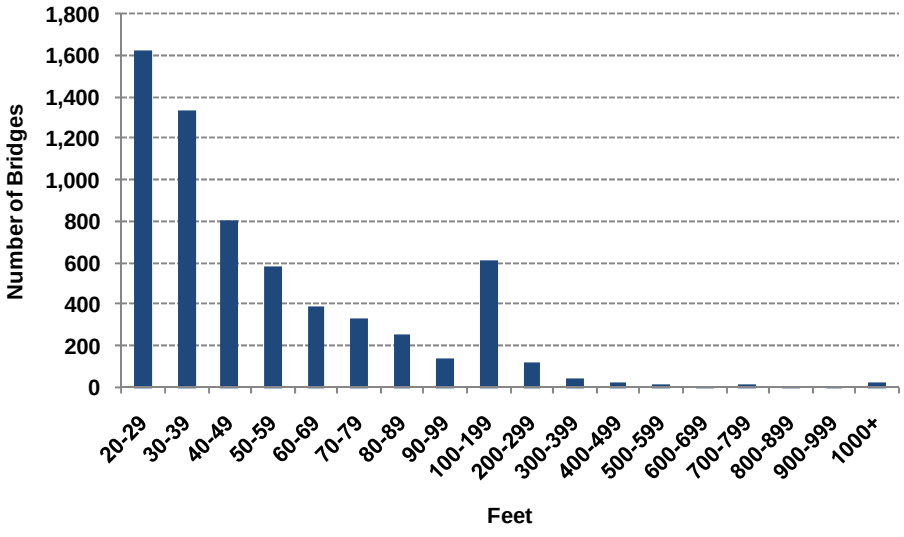
Figure 8: Highway Bridge Count (greater than 20 feet) by Owner, 2011



Source: PennDOT Bureau of Design, 6/29/11

Data from PennDOT indicates that a significant number of the non-state-owned bridges longer than 20 feet are less than 40 feet in length. The average length of non-state-owned bridges is 69 feet, while the average deck area is 462 square feet. The array of the state's non-state-owned bridges greater than 20 feet in length is shown in Figure 9, below.

Figure 9: Length of Non-state-owned Bridges Greater Than 20 Feet, 2011



Source: PennDOT Bureau of Design

The condition of local bridges is addressed in the chapter on needs.

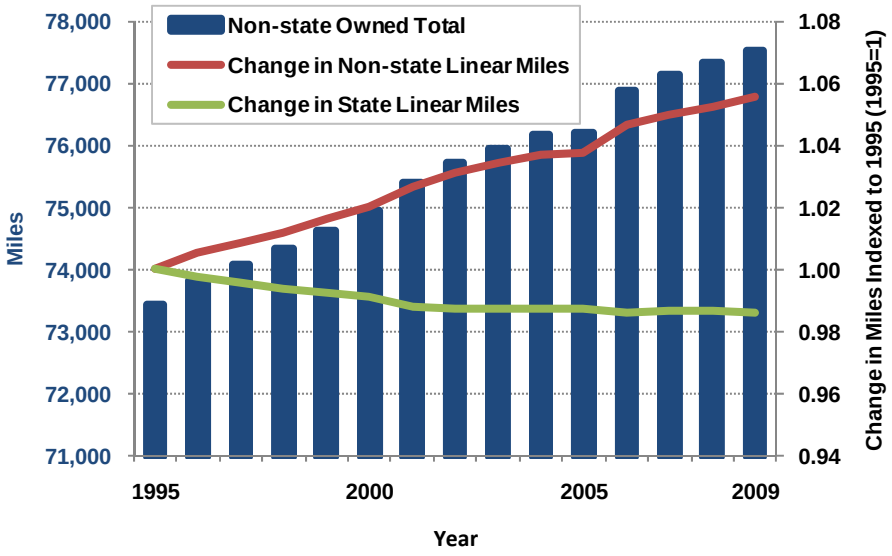
2.3 Roadway Statistics

This section outlines changes over time in the state's roadway network by linear miles and by Daily Vehicle Miles of Travel (DVMT), or travel demand, by ownership.

2.3.1 Roadway Mileage

Total mileage of the state's locally-owned roadway network has increased steadily over the past 15 years, as shown in Figure 10. The data show that a total of 4,076 linear miles of roadway have been added to the state's locally-owned roadway network over the past 15 years, or an average of 272 miles a year. Over this same period, total linear mileage of state-owned roadway has declined from a 1995 total of 40,408 to 39,839 in 2009. This shift is partially the result of the Highway Transfer Program, discussed in a later section.

Figure 10: Non-state-owned Linear Miles, 1995-2009 and Change in State/Non-state Mileage Indexed to 1995



Source: PennDOT Bureau of Planning and Research

Data on locally-owned roadways can also be organized by *functional classification*, a method that planners at FHWA and PennDOT have been using since the mid-1960s to identify a hierarchy of roadways.

Table 5 shows the breakdown of locally-owned mileage by functional classification. Note that federal aid designation is based on a highway's functional classification.

Table 5: Locally-owned Mileage (Urban/Rural) by Functional Classification, 2009

	Federal Aid Linear Miles				Non-Federal Aid Linear Miles			Total Linear Miles
	Other Principal Arterial	Minor Arterial	Major Collector	Subtotal	Minor Collector	Local	Subtotal	
Urban	215.92	776.78	2,121.32	3,114.02	0.00	30,912.56	30,912.56	34,026.58
Rural	0.42	33.81	186.35	220.58	146.53	43,132.56	43,279.09	43,499.67
Total	**216.34**	**810.59**	**2,307.67**	**3,334.60**	**146.53**	**74,045.12**	**74,191.65**	**77,526.25**

Source: PennDOT Bureau of Planning and Research

Defining "Urban" versus "Rural"

- ***Urban*** *includes urban places of 5,000 or more population and urbanized areas as designated by the Bureau of the Census.*
- ***Rural*** *includes the areas outside of these boundaries.*

Source: PennDOT Bureau of Planning and Research "PA Highway Statistics," 2009

Roadways are eligible for some categories of federal funding based on their functional classification. From Table 5 it should be noted that of the state's 77,526 linear miles of municipally-owned roadway, only 3,334.6 miles (4.3 percent) are on the federal aid system, and thus eligible to receive federal funds.

Mileage is also tracked by lane-mile. This provides a better basis when analyzing maintenance or rehabilitation work. Table 6 is a summary of linear and lane-miles on the local system.

Table 6: Locally-owned Mileage (Urban/Rural) by Linear and Lane-Miles

Rural		Urban		Total Statewide	
Linear Miles	Lane Miles	Linear Miles	Lane Miles	Linear Miles	Lane Miles
43,374	86,748	34,163	68,706	77,537	155,454

Source: PennDOT Bureau of Planning and Research

Measuring Roadways: Linear miles versus Lane-miles

"Lane-miles" refers to the linear length of lanes of a roadway segment. They are the product of centerline miles and total number of lanes. Thus, a four-lane roadway that is 10 miles long has 40 lane-miles.

Despite the obvious differences between linear and lane-miles, linear miles do not account for areas of roadway with acceleration and deceleration lanes, or extra areas of cartway width that must be maintained (e.g., parking or bicycle lanes, etc.).

Table 7 shows the surface type (by mileage) of the state's municipally-owned roadways. While the primary surface type is a bituminous roadway, a significant portion of the local system is unimproved or gravel.

Table 7: Municipal Mileage by Surface Type

	Act 655*	Turnback**	Total***
Unimproved	1,719.48	16.23	1,735.71
Gravel	14,861.93	817.40	15,679.33
Seal Coat	1,760.61	118.82	1,879.43
Bituminous	53,238.43	3,692.55	56,930.98
Brick	247.07	1.65	248.72
Concrete	354.83	4.93	359.76
Total	**72,182.35**	**4,651.58**	**76,833.93**

Source: PennDOT Bureau of Municipal Services

Municipal Mileage by Surface Type: Notes

* ***Act 655*** *refers to local roads eligible for annual municipal liquid fuels payments.*

** ***Turnback*** *refers to local roads transferred from PennDOT and eligible for an annual $4,000 allocation per mile.*

*** ***Total*** *does not include county-owned roads.*

2.3.2 PennDOT's Highway Transfer "Turnback" Program

The Highway Transfer Program was initiated in 1981. It has provided the Commonwealth with cost savings through the rehabilitation and transfer of ownership of "functionally local" state highways and bridges (see Table 8). Since 1981, the program has transferred 508 bridge structures and 4,688 miles of the original 12,000 miles identified as functionally local program candidates.

Table 8: Functional Classification Hierarchy

Functional Class
Interstate Highways
Other Freeways and Expressways
Other Principal Arterial Highways
Minor Arterials
Urban or Rural Major Collectors
Rural Minor Collectors
Local Roads

Source: Federal Highway Administration

PennDOT either rehabilitates the roadway before the transfer takes place or provides the participating municipality funding to rehabilitate the road. Each year on April 1, Pennsylvania municipalities receive a maintenance payment of $4,000 per turnback mile.[3] Some 1,100 municipalities have participated in the Highway Transfer Program. In some of the state's municipalities, officials desire to install landscaping, lighting, and other visual upgrades, or there is a pending land development along a roadway. The Turnback Program gives them more flexibility to make these improvements.

The first few years after its inception, the Turnback Program was netting 500 to 600 miles annually before dropping off during the 1990s (see Figure 11). Today, PennDOT transfers closer to 20 miles a year. They are typically shorter roadways that are more logical for local governments to maintain.

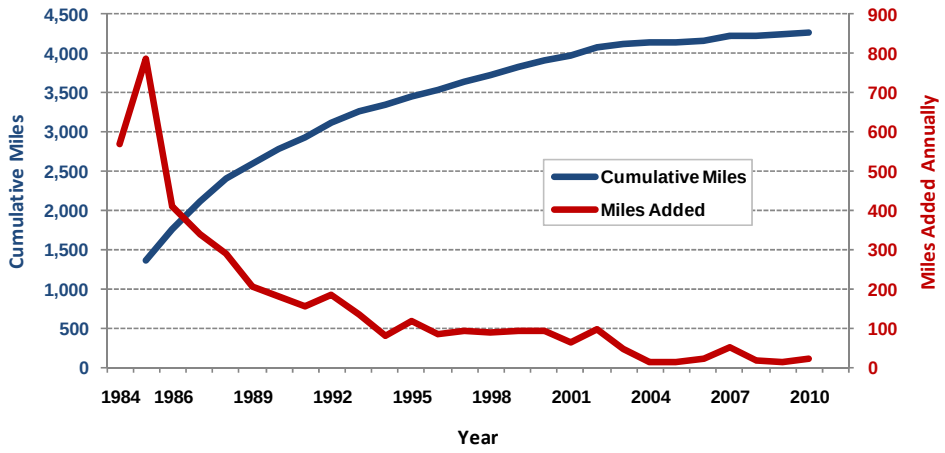
The $4,000/mile annual payment is not indexed for inflation, and thus does not increase over time, apart from legislative increases. In light of this, there is a longer-term disincentive for municipalities to participate in the Turnback Program. Also, municipalities are reluctant to accept the financial and maintenance responsibility for bridges that are on Turnback roadways, which creates an ongoing maintenance concern, as the annual $4,000/mile available through the program is not enough to cover the costs of ongoing bridge maintenance and operation.

PennDOT has been meeting its program budget every year, and currently has $8 million available. It estimates that, by the year 2020, the capital restoration budget will be impacted. However, no major ownership changes will occur under current funding.

The following tables show cumulative turnback activity, annual restoration costs, and the annual maintenance payments dating back to 1984.

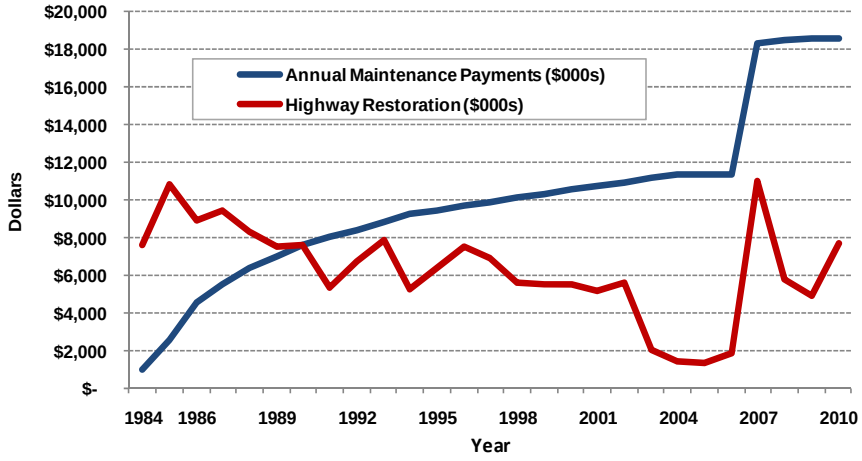
[3] The amount was originally $2,500 until 2006, when it was legislatively increased.

Figure 11: Cumulative Turnback Roadway Mileage and Miles Added Annually, 1984-2010



Source: PennDOT Bureau of Municipal Services

Figure 12: Annual Maintenance Payments and Highway Restoration Dollars (in thousands), 1984-2010[4]



Source: PennDOT Bureau of Municipal Services

2.3.3 Travel Demand

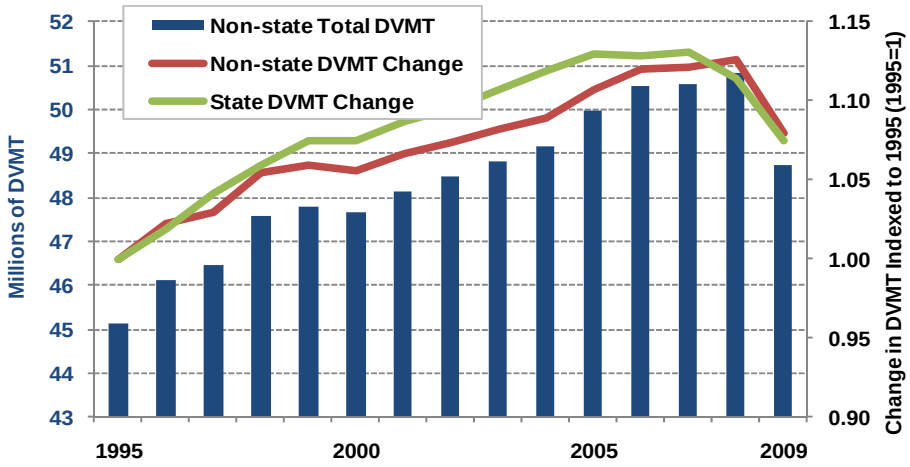
For the five-year period ending in 2008, daily vehicle miles of travel (DVMT) on all the state's roadways has increased just 0.8 percent, to 293.1 million miles. On the locally-owned roadway network, however, DVMT has increased at a much greater rate (4.1 percent), from 48.8 million miles in 2003, to an all-time high of 50.8 million in 2008. With the economic recession that ran from December 2007 to June 2009, DVMT on both

[4] Amounts prior to 2004-05 were taken from Governor's Budgets; data from 2004-05 forward taken from SAP. All amounts reflect expenditures plus commitments for each fiscal year.

state and locally-owned roadways has since experienced a rare downturn. In the case of locally-owned roadways, DVMT declined to just 48.7 million miles—a seven-year low.

Figure 13 shows a longer-term trend in DVMT on both state and locally-owned roadways, dating back to 1995. The figure shows that growth in DVMT for the 15-year period on both state and locally-owned roadways has grown at roughly the same pace, with both networks experiencing significant downturns during the recent recession.

Figure 13: DVMT on Locally-owned Roadways, 1995-2009, and Change in State/Non-state-owned Roadway DVMT Indexed to 1995



Source: PennDOT Bureau of Planning and Research

2.3.4 Roadway Conditions

While PennDOT has knowledge of the extent of Pennsylvania's locally-owned roadway network, there is no reliable information available on the condition of those assets. PennDOT, in cooperation with its planning partners, is initiating an effort to collect additional information on local roadways.

Some municipalities maintain a database and system for tracking roadway condition over time. Some municipalities inspect their roads on a periodic basis and look at characteristics such as cracking, base failures, surface migration, patching/utility cuts, potholes, and drainage. Generally, the larger municipalities are more sophisticated in managing their assets. However, it appears that most municipalities have no formal asset management process.

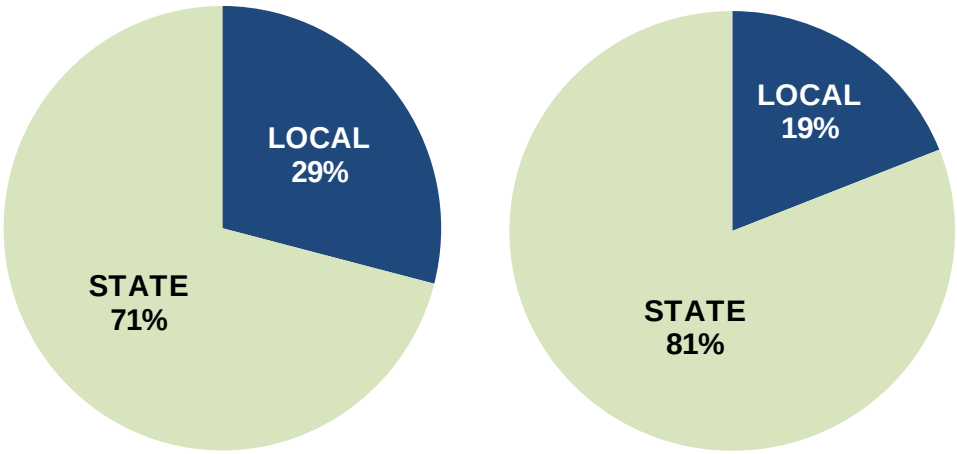
2.3.5 Roadway Safety: Crashes by Roadway Type

PennDOT collects data on reportable crashes[5] that occur on state- and locally-owned roadways. Crashes have been declining over the past five years, most likely as a result of increased safety practices and the overall decline in DVMT brought about in part by the economic recession. Total fatalities have also declined, to an all-time low of 1,244 in 2009.

Figure 14 and Figure 15 compare state and local roadways as they relate to several planning indicators, including crashes, fatalities, DVMT, and total mileage. The statistics show that while state-owned roadways represent only 34 percent of all roadways, a large majority of crashes and fatalities occur on state-owned roadways, which also carry 77 percent of all traffic.

Looking at crash rates on state and local roadways based on each 100 million vehicle-miles traveled, local roads have a higher rate of crashes than state roads (180 versus 108) and a higher rate of injuries (124 versus 84). However, local roads have a lower fatality rate than state roads (1.19 versus 1.37).

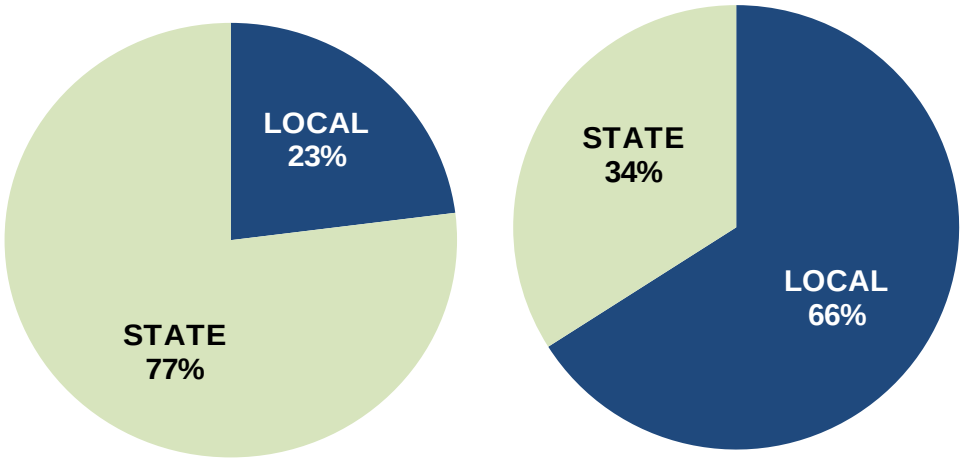
Figure 14: Share of Crashes (left) and Fatalities (right), 2007



Source: PennDOT Bureau of Highway Safety and Traffic Engineering

[5] Reportable crash is a crash resulting in death, or injury in any degree, to any person involved; or a crash resulting in damage to any vehicle serious enough to require towing.

Figure 15: Share of Total DVMT (left) and Roadway Mileage (right), 2009



Source: PennDOT Bureau of Planning and Research

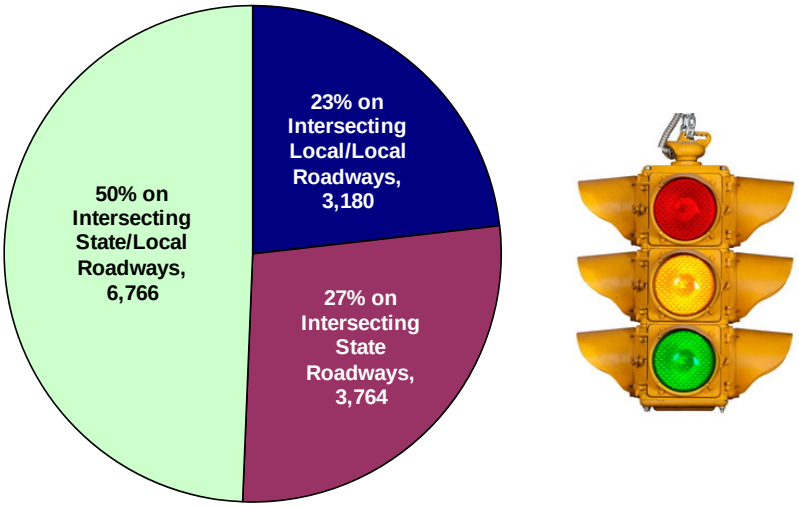
2.4 Traffic Signals

An important component of Pennsylvania's transportation system is its inventory of more than 14,000 traffic signals. The number of signals varies throughout the state, from the City of Philadelphia, which has 3,246, to Forest County, which has none. As travel levels continue to increase on Pennsylvania roadways, the number of traffic signals needed to control intersections and manage capacity also increases. Data from PennDOT's Bureau of Highway Safety and Traffic Engineering indicates that in the three-year period ending 2007, the total number of traffic signals increased by 3.4 percent, to 14,115 statewide.

These signals are owned, operated, and maintained by the host local municipality.[6] Despite this, approximately 77 percent of all the traffic signals in Pennsylvania involve state highways, as shown in Figure 16.

[6] Of the state's inventory of over 14,000 traffic signals, PennDOT owns and maintains only nine.

Figure 16: Pennsylvania Traffic Signal Locations, 2008



Source: PennDOT Bureau of Highway Safety and Traffic Engineering

Currently, there is no statewide signal asset management system to track the age and condition of traffic signals. There is concern over the condition of traffic signals, as many of the state's municipalities have neither the technical expertise nor the resources to adequately maintain and operate them. There is minimal operational oversight at the state level after initial installation.

3. Municipal Survey

In an effort to gain a better understanding of the condition and needs of the local transportation inventory and how local municipalities track the performance of their transportation assets, the TAC surveyed municipalities and counties in April 2011. (Background information related to the survey, including the survey instrument, response details for each question, and open-ended comments from municipal officials, is included in Appendix B – Municipal Survey Details on page 70.) The intent of the survey was to fill gaps in information such as spending, management of assets, and the condition of roads in Pennsylvania's municipalities. Respondents were asked nine questions (with counties being asked ten) and were given the option of identifying themselves.

The web-based survey was developed through Survey Monkey's web service (www.surveymonkey.com). An e-mail invitation to complete the survey (along with the survey link) was distributed to local governments by five trusted associations:

- County Commissioners Association of Pennsylvania
- Pennsylvania League of Cities and Municipalities
- Pennsylvania State Association of Boroughs
- Pennsylvania State Association of Township Commissioners
- Pennsylvania State Association of Township Supervisors

Approximately one to two weeks prior to the survey closing date, the associations sent a reminder e-mail encouraging municipalities to complete the survey, further enhancing the response rate.

A summary of the municipal survey results follows in this section.

3.1 Survey Results

A total of 572 surveys were completed, although not all of the respondents completed every question. Municipalities were given the option of identifying themselves; 339 of the 572 respondents did so.

In this section, survey results are presented for each question, along with a brief analysis. The number of responses for each question is indicated.

3.1.1 Municipality Types

Question #1: What is your municipality type?

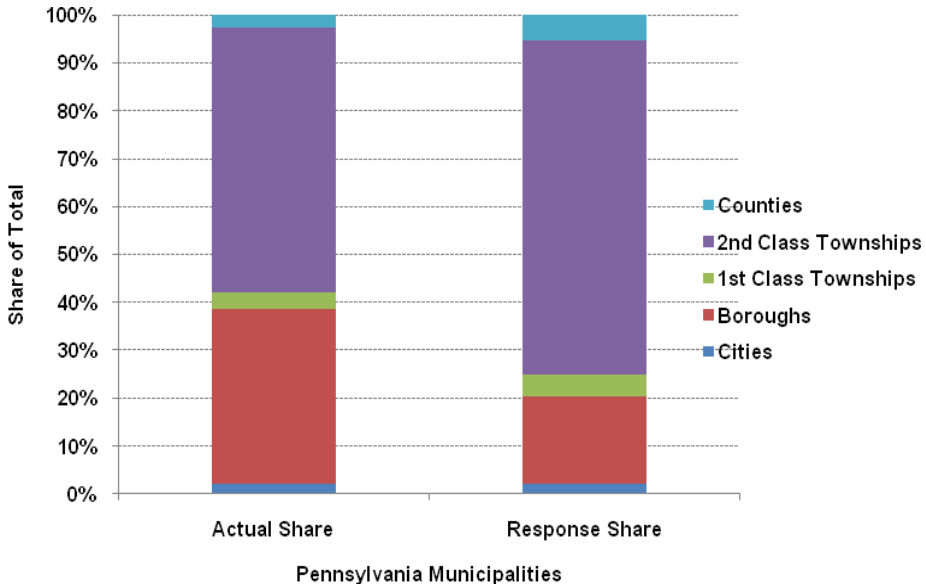
Table 9: Share of Municipality Types: Surveyed versus Responses

	Actual	Actual Share	Responses	Response Share
Cities	56	2.1%	13	2.3%
Boroughs	960	36.5%	104	18.2%
1st Class Townships	92	3.5%	26	4.5%
2nd Class Townships	1,455	55.3%	399	69.7%
Counties	67	2.5%	30	5.2%
TOTAL	2,630		572	

Source: TAC Municipal Survey, 2011

Figure 17 graphically compares the distribution of the type of municipalities to the municipality types that responded to the survey. Second class townships and counties demonstrated the strongest response rate.

Figure 17: Share of Municipality Types: Actual versus Responses



Source: TAC Municipal Survey, 2011

3.1.2 Miles of Local Roads

Question #2: How many miles of local roads are you responsible for?

Table 10: Miles of Local Roads

	Total	City	Borough	1st Class Township	2nd Class Township	County
Total # of Surveys Submitted	572	13	104	26	399	30
Total # of Question Responses	567	13	103	26	397	28
Range	0 to 268	27 to 268	1 to 74	4 to 170	3 to 250	0 to 56
Mean	40	102	15	66	45	5
Median	32	90	10	67	40	1

Source: TAC Municipal Survey, 2011

Ninety-eight percent of respondents provided an answer to this question. Among the various municipality types, miles of roads for which they are responsible range from 0-268 miles. Not surprisingly, cities show the highest mean with 102 miles. The city median of 90 miles suggests that a small number of cities manage a larger number of miles, causing the mean to be somewhat higher than the median. It is also noteworthy that there is variability between county responsibilities, in that many counties have responsibility for little to no road mileage, and only a few have significant mileage. With all other types of municipalities, the mean and median are relatively similar, suggesting that there are fewer outliers of municipalities managing larger numbers of local roads than their counterparts.

3.1.3 Local Bridges

Question #3: To the best of your knowledge, how many local bridges are you responsible for?

Table 11: Number of Bridges

	Less than 20'	Greater than 20'
Total # of Surveys Submitted	572	572
Total # of Question Responses	545	543
Range	0 to 93	0 to 162
Mean	3	4
Median	1	1

Source: TAC Municipal Survey, 2011

As with miles of road, the range of local bridges varies greatly among the municipalities (ranging from 0-162). Both the mean and median (for Less than 20 Feet and Greater than 20 Feet) are low (1-4) suggesting that a small number of municipalities have a large number of bridges. In addition, 252 of 545 respondents indicate having "0" bridges of less than 20 feet, and 244 of 543 respondents indicate having "0" bridges over 20 feet. This also contributes to the low mean and median.

When looking at the data by municipality type, counties show the largest range in number of bridges (0-162) and also have a relatively high mean and median, 42 and 35 respectively, for bridges greater than 20 feet.

3.1.4 Annual Budget Sources and Funds

Question #4: To the best of your knowledge, what is your most recent annual budget by source of funds for maintenance, repair, and improvement of your roads and bridges?

Table 12: Annual Budget Sources and Funds

Total	Liquid Fuels Reimbursement	Other Grants	Municipal General Fund
Total # of Surveys Submitted	572	572	572
Total # of Question Responses	382	379	382
Range	$0 to $1,900,000	$0 to $2,500,000	$0 to $50,298,129
Mean	$173,509	$56,689	$608,725
Median	$112,063	$0	$75,000

Source: TAC Municipal Survey, 2011

A total of 67 percent of respondents (382 of 572) answered this question.

Another anomaly is that of a Median of "$0" for Other Grants. This indicates that more than half of all respondents indicated "$0" for this source of funds. In this particular instance, of the 382 responses, 276 indicated "$0." Grants are most likely a state or federal reimbursement for a highway or bridge project or perhaps a developer contribution. Since a limited number of municipalities would have such a project under way at any particular time, it is not surprising that there were many "$0" answers.

With regard to the range of funds received for Liquid Fuels Reimbursement, Other Grants and Municipal General Fund, the Municipal General Fund shows the widest range ($0-$50.3 million). The high end of the Municipal General Fund range was established by one second class township. In an attempt to validate this data, a review of Municipal Annual Financial Reports, available through DCED's website[7], was conducted. Public Works Highways and Streets expenditures for 2009 were reviewed to determine whether any second class township had expenditures nearing $50 million. They did not. It was also discovered that the second class township in question (which had identified itself) had expenditures of $90,924.

With this particular question, there were a number of instances where the data appeared questionable. For instance, the next highest survey response for the Municipal General Fund expenditures was $29.5 million (a city). Given the data available on the DCED website, this also seemed unlikely, particularly when compared with the respondent's other data. Perhaps respondents misinterpreted the question and indicated the budget for the entire Municipal General Fund rather than funds designated for highways or bridges, or there were cases of entry errors. Either way, the results for the Municipal General Fund part of this question, in particular, are not conclusive.

3.1.5 Transportation Spending

Question #5: To the best of your knowledge, please indicate how you spend your transportation budget by percentage on the following activities.

Table 13: Transportation Spending

Total (365)	Maintenance	Winter	Capital Improvements	Operations	Equipment
Range	0 to 100%	0 to 100%	0 to 100%	0 to 100%	0 to 71%
Mean	37%	19%	27%	6%	10%
Median	35%	18%	20%	3%	10%

Source: TAC Municipal Survey, 2011

[7] http://munstatspa.dced.state.pa.us/Reports.aspx

In regard to transportation spending, some municipalities spend their entire budget (100 percent) on one of the four activities: Maintenance, Winter, Capital Improvements, or Operations. Of each activity overall, Maintenance represents the highest spending (with a 37 percent Mean and 35 percent Median), while Operations represents the least spending. Second class townships have the highest percentage (40 percent) of spending in Maintenance.

3.1.6 Asset Management

Question #6: Do you have some type of asset management database to manage your assets?

Table 14: Use of Asset Management Software by Municipality

	Total	City	Borough	1st Class Township	2nd Class Township	County
Total # of Surveys Submitted	572	13	104	26	399	30
Total # of Question Responses	382	12	71	17	257	25
Yes	91	2	18	4	57	10
No	291	10	53	13	200	15

Source: TAC Municipal Survey, 2011

Sixty-six percent (382 of 572) of municipalities responded to this question. The vast majority of respondents (291) indicated that they do not have an asset management database. For those that indicated using a database, Excel and QuickBooks were most frequently mentioned, as shown in Table 15.

Table 15: Asset Management Software

Software Type	No. of Responses
Microsoft Excel	16
QuickBooks	15
Freedom Systems	3
Microsoft Access	3
GeoPlan	2

Source: TAC Municipal Survey, 2011

Mentioned only one time were: IBISTEK, MASS90, National Bridge Inspection Standards (NBIS), AssetMax, BASB34, BMS, CMMS, and Industrial Appraisal.

A representative sampling of other comments include:

- We do not but are in process of developing a system with a private engineer.
- We do not have all information in one place.
- Our capital improvement plan includes a regular assessment of our bridge stock, their condition, and associated maintenance/replacement needs.
- We have a public works equipment and road improvement list.
- We recently did an inventory of the borough during the Capital Improvements Plan legwork.
- We have road and capital equipment replacement schedules.
- Pavement decisions are based on a pavement management system, with the governing body stating a desired level of pavement performance.
- We use Google Earth. Bridge engineering loaded the bridge information on the map.
- We have a vehicle inventory and maintenance log.
- We are developing a road inventory list which includes the condition of our roads and cost of repairs. We also track when they were repaired/overlaid and proposed repairs.
- We have a Roadway Management system in place that tracks and schedules roads for sealing, overlays, sign replacement schedules, bridge conditions, etc.
- We maintain an in-house road history of all roads in township.

3.1.7 Capital Improvement Plan (CIP)

Question #7: Do you have a Capital Improvement Plan?

Table 16: Use of Capital Improvement Program (CIP) by Municipality

	Total	City	Borough	1st Class Township	2nd Class Township	County
Total # of Surveys Submitted	572	13	104	26	399	30
Total # of Question Responses	386	12	73	17	258	26
Yes	147	10	28	9	86	14
No	239	2	45	8	172	12

Source: TAC Municipal Survey, 2011

Sixty-seven percent (386 of 572) of municipalities responded to this question. Again, the vast majority (239) do not have a Capital Improvement Plan. Ten of twelve City respondents (83 percent) indicated that they do have a plan; the highest percent of all municipality types.

3.1.8 Road Conditions

Question #8: To the best of your knowledge, please indicate the relative condition of your roads.

Table 17: Municipal Road Condition

	Good	Fair	Poor
Range	0 to 100%	0 to 100%	0 to 100%
Mean	41%	38%	20%
Median	40%	30%	10%

Source: TAC Municipal Survey, 2011

Overall, the majority of municipalities indicate that their roads are in the Good to Fair condition with counties indicating that an average of 62 percent of their roads are in Good condition. This high average may be due to the fact that few roads are managed by counties.

3.1.9 Annual Unmet Need

Question #9: To the best of your knowledge, please estimate your annual unmet needs.

Table 18: Annual Unmet Need

Total	Highway Capital Needs	Bridge Needs	Traffic Signals	Stormwater	Equipment	ADA Compliance
Total # of Surveys Submitted	572	572	572	572	572	572
Total # of Responses	310	282	240	265	281	218
Range	$0 to $50,000,000	$0 to $33,000,000	$0 to $1,000,000	$0 to $50,000,000	$0 to $4,000,000	$0 to $4,200,000
Mean	$933,812	$724,504	$49,632	$436,676	$131,979	$122,555
Median	$200,000	$50,000	$2,000	$50,000	$70,000	$0

Source: TAC Municipal Survey, 2011

The most pressing unmet capital needs appears to be Highway Capital, with a Mean of $933,812 and Median of $200,000 in annual unmet need. The one exception among the five types of municipalities indicating that Highways are their most pressing need is counties. For county respondents, Bridges were the number one unmet need with a Mean of $4.7 million and Median of $2.0 million. As previously noted, most counties do not own many highway miles, but do own bridges.

Similar to Question #4, addressing Annual Budgets and Sources of funds, the responses raised concerns as to how the question was interpreted. The requested information was annual unmet capital needs, however many respondents may have provided total capital needs. This brings into question the validity of the answers to this question.

3.1.10 Administration of Liquid Fuels Funding

Note: This question was asked solely of the counties.

Question #10: Briefly describe how you administer your liquid fuels funding. Please describe if you distribute any to your municipalities on a formula basis, or if you offer a competitive program, or employ some other approach. Thank you.

The vast majority of county respondents indicated that the primary use of liquid fuels funding is for bridges. This response is not surprising in light of county responses to Question # 9 – Unmet Need, where the most pressing unmet need is bridges.

Responses to this question generally fell into one of two categories: 1) Primarily Bridges with Some Road Maintenance, and 2) Funds Allocated to Municipalities Based on a Competitive Process or Formula. Although some respondents indicated that funds were allocated to municipalities, many noted that they had moved away from supporting municipal needs because county needs are so great.

3.2 Extrapolations

Survey data results and existing transportation data were utilized to extrapolate estimates of number of local bridges and transportation spending.

3.2.1 Total Estimated Local Bridges (Under 20 feet)

Municipalities are responsible for an estimated 4,297 bridges under 20 feet. This estimate was derived by determining the portion of the whole, for bridges (over 20 feet), reported in the survey (2,303 bridges were reported by the sample while 6,332 bridges are documented through PennDOT's Bridge Management System). Therefore the portion of the sample to whole is 36 percent: 2,303/6,332.

A rate of 36 percent was used to estimate the number of bridges under 20 feet, assuming that the sample represented the same portion of the whole. In other words, 1,547/.36 = 4,297.

Table 19: Estimated Number of Local Bridges

Bridge Actual vs. Estimate	
Bridges Over 20'* (Actual)*	6,332
Bridges Over 20' (Survey Sample)	2,303
Percent of Survey vs. Actual	36%
Bridges Under 20' (Survey Sample)	1,547
Bridges Under 20' (Estimate)^	4,297

Source: TAC Consulting Team
*Source: PennDOT Bridge Management System
^ Estimate = 1,547/36%

3.2.2 Total Estimated Transportation Spending

Municipalities' annual spending is estimated at $1,347,017,071. Similar to estimating bridges of less than 20 feet, the estimate was derived by determining the portion of the whole, for Liquid Fuels, reported by municipalities in the survey ($58 million was reported by the sample while $343 million is documented for all municipalities). Therefore the portion of the sample to whole is 16.9 percent, or $58/$343.

A rate of 16.9 percent was used to estimate spending, assuming that the sample represented the same portion of the whole. In other words, $227,645,885/.169 = $1,347,017,071. See Table 20, below, for details.

Table 20: Estimated Transportation Spending

Liquid Fuels	In millions
Liquid Fuels (2009 Actual)^	$343
Liquid Fuels (Survey Sample)*	$58
Percent of Survey vs. Actual	**16.9%**
Estimated Transportation Spending	**Total Dollars**
Public Works Spending*	$227,645,885
Public Works Estimate (All Municipalities)	$1,347,017,071

Source: TAC Consulting Team
^2009 Liquid Fuels ($307 million to municipalities plus $36 million to counties): PennDOT Bureau of Fiscal Management
*2009 Liquid Fuels data for municipalities that identified themselves in the survey

3.3 Summary and Conclusions from the Survey

Highlights from the results of the 572 surveys include:

- There is a range of 0 – 268 miles of local roads by municipal entity.
- There is a range of 0 – 162 bridges by municipal entity.
- Transportation budget average spending (by percent) is:

  - 37 percent on Maintenance
  - 27 percent on Capital Improvements
  - 19 percent on Winter
  - 10 percent on Equipment
  - 6 percent on Operations
- 76 percent of municipalities use no asset management system.
- 62 percent of municipalities have no capital improvement plan.
- An average of 20 percent of municipal roads are rated as being in poor condition, and 38 percent are rated as fair.
- Report of unmet need ranges from (high to low):
  1. Highway
  2. Stormwater
  3. Bridge
  4. Americans with Disabilities Act (ADA) Compliance
  5. Equipment
  6. Traffic Signal
- Statewide extrapolations, utilizing known and survey data, reveal:
  - An estimated 4,297 bridges under 20 feet
  - Annual estimated spending of $1,347,017,071

Based on normal statistical sampling methodology, the response rate to the survey was adequate and should provide a reasonable confidence level. However, the consulting team believes that the validity of responses varies based on the type of question. For questions that required a direct response or a yes/no response, the answers are expected to be representative. For questions that required a more complex answer or presented opportunity for misinterpretation, the variation of responses along with responses being outside known limits brought into question the validity of the answers. This was taken into account in the use of this data in further analysis.

4. Local Revenue and Expenditures

Revenue and expenditures by local governments on their highway and bridge systems is not something for which there is a direct source of information. There are a number of sources of revenue that local governments use for highways and bridges. For this report, these have been considered in the following categories, with information sources indicated:

- Liquid Fuels Payments – Figures are available from PennDOT for all liquid fuels payments to local governments.
- Grants – Figures are available from PennDOT for all project related federal and state grants. Information is not known for other government grants or funding provided from developers.
- General Fund – Information is not known about how much local governments spend on highways and bridges from their general revenue.

To fill in the gaps, other information sources were reviewed. Reporting of revenue and expenditures to DCED provides some information, however, that data is incomplete for some reporting years and reporting cannot be broken down into subcategories. The Municipal Survey was also used to estimate total spending on local highways and bridges.

The following discusses the available information and other sources of information.

4.1 Liquid Fuels

In 1956, the General Assembly enacted Act 655, which provides municipalities other than counties with an annual allocation of liquid fuels taxes from the State's Motor License Fund. As the General Assembly has enacted increases to funding into the Motor License Fund over time through various acts, there have been several increases in liquid fuels funding for municipalities. These increases have varied from percentages of new revenue to flat amounts. The most recent example includes Act 44 of 2007, which in part directed revenue from the Pennsylvania Turnpike to be used in funding Pennsylvania's transportation programs. This Act directed that $30 million annually go to municipalities for local roads. The funding involved with each Act is tracked separately over time. Liquid fuels taxes are currently collected through a combination of the 12-cent flat tax on all liquid fuels and an Oil Company Franchise Tax (OCFT). The OCFT is currently administered at 153.5 mills for all fuels with a 55-mill diesel surtax. A breakdown of the sources of liquid fuels allocations for the most recent year is summarized in Table 21.

Table 21: Municipal Liquid Fuels, FY 2009-10

Act/Amendment	Amount ($000s)	Source
Act 655 of 1956, plus 1981 & Other Amendments	$188,382	20 percent of 11½ cents + 20 percent of 35 mills of OCFT
Act 68 of 1980	$5,000	$5 million
Act 32 of 1983	$0	0 percent of 25 mills of OCFT
Act 26 of 1991	$48,873	12 percent of 55 mills of OCFT
Act 3 of 1997	$35,599	12 percent of 38½ mills of OCFT
Act 44 of 2007	$30,000	$30 million
TOTAL	$307,854	

Source: PennDOT Bureau of Fiscal Management

Distribution of liquid fuels funding is based on the mileage and population of the municipality, and the revenue must be used on the roads and bridges for which the municipalities are responsible. Allocations are made on the basis of 50 percent mileage and 50 percent population. Mileage is determined by PennDOT based on municipal reporting, while population is based on official reports from the U.S. Census. To be placed on the system a road must have minimum of 33-feet right-of-way in a township and 16-feet right-of-way in a borough. The cartway (or drivable surface) must be a minimum width of 16 feet, and the road must be a minimum of 250 feet long. If the road is a dead end, it must have a cul-de-sac (turnaround) at the end with a minimum radius of 40 feet.

Table 22 summarizes the distribution of liquid fuels funds statewide for 2009 through 2011.

Table 22: Municipal Liquid Fuels Appropriations, 2009-11

	2009	2010	2011
Total municipalities	2,561	2,562	2,562
Total municipal miles	71,980.59	72,179.26	72,280.15
Total municipal population	12,284,183	12,284,183	12,284,183
Total Appropriation	**$319,967,000**	**$307,854,000**	**$315,446,000**

Source: PennDOT Bureau of Municipal Services

The following table and accompanying figure demonstrate how liquid fuels funding was spent by the state's municipalities in 2009. A majority of this funding was expended on highway construction and rebuilding projects (30.4 percent), followed by maintenance and repairs of roadways and bridges (27.6 percent). These figures of course do not include spending of other revenue, such as from general funds, other grants, or bond issues.

Table 23: Actual Use of Liquid Fuels Funding (in thousands), 2009[8]

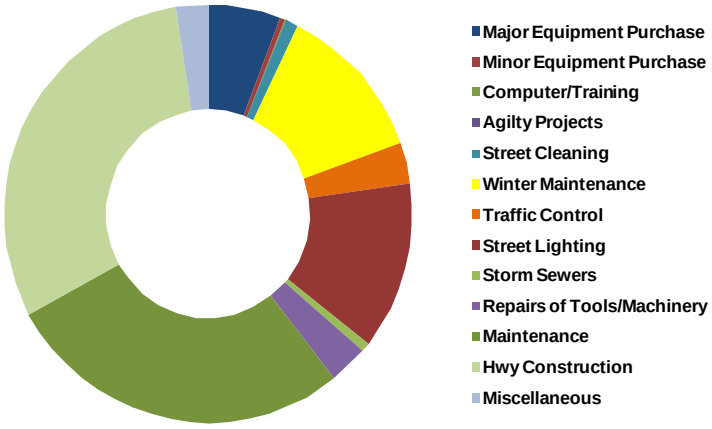
Type of Work	Amount	Percent of Total
Highway Construction and Rebuilding Projects	$105,387.2	30.4%
Maintenance & Repairs of Roadways and Bridges	$95,553.2	27.6%
Street Lighting (Illumination)	$45,041.8	13.0%
Winter Maintenance	$42,690.0	12.3%
Major Equipment Purchases	$19,988.0	5.8%
Traffic Control Devices (Traffic signals)	$10,999.4	3.2%
Repairs of Tools & Machinery	$10,877.9	3.1%
Miscellaneous	$8,968.3	2.6%
Cleaning Streets & Gutters	$3,310.5	1.0%
Storm Sewers & Drains	$2,127.3	0.6%
Minor Equipment Purchases	$1,463.7	0.4%
Agility Projects	$166.3	0.04%
Computer/Computer Related Training	$35.4	0.01%
Total	$346,609.0	- -

Source: PennDOT Bureau of Municipal Services

The share of liquid fuels funding going to local government has been an issue of debate. At certain points in the past (most recently 1981), the portion of liquid fuels revenue going to municipal governments represented 20 percent of all liquid fuels revenue (other than the one-half cent to counties). Subsequent highway revenue increases have allocated lesser amounts to municipalities. The current municipal allocation now represents only 15.5 percent of all liquid fuels revenue.

[8] It should be noted that there are several reasons why 2009 Liquid Fuels allocations ($319,967) do not match actual use ($346,609, from Table 23). These include 1) carryover Liquid Fuels monies from previous years may have been spent in 2009; 2) interest income on Liquid Fuels accounts; 3) excess turnback project funds; and, 4) as well as the annual turnback maintenance funds that are deposited into the LF accounts and spent like Liquid Fuels funds. Allocations and expenditures could rarely be the same in any year other than by coincidence. Another factor that causes variations in the numbers is when counties elect to allocate their Liquid Fuels funds to specific municipalities.

Figure 18: Liquid Fuels Expenditures, 2009



Source: PennDOT Bureau of Municipal Services

Table 24: Percentage of Liquid Fuels Allocated to Municipalities (in thousands), FY 2009-10

Fuel Revenue	2009-10 Total	Allocated to Municipalities	Percentage of Allocation
Liquid Fuels	548,884		
Fuel Use	145,333		
OCFT (Non-Restricted)	447,986		
OCFT (55 mills for Bridges)	86,380		
OCFT (Turnback)	23,570		
Act 26	432,131		
Act 3	302,492		
Total	**$1,986,776**	**$307,854**	**15.5%**

Source: PennDOT Bureau of Fiscal Management

4.2 Payments to Counties

Counties also receive a portion of liquid fuels funding. The original allocation was established by the Liquid Fuels Act of 1931, and allocated one-half cent of fuel tax to counties. Distribution is based on each county's gas consumption in the years 1927, 1928, and 1929 relative to the statewide consumption in those years. An additional $5 million allocation was authorized by Act 44 of 2007. Distribution of the $5 million is based on the ratio of square foot deck area of a county's owned bridges to the total statewide deck area of county-owned bridges. The County Liquid Fuels Program funds a range of projects to

support counties' construction, reconstruction, maintenance, and repair of county roads, streets, and bridges. Sources of annual payments to counties are shown in Table 25.

Table 25: Payments to Counties, FY 2009-10

Act/Amendment	Amount ($000s)	Source
Liquid Fuels Tax Act of 1931	$31,173	One-half cent per gallon is allocated to counties; distributed per historic use
Act 44 of 2007	$5,000	$5 million allocated to counties; distributed on relative square foot deck area of county-owned bridges
TOTAL	$36,173	

Source: PennDOT Bureau of Fiscal Management

Counties may pass these funds to the municipalities within their jurisdictions. Since counties have varying degrees of responsibilities for roads and bridges, the practices vary greatly by county. Counties without ownership for bridges distribute those funds to municipalities.

Based on the Municipal Survey, the majority of counties indicated that they do not distribute this funding to municipalities. Many indicated that the funding is used for maintenance and repair of county-owned highways and bridges. A number of counties indicated that they had allocated funding in the past, but have discontinued the practice due to county needs. A number of counties did indicate that they still allocate some funds to municipalities based on a formula or through a competitive process.

4.2.1 Project-Related Funding

State and federal funding for projects on the local system are provided as part of the Twelve-Year Program. Highway projects are only eligible for federal funding if they are on the federal aid system. There are a limited number of these projects on the Program at any time.

There is more federal and state funding programmed for bridge projects. Since the first Bridge Program legislation in 1982, there has been dedicated state funding for bridges, some of which can be used on local bridges. Federal funding is also available for rehabilitation or replacement of deficient bridges on the local system.

For any bridge project funded with federal dollars, 80 percent of the cost is eligible for federal reimbursement and 15 percent is eligible for state funding, with the remaining 5 percent being provided by the local county or municipality. If no federal funds are involved, state funds can cover 80 percent of the costs with a 20 percent local match. Structures that are less than 20 feet in length are not eligible for federal funding.

For bridge projects to be funded with state funds, they must be listed in an approved bridge capital budget and be included on the regional transportation improvement program. Funding is always limited, and each area must establish its program based on priorities.

4.3 Summary of Payments to Local Government

In addition to liquid fuels payments to counties and municipalities, PennDOT provides other funds. As detailed earlier, the highway transfer program (or "Turnbacks") provides annual payments to municipalities which have accepted mileage. Other payments include distribution of fines and various project reimbursements of federal and state aid. This includes mainly reimbursements for bridge projects but also includes some highway projects.

The various payments provided by PennDOT are shown in Table 26. A summary of these payments over the past 10 years is also shown graphically in Figure 19. It should be noted that the Subtotal for Annual Allocations represents those payments that local government can expect to receive each year. The final subtotal for "State/Federal Grants for Projects" and the Subtotal for "Project-Related" involves funding that can be used only on a project-related basis. Obviously, this amount will have greater variance from year to year.

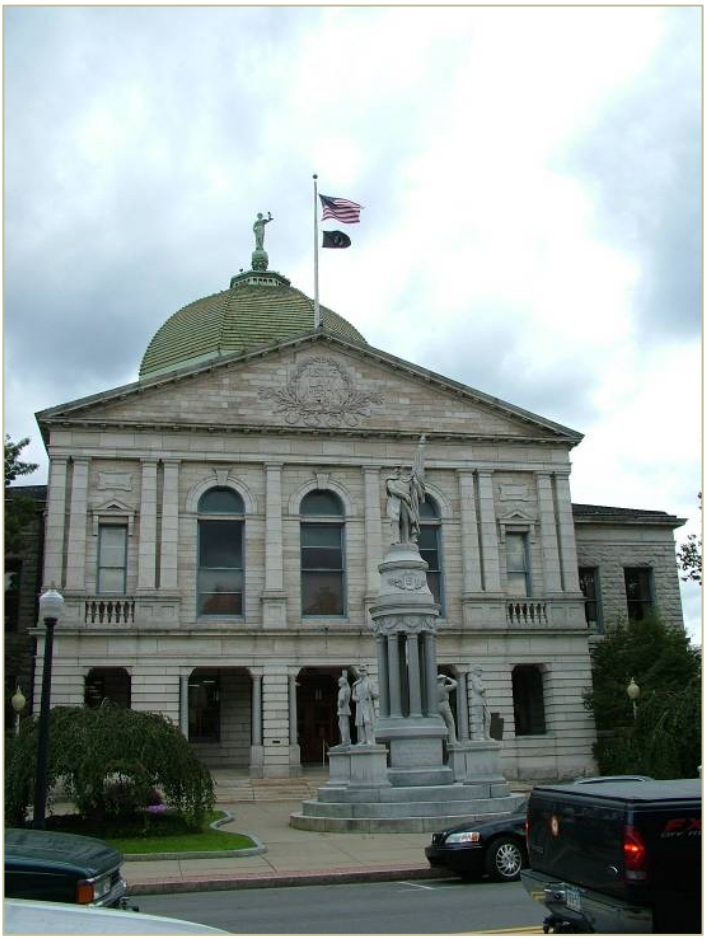


Table 26: Breakdown of Payments to Local Governments Statewide

Payment to Local Governments	FY2008-09 ($000s)	FY2009-10 ($000s)	Description
Liquid Fuels Municipalities			
Local road maintenance and construction payments	$200,451	$188,382	Act 655 of 1956: liquid fuels to municipalities
Supplemental local road maintenance and construction payments	$5,000	$5,000	Act 68 of 1980: supplement to Act 655
Local road payments – excise tax	$53,700	$48,873	Act 26 of 1991: supplement to Act 655
Payments to municipalities	$38,044	$35,599	Act 3 of 1997: supplement to Act 655
Municipal roads and bridges	$30,000	$30,000	Act 44 of 2007: supplement to Act 655
Liquid Fuels Counties			
Payments to counties	$30,197	$31,173	Liquid Fuels Tax Act of 1931: one half cent of flat tax on gasoline and diesel (to counties) for maintenance and construction
Maintenance and construction of county bridges	$5,000	$5,000	Act 44 of 2007: based on bridge deck area
Highway Transfer			
Annual maintenance payments – Highway Transfer	$18,944	$19,016	Act 32 of 1983 provides for annual maintenance payment of $4,000 for each mile of highway transferred to local jurisdiction
Fines[9]			
Reimbursements to municipalities – Vehicle Code Fines	$12,976	$12,830	Judicial Code (Title 42,3571); 50% of Vehicle Code fines issued by the PSP; 50% population, 50% mileage
Subtotal - Annual Allocations	**$394,312**	**$375,873**	
State/Federal Grants for Projects			

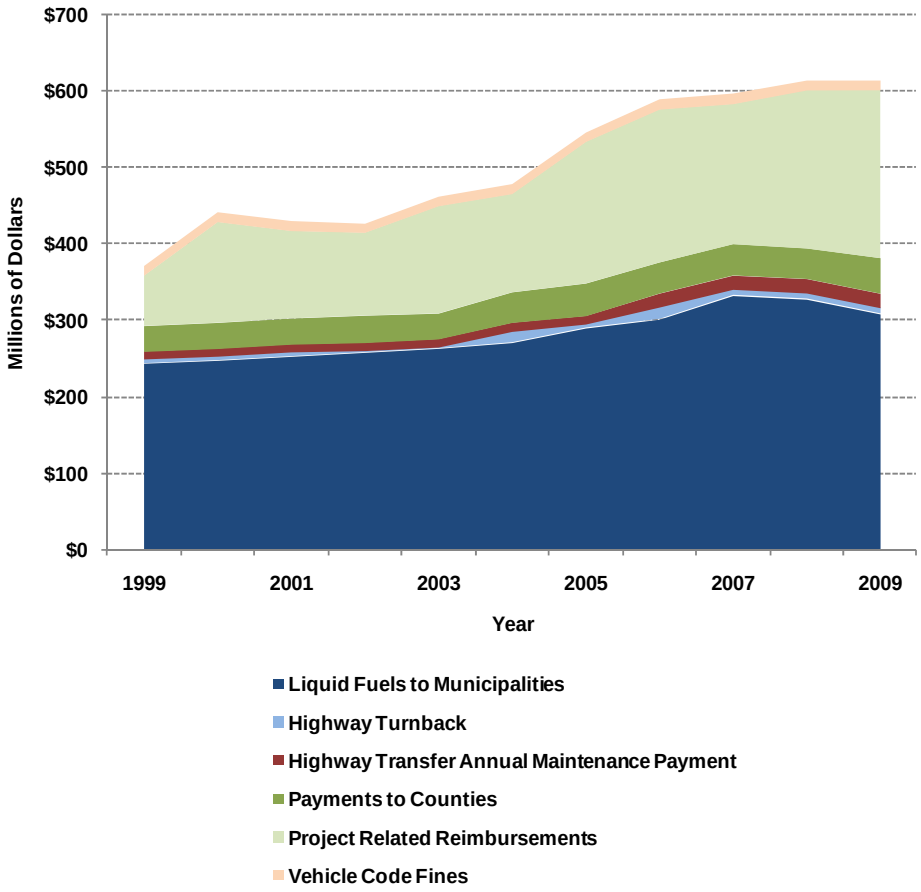
[9] Revenue distributed for fines may be used for the cost of police.

Payment to Local Governments	FY2008-09 ($000s)	FY2009-10 ($000s)	Description
County bridges excise tax	$4,538	$10,000	Act 26: Supplemental funding for repair or replacement of county and forestry bridges
Restoration projects – Highway Transfer	$8,000	$8,000	Act 32 of 1983 provides funding for restoration and turnback of local highways to local government control (by either PennDOT or local government)
Federal aid – County bridges	$42	$16	Federal reimbursement to PennDOT for costs incurred in overseeing county-owned bridge projects
Local grants for bridge projects	$25,000	$30,000	Act 234 of 1982, grants to counties or municipalities to fund up to 80 percent of the non-federal share of bridge projects
Federal aid – Local grants for bridge projects	$955	$1,996	Federal reimbursement to PennDOT for costs incurred in overseeing county or municipal bridge projects
Reimbursements from local governments	$1	$4	Local reimbursement to PennDOT for costs incurred in overseeing county or municipal projects
Federal reimbursements – bridge projects	$74,713	$79,304	Federal pass-through reimbursement to counties or municipalities for the federal share of county/municipal bridge projects
Federal reimbursements – political subdivisions	$105,712	$107,226	Federal pass-through reimbursement to counties or municipalities for the federal share of county/municipal highway projects
Local share Highway and Bridge Projects	$777	$1,617	City of Philadelphia's share of the South Street Bridge project
Subtotal – Project Related	**$219,738**	**$238,163**	
Totals	**$614,050**	**$614,036**	

Source: PennDOT Bureau of Fiscal Management

The total amount of payment to local municipalities during FY2009-10 was $614 million. This consisted of $376 million in annual allocations and $238 million in project related reimbursements. This was a slight decrease from the previous year, yet total payments to municipalities have been increasing, as depicted in Figure 19.

Figure 19: Total Payments to Local Government, FY 1999-09



Source: PennDOT Bureau of Fiscal Management

4.4 DCED Reporting

Local governments electronically report revenue and expenditures to DCED on an annual basis. DCED summarizes this information and posts it on its Web site. Table 27 shows total expenditures, revenue, and spending on public works: highways and streets for the four-year period ending 2009 as compiled from the municipal and county reports.

Table 27: Electronic Filing of Revenue and Expenditures, 2006-09 (in millions)

	2006	2007	2008*	2009*
Total revenue	$15,180	$16,292	$7,979	7,795
Total expenditures	$14,640	$15,264	$7,991	7,842
Expenditures: Public works, highways and streets	$1,495	$1,641	$1,271	1,218

Source: PA Department of Community and Economic Development
*Data for 2008 and 2009 is incomplete

The variance of these figures is due to the data for 2008 and 2009 being incomplete. A number of municipalities, including some large cities, did not report for these years.

DCED also noted that in calculating the total amount of spending on "public works: highways and streets," local governments report on several line items, as follows:

- Administration
- Cleaning of streets and gutters
- Winter maintenance
- Traffic control devices
- Street lighting
- Sidewalks and crosswalks
- Storm sewers and drains
- Repairs of tools and machinery
- Maintenance and repairs of roads and bridges
- Highway construction and rebuilding projects

Presently, DCED is unable to provide a statewide figure for spending by each of these line item expenditures.

Based on the information from DCED, it appears that any conclusions about total spending on highways and bridges should be based on 2006 and 2007 data.

4.5 Estimating Total Spending

To estimate total municipal spending based on the information available, two potential methods were explored:

- Base total spending on the DCED financial reporting, taking into account that the last two years of complete data were 2006 and 2007. Averaging those two years provides a spending figure of $1.568 billion. The major concern with this method is using data that is several years old, because the more recent data is incomplete.
- Base total spending on an extrapolation of information from the Municipal Survey. This provides an estimate of $1.346 billion. The concern with using this method is that some survey responses bring into question the integrity of the data.

The study team determined that the first method of utilizing DCED figures was the best basis for estimating total municipal spending.

The survey data is the best information available to determine how revenue is spent. Based on the survey, the following are the percentages of spending:

Table 28: Local Government Spending on Highways and Bridges

Type of Work	Percent of Total	Spending (Millions)
Maintenance & Repairs of Roadways and Bridges	37%	$580
Highway & Bridge Capital Improvements	27%	$423
Winter Maintenance	19%	$298
Equipment	10%	$157
Operations	7%	$110
Total	100%	$1,568

Source: TAC Municipal Survey, 2011

4.6 Agility Program

During periods of limited revenue for state and local operations, the Agility Program gains importance as a tool for PennDOT field staff and local government partners to help address budget shortfalls. Historically, partnerships have been formed between PennDOT and thousands of municipalities and other governmental organizations for the purpose of exchanging services—essentially bartering so each can focus on the tasks it is best suited to address. All parties increase productivity and improve their relationships and communications at all levels as a result of these interactions. Currently there are 445 Agility Agreements with municipalities which comprise approximately 90 percent of all agreements.[10]

From 2007 through 2011, municipalities have received significant amounts of PennDOT services. These include, for example, 3,517 tons of asphalt paving, 835 lane-miles of striped local roads, and hundreds of lane-miles repaired with 234,000 gallons of sealant. In return, municipalities mowed more than 4,000 acres of PennDOT-owned medians and rights-of-way statewide and performed a variety of other services for the department.

Also, PennDOT has converted some of its "paid" winter contracts with municipalities to agility agreements. Under this arrangement, and in return for municipalities performing winter services on state roads, the municipalities receive PennDOT services instead of cash.

In order to exchange services each party must sign an Agility Agreement, which is essentially a contract between PennDOT and the partner.

[10] The remaining 10 percent of agreements are with volunteer fire departments, school districts, public use airports, and others.

5. Local Highway and Bridge Needs

The analysis described in this section quantifies the needs on the local highway and bridge network. This study acknowledged at the outset that there is no source of comprehensive data regarding the condition of the local highway and bridge system, and there is no known source of what is required to adequately maintain and restore the local network. There are, however, particular data elements that are available, such as bridge needs from the biennial inspection of all bridges greater than 20 feet in length. There are other data elements available, such as the extent of the system, which can be used to provide estimates of needs. Information from the Municipal Survey was helpful in filling some information gaps. Still, it was necessary to make certain assumptions for this analysis. Throughout this analysis, good asset management practices have been considered, including methodologies used in cooperation with PennDOT and the TAC for the Transportation Funding Study in 2010. In some cases, samples of local practices were reviewed to provide a basis for estimation and also to make sure that assumptions are realistic.

Table 29 identifies the categories of needs that were considered:

Table 29: Highway and Bridge Needs Categories

Category	Description
Roadways	
Roadway Maintenance & Repair	Addressing the quality of pavements on the local systems; performing routine maintenance activities on roadways and bridges, drainage, roadside, streetlights, and sidewalks; maintaining adequate pavement markings and signing along highways
Winter Maintenance	Requirements to clear roads of snow and ice
Traffic Signals	Keeping traffic signals operating to adequately control traffic
Bridges	
Bridges > 20’	Needs on the inspected bridges over 20’ in length
Bridges < 20’	Needs on bridges 8’ to 20’ in length

The following sections discuss the methodology and calculations of needs for each of the categories above.

5.1 Roadways

Based on PennDOT statistics, local governments throughout the state own and maintain a total of approximately 77,500 linear miles or 155,400 lane miles of roadway. These roadways consist of various surface types, including unimproved, gravel, seal coat, bituminous, concrete, and brick. The number of miles of bituminous roadway is by far the greatest of the surface types, with concrete and brick being the two least common. The following table summarizes the locally-owned and maintained roadways by surface type. The Act 655 and Turnback information is based on PennDOT Bureau of Municipal Services records. For completeness, county-owned roads were added and assumed to fall into the Bituminous category.

Table 30: Municipal Mileage by Surface Type (Linear Miles)

	Act 655	Turnback	County	Total
Unimproved	1,719	16		1,735
Gravel	14,862	817		15,679
Seal Coat	1,761	119		1,880
Bituminous	53,238	3,693	703	57,634
Concrete	355	5		360
Brick	247	2		249
TOTAL	72,182	4,652	703	77,537

Source: PennDOT Bureau of Municipal Services

The price to maintain and improve these roadways is a major cost for local municipalities, regardless of the municipality's geographic setting (i.e., urban or rural). The source of funding for road work is generally limited to liquid fuels allocations and local general fund revenue from local tax receipts. Considering the current financial environment, the goal of most municipalities is to maintain the existing conditions or to extend the life of the roadways through relatively low cost maintenance activities, such as cleaning and sealing cracks in bituminous pavements. In many cases, repair and reconstruction are performed only on an as-needed basis due to insufficient funding to undertake major resurfacing projects. As major roadway repair and reconstruction projects are deferred, the financial needs to repair and maintain the local roadway system will become greater and greater.

The majority of maintenance work is performed by crews employed by the municipality that are sometimes understaffed, especially in the Marcellus Shale natural gas region, where there is significant competition with gas drilling companies for locally available skilled laborers and equipment operators. This competition has driven up the cost to employ these workers because the gas drilling companies are capable of offering higher pay and increased benefits. In order to remain competitive, municipalities will need to

provide increased wages and benefits. This will result in increased costs to acquire and retain qualified workers. The problem is compounded by the sharp increase in wear and tear on roadways in these same Marcellus Shale municipalities.

The roadway portion of this study considered pavements, sidewalks, drainage, line painting, signage, street sweeping, mowing, tree trimming, guiderail, street lighting, and traffic signals. It focused on determining what construction/maintenance activities are currently performed by municipalities, what costs are associated with these tasks, and what should be done in the future to properly maintain the assets. This was done by conducting phone interviews with personnel from PennDOT maintenance organizations, PA DCNR, and municipalities.

Because the local roadway network consists of many different road surface types and geographic settings, categories were developed to estimate the costs. Based on the information collected, typical roadway maintenance strategies were developed for the various roadway surface types present within the local road network. Additionally, both rural and urban geographic settings were considered in the development of the maintenance strategies. The following roadway categories and associated maintenance strategies were developed, shown with both linear and lane mileages.

Table 31: Roadway Categories and Mileages

Roadway Surface Type	Linear Miles	Lane Miles
Rural Unimproved & Gravel	17,414	34,828
Rural Seal Coat	1,880	3,760
Rural Bituminous	24,080	48,160
Urban Bituminous	33,554	67,488
Urban Concrete	609	1,218
TOTAL	77,537	155,454

Source: PennDOT Bureau of Municipal Services & Bureau of Planning and Research

Unimproved and gravel surfaces were combined because the maintenance operations for these roadway surfaces are very similar. Brick roadway surfaces represented only a small portion of the local roadway network, so those mileages were combined under the Urban Concrete category. Concrete road surfaces were only considered in urban settings, and unimproved, gravel, and seal coat surface roadways were only considered for rural settings. Appendix A contains tables summarizing the maintenance strategies developed for each of the roadway categories.

Although PennDOT maintains a database of pavement conditions for state-owned roadways, no such database is currently available to assess the existing condition of the locally-owned pavements. It was assumed that the existing conditions of locally-owned roadways are generally fair to good, understanding that the pavement conditions and the local user's expectations of the serviceability and rideability will vary with geographic

location and roadway surface type. The Municipal Survey also indicated that municipalities estimated that 80 percent of their roads were either good or fair.

Unit costs for the various work items were developed through information collected from phone interviews, from PennDOT ECMS bid data, and from cost estimating catalogs. Typical quantities were generally developed based on the information collected for this study. In many cases, quantities for estimating the costs were developed based on assumptions, due to the variability of roadway conditions and because no specific data was available. The assumptions were developed based on reasonable quantities that could be expected to be required per lane-mile of roadway throughout the maintenance cycle for a roadway in fair to good condition.

Using the unit costs and quantities, the total cost for each year of the maintenance cycle was calculated. Note that the annual cost per lane mile of roadway varies with the work items that are required in each individual year of the cycle. Years where higher cost items are required, such as a bituminous overlay, will have a higher annual cost. The annual costs were then summed over the entire maintenance cycle to yield a total cost of the cycle based on one lane-mile of roadway. Considering that roads within any municipality vary in condition, the maintenance cycles of the roads will be offset; therefore, any of the maintenance activities will likely be taking place simultaneously within the municipality in any given year. To account for varying maintenance cycles, the total cycle cost per lane-mile was divided by the number of years in the cycle, resulting in a required annual cost per lane-mile of roadway. The following table summarizes the total annual cost per lane-mile required to perform the recommended maintenance strategy for each category of roadway analyzed:[11]

Table 32: Total Annual Maintenance/Repair Cost per Lane Mile of Roadway

Roadway Type Category	Annual Cost Per Lane-Mile
Rural – Unimproved and Gravel Surfaces	$11,729
Rural – Seal Coat Surface	$11,369
Rural – Bituminous Surface	$17,694
Urban – Bituminous Surface	$26,666
Urban – Concrete Surface	$21,474

These annual costs per lane-mile were then applied to the lane mileages to provide total annual statewide costs. This indicates a total of $3.1 billion for all capital repair and maintenance of local roadways.

[11] More detail is provided in
Appendix A – Pavement Maintenance Strategies

Table 33: Roadway Cost Summary

Roadway Type	Linear Miles	Lane Miles	Cost/ Lane Mile	Annual Cost
Rural Unimproved & Gravel	17,414	34,828	$11,729	$408,497,612
Rural Seal Coat	1,880	3,760	$11,369	$42,747,440
Rural Bituminous	24,080	48,160	$17,694	$852,143,040
Urban Bituminous	33,554	67,488	$26,666	$1,799,635,008
Urban Concrete	609	1,218	$21,474	$26,155,332
TOTAL	77,537	155,454		$3,129,178,432

Source: PennDOT Bureau of Municipal Services & Bureau of Planning and Research

5.2 Winter Maintenance

The cost of winter maintenance is difficult to estimate on a per mile basis. Winter weather can vary greatly between different areas of the state, and the level of winter maintenance can vary by year according to the severity of that particular winter. Therefore, other methods were used to estimate these costs.

Costs for winter maintenance were calculated based on information received through the municipal survey and current total estimated spending. One question in the survey asked how a local government spends its current transportation budget by percentage by category, with one category being winter maintenance. With 365 responses to this question, the average response for winter maintenance was 19 percent. This percentage was applied to the total estimated spending on highways and bridges for all local governments for an annual estimate for winter maintenance of $298 million to care for the 77,500 miles of local roads.

Percent Spent on Winter Maintenance = 19 percent

Total Estimated Spending = $1.568 billion

Annual Estimate for Winter Maintenance = $297, 920,000

5.3 Traffic Signals

Properly operating and maintaining Pennsylvania's 14,000 traffic signals is the responsibility of the host municipalities. This is a significant cost and responsibility.

As previously noted, there is no statewide signal asset management system to determine the age and condition of traffic signals. There is concern over the condition of traffic signals, as many of the state's municipalities have neither the technical expertise nor the resources to adequately maintain and operate them. There is minimal operational oversight at the state level after initial installation.

PennDOT's Bureau of Highway Safety and Traffic Engineering has calculated annual estimated costs for properly maintaining and operating these signals. This includes the

standard that every signal should be retimed every five years based on current traffic demands.

Table 34 shows the estimated total annual costs for general maintenance, energy costs, and periodic retiming, based on 14,000 signals.

Table 34: Estimated Total Annual Costs for Signal Maintenance

Item	Annual Cost	Comment
Maintenance	$49,000,000	$3,500/yr. for each signal
Operating (Energy)	$21,000,000	$1,500/yr. for each signal – could be lower based on conversion to light-emitting diodes (LEDs)
Retiming	$21,000,000	$7,500/signal once every 5 years
Total	$91,000,000	

Source: PennDOT Bureau of Highway Safety and Traffic Engineering

While these costs are optimal, the reality is that proper maintenance is not occurring on many signals, and very few signals are retimed to optimize operations.

PennDOT's Bureau of Highway Safety and Traffic Engineering has also developed numbers estimating the costs statewide for upgrading all traffic signals over a 10-year period. Estimating $100,000 for each major upgrade, total costs would be $140 million per year over a 10-year period.

Therefore, the total cost for operating, maintaining, and upgrading traffic signals is $231 million annually.

5.4 Bridges

PennDOT's Bridge Management System (BMS) is an information tool for asset management as well as monitoring the progress of Pennsylvania's bridge program. In accordance with federal requirements, all bridges greater than 20 feet in length are required to be inspected every two years, regardless of ownership, and inspection data is included in BMS. Therefore, there is considerable information about all local bridges over 20 feet.

While PennDOT inspects and includes data on all state-owned bridges between 8 and 20 feet in length, there are no requirements for local bridges less than 20 feet. BMS contains

some information on approximately 762 local bridges less than 20 feet; this is based on information voluntarily reported and is far from complete. However, there are some recent inventories of bridges less than 20 feet that were helpful in estimating the statewide inventory.

5.4.1 Estimating Bridges Less Than 20 Feet

PennDOT and its planning partners have initiated studies to begin to identify the inventory of bridges less than 20 feet long on the local system. Several planning partners have recently conducted pilot studies aimed at obtaining better inventory and condition information on locally-owned structures.

The most comprehensive study has been conducted by the Williamsport MPO (Lycoming County), which identified a total of 101 bridges less than 20 feet long. Similar studies are under way or complete in the Northern Tier planning region and the North Central planning region. The results of these efforts provides a 10-county sample of an "under 20-foot" bridge inventory.

While this sample is limited and covers only one geographical area of the state, it is the best information available. Future efforts by PennDOT to add to the actual inventory will provide additional accuracy.

The following analysis was used to extrapolate the sample of under 20-foot local bridges to a statewide inventory:

- The numbers of under 20-foot local bridges for the 10 counties were summarized.
- The numbers of bridges greater than 20 feet long and the mileages of local roads in each county were summarized.
- The percent of bridges greater than 20 feet long, relative to the statewide total, and the percent of miles of local roads, relative to the statewide total, were calculated.
- These percentages were then applied to the sample of under 20-foot bridges to extrapolate to statewide totals.

It was assumed that the number of under 20-foot bridges would have some relationship to the number of over 20-foot bridges in the same counties, as well as a relationship to the miles of roads. The results show that these relationships were actually very similar. This provides an estimate of bridges less than 20 feet long that appears to be reasonable. The figures are shown in Table 35.

Table 35: Local Bridges 8 to 20 Feet in Length

County	Bridges < 20'	Bridges > 20'	Local Road Mileage
Bradford	100	128	1,594.3
Cameron	4	16	122.9
Clearfield	77	70	1,135.1
Elk	23	35	373.6
Jefferson	68	50	841.3
Lycoming	101	109	1,256.3
McKean	58	78	480.7
Potter	46	40	637.3
Sullivan	18	39	298.3
Tioga	119	93	1,141.4
Subtotal	**614**	**658**	**7,881.2**
Statewide		6,332	77,526.2
Percent of statewide		10.39%	10.17%
Extrapolate based on >20' bridges	5,911		
Extrapolate based on mileage	6,037		
Average	5,974		

Sources: PennDOT Bridge Management System, 6/29/11; Bureau of Planning and Research; Local Bridge Reports from Northern Tier, North Central and Lycoming County

Based on this analysis, an assumption was made that there are 6,000 bridges 8 to 20 feet in length throughout the state.

5.4.2 Local Bridge Conditions

The condition of local bridges 20 feet and longer is shown in Table 36. Thirty-four percent of the bridges over 20 feet are rated as structurally deficient. This is much higher than state bridges, for which approximately 19 percent of total bridges are structurally deficient.

Table 36: Condition of Locally-owned Bridges 20 Feet and Longer

Planning Indicator	
Number Local Bridges	6,332
Sq. Ft. Deck Area	14.3056 msf
Number Posted	1,795
Posted Rate	28.3%
Number Closed	200
Closed Rate	3.2%
Structurally Deficient (SD)	2,189
Percentage Structurally Deficient	34.6%
SD Deck Area	4.3406 msf
Percent SD Deck Area	30.3%

Source: PennDOT Bridge Management System, 6/29/11

5.4.3 Calculations of Local Bridge Need

A number of data elements and assumptions were used in the following calculations:

- Local bridge statistics for bridges greater than or equal to 20 feet long were taken from the PennDOT public quarterly bridge report as of June 29, 2011.
- The number of local bridges 8-20 feet in length was estimated at 6,000, based on analysis of the inventory for 10 sample counties.
- Average deck area for bridges 8-20 feet long was calculated at 390 square feet, based on a sample of bridges in the BMS.
- 1.5 percent of bridge deck was assumed to become structurally deficient (SD) annually based on PennDOT information and assumptions from the TAC Transportation Funding Study (2010).
- Structurally deficient (SD)—number and Sq. Ft. Deck Area (SFDA)—8-20-foot bridges were assumed to be in the same percentage as the Lycoming County inspection sample (45%).
- Average costs used were $400 per square foot for bridge rehabilitation and $650 per square foot for bridge replacement.
- Application of costs for existing SD bridges were assumed at 30 percent rehabilitation and 70 percent replacement based on federal eligibility of over/under a sufficiency rating of 50.0, along with a review of SD sufficiency ratings for local bridges in BMS.
- Addressing the 1.5 percent new SD bridges each year was assumed at the rehabilitation cost.

This yielded the following calculations:

Table 37: Local Bridges and Deficiencies – Bridges 8 Feet and Longer

	Bridges >20'	Bridges 8' - 20'	All Bridges > 8'
Number of Bridges	6,332	6,000	12,332
Sq. Ft. Deck Area	14,305,600	2,340,000	16,645,600
Number SD	2,189	2,074	4,263
SD Sq. Ft. Deck Area	4,340,600	1,053,000	5,393,600

Source: PennDOT Bridge Management System, 6/29/11

Two calculations were made, as follows:

Minimum Needed to Keep Pace

This addresses the equivalent of the new SD deck area each year, so the total deficiencies do not grow. It requires $99.9 million annually, based on addressing the 1.5 percent of deck area that becomes deficient each year, as follows:

1.5 percent of 16,645,600 sq. ft. = 249,684
x $400/sq. ft. = $99,873,600

Addressing the Backlog of SD Bridges

This was considered based on reducing the backlog by 50 percent over time. Initially, two scenarios were tested—one to address the backlog over 20 years, and the second to address the backlog more aggressively over 10 years. It was determined that a 20-year period was a more realistic target for achieving such a significant reduction in deficiencies.

Table 38: Funding Requirements to Reduce Local Bridge Deficiencies by 50 Percent over 20 Years

	Scenario to Reduce Local SD by 50% Over 20 Years
SFDA	5,393,600
50 Percent of Backlog	2,696,800
Annual SFDA	134,840
30% Rehab @ $400/sf	$16,180,800
70% Replace @ $650/sf	$61,352,200
Total	$77,533,000
Address 1.5% New SD annually	$99,873,600
Total Annual Funding Required	$177,406,600

If this level of funding was committed to local bridges, approximately 250-300 local bridges could be improved each year.

5.5 Total Highway and Bridge Needs

The following is a summary of annual needs for the repair and maintenance of the local highway and bridge network. These needs total over $3.8 billion.

Table 39: Annual Highway and Bridge Needs (in thousands)

Category	Description	Annual Needs
Roadways		
Roadway Maintenance & Repair	Addressing the quality of pavements on the local systems; perform routine maintenance activities on roadways, drainage, roadside, streetlights, sidewalks and bridges; maintaining adequate pavement markings and signing along highways	$3,129,178
Winter Maintenance	Requirements to clear roads of snow and ice	$297,920
Traffic Signals	Keeping traffic signals operating to adequately control traffic	$231,000
Bridges		
Bridges > 8’	Need on all local bridges over 8’ in length	$177,407
Total		**$3,835,505**

5.6 Additional Mandates

In addition to the costs detailed above, municipal governments have many financial areas of concern that relate to federal or state mandates. Three of the most significant mandates are described below, along with their potential financial impact:

1. Signage
2. Stormwater Requirements
3. Compliance with the Americans with Disabilities Act

The cost to address these mandates is above and beyond the previously calculated needs.

5.6.1 Signage

The Federal Highway Administration (FHWA) establishes national standards for highway signing and marking through the Manual on Uniform Traffic Control Devices (MUTCD), which is the national standard for all traffic control devices. The MUTCD applies to any street, highway, bikeway, or private road open to public travel. The most

recent proposed changes to the MUTCD would have placed deadlines on replacement of various traffic signs and street name signs to meet minimum levels of sign retroreflectivity, which is the visibility of a sign at night.

The new regulations drew many comments from local government and others regarding the financial impact. In response, the FHWA issued a proposed regulation on August 31, 2011, which would eliminate many of the proposed deadlines for traffic sign replacement. The new proposal allows communities to replace and upgrade signs when they reach the end of their useful life. Some deadlines are retained for sign upgrades that are critical to public safety.

With the number of signs that would have needed to be upgraded, the original proposal would have been extremely costly to local governments. The revised proposal will still have an impact for ongoing sign replacement, but this impact will be much more manageable.

5.6.2 Stormwater Requirements

Drainage system maintenance has been complex and contentious between PennDOT and local governments. Various provisions of the State Highway Law of 1945 address maintenance responsibility for state highways, including drainage on and through them, e.g., 36 P.S. §670-542 and 543 (first and second class cities); 36 P.S. §670-522 and 521 (2A and third class cities); 36 P.S. §670-513 (boroughs and incorporated towns); and 36 P.S. §670-501 (townships). These provisions divide responsibility between PennDOT and the local government through which the state highway traverses. These responsibilities vary among municipality types as specified in law.

In 2007, the TAC studied and issued a report entitled Stormwater Facilities on State Highways. The TAC report recognized that the management of stormwater on state highways is a complex issue. Legally, cities and boroughs have the responsibility for maintenance of stormwater facilities along state highways, and PennDOT policy requires townships to maintain stormwater systems as well. The report recommended that the General Assembly enact legislation to enable the establishment of special purpose municipal authorities to allow for the collection of appropriate fees to adequately maintain stormwater facilities along state highways. PennDOT has calculated total annual costs of $294 million along state highways for regular maintenance and cyclical replacement of all stormwater structures.

Through considerable discussions with local government association representatives, PennDOT issued changes to their Maintenance Manual. The major change is that PennDOT will assume structural responsibility for existing enclosed surface drainage facilities within townships where a written agreement or highway occupancy permit does

not assign responsibility otherwise. PennDOT already assumes responsibility for open systems in townships. Townships would still be responsible for capacity issues generated by drainage from upstream development and local streets. PennDOT has also implemented a policy for ensuring that private applicants for driveways are ultimately responsible for the cost of drainage facilities within highway right-of-way relating to their private improvements.

Additional stormwater issues may be faced by municipalities related to the National Pollutant Discharge Elimination System (NPDES) permit program. Polluted stormwater runoff is commonly transported through Municipal Separate Storm Sewer Systems (MS4s), from which it can be discharged untreated into local water bodies. Operators must obtain a permit and develop a stormwater management program. The future potential for installation of filtration systems is something that cannot be estimated, but could be significant.

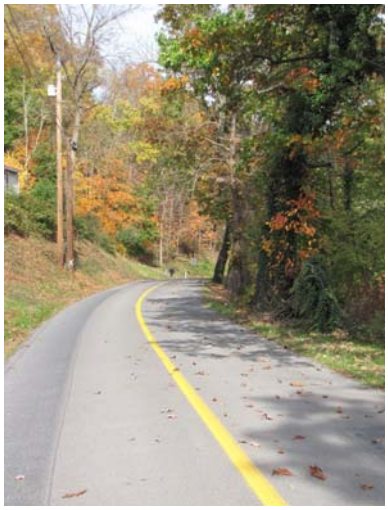
5.6.3 Compliance with the Americans with Disabilities Act (ADA)

The Americans with Disabilities Act (ADA) of 1990 is a federal civil rights statute. Updates to PennDOT ADA policy, standards, and guidance were issued November 14, 2008. PennDOT could seek reimbursement from municipalities for all curb ramps constructed by the department. (PennDOT spent approximately $90 million during the 1990s for new curb ramps.) Currently, PennDOT will not seek reimbursement for the construction of curb ramps crossing state routes. There are no known proposed changes to state regulations regarding maintenance responsibilities for curb ramps and sidewalks. The estimated number of curb ramps impacting state roads includes:

- 100,000 crossing state routes (PennDOT) – Estimated PennDOT cost: $550 million; $55 million/year for 10 years
- 70,000 crossing local roads along routes (municipality) – Estimated local municipality cost: $385 million; $38.5 million/year for 10 years

Currently an involved municipality may choose to participate in a PennDOT project or opt to pursue curb ramp/ADA compliance on its own for their facilities along a state route. If a PennDOT project is federally funded, the municipality can take advantage of the federal funds based on the pro-rata funding splits. Municipalities may use Liquid Fuels funds for curb ramp construction. Municipalities can exercise their ability to assign maintenance responsibilities to adjacent property owners through the passing of ordinances.

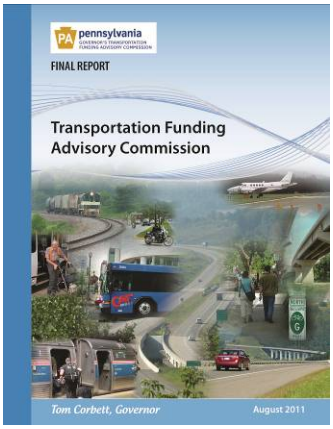
6. Funding Options for Local Transportation



Revenue being directed to local roads and bridges comes from three primary sources—the local share of liquid fuels, grants for specific projects, and local general fund revenue. It is clear that local governments are currently making a significant commitment to their local infrastructure, but needs are far outstripping revenue. For local government to increase funding to roads and bridges, they are severely limited to their existing taxing authority which is normally property taxes.

To address the large unmet needs identified in this report, the solution needs to employ a variety of financing mechanisms to meet the required future investments. This study considered the work completed by the Transportation Funding Advisory Commission and the Governor's Marcellus Shale Advisory Commission. This was supplemented by a best practices review of revenue mechanisms used in other states.

6.1 Transportation Funding Advisory Commission



In April 2011, Governor Corbett created the Transportation Funding Advisory Commission by executive order. The Commission's report was submitted to the Governor on August 1, 2011, and recommended a funding package that allows for long-term investment for all modes of transportation. The proposed package recommends a phased set of revenue components which would provide more than $300 million in additional annual revenue for local highways and bridges by Year Five. A significant portion of a statewide increase such as this would be a major step toward addressing the gap at the local level.

The proposal also includes efficiency and modernization recommendations. Table 40 lists a number of these recommendations which would benefit local governments in managing their infrastructure needs. These call for a greater amount of collaboration between PennDOT and local governments, leading to a better coordinated system.

Table 40: TFAC Modernization Recommendations Benefitting Local Government

TFAC Recommendation	Description	Principal Benefits
Update traffic signals to LED and optimize timing	Currently municipalities own and maintain the state's 14,000 traffic signals. PennDOT would oversee modernizing signals and optimizing their operation.	• Drivers can see lights better, improving safety. • Energy costs reduced by 80% for local governments. • Existing roadways can handle more traffic for a relatively modest investment, reducing congestion and improving air quality. • Faster transition statewide to consistent, updated signals.
Eliminate local cost share for ADA curb ramps	When improving state highways, PennDOT would construct curb ramps compliant with the Americans with Disabilities Act at all affected cross-streets, and seek maintenance agreements with municipalities in lieu of cost sharing.	• Cost savings to local governments ($238 million). • Efficient installation statewide. • Clear-cut maintenance responsibilities.
Agility agreements with PTC and local governments	Formalize cooperation between PennDOT and local governments, as well as the Pennsylvania Turnpike Commission (PTC), through agility agreements. They facilitate joint planning, training, and materials development as well as shared use of materials and equipment and exchange of services.	• Common-sense approach to managing transportation infrastructure. • Cost savings for PennDOT and local governments. • Better roadway maintenance and service.
Enhanced collaboration	Broader collaboration among state agencies, the PTC, transportation management areas, and county and municipal governments, all with overlapping jurisdictions and goals. Efforts would align responsibilities with areas of strength, with PennDOT taking the overall lead.	• Transportation system planning, development, operation, and maintenance would be better managed. • Streamlined methods would be more cost-effective.

TFAC also recommended that the General Assembly provide enabling legislation so local governments have the option to raise revenue to support transportation investment. Examples of local option taxes are provided in section 6.3.

6.2 Governor's Marcellus Shale Advisory Commission

In March 2011, Governor Corbett created the Governor's Marcellus Shale Advisory Commission by executive order. The Commission's report was issued on July 22, 2011. Among the many issues addressed in this report was the impact on local roads and bridges created by the increased gas extraction activity in particular regions of the state.

Photo: Ken Meyer

The Commission's report recommends many specific actions including the enactment of a fee for the purpose of mitigating the impacts borne by the citizens and local governments attributable to natural gas development. This includes the impacts on local roads and bridges.

6.3 Additional Revenue Options

A "best practice" review was conducted of other states' mechanisms for revenue generation to fund local roads and bridges. After a high-level nationwide scan of other state practices, a close examination was done for eight states and more than two dozen funding options. To provide context for possible applicability to Pennsylvania, the funding mechanisms were examined for their structure, ease of implementation, revenue generation, and other relevant factors.

The best practice review identified a number of new, innovative programs for possible implementation in Pennsylvania. Local option taxes that provided counties and municipalities with the authority to enact their own funding emerged as the most successful and popular alternatives. In order to take advantage of any of these innovations, Pennsylvania would need to grant local governments more authority over transportation funding mechanisms.

However, none of these mechanisms could be implemented without considering associated issues. A particular concern in Pennsylvania would be whether taxing authority would be granted to counties or municipalities or both. In many states, counties have a stronger role in transportation than they traditionally have had in Pennsylvania. Of particular interest would be the potential for enactment at the county or regional level and determination of how the proceeds would be shared among the counties and individual municipalities. Adapting any of these mechanisms to Pennsylvania would also

require new administrative mechanisms related to collection and distribution of the revenue. While some could be collected through existing state processes, they could create new challenges in tracking and assigning the origin of revenue.

The following table highlights the potential new mechanisms from the best practice review which were considered to be most applicable to Pennsylvania.

Table 41: Potential Local Government Funding Mechanisms

Revenue Mechanism	Description	Pros	Cons
Local option sales tax	• Typically levied by counties; range from 0.25% to 2%; on items already subject to state tax • Requires change in administration to establish structure for remittance of revenue • Likely requires an ordinance by governing body and approval by referendum	• Proven to be successful in many areas of the U.S. • PA sales tax already exempts many necessities, limiting impact on low-income populations	• Typically mirrors sales trends which can vary with economic conditions • Municipal-based (and perhaps county-based) sales taxes could cause residents to shop in neighboring municipalities without a tax
Local option gas tax	• Levied on motor fuel in addition to state excise taxes • State would collect and remit back to local level • Would require structure to track sales and remit • Authorizing legislation would need to set minimum and maximum tax that could be enacted	• High yield • Builds on existing collection mechanism • Used in many states including FL, IL, OR, VA, and WA	• High and volatile gas prices may discourage enactment • Diminishing returns with greater vehicle efficiencies • Works against moving gas tax collection to higher level • Municipal-based (and perhaps county-based) gas taxes could cause drivers to purchase gas in neighboring municipalities without a tax
Local option vehicle	• Typically a flat rate, but could be based on other	• Urban and suburban areas	• Residents are impacted but not

Revenue Mechanism	Description	Pros	Cons
registration	variables such as weight, value, age, etc. • State could collect and distribute to locals	with large populations would benefit the most • Best if implemented at county or regional level • Used in CA, TX, VA, and WA	others using roads • Would not generate as much for rural areas
Vehicle personal property tax	• Annual fee could be collected with annual state registration • Calculated by multiplying the rate by the value of the vehicle which decreases annually • Would require a new administrative structure	• Could generate significant revenue • Taxes those who can afford more expensive vehicles	• May create large annual fees for vehicle owners • May lead to negative impacts on consumer spending for new vehicles
Transportation utility fee	• Treats transportation like other local services financed through user charges • Designed to capture property owners' use of transportation and rates may be set based on property type • Typically collected through municipal monthly or quarterly utility bill	• Provide the greatest amount of control for municipalities • Rates can be tailored to meet local goals • Relatively simple for municipalities with an established structure for charges	• More difficult to use in rural areas • No framework for oversight exists • May discourage businesses to locate there
Public-Private Partnerships	• Allows for contractual agreements between public agencies and a private entity to finance, operate, maintain, and/or construct public infrastructure	• Can be used by a broad range of public agencies • Allows for shared risk between public and private sectors • Can lead to expedited project development and overall lower costs	• Small communities and rural areas may have limited use • Risk must be considered in releasing control of public asset

7. Study Findings and Recommendations

7.1 Findings

Local Government is responsible for a significant portion of Pennsylvania's highway and bridge system.

- Local governments are responsible for approximately 77,500 miles or 64 percent of all public road mileage in the state.
- Local governments are responsible for an estimated 12,000 bridges greater than 8 feet long.
- Municipalities own and operate all of the state's 14,000 traffic signals; 77 percent of these signals involve a state highway.
- Pennsylvania's locally-owned roadway network continues to grow at a rate of 272 miles a year on average, even as the size of the state-owned network has declined slightly. Overall growth in travel demand on locally-owned roadways is also increasing at a greater rate than on state-owned facilities—4.1 percent versus 0.8 percent between 2004 and 2008.

Ownership of the local system is based on Pennsylvania's historical development, and therefore has inherent inefficiencies.

- Responsibility for 99 percent of local roadway mileage is split among 2,562 municipalities. The remaining 1 percent is owned by the state's counties, although 37 of the 67 counties own no roadway miles.
- 54 percent of municipalities own fewer than 25 miles of roadway.
- Responsibility for local bridges is more evenly split between municipalities and counties. Counties own 42 percent of bridges, although the majority own little to no roadway miles.
- The majority of local governments do not have adequate tracking mechanisms in place to manage their transportation infrastructure. A survey revealed that 62 percent of municipalities do not maintain a Capital Improvement Program, and 76 percent do not have any form of an asset management system. Many municipalities find themselves in a reactionary mode—they struggle just to provide basic maintenance and lack the ability to plan for their assets long-term.

Total local spending on transportation infrastructure is estimated at nearly $1.6 billion.

- According to data from DCED, approximately 11 percent of their total local government expenditures is on "public works: streets and roads." This is based on municipal reported data from 2006 and 2007, with newer data being incomplete.

- For the 2009-10 Fiscal Year, local governments received $376 million in annual allocations from Liquid Fuels payments, Highway Transfer payments, and the local portion of fines. Municipal Liquid Fuels is the largest portion of this at $308 million.
- Local governments received $238 million in project-related reimbursements and grants in FY 2009-10.
- Remaining local spending is assumed to be primarily from local government general funds.

Liquid Fuels is a critical source of funding for local transportation needs, but it cannot completely address local needs.

- Liquid fuels revenue has shown little growth and will likely not grow substantially in the future due to increasing vehicle fuel efficiency and greater use of alternative fuels.
- Act 655 of 1956 created the Liquid Fuels funding mechanism for local transportation needs. Through the various acts since 1956 (from percentages of new revenue, to flat amounts), municipalities' share of the Liquid Fuels funding has eroded from its original 20 percent to 15.5 percent today. This compares to the fact that local roads represent 66 percent of the statewide system and carry 23 percent of all travel.
- Liquid Fuels distribution formulas are based on the size of the municipality's population and roadway network. The formulas are used irrespective of the differences among cities, boroughs, and townships, whose roadway networks all exhibit varying degrees of complexity with regard to features, as well as use.
- Pennsylvania's counties receive one-half cent of the fuel tax. Based on the Liquid Fuels Act of 1931, distribution is based on what each county's gasoline consumption was during the years 1927-29 against the statewide total. An additional $5 million allocation, authorized in Act 44 of 2007, is distributed based on relative bridge deck area.

The annual unmet need to maintain and repair local roads and bridges is estimated to be more than $2.0 billion.

- The study estimated a total need to maintain and repair local roads and bridges of $3.8 billion. This is based on an analysis of the local system assuming sound asset management strategies and acceptable local government practices.
- The annual need for local roadways is estimated at over $3.6 billion. The items within this estimate include addressing the quality of pavements; performing routine and winter maintenance; addressing drainage, roadside features, streetlights and sidewalks; maintaining pavement markings and signs, and keeping traffic signals operating correctly.

- The annual needs estimate for addressing bridges is $177 million. This includes addressing new deficiencies that occur each year and reducing the existing backlog of deficient bridges over time. At this level of investment, 250 – 300 local bridges could be addressed each year.
- Additional unfunded mandates could hinder local government's ability to pay for needed transportation improvements. Some of the identified mandates include new signing requirements, stormwater issues, and ADA compliance.
- Based on the estimated current local spending levels, there is more than $2 billion in annual unmet needs on the local transportation system. Continuing to under invest in infrastructure will create an underperforming system which will increase costs to users and will require an even greater investment to fix in the future.[12]

7.2 Recommendations

The General Assembly, PennDOT, and local governments must each take actions to raise the revenue needed to address the growing backlog of local roadway and bridge needs.

Local government can play a larger role in overall mobility within each region and locale across Pennsylvania. However, the estimated $2 billion in unmet needs on the local system must be addressed. An adequate share of any new transportation revenue initiative in Pennsylvania should be provided to local governments for their transportation system needs. The Transportation Advisory Committee supports the Transportation Funding Advisory Commission's recommended revenue package which would provide more than $300 million in new annual state revenue for local highways and bridges.

Beyond that, local governments need to raise additional revenue for transportation, but they have limited options available to them. The General Assembly should provide enabling legislation so that local governments can have greater options to raise revenue (implement a tax) to support local transportation investment.

[12] The May 2010 TAC Transportation Funding Study estimated unmet local highway/bridge and traffic signal needs at $432 million per year.

PennDOT should take a more prominent role in the operations of traffic signals across the Commonwealth.

Traffic signal improvements can provide the most cost-effective investments to improve the flow of traffic. While traffic signals are owned by local governments, PennDOT should partner with local governments to oversee modernizing and optimizing their operation. This would provide a faster transition to more consistent, updated signal systems statewide. PennDOT involvement would range from technical assistance for individual signal operations to coordination of multiple signals along highway corridors and across municipal boundaries. PennDOT should take the lead to integrate signal operations along key corridors into regional traffic management centers to allow for better rerouting of traffic during major incidents and emergencies.

PennDOT should take steps to expand the information available on the condition and needs of the local system.

While PennDOT has knowledge of the *extent* of Pennsylvania's locally-owned roadway network, there is limited information available on the *condition* of those assets. This is particularly true for locally-owned roadways and locally-owned bridges that are less than 20 feet long. This study developed an analytical approach to calculate statewide needs on the local system, but there is no substitute for actual reliable information upon which to make decisions. PennDOT has initiated efforts with its planning partners across the state to collect additional information on the local system. These efforts need to continue and be expanded statewide to provide more information about this 77,500-mile local system.

With regard to spending for transportation, local governments electronically report revenue and expenditures to DCED on an annual basis. DCED asks for data on a number of line items under spending for "public works: highways and streets," such as winter maintenance, lighting, storm sewers and drains, etc. However, this data is not made available in a form that can be used for statewide planning or analysis. PennDOT and DCED should collaborate to make this data available and accessible.

8. Appendix A – Pavement Maintenance Strategies

The following tables summarize the general maintenance strategies developed for each of the roadway categories listed in Sub-section 5.1- Roadways.

Table 42: Roadway Maintenance – Rural, Unimproved and Gravel Surface

Work Item	Schedule
Grading	2 x Annually
Ditching	Every 2.5 Years
Add Stone/Gravel (2")	Every 5 Years
Tree Trimming	Every 5 Years
Drainage	Inspect every 5 years, replace as needed
Mowing	3 x Annually
Guide Rail Repair	Inspect annually, replace as needed
Sign Replacement	Inspect annually, replace as needed

Table 43: Roadway Maintenance – Rural, Seal Coat Surface

Work Item	Schedule
Ditching	Annually
Pothole Patching	Annually
Seal Coat	Every 5 Years
Tree Trimming	Every 5 Years
Drainage	Inspect every 5 years, replace as needed
Mowing	3 x Annually
Guide Rail Repair	Inspect annually, replace as needed
Sign Replacement	Inspect annually, replace as needed

Table 44: Roadway Maintenance – Rural, Bituminous Surface

Work Item	Schedule
Pothole Patching	Annually
Crack Sealing	Annually
Ditch Cleaning	Every 3 Years
Shoulder Cutting	Every 3 Years
Tree Trimming	Every 5 Years
Drainage	Inspect every 5 years, replace as needed
Bituminous Overlay	Every 20 Years
Mowing	3 x Annually
Guide Rail Repair	Inspect annually, replace as needed
Sign Replacement	Inspect annually, replace as needed
Apply Pavement Markings	Every 2 Years

Table 45: Roadway Maintenance – Urban, Bituminous Surface

Work Item	Schedule
Pothole Patching	Annually
Crack Sealing	Annually
Tree Trimming	Every 5 Years
Milling	Every 10 Years
Base Repair	Every 10 Years
Bituminous Overlay	Every 10 Years
Pave Shoulders	Every 10 Years
Drainage	Inspected every 5 years, replace as needed
Mowing	15 x Annually
Guide Rail Repair	Inspect annually, replace as needed
Sign Replacement	Inspect annually, replace as needed
Apply Pavement Markings	Annually
Repair Sidewalks	Inspect annually, replace as needed
Repair Streetlights	Inspect annually, replace as needed

Table 46: Roadway Maintenance – Urban, Concrete Surface

Work Item	Schedule
Spall Repair	Annually
Tree Trimming	Every 5 Years
Concrete Patching	Every 5 Years
Joint and Crack Sealing	Every 5 Years
Microsurfacing	Every 5 Years
Drainage	Inspected every 5 years, replace as needed
Mowing	15 x Annually
Guide Rail Repair	Inspect annually, replace as needed
Sign Replacement	Inspect annually, replace as needed
Apply Pavement Markings	Annually
Repair Sidewalks	Inspect annually, replace as needed
Repair Streetlights	Inspect annually, replace as needed

9. Appendix B – Municipal Survey Details

After the survey closing date, respondent data was reviewed and cleaned. For instances where the respondent data was duplicative (i.e., two individuals completed a duplicate survey for the same municipality), the most complete information was retained. For instances where a series of percentage estimates were requested and respondents left one instance (in a series) blank, 0 percent was assumed for that blank instance. For instances where data was outside already validated existing data, it was deleted. For example, PennDOT maintains records of mileage for all municipalities. Based on this record, the largest number of roadway miles for any given municipality is the City of Philadelphia (2,191), City of Pittsburgh (893) and City of Erie (297). No other municipality in the state has more than 297 miles of roadway. In instances where municipalities reported miles above this figure, and it was certain that they were not representing the cities of Philadelphia, Pittsburgh or Erie, the response to that particular question was eliminated. (For example, one municipality indicated it had 12,000 miles of local roads.)

The results of the survey were then used to extrapolate information to statewide totals. Based on the data that is known from PennDOT and the DCED records, the relationship of the sample to the total was used to extrapolate other data elements.

The statistical validity of the survey was also examined. The desire was to have enough responses to produce a confidence interval of 5 at a 95 percent confidence level. In other words, the reader could be 95 percent sure that the results were within 5 percentage points of the true value.

9.1 Survey Instrument

The State Transportation Advisory Committee has commissioned a study to investigate the operation and maintenance of local roads and bridges. The study, planned for completion in mid-2011, will assess the current funding levels and sources being used to address local road and bridge needs and the adequacy of the current funding. Recommendations will be made on how to improve funding of local highways and bridges. Please assist in this study by filling out this short survey.

Note: Question 10 was provided to counties only.

1. What is your municipality type?
   - _ County
   - _ City
   - _ Borough
   - _ First Class Township
   - _ Second Class Township

2. How many miles of local roads are you responsible for?

3. To the best of your knowledge, how many local bridges are you responsible for?
   _ Greater than 20 feet
   _ Less than 20 feet

4. To the best of your knowledge, what is your most recent annual budget by source of funds for maintenance, repair and improvement of your roads and bridges? Please enter amounts in dollars, but omit the "$" symbol
   _ Liquid Fuels reimbursement
   _ Other grants (federal, state, developer, etc.)
   _ Municipal General Fund (including debt)

5. To the best of your knowledge, please indicate how you spend your transportation budget by percentage on the following activities. (100% Total)
   _ % Maintenance (pavement or bridge repairs, patching, sign repair, debris removal, pavement markings, drainage clearing, etc.)
   _ % Winter Services (plowing, salt, etc.)
   _ % Capital Improvements (resurfacing, reconstruction, bridge replacement, ADA compliance, new signage, etc.)
   _ % Operations (traffic signal maintenance, energy costs, etc.)
   _ % Equipment (trucks, plows, etc.)

6. Do you have some type of asset management database to manage your assets? If yes, please briefly explain
   _ Yes
   _ No

7. Do you have a Capital Improvement Plan?
   _ Yes
   _ No

8. To the best of your knowledge, please indicate the relative condition of your roads. (100% Total)

   Definitions:

   Good – Ride quality is good. Surface may be in very good condition or it may show infrequent to occasional signs of distress such as cracking.

   Fair – Ride quality is noticeably inferior to new pavements, showing infrequent signs of distress. Surface defects may include moderate rutting, cracking and raveling; patching is apparent.

   Poor – Ride quality is noticeably inferior. Drivability, even at slower speeds, is somewhat impaired. Surface defects are severe.

   _ % Good
   _ % Fair
   _ % Poor

9. To the best of your knowledge, please estimate your annual unmet needs. Please enter amounts in dollars but omit the "$" symbol
   - _ Highway Capital Needs (resurfacing, reconstruction)
   - _ Bridge Needs (replacement, rehabilitation, preservation)
   - _ Traffic Signals (maintenance, upgrade, timing)
   - _ Stormwater
   - _ Equipment
   - _ ADA Compliance (curb ramps)

10. Briefly describe how you administer your liquid fuels funding. Please describe if you distribute any to your municipalities on a formula basis, or if you offer a competitive program, or employ some other approach. Thank you.

11. Your contact information:
    Name
    Municipality
    Phone
    E-mail

9.2 Bridges by Municipality Type

City	Less than 20'	Greater than 20'
Total # of Surveys Submitted	13	13
Total # of Question Responses	13	13
Range	0 to 30	0 to 22
Mean	5	7
Median	0	4

Borough	Less than 20'	Greater than 20'
Total # of Surveys Submitted	104	104
Total # of Question Responses	101	100
Range	0 to 40	0 to 60
Mean	1	1
Median	0	0

First Class Township	Less than 20'	Greater than 20'
Total # of Surveys Submitted	26	26
Total # of Question Responses	25	25
Range	0 to 15	0 to 8
Mean	2	2
Median	0	2

Second Class Township	Less than 20'	Greater than 20'
Total # of Surveys Submitted	399	399
Total # of Question Responses	376	375
Range	0 to 30	0 to 40
Mean	3	2
Median	1	1

County	Less than 20'	Greater than 20'
Total # of Surveys Submitted	30	30
Total # of Question Responses	30	30
Range	0 to 93	0 to 162
Mean	6	42
Median	0	35

Source: TAC Consulting Team

9.3 Annual Budget Sources and Funds by Municipality Type

City	Liquid Fuels Reimbursement	Other Grants	Municipal General Fund
Total # of Surveys Submitted	13	13	13
Total # of Question Responses	12	12	12
Range	$100,000 to $1,900,000	$0 to $2,500,000	$0 to $29,507,000
Mean	$656,394	$476,167	$4,075,136
Median	$432,776	$312,500	$737,500

Borough	Liquid Fuels Reimbursement	Other Grants	Municipal General Fund
Total # of Surveys Submitted	104	104	104
Total # of Question Responses	69	69	69
Range	$0 to $596,700	$0 to $770,000	$0 to $6,855,514
Mean	$72,187	$23,548	$347,531
Median	$40,000	$0	$25,600

First Class Township	Liquid Fuels Reimbursement	Other Grants	Municipal General Fund
Total # of Surveys Submitted	26	26	26
Total # of Question Responses	16	16	16
Range	$50,000 to $1,187,500	$0 to $100,000	$0 to $12,000,000
Mean	$322,308	$16,479	$1,964,214
Median	$264,735	$0	$425,000

Second Class Township	Liquid Fuels Reimbursement	Other Grants	Municipal General Fund
Total # of Surveys Submitted	399	399	399
Total # of Question Responses	260	257	260
Range	$0 to $976,760	$0 to $950,000	$0 to $50,298,129
Mean	$143,846	$14,105	$488,358
Median	$113,063	$0	$100,000

County	Liquid Fuels Reimbursement	Other Grants	Municipal General Fund
Total # of Surveys Submitted	30	30	30
Total # of Question Responses	25	25	25
Range	$0 to $1,700,000	$0 to $2,144,000	$0 to $1,201,000
Mean	$434,637	$410,306	$50,040
Median	$346,000	$76,560	$0

9.4 Transportation Spending by Municipality Type

City (12)	Maintenance	Winter	Capital Improvements	Operations	Equipment
Range	5 to 65%	8 to 43%	9 to 76%	0 to 40%	0 to 20%
Mean	29%	23%	26%	15%	8%
Median	28%	17%	22%	10%	7%

Borough (65)	Maintenance	Winter	Capital Improvements	Operations	Equipment
Range	0 to 100%	0 to 100%	0 to 100%	0 to 100%	0 to 46%
Mean	30%	22%	27%	11%	8%
Median	20%	15%	11%	5%	5%

First Class Township (16)	Maintenance	Winter	Capital Improvements	Operations	Equipment
Range	0 to 83%	0 to 33%	0 to 100%	0 to 30%	0 to 28%
Mean	30%	17%	31%	12%	10%
Median	25%	15%	25%	10%	9%

Second Class Township (248)	Maintenance	Winter	Capital Improvements	Operations	Equipment
Range	0 to 100%	0 to 60%	0 to 100%	0 to 30%	0 to 71%
Mean	40%	20%	23%	4%	12%
Median	40%	20%	18%	3%	10%

County (24)	Maintenance	Winter	Capital Improvements	Operations	Equipment
Range	1 to 100%	0 to 60%	0 to 99%	0 to 21%	0 to 8%
Mean	32%	6%	58%	2%	1%
Median	27%	0%	70%	0%	0%

9.5 Road Condition by Municipality Type

City (12)	Good	Fair	Poor
Range	0 to 30%	25 to 85%	10 to 75%
Mean	18%	50%	33%
Median	20%	50%	30%

Borough (66)	Good	Fair	Poor
Range	0 to 100%	0 to 100%	0 to 75%
Mean	38%	44%	18%
Median	35%	42%	15%

First Class Township (16)	Good	Fair	Poor
Range	2 to 75%	20 to 75%	0 to 68%
Mean	51%	36%	13%
Median	60%	30%	10%

Second Class Township (233)	Good	Fair	Poor
Range	0 to 100%	0 to 100%	0 to 100%
Mean	41%	37%	22%
Median	40%	30%	10%

County (18)	Good	Fair	Poor
Range	0 to 100%	0 to 60%	0 to 70%
Mean	62%	16%	10%
Median	68%	8%	0%

9.6 Annual Unmet Need by Municipality Type

City	Highway Capital Needs	Bridge Needs	Traffic Signals	Stormwater	Equipment	ADA Compliance
Total # of Surveys Submitted	13	13	13	13	13	13
Total # of Question Responses	12	12	10	12	12	12
Range	$120,000 to $50,000,000	$0 to $15,000,000	$10,000 to $1,000,000	$25,000 to $50,000,000	$50,000 to $1,000,000	$0 to $2,000,000
Mean	$7,180,833	$2,423,333	$330,900	$4,607,917	$416,383	$483,333
Median	$1,400,000	$300,000	$175,000	$500,000	$410,800	$200,000

Borough	Highway Capital Needs	Bridge Needs	Traffic Signals	Stormwater	Equipment	ADA Compliance
Total # of Surveys Submitted	104	104	104	104	104	104
Total # of Question Responses	59	49	48	52	51	47
Range	$0 to $50,000,000	$0 to $20,000,000	$0 to $1,000,000	$0 to $20,000,000	$0 to $4,000,000	$0 to $4,200,000
Mean	$1,483,185	$712,041	$63,469	$656,029	$200,373	$328,948
Median	$200,000	$0	$5,000	$100,000	$50,000	$15,000

First Class Township	Highway Capital Needs	Bridge Needs	Traffic Signals	Stormwater	Equipment	ADA Compliance
Total # of Surveys Submitted	26	26	26	26	26	26
Total # of Question Responses	16	15	15	15	15	13
Range	$100,000 to $3,100,000	$0 to $850,000	$0 to $800,000	$4,000 to $2,000,000	$0 to $350,000	$0 to $1,000,000
Mean	$674,754	$149,467	$127,243	$494,585	$114,333	$178,538
Median	$350,000	$80,000	$90,000	$300,000	$100,000	$25,000

Second Class Township	Highway Capital Needs	Bridge Needs	Traffic Signals	Stormwater	Equipment	ADA Compliance
Total # of Surveys Submitted	402	402	402	402	402	402
Total # of Question Responses	210	187	155	173	191	136
Range	$0 to $10,000,000	$0 to $4,000,000	$0 to $750,000	$0 to $20,000,000	$0 to $1,000,000	$0 to $1,000,000
Mean	$455,275	$259,730	$21,843	$98,364	$101,831	$23,054
Median	$150,000	$50,000	$8	$25,000	$50,000	$0

County	Highway Capital Needs	Bridge Needs	Traffic Signals	Stormwater	Equipment	ADA Compliance
Total # of Surveys Submitted	30	30	30	30	30	30
Total # of Question Responses	13	19	12	13	12	11
Range	$0 to $6,000,000	$0 to $33,000,000	$0 to $250,000	$0 to $1,500,000	$0 to $255,700	$0 to $0
Mean	$723,077	$4,712,035	$21,833	$144,231	$58,808	$0
Median	$0	$2,000,000	$0	$0	$10,000	$0

Comments on Liquid Fuels (LF) Spending

Primarily Bridges with Some Road Maintenance

- 100 percent of liquid fuel funding is utilized for road and bridge upkeep.
- All liquid fuels funds are spent on county bridges. None are distributed to municipalities. All but 10 bridges with spans longer than 20 feet are owned by the county.
- We use all liquid fuels for the maintenance, rehabilitation, and replacement of county-owned bridges.
- We use it for county bridges.
- Liquid fuels funds are fully allocated to the maintenance/repair of the county's bridges and to cover the county's share of NBIS inspection costs. There is no distribution to municipalities.
- No longer provide for a competitive process to municipalities due to backlog of county bridge projects. County Engineer, Controller's Office, Administration, County Parks Department, and County Planning Commission identify budget annually. City uses all funds for bridge maintenance—no distribution of funds.
- We had a grants program for municipalities that was on a competitive basis, but have furloughed that while we do an upfront bridge project that will be retro-reimbursed. Once that reimbursement is received, we plan to reactivate this program.
- We use our liquid fuels funds to maintain and replace our county bridges. We have shifted our focus over the last several years and are prioritizing replacement of our SD bridges. We have developed an in-house capital improvements planning process that we will be using to consider additional county funding to help replace our SD bridges. LF funding is grossly inadequate to replace bridges and must be supplemented by other funding sources. We previously gave a portion of our LF funding to the municipalities on a formula basis, but discontinued that practice in 2004 as our bridge needs continued to mount. Further, the administrative costs for small grants outweighed the benefits.
- A problem is obtaining permits and PennDOT approval. For PennDOT projects, the amount spent on engineering sometimes exceeds the cost of the bridge. On 100 percent local projects, we can't get permits, sitting in DEP for over 8 to 12 months.
- In previous years the county did distribute some funding to local municipalities, but has discontinued the practice due to our own unmet needs. We will shortly hire a private engineering firm to serve as county bridge engineer.
- Majority of liquid fuels funds are spent by county bridge and road maintenance.
- Used for county roads only

Some or All Funds Allocated to Municipalities Based on a Competitive Process or Formula

- Municipalities request funding for eligible projects through a competitive process.
- County aid is provided on a formula basis.
- Fixed allocation to all municipalities = $1 per capita. Special projects allocations are made on a competitive and needs-based basis.
- For 2011, the county will distribute about $450,000 in county aid to the municipalities based on a formula using population and miles of road.
- County employees administer all our funds. Extra funds, when available, are provided through a competitive process to municipalities.
- The county does receive some County Aid Requests and those are handled on a case-by-case basis.
- No liquid fuels funds are assigned to municipalities on an ongoing basis. Requests for County Aid are considered on an individual basis.
- We distribute approximately one-half of our liquid fuels funds to municipalities based upon population and road mileage. The majority of the balance is used to pay debt service on bridge construction projects. Please note that we are replacing a county bridge this year using our own county funds.
- We distributed $150,000 to local municipalities on a competitive basis.