

Building Tennessee's Tomorrow: Anticipating the State's Infrastructure Needs

July 2013 through June 2018

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June 2015

The Honorable Ron Ramsey
Lt. Governor and Speaker of the Senate

The Honorable Beth Harwell
Speaker of the House of Representatives

Members of the General Assembly

State Capitol
Nashville, TN 37243

Ladies and Gentlemen:

Transmitted herewith is the thirteenth in a series of reports on Tennessee's infrastructure needs by the Tennessee Advisory Commission on Intergovernmental Relations pursuant to Public Chapter 817, Acts of 1996. That act requires the Commission to compile and maintain an inventory of infrastructure needed in Tennessee and present these needs and associated costs to the General Assembly during its regular legislative session. The inventory, by law, is designed to support the development by state and local officials of goals, strategies, and programs to

- improve the quality of life of all Tennesseans,
- support livable communities,
- and enhance and encourage the overall economic development of the state through the provision of adequate and essential public infrastructure.

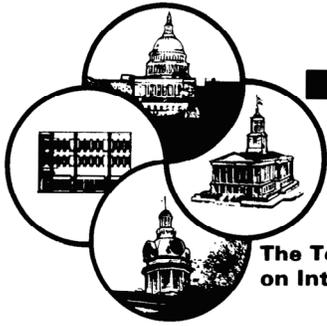
This report represents the staff's continuing efforts to improve the inventory.

Information from the annual inventory is being used for local planning and community and economic development grants. In addition, anyone with an interest in infrastructure needs can access this information online at ctasdata.utk.tennessee.edu through a partnership with the University of Tennessee's County Technical Assistance Service. There you can compare counties and different types of infrastructure needs using online mapping services, extract data, and even link to the data.

Sincerely,

Senator Mark Norris
Chairman

Lynnissee Roehrich-Patrick
Executive Director



TACIR

The Tennessee Advisory Commission
on Intergovernmental Relations



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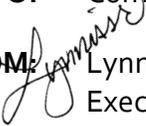
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MEMORANDUM

TO: Commission Members

FROM:  Lynnisse Roehrich-Patrick
Executive Director

DATE: 11 June 2015

SUBJECT: Building Tennessee's Tomorrow, 2015

The Tennessee General Assembly charged the Tennessee Advisory Commission on Intergovernmental Relations in 1996 with developing and maintaining an inventory of public infrastructure needs "in order for the state, municipal and county governments of Tennessee to develop goals, strategies, and programs which would

- improve the quality of life of its citizens,
- support livable communities, and
- enhance and encourage the overall economic development of the state."

Each year since this mandate was created for the Commission, we have worked with the state's nine development districts to inventory Tennessee's public infrastructure needs, gathering information from state and local officials. The information they provide is analyzed by Commission staff, and an annual report is prepared for the General Assembly.

The current report is submitted for your approval. It is the thirteenth in the series and presents \$42.3 billion of infrastructure improvements reported by state and local officials for the inventory. This most recent inventory includes projects that need to be in some stage of development during the five-year period July 2013 through June 2018. The report includes statewide information by type of infrastructure and by level of government, as well as information about the condition and needs of our public school facilities. The report also includes information about the availability of funding to meet reported needs, and a comparison of county-area needs. County-area information about each type of infrastructure in the inventory, along with relevant legislation, inventory forms, and a glossary of terms can be found in the appendixes to the report.

Building Tennessee's Tomorrow: Anticipating the State's Infrastructure Needs

July 2013 through June 2018

EXECUTIVE SUMMARY

This report is the thirteenth in a series on infrastructure needs that began in the late 1990s. These reports to the General Assembly present Tennessee's public infrastructure needs as reported by local officials, those compiled by the Tennessee Department of Transportation, and those submitted by other state departments and agencies as part of their budget requests to the Governor. This report provides two types of information collected during fiscal year 2013-14 and covering the five-year period July 2013 through June 2018: (1) needed infrastructure improvements and (2) the condition of existing public school buildings. Infrastructure needs fall into six broad categories. See table 1.

Table 1. Summary of Reported Infrastructure Improvement Needs

Five-year Period July 2013 through June 2018

Category	Five-year Reported Estimated Cost	
Transportation and Utilities	\$ 25,900,438,008	61.2%
Education	8,494,829,132	20.1%
Health, Safety, and Welfare	4,993,531,862	11.8%
Recreation and Culture	1,690,538,664	4.0%
General Government	720,592,385	1.7%
Economic Development	508,443,614	1.2%
Grand Total	\$ 42,308,373,665	100.0%

A number of conclusions may be drawn from the information compiled in the inventory:

- The total estimated cost of public infrastructure improvements that need to be started or completed in fiscal years 2013 through 2018 is estimated at \$42.3 billion. This total is \$4.1 billion more than the estimate in last year's inventory, an increase of 10.7%, mainly because bridges with remedial needs exceeding \$50,000 are now treated as immediate needs, consistent with all other project types in the inventory, regardless of when funds will be available to repair or upgrade them. Without those bridge projects, the total cost would have increased only \$369 million (1.0%). See table 2.
- Transportation and Utilities is and always has been the single largest category in the inventory and would be even without

The Tennessee General Assembly charged the Tennessee Advisory Commission on Intergovernmental Relations (TACIR) with developing and maintaining an inventory of infrastructure needs "in order for the state, municipal, and county governments of Tennessee to develop goals, strategies, and programs that would

- improve the quality of life of its citizens,
- support livable communities, and
- enhance and encourage the overall economic development of the state."

Public Chapter 817, Acts of 1996.

Table 2. Comparison of Estimated Cost of Infrastructure Improvement Needs
July 2012 Inventory vs. July 2013 Inventory

Category	Reported Cost			
	July 2012 through June 2017	July 2013 through June 2018	Difference	Percent Change
Transportation and Utilities	\$ 21,689,943,786	\$ 25,900,438,008	\$ 4,210,494,222	19.4%
Education	7,526,218,947	8,494,829,132	968,610,185	12.9%
Health, Safety, and Welfare	5,549,929,028	4,993,531,862	(556,397,166)	-10.0%
Recreation and Culture	1,655,819,753	1,690,538,664	34,718,911	2.1%
General Government	551,764,689	720,592,385	168,827,696	30.6%
Economic Development	1,235,555,051	508,443,614	(727,111,437)	-58.8%
Grand Total	\$ 38,209,231,254	\$ 42,308,373,665	\$ 4,099,142,411	10.7%

the addition of the bridges described above. Transportation and Utilities increased over \$4.2 billion (19.4%) from last year to \$25.9 billion, again mainly because of those bridges. Comprising 61% of estimated costs for all infrastructure improvements, transportation alone dwarfs all other types of infrastructure needs, and continuing its upward trend, would have increased by \$481 million or 2.2% without the added bridges.

- Education is the second largest category and increased \$969 million (12.9%) to \$8.5 billion, mainly because of a \$654 million (16.7%) increase in the cost of improvements needed at the state’s public college and university campuses, which now stands at \$4.6 billion. The estimated cost for improving the state’s public school buildings has remained flat overall since 2007 but increased \$290 million (8.1%) this year to \$3.8 billion, mainly because new schools and new renovation needs added to a growing backlog of unfinished school renovations. Asked about the overall condition of their school buildings, public school officials reported that 95% are in good or better condition.
- Health, Safety, and Welfare, the third largest category in the inventory, decreased by \$556 million (10%) to \$5.0 billion. This decline resulted primarily from decreases in the need for improved law enforcement and water and wastewater infrastructure. Water and wastewater accounts for the largest portion of the Health, Safety, and Welfare category at \$3.4 billion; it decreased by \$217 million (6%) from last year. The estimated cost for law enforcement needs decreased \$374 million (29.3%) to \$901 million. The total cost of three other types of infrastructure improvements in this category decreased: housing, storm water, and solid waste. The estimated cost of infrastructure improvements needed for public health and fire protection facilities increased—public health increased \$43 million (13.7%) to \$353 million, and fire protection increased \$5 million (2.9%) to \$175 million.
- The Recreation and Culture category increased overall by \$35 million (2.1%) to \$1.7 billion because an increase in recreation

infrastructure needs offset decreases in library, museum, and historic site improvements and community development needs. The estimated cost of infrastructure for recreation increased \$54 million (5.4%) to \$1.0 billion, mainly because of the new \$65 million Nashville Sounds baseball stadium. The estimated cost for libraries, museums, and historic sites decreased by \$3 million (0.9%) to \$370 million, and community development decreased \$16 million (5.2%) to \$282 million.

- General Government infrastructure improvements increased \$169 million (30.6%) to \$721 million. This category includes only two types of infrastructure: public buildings and other facilities. The estimated cost of public building improvements increased \$143 million (32.6%) to \$583 million, and the need for other facilities such as storage and maintenance facilities was up \$25 million (22.7%) to \$138 million.
- The combined estimated cost of both types of infrastructure in the Economic Development category—the smallest inventory category this year—decreased \$727 million (58.8%) since the last inventory and now totals \$508 million. The cost of business district development decreased \$706 million (71.9%) to \$276 million mainly because Nashville completed its Music City Convention Center at a cost of \$624 million. The cost of industrial sites and parks decreased \$21 million (8.3%) to \$233 million largely because of two canceled projects.
- Local officials are confident in obtaining funding for only \$11.8 billion of the \$33.9 billion needed to meet local infrastructure improvement needs. Most of that amount, \$11.0 billion, is for needs that are fully funded; \$852 million is for needs that are only partially funded; and another \$22.1 billion is not yet available. These figures do not include improvements for which funding information is not collected, such as improvements at existing schools and those in state agencies' capital budget requests.
- Of the infrastructure improvements that were needed in 2008 and completed by 2013, 46% is owned by the state, 31% by counties, and 18% by cities. Special districts own 4%, and the remaining 2% is jointly owned. The government that owns infrastructure typically funds the bulk of its cost, and a variety of revenue sources are tapped. For example, the state collects taxes and appropriates those funds to their own projects and provides grants to the local level through programs at various agencies. Cities and counties fund most of their infrastructure improvements with revenue from property and sales taxes, while utility districts have a dedicated revenue source in the form of user fees. The federal government owns very little of the infrastructure in the inventory but provides substantial funding for transportation infrastructure.
- Public infrastructure needs and the ability to meet them vary across the state, and wealth and population factors are strongly

tied to both. In general, the more people a county has and the more its population grows, the more infrastructure it will need and, fortunately, the more wealth it will likely have to pay for those needs. The relationships among these factors are strong and well demonstrated by the variation reported for each Tennessee county, although they are not perfectly aligned in any county. Some counties are able to meet their infrastructure needs more easily than others; some continue to report the same needs year after year, and even fast growing counties can find it difficult to meet their needs. And, relative to county population, counties with small populations need and complete just as much or more infrastructure than counties with large populations.

Building Tennessee’s Tomorrow: Anticipating the State’s Infrastructure Needs

July 2013 through June 2018

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INTRODUCTION

One of the greatest fiscal challenges facing our elected officials is dealing with the nation's aging infrastructure. As the population grows and shifts, new classrooms must be built and equipped to meet our children's needs. As roads and bridges wear out, they must be repaired or replaced to ensure our safety. And as outdated water lines begin to crack and fail, they must be upgraded to carry clean drinking water safely and efficiently. These examples are just a few of the demands confronting state and local officials as they struggle with the daunting task of matching limited funds to seemingly unlimited needs.

Why do we rely on the public sector for roads, bridges, water lines, and schoolhouses instead of looking to the private sector? The private sector does a fine job of providing goods and services when it is possible to monitor and control their use and exclude those who cannot or will not pay an amount sufficient to generate profit. In the interest of general health and safety, excluding users is not always desirable, and profit may not always be possible. Public infrastructure is the answer when the service supported is essential to the common good and the private sector cannot profitably provide it at a price that makes it accessible to all. Therefore, we look to those who represent us in our public institutions to set priorities and find ways to fund them.

Why inventory public infrastructure needs?

The Tennessee General Assembly affirmed the value of public infrastructure in legislation enacted in 1996 when it deemed an inventory of those needs necessary "in order for the state, municipal, and county governments of Tennessee to develop goals, strategies, and programs which would

- improve the quality of life of its citizens,
- support livable communities, and
- enhance and encourage the overall economic development of the state

"...infrastructure projects require, in a democracy at least, some measure of consensus to move forward. Generating that consensus is difficult, particularly in our system of government where localities, states, and the feds operate almost independently of one another."

Alex Marshall, *Governing*, "Why the Word 'Infrastructure' Replaced 'Public Works,'" August 7, 2015
<http://www.governing.com/columns/eco-engines/gov-the-word-infrastructure.html>

The Commission relies entirely on state and local officials to evaluate the infrastructure needs of Tennessee's citizens.

Local officials are encouraged to report their needs as they relate to developing goals, strategies, and programs to improve their communities. They are limited only by the very broad purposes for public infrastructure as prescribed by law.

through the provision of adequate and essential public infrastructure.”¹ The public infrastructure needs inventory on which this report is based was derived from surveys of local officials by staff of the state's nine development districts,² the capital budget requests submitted to the Governor by state officials as part of the annual budget process, and bridge and road needs from project listings provided by state transportation officials. The Commission relies entirely on state and local officials to evaluate the infrastructure needs of Tennessee's citizens as envisioned by the enabling legislation.

What infrastructure is included in the inventory?

For purposes of this report, and based on the direction provided in the public act and common usage, public infrastructure is defined as

capital facilities and land assets under public ownership or operated or maintained for public benefit.

To be included in the inventory, infrastructure projects must not be considered normal or routine maintenance and must involve a capital cost of at least \$50,000.³ This approach, dictated by the public act, is consistent with the characterization of capital projects adopted by the Tennessee General Assembly for its annual budget.

Local officials were asked to describe anticipated needs for the period July 1, 2013, through June 30, 2033, classifying those needs by type of project. State-level needs were derived from capital budget requests. Both state and local officials were also asked to identify the stage of development as of July 1, 2013. The period covered by each inventory was expanded to 20 years in 2000 because of legislation requiring its use by the Commission to monitor implementation of Tennessee's Growth Policy Act.⁴ Plans developed pursuant to that act established growth boundaries for annexation by the state's municipalities. This report focuses on the first five years of the period covered by the inventory.

Within these parameters, local officials are encouraged to report their needs as they relate to developing goals, strategies, and programs to improve their communities. They are limited by only the very broad purposes for public infrastructure as prescribed by law. No independent assessment of need constrains their reporting. In addition, the inventory includes bridge and road needs from project listings provided by state transportation and

¹ Chapter 817, Public Acts of 1996. For more information about the enabling legislation, see appendix A.

² For more information on the importance of the inventory to the development districts and local officials, see appendix B.

³ School technology infrastructure is included for existing schools regardless of cost in order to provide information related to the technology component of the state's education funding formula.

⁴ Chapter 672, Public Acts of 2000.

capital needs identified by state officials and submitted to the governor as part of the annual budget process.

How is the inventory accomplished?

The public infrastructure needs inventory is developed using two separate, but related, inventory forms.⁵ Both forms are used to gather information from local officials about needed infrastructure improvements. The second form is also used to gather information about the condition of existing public school buildings, as well as the cost to meet all facilities mandates at the schools, put them in good condition, and provide adequate technology infrastructure. Information about the need for new public school buildings and for school system-wide infrastructure improvements is gathered in the first form. TACIR staff provide local officials with supplemental information from the state highway department about transportation needs, many of which originate with local officials. This information helps ensure that all known needs are captured in the inventory.

In addition to gathering information from local officials, TACIR staff incorporate capital improvement requests submitted by state officials to the Governor’s Budget Office into the inventory. While TACIR staff spend considerable time reviewing all the information in the inventory to ensure accuracy and consistency, the information reported in the inventory is based on the judgment of state and local officials. In some cases, information is limited to that included in the capital improvements programs of local governments, which means that it may not fully capture local needs.

Projects included in the inventory are required to be in the conceptual, planning and design, or construction phase at some time during the five-year period July 2013 through June 2018. Projects included are those that need to be either started or completed during that period. Estimated costs for the projects may include amounts spent before July 2013 to start a project that needs to be completed during the five-year period or amounts to be spent after June 2018 to complete a project that needs to be started during the five-year period. Because the source of information from state agencies is their capital budget requests, all of those projects are initially recorded as conceptual.

In the context of the public infrastructure needs inventory, the term “mandate” is defined as *any rule, regulation, or law originating from the federal or state government that affects the cost of a project.*⁶ The mandates most commonly reported are the Americans with Disabilities Act (ADA), asbestos, lead, underground storage tanks, and the Education Improvement Act (EIA). The EIA mandate was to reduce the number of students in each public school classroom by an overall average of about

⁵ Both forms are included in appendix C.

⁶ See the Glossary of Terms at the end of the report.

TACIR staff provide local officials with supplemental information from the state highway department about transportation needs, many of which originate with local officials. This information helps ensure that all known needs are captured in the inventory.

Projects included in the inventory are those that need to be either started or completed during the five-year period July 2013 through June 2018.

In a time of tight budgets, the annual inventory process is the one opportunity many decision makers have to set funding issues aside for a moment and think proactively and broadly about their infrastructure needs.

The public infrastructure needs inventory provides the basic information that helps state and local officials match needs with funding.

4½ by fall 2001. Tennessee public schools began working toward that goal with passage of the EIA in 1992 and met it by hiring a sufficient number of teachers. However, some schools still do not have sufficient classroom space to accommodate the additional classes and teachers required.

Except in the case of existing public schools, the inventory does not include estimates of the cost to comply with mandates, only whether the need was the result of a mandate; therefore, mandates themselves are not analyzed here other than to report the number of projects affected by mandates. Even in the case of public schools, with the exception of the EIA, the cost reported to TACIR as part of the public infrastructure needs inventory is relatively small—less than 1% of the total.

How is the inventory used?

The Public Infrastructure Needs Inventory is both a product and a continuous process, one that has been useful in

- short-term and long-range planning,
- providing a framework for funding decisions,
- increasing public awareness of infrastructure needs, and
- fostering better communication and collaboration among agencies and decision makers.

The inventory promotes planning and setting priorities.

The Public Infrastructure Needs Inventory has become a tool for setting priorities and making informed decisions by all stakeholders. Many decision makers have noted that in a time of tight budgets and crisis-based, reactive decisions, the annual inventory process is the one opportunity they have to set funding issues aside for a moment and think proactively and broadly about their very real infrastructure needs. For most officials in rural areas and in smaller cities, the inventory is the closest thing they have to a capital improvements program (CIP). Without the inventory, they would have little opportunity or incentive to consider their infrastructure needs. Because the inventory is not limited to needs that can be funded in the short term, it may be the only reason they have to consider the long-range benefits of infrastructure.

The inventory helps match critical needs to limited funding opportunities.

The Public Infrastructure Needs Inventory provides the basic information that helps state and local officials match needs with funding, especially in the absence of a formal capital improvements program. At the same time, the inventory provides information needed by the development districts to update their respective Comprehensive Economic Development Strategy Reports required annually by the Federal Economic Development

Administration. Unless a project is listed in that document, it will not be considered for funding by that agency. Information from the inventory has been used to develop lists of projects suitable for other types of state and federal grants as well. For example, many projects that have received Community Development Block Grants were originally discovered in discussions of infrastructure needs with local government officials. And it has also helped state decision makers identify gaps between critical needs and available state, local, and federal funding, including an assessment of whether various communities can afford to meet their infrastructure needs or whether some additional planning needs to be done at the state level about how to help them.

The inventory provides an annual review of conditions and needs of public school facilities.

The schools' portion of the inventory is structured so that the condition of all schools is known, not just the ones in need of repair or replacement. Data can be retrieved from the database and analyzed to identify particular needs, such as technology. This information is useful in pinpointing pressing needs for particular schools and districts, as well as providing an overview of statewide needs. This unique statewide database provides information about the condition and needs of Tennessee's public school facilities.

The inventory increases public awareness, communication, and collaboration among decision-makers.

The state's infrastructure needs have been reported to a larger public audience, and the process has fostered better communication between the development districts, local and state officials, and decision makers. The resulting report has become a working document used at the local, state, and regional levels. It gives voice to the often-underserved small towns and rural communities. Each update of the report provides an opportunity for re-evaluation and re-examination of projects and for improvements in the quality of the inventory and the report itself. This report is unique in terms of its broad scope and comprehensive nature. Through the inventory process, development districts have expanded their contact, communication, and collaboration with agencies not traditionally sought after (e.g., local boards of education, utility districts, and the Tennessee Department of Transportation) and strengthened personal relationships and trust with their more traditional local and state contacts. Infrastructure needs are being identified, assessed, and addressed locally and documented for the Tennessee General Assembly, various state agencies, and decision makers for further assessment and consideration.

What improvements have been made to the inventory?

As each inventory cycle comes to a close, TACIR staff review the collection and analysis process to identify ways to improve efficiency and accuracy.

Many projects that have received Community Development Block Grants were originally discovered in discussions of infrastructure needs with local government officials.

Each update of this report provides an opportunity for reevaluation and reexamination of projects and for improvements in the quality of the inventory and the report itself.

Information about public infrastructure needs in Tennessee is now available online at ctasdata.utk.tennessee.edu.

Recent improvements include a more efficient system for updating the infrastructure needs of the state's public colleges and universities and more accurate and comprehensive reporting of bridge improvement needs. A new data collection interface was developed to update information provided by the Tennessee Board of Regents (TBR) through the Governor's Budget Office. TACIR staff can now directly access data in a capital project database maintained by TBR staff, dramatically improving the accuracy and processing time.

TACIR staff's review of the logic applied to determine which bridges are included in the annual inventory revealed that some bridges were not included as immediate needs if state bridge surveyors believed they were not likely to be repaired or replaced during the five years covered by the inventory. This approach was inconsistent with how other projects are evaluated and did not reflect the critical role of bridge upkeep. Beginning with this inventory, all bridges with remedial needs exceeding an estimated cost of \$50,000 are treated as immediate needs, consistent with all other project types in the inventory, regardless of when funds will be available to repair or upgrade them. As a result, over \$3.7 billion in bridge needs were added to the 2013 inventory.

What else needs to be done?

The data collection process continues to improve, and the current inventory is more complete and accurate than ever. The Commission has tried to strike a balance between requiring sufficient information to satisfy the intent of the law and creating an impediment to local officials reporting their needs. By law, the inventory is required of TACIR, but it is not required of state or local officials; they may decline to participate without penalty. Similarly, they may provide only partial information. This can make comparisons across jurisdictions and across time difficult. But with each annual inventory, participants have become more familiar with the process and more supportive of the program.

Improvements in the technological infrastructure of the inventory itself have set the stage for future efforts to make the inventory more accessible and useful to state and local policy makers and to researchers. Future work will include a closer look at financing the infrastructure needs across the state.

Building Tennessee's Tomorrow: Anticipating the State's Infrastructure Needs

July 2013 through June 2018

INFRASTRUCTURE NEEDS STATEWIDE

The estimated cost of public infrastructure needed statewide increased to \$42.3 billion.

State and local officials estimate the cost of public infrastructure improvements that need to be in some stage of development between July 1, 2013, and June 30, 2018, at \$42.3 billion, an increase of approximately \$4.1 billion (10.7%) from last year's report (see table 3)⁷ because 4,598

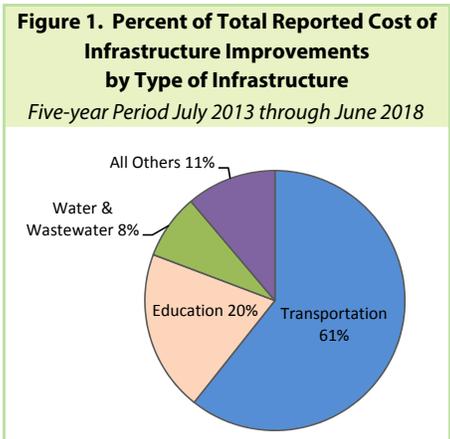
Table 3. Comparison of Estimated Cost of Needed Infrastructure Improvements

July 2012 Inventory vs. July 2013 Inventory

Category and Type of Infrastructure	July 2012 Inventory	July 2013 Inventory	Difference	Percent Change
Transportation and Utilities	\$ 21,689,943,786	\$ 25,900,438,008	\$ 4,210,494,222	19.4%
Transportation	21,466,148,077	25,670,939,050	4,204,790,973	19.6%
Other Utilities	223,795,709	229,498,958	5,703,249	2.5%
Education	\$ 7,526,218,947	\$ 8,494,829,132	\$ 968,610,185	12.9%
Post-secondary Education	3,915,209,855	4,569,056,766	653,846,911	16.7%
School Renovations and Replacements*	2,032,782,160	2,118,710,913	85,928,753	4.2%
New Public Schools and Additions	1,521,085,932	1,718,465,453	197,379,521	13.0%
Other Education	51,170,000	76,240,000	25,070,000	49.0%
School System-wide	5,971,000	12,356,000	6,385,000	106.9%
Health, Safety, and Welfare	\$ 5,549,929,028	\$ 4,993,531,862	\$ (556,397,166)	-10.0%
Water and Wastewater	3,632,001,753	3,415,219,505	(216,782,248)	-6.0%
Law Enforcement	1,274,790,107	900,985,199	(373,804,908)	-29.3%
Public Health Facilities	310,944,500	353,479,500	42,535,000	13.7%
Fire Protection	170,469,132	175,486,676	5,017,544	2.9%
Storm Water	111,551,536	109,008,982	(2,542,554)	-2.3%
Solid Waste	36,172,000	34,802,000	(1,370,000)	-3.8%
Housing	14,000,000	4,550,000	(9,450,000)	-67.5%
Recreation and Culture	\$ 1,655,819,753	\$ 1,690,538,664	\$ 34,718,911	2.1%
Recreation	984,843,075	1,038,482,825	53,639,750	5.4%
Libraries, Museums, and Historic Sites	373,677,514	370,358,259	(3,319,255)	-0.9%
Community Development	297,299,164	281,697,580	(15,601,584)	-5.2%
General Government	\$ 551,764,689	\$ 720,592,385	\$ 168,827,696	30.6%
Public Buildings	439,658,889	582,992,585	143,333,696	32.6%
Other Facilities	112,105,800	137,599,800	25,494,000	22.7%
Economic Development	\$ 1,235,555,051	\$ 508,443,614	\$ (727,111,437)	-58.8%
Business District Development	981,578,620	275,530,800	(706,047,820)	-71.9%
Industrial Sites and Parks	253,976,431	232,912,814	(21,063,617)	-8.3%
Grand Total	\$ 38,209,231,254	\$ 42,308,373,665	\$ 4,099,142,411	10.7%

*School Renovations and Replacements include school technology projects with estimated costs below the \$50,000 threshold used for other types of infrastructure included in the inventory. Individual technology projects under the threshold totaled \$4,529,749 in 2013 and \$4,012,845 in 2012.

⁷ Totals for the July 2012 inventory have been adjusted because of on-going data quality control. For complete listings of all needs reported in the July 2013 inventory by county and by public school system, see appendixes D and E.



bridges rated insufficient and assigned an estimated repair or replacement cost by a state bridge inspector have been included as immediate needs as explained in the introduction to this report. Without them, the total cost of the inventory would have increased only \$369 million (1.0%). With them, transportation infrastructure improvements now account for 61% of the total inventory (see figure 1), up from an average of 53% over the past six inventories. Education infrastructure remains flat at 20% of the total inventory, and water and wastewater follows at 8%, down from an average of 10%. All other types of infrastructure combined dropped from an average of 17% to 11%.

Infrastructure projects that support other improvements total more than \$560 million.

Some infrastructure projects are needed to support other types of public infrastructure improvements. When that's the case, those costs are included with the infrastructure they support to show the full cost of that improvement. The same is true for all property acquisition and some storm water, telecommunications, and other utilities improvements. For example, if a rail spur is needed to create a new industrial site, then the rail spur is recorded in the inventory as an industrial site project with transportation as its secondary project type. Similarly, if a sewer line or storm water drain is needed for a new school, then the project is recorded as new school construction with water and wastewater or storm water as its secondary type. This dual classification allows more flexibility in analyzing the costs of different types of infrastructure improvements. Those costs are included with the infrastructure they support in table 3 and throughout this report except where they are broken out in table 4 below.

Table 4. Comparison of Infrastructure that Supports Direct Service to Private Sector and Infrastructure that Supports Other Public Infrastructure
Five-year Period July 2013 through June 2018

Type of Infrastructure	Provide Direct Service to Private Sector		Support Other Public Infrastructure		Project Type Total
	Est. Cost [in millions]	Percent of Total	Est. Cost [in millions]	Percent of Total	Est. Cost [in millions]
Transportation	\$ 25,670.9	99.6%	\$ 94.6	0.4%	\$ 25,765.5
Water and Wastewater	3,415.2	98.5%	52.0	1.5%	3,467.3
Other Utilities	229.5	99.7%	0.7	0.3%	230.2
Storm Water	109.0	84.0%	20.8	16.0%	129.8
Property Acquisition	0.0	0.0%	393.8	100.0%	393.8
Grand Total	\$ 29,424.7	98.1%	\$ 561.9	1.9%	\$ 29,986.5

Transportation infrastructure continues to dominate the inventory.

Transportation and Utilities is the single largest category (\$25.9 billion) and increased the most in overall cost (\$4.2 billion), but the increase, as discussed in the introduction, is mainly because a change in inventory procedures that added \$3.7 billion in bridge projects to the 2013 inventory. Without these bridges, the infrastructure needed in this category would have only increased \$481 million. Transportation alone, at \$25.7 billion, accounts for nearly all of this category and all but

\$5.7 million of the increase. See table 3. Unlike in previous years, any bridge that has a remedial need identified by a state inspector that exceeds an estimated cost of \$50,000 is reported as a need, no matter how long it is expected to take to obtain funding and address the problems with the bridge. Some bridges are rated functionally obsolete or structurally deficient, but this does not mean that they are unsafe. A functionally obsolete bridge is one built to a roadway width or load-carrying capacity that no longer meets the standards for current vehicle traffic. Narrow shoulders, road misalignment, or limited vehicle carrying capacity can cause drivers to reduce speed or take another route. Structurally deficient bridges tend to have a poor load-carrying condition because of deterioration or inadequate waterway openings, which can cause watercraft traffic interruptions. These bridges need maintenance or repair to remain open and eventually will need to be completely rehabilitated or replaced. See table 5 for a breakdown of bridge needs.

Table 5. Bridge Infrastructure Needs by Condition
Five-year Period July 2013 through June 2018

Bridge Condition	Bridge Count	Estimated Cost
Functionally Obsolete	2,035	\$ 1,899,889,853
Structurally Deficient	478	788,602,665
Both Conditions	451	931,708,592
Neither Condition	3,779	4,100,896,346
N/A	46	339,528,564
Total	6,789	\$ 8,060,626,020

Aside from these bridges, new transportation projects in the inventory totaled \$2.4 billion, and hundreds of projects remaining in the inventory increased in cost by a total of \$1.1 billion. These increases were slightly offset by \$1.2 billion for projects completed since the last inventory, \$942 million for projects that decreased in cost, and \$655 million for projects that were canceled or postponed. Projects totaling \$36 million were removed from the inventory because they were reduced from true improvements to maintenance or repairs.

More than \$171 million of the \$942 million in decreased transportation project costs were because the Tennessee Department of Transportation's new Expedited Project Delivery program (EPD) is reflected in the inventory for the first time this year. Under the EPD program, TDOT evaluates projects and, where appropriate, recommends cost-effective modifications, such as intersection and lane modifications as well as safety improvements.⁸ TDOT modified five projects included in this inventory, all on state routes in Fentress, Hardin, Jackson, Lauderdale, and Macon

⁸ See <http://www.tn.gov/tdot/topic/strategic-investments>, <http://www.greshamsmith.com/showcase/projects/showcase-7/tdot-expedited-proj-delivery>, and http://www.greenevillesun.com/news/tdot-commissioner-says-dept-taking-closer-look-at-road-project/article_01b50924-b10b-565d-becf-ce4052b857f9.html

The County Bridge Relief Act of 2014, an amendment to the State Bridge Grant Program, allows counties to address bridge replacement and repairs sooner by lowering the local's share of the cost from 20% to 2%. To receive 98/2 funding, counties must apply for bridge repair or replacement to the Tennessee Department of Transportation before July 1, 2016.

<http://www.tnhighwayofficials.org/county-bridge-relief-act-2014>

counties, and reduced their estimated costs from \$180 million to \$9 million. Instead of building new roads or widening existing roads, TDOT will add guardrails, pavement markings, and signage and improve intersections, lanes, shoulders, curves, and bridges.

The estimated cost of improvements for the other type of infrastructure in the Transportation and Utilities category—other utilities, which includes electricity, gas, and telecommunications—increased 2.5% to \$229 million, mainly because of new projects. Stewart County needs natural gas lines throughout the county (\$5 million), Loudon County needs a new substation at the Sugarlimb Industrial Park (\$3 million), and Sparta, in White County, needs to replace electric and water meters with automated meters for easier reading (\$2 million). Greeneville (Greene County) added two projects totaling \$2 million to build an operations center and training facility for Greeneville Light and Power. Offsetting these increases, Morristown, in Hamblen County, completed the largest project—\$3 million to improve energy efficiency and reduce demand for electricity during peak hours with smart grid automatic meters for 14,400 electric customers in the city.

Improvements at colleges and universities largely drive growth in Education infrastructure needs.

Education, including post-secondary and public school improvements, is the second largest category (\$8.5 billion) and increased \$969 million (12.9%). Most of that increase (\$654 million) is for improvements at the state's public college and university campuses, which now total \$4.6 billion. Tennessee Technological University in Cookeville, Middle Tennessee State University in Murfreesboro, and the University of Memphis each added more than \$200 million in new projects, combined totaling \$616 million. Out of a total \$1.4 billion in new post-secondary needs, the largest includes a new \$82 million chemistry laboratory at Tennessee Tech, a new \$80 million housing and parking complex at UT Chattanooga, a new \$77 million student union at MTSU, and a new \$51 million university center at the University of Memphis.

Completion of a few large projects and a large decrease in the cost of another offset some of the increase for the post-secondary campuses. Tennessee State University spent \$23 million to refurbish the Avon Williams Campus building for non-traditional students in downtown Nashville to comply with life safety and building codes, and the Tennessee Technology Center in Cookeville completed a new \$23 million nursing and health services building. A new academic and student services building at Nashville State Technical Community College decreased from \$41 million to \$15 million because the project was split into phases with the later phases falling outside this report's five-year window.

Improvements for public school buildings include new space and improvements in existing school facilities. These costs have been relatively flat overall since 2007 but increased 8.1% this year to \$3.8 billion, mainly

for new schools and a growing backlog of school renovations. The need for both new schools and additions increased with \$187 million (15.6%) more for new schools and \$11 million (3.3%) more for additions. Davidson County needs five new schools at a total cost of \$94 million that were not reported last year, and Fentress, Roane, Robertson, Sumner, Washington, and Wilson counties each need one new school at a total cost of \$151 million.

The estimated cost of improvements needed in existing schools, including renovations (\$1.5 billion), total replacements (\$345 million), technology (\$129 million), and mandated changes (\$119 million), increased \$86 million (4.2%) to \$2.1 billion—the fifth straight year that the estimated cost for improvement in existing schools has grown. Renovations required by mandates, such as fire code compliance and asbestos and lead removal, are the only type of school need that decreased since last year (2.5%). School system-wide needs for projects like bus garages and central office buildings, which serve entire school systems, more than doubled to \$12 million (106.9%) after a downward trend since 2009. The public schools chapter, presented later in this report, provides more information about infrastructure needs for the state’s local school systems.

Infrastructure needs at state-owned schools such as the Alvin C. York Agricultural Institute and the Tennessee Schools for the Blind and Deaf, included under other education, increased to \$76 million (49%), mainly because of one large cost increase. The School for the Deaf in Knox County adjusted the cost of its new high school from \$10 million to \$29 million. Two new projects also contributed to the overall increase: a \$3 million multi-purpose classroom expansion at Alvin C. York Agricultural Institute in Fentress County and a \$1 million upgrade to the communication system at the Tennessee School for the Blind in Davidson County.

Health, Safety, and Welfare needs decreased, mostly because of declines in water and wastewater and law enforcement needs.

Health, Safety, and Welfare, the third largest category in the inventory, decreased \$556 million (10%) to \$5.0 billion. This decline resulted primarily from decreases in the need for improved water and wastewater and law enforcement infrastructure. Water and wastewater accounts for the largest portion of the Health, Safety, and Welfare category at \$3.4 billion. It decreased \$217 million (6%) from last year, mainly because of completed and canceled projects. Several projects costing over \$10 million each were completed. Watauga River Regional Water Authority completed a \$16 million treatment and distribution facility, and Davidson County completed a \$14 million upgrade that is part of the overflow abatement program at the Whites Creek Pump Station. Harrogate, in Claiborne County, completed a citywide sewer project, and Marshall County renovated the wastewater plant in Lewisburg; each cost \$14 million. Canceled projects total \$132 million. Giles, Hamblen, and McMinn counties

The EPA calls combined sewers “remnants of the country’s early infrastructure.” The first sewers weren’t designed to handle the constant and huge stream of wastes from our toilets, because they were invented when we didn’t have any toilets. Sewers were originally built to solve the problems of cities that were flooded with their own refuse—garbage, animal manure, and human waste left in the open rather than in a privy or latrine—during every rainstorm. To prevent that flooding, the fouled stormwater was shunted out of town and into the nearest handy receptacle, which was often a lake, river, stream, or ocean.

<http://www.theatlantic.com/technology/archive/2015/09/americas-sewage-crisis-public-health/405541/>

canceled the largest projects, totaling \$95 million combined for water lines and sewer systems. New projects total \$175 million, and cost increases total \$168 million. The estimated cost of two sewer-system improvements to reduce combined storm water and sewer flows into the Cumberland River in Davidson County, required by the US Environmental Protection Agency so that Nashville complies with the Clean Water Act, increased \$91 million to a total of \$440 million because of delays and changes in scope.

The estimated cost for law enforcement infrastructure improvements decreased \$374 million (29.3%) to \$901 million, mainly because three large projects totaling \$385 million were postponed and are no longer needed in this inventory’s five-year window. The new \$198 million women’s prison, a \$140 million upgrade and expansion of clinical service facilities, and a \$47 million expansion of the Tennessee Prison for Women were all postponed until 2025. The Tennessee Department of Correction says it does not need a new prison in the near future because it’s no longer in their updated strategic plan. Canceled projects totaling \$62 million also contributed to the overall decline. The Tennessee Department of Children’s Services canceled four proposed youth development centers to house juvenile offenders in Hamilton (\$12 million), Warren (\$14 million), Gibson (\$15 million), and Sullivan (\$16 million) counties because it is no longer building these types of facilities to meet its long-range needs and is instead focusing on renovating and building onto existing facilities.

Decreases in costs for public housing, storm water, and solid waste infrastructure improvements also contributed to the overall decline in the Health, Safety, and Welfare category. The total cost of housing needs decreased a total of \$9 million (67.5%) to \$5 million, mainly because the \$12 million renovated Village of Cypresswood public housing in Memphis offset new housing needs and scope changes in existing projects. The cost of storm water improvements decreased by \$3 million (2.3%) to \$109 million, mainly because four projects were completed and four decreased in cost. The largest one completed was a \$2 million storm water control project on the Wolf River in Germantown (Shelby County). Solid waste needs decreased by \$1 million (3.8%) to \$35 million because of a few completed and canceled projects. Williamson County improved the Thompson Station Convenience Center at a cost of \$250,000, and Lake County replaced an old incinerator for \$230,000. Four projects were canceled totaling \$550,000. Three of those, totaling \$475,000, are in Greeneville (Greene County) and were canceled because the city is instead working with the county to handle its solid waste. The other canceled project was a new \$75,000 convenience center in Robertson County that the county commission has decided it no longer needs.

The decrease in cost for Health, Safety, and Welfare projects would have been larger if not for increases in public health and fire protection facilities. The cost of public health facilities improvements increased \$43 million (13.7%) to \$353 million, mainly because of \$88 million in new projects. The State Veterans Home Board added two new projects totaling \$58

million. The largest will build a \$48 million nursing home and community living center in Shelby County. The Department of Intellectual and Developmental Disabilities added four new projects totaling \$18 million, including \$12 million to continue implementing master plans for the Arlington, Clover Bottom, and Greene Valley developmental centers. The largest project completed in this type was a \$12 million outpatient diagnostic center near Henry County's medical center. The cost of improvements in fire protection infrastructure increased \$5 million (2.9%) to \$175 million because of new projects and increases in the cost of some that were already in the inventory. The largest new project is \$7 million for either the construction of a new fire station or the renovation of several stations in Bristol (Sullivan County) based on a comprehensive fire station location study. The Memphis and Shelby County Port Commission will also build a new \$6 million fire station at its Pidgeon Industrial Park.

New Nashville Sounds baseball stadium drives increase in Recreation and Culture costs.

The Recreation and Culture category increased \$35 million (2.1%) to \$1.7 billion despite decreases in community development and libraries, museums, and historic sites. The addition of new infrastructure needs offset completed infrastructure improvements, cost decreases, and cancellations to produce a \$54 million (5.4%) increase in the estimated cost of recreation infrastructure, which now totals a little more than \$1 billion. The largest addition is the Nashville Sounds baseball stadium and parking garage at the historic Sulphur Dell site just north of downtown, totaling \$65 million, followed by a \$35 million greenway connector that Montgomery County is building between Liberty and McGregor parks along the Cumberland River. Two other large recreation improvements are proposed for state universities. East Tennessee State University is planning a new \$18 million football stadium, and Austin Peay State University expects to spend \$17 million to renovate its football stadium.

The cost of community development projects decreased \$16 million (5.2%) to \$282 million because of completed projects, cost decreases, and a few canceled projects. The largest project completed is a \$3 million renovation of the Mitchellville welcome center in Robertson County on the southbound side of Interstate 65. The largest cost decrease is the Carroll County community center project in downtown McKenzie, which decreased from \$10 million to \$1 million because the existing building will be renovated instead of being replaced. Five projects were canceled totaling \$5 million. The estimated cost of improvements for libraries, museums, and historic sites decreased \$3 million (0.9%) to \$370 million, mainly because completed and canceled needs barely offset the addition of new projects and cost increases. The increased cost for an improved state library and archives space was the most significant, increasing from \$71 million to \$89 million after plans became clearer.

Improvements in state facilities in Davidson County are driving the big increase in General Government infrastructure needs.

Both types of infrastructure improvements in the General Government category, public buildings and other facilities, contributed to the \$169 million (30.6%) overall cost increase, bringing the total to an estimated \$721 million. The estimated cost of improvements in public buildings alone increased \$143 million (32.6%) to \$583 million, mainly because of new projects totaling \$175 million, 74% of which (\$129 million) is for state-owned buildings, mostly in Davidson County (\$122 million). The largest new project is the \$42 million proposed restoration and renovation of the John Sevier Building, which sits just below the state capitol. The state also plans a new visitor center for the capitol with renovations to Motlow Tunnel for \$12 million. The largest new project that is not state-owned is the \$30 million expansion of the Dickson County courthouse.

The cost of other facilities improvements, including those for storage and maintenance facilities, which do not fit the definition of a more specific type of infrastructure, increased \$25 million (22.7%) to \$138 million because of new projects and one large cost increase. The Department of Veterans Affairs and the State Veterans Home Board together added improvements estimated to cost \$9 million, 81% of the cost of all new projects. The Department of Veterans Affairs will develop a new \$8 million veterans cemetery in Madison County, and the Department of Agriculture's Division of Forestry will build a new \$1 million seedling cooler in Chester County to facilitate operations and increase revenue. The estimated cost of a land purchase and building construction project at the public works complex in Knox County increased from \$500,000 to \$19 million because the cost of the building was added to the estimate.

Completion of Nashville's convention center caused a large decrease in Economic Development needs.

The Economic Development category decreased \$727 million (58.8%) to \$508 million because both types of infrastructure in the category decreased. The cost of business district development decreased \$706 million (71.9%) to \$276 million, mainly because Nashville completed its Music City Convention Center at a cost of \$624 million. The 2.1 million square-foot facility opened in May 2013. Ripley, the county seat of Lauderdale County, finished the next \$10 million phase in its effort to revitalize its town square, including upgrades to streets and sidewalks, landscaping, and buildings. One new project slightly offset the overall decrease: Bristol (Sullivan County) is building \$25 million of infrastructure to support a major retail, commercial, and restaurant center along Interstate 81. The cost of industrial sites and parks decreased \$21 million (8.3%) to \$233 million largely because of two canceled projects: a \$15 million commercial and industrial park in

Fairview (Williamson County) and a \$22 million rail project at the Frank C Pidgeon Industrial Area in Shelby County.

State infrastructure improvements continue to dominate overall, and county improvements continue to exceed those of cities.

State agencies own the majority of all public infrastructure in the inventory (61.7%), and their share of the total cost of needed improvements continues to increase (see figure 2). The largest portion of seven of the twenty-one infrastructure types

(transportation; post-secondary education; other education; law enforcement; public health facilities; libraries, museums, and historic sites; and public buildings), including slightly more than three-fourths (77.2%) of transportation improvements, are the responsibility of the state. Nearly all improvements needed for post-secondary education (99.8%) belong to the state’s public colleges and universities. These improvements, combined with transportation, comprise the bulk of state-owned infrastructure in the inventory,

accounting for \$24.4 billion of the \$26.1 billion total reported for state government. The next largest areas of state responsibility are law enforcement and public health facilities. State needs exceed half of the totals for both of these types of infrastructure though the dollar amounts are relatively small. The state’s share of law enforcement costs is 53.1% (\$479 million), and its share of public health facilities costs is 94% (\$332 million). The state is also responsible for 64.7% of the cost of libraries, museums, and historic sites (\$240 million) and 50.9% of the cost of public buildings (\$297 million). All improvements for other education infrastructure (\$76 million), including the schools for the deaf and blind and Alvin C. York Agricultural Institute, belong to the Department of Education. See table 6.

At the local level, infrastructure needed by counties (\$7.8 billion) slightly exceeds what is needed by cities (\$5.7 billion). Counties need most of the infrastructure in six of the 21 project types in the inventory, while cities need most of the infrastructure in eight of them. Counties are responsible for most of school system-wide (96%), new school and addition construction (89.5%), solid waste (78.1%), school renovations and replacements (75.3%), industrial sites and parks (63.9%), and business district development (62.6%) needs. On the other hand, almost half of the water and wastewater

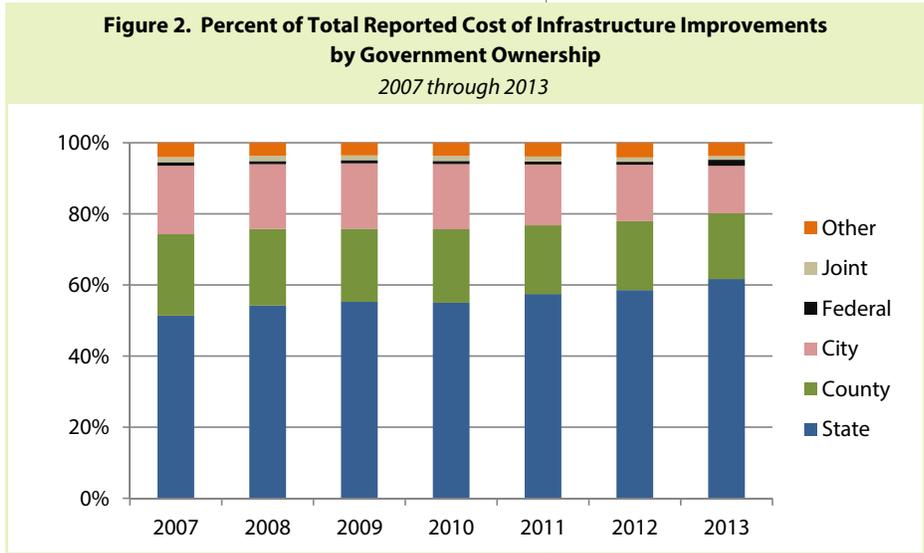


Table 6. Total Estimated Cost in Millions and Percent of Total of Needed Infrastructure Improvements by Project Type and Level of Government
Five-year Period July 2013 through June 2018

	City		County		State		Federal		Joint		Other		Total	
	Estimated Cost [in millions]	Percent of Total	Estimated Cost [in millions]	Percent of Total	Estimated Cost [in millions]	Percent of Total	Estimated Cost [in millions]	Percent of Total	Estimated Cost [in millions]	Percent of Total	Estimated Cost [in millions]	Percent of Total	Estimated Cost [in millions]	Percent of Total
Category and Type of Infrastructure	\$ 2,538.3	9.8%	\$ 2,604.6	10.1%	\$ 19,820.5	76.5%	\$ 698.0	2.7%	\$ 222.1	0.9%	\$ 16.9	0.1%	\$ 25,900.4	100.0%
Transportation	2,379.6	9.3%	2,563.7	10.0%	19,813.6	77.2%	698.0	2.7%	216.1	0.8%	0.0	0.0%	25,670.9	100.0%
Other Utilities	158.8	69.2%	40.9	17.8%	7.0	3.0%	0.0	0.0%	6.0	2.6%	16.9	7.4%	229.5	100.0%
Education	\$ 60.1	0.7%	\$ 3,150.6	37.1%	\$ 4,638.0	54.6%	\$ 0.0	0.0%	\$ 0.0	0.0%	\$ 646.2	7.6%	\$ 8,494.8	100.0%
Post-secondary Education	1.9	0.0%	5.5	0.1%	4,561.7	99.8%	0.0	0.0%	0.0	0.0%	0.0	0.0%	4,569.1	100.0%
School Renovations and Replacements	38.2	1.8%	1,595.1	75.3%	0.0	0.0%	0.0	0.0%	0.0	0.0%	485.4	22.9%	2,118.7	100.0%
New Public Schools and Additions	19.5	1.1%	1,538.2	89.5%	0.0	0.0%	0.0	0.0%	0.0	0.0%	160.8	9.4%	1,718.5	100.0%
Other Education	0.0	0.0%	0.0	0.0%	76.2	100.0%	0.0	0.0%	0.0	0.0%	0.0	0.0%	76.2	100.0%
School System-wide	0.5	4.0%	11.9	96.0%	0.0	0.0%	0.0	0.0%	0.0	0.0%	0.0	0.0%	12.4	100.0%
Health, Safety, and Welfare	\$ 1,876.3	37.6%	\$ 1,239.3	24.8%	\$ 823.1	16.5%	\$ 0.0	0.0%	\$ 155.9	3.1%	\$ 899.0	18.0%	\$ 4,993.5	100.0%
Water and Wastewater	1,542.7	45.2%	819.2	24.0%	0.0	0.0%	0.0	0.0%	154.3	4.5%	899.0	26.3%	3,415.2	100.0%
Law Enforcement	107.9	12.0%	314.5	34.9%	478.6	53.1%	0.0	0.0%	0.0	0.0%	0.0	0.0%	901.0	100.0%
Public Health Facilities	2.1	0.6%	19.1	5.4%	332.2	94.0%	0.0	0.0%	0.0	0.0%	0.0	0.0%	353.5	100.0%
Fire Protection	106.2	60.5%	56.7	32.3%	12.3	7.0%	0.0	0.0%	0.3	0.2%	0.0	0.0%	175.5	100.0%
Storm Water	107.2	98.3%	1.0	0.9%	0.0	0.0%	0.0	0.0%	0.8	0.7%	0.0	0.0%	109.0	100.0%
Solid Waste	7.2	20.6%	27.2	78.1%	0.0	0.0%	0.0	0.0%	0.5	1.3%	0.0	0.0%	34.8	100.0%
Housing	3.1	67.0%	1.5	33.0%	0.0	0.0%	0.0	0.0%	0.0	0.0%	0.0	0.0%	4.6	100.0%
Recreation and Culture	\$ 782.5	46.3%	\$ 384.6	22.8%	\$ 486.2	28.8%	\$ 0.2	0.0%	\$ 36.5	2.2%	\$ 0.5	0.0%	\$ 1,690.5	100.0%
Recreation	518.4	49.9%	269.4	25.9%	224.4	21.6%	0.2	0.0%	26.1	2.5%	0.0	0.0%	1,038.5	100.0%
Community Development	183.1	65.0%	66.6	23.6%	22.0	7.8%	0.0	0.0%	9.4	3.4%	0.5	0.2%	281.7	100.0%
Libraries, Museums, and Historic Sites	81.0	21.9%	48.6	13.1%	239.8	64.7%	0.0	0.0%	0.9	0.2%	0.0	0.0%	370.4	100.0%
Economic Development	\$ 140.9	27.7%	\$ 321.4	63.2%	\$ 1.4	0.3%	\$ 0.0	0.0%	\$ 33.9	6.7%	\$ 10.8	2.1%	\$ 508.4	100.0%
Business District Development	80.7	29.3%	172.5	62.6%	0.0	0.0%	0.0	0.0%	19.4	7.0%	2.9	1.0%	275.5	100.0%
Industrial Sites and Parks	60.2	25.8%	148.9	63.9%	1.4	0.6%	0.0	0.0%	14.5	6.2%	7.9	3.4%	232.9	100.0%
General Government	\$ 252.7	35.1%	\$ 128.8	17.9%	\$ 318.3	44.2%	\$ 20.0	2.8%	\$ 0.0	0.0%	\$ 0.8	0.1%	\$ 720.6	100.0%
Public Buildings	157.1	26.9%	108.5	18.6%	296.7	50.9%	20.0	3.4%	0.0	0.0%	0.7	0.1%	583.0	100.0%
Other Facilities	95.6	69.5%	20.3	14.7%	21.6	15.7%	0.0	0.0%	0.0	0.0%	0.1	0.1%	137.6	100.0%
Grand Total	\$ 5,650.8	13.4%	\$ 7,829.3	18.5%	\$ 26,087.5	61.7%	\$ 718.2	1.7%	\$ 448.3	1.1%	\$ 1,574.2	3.7%	\$ 42,308.4	100.0%

(45.2%) and recreation (49.9%) infrastructure in the inventory belong to cities, as do nearly all storm water (98.3%) and most other facilities (69.5%), other utilities (69.2%), public housing (67%), community development (65%), and fire protection (60.5%) infrastructure. When transportation projects are excluded from total costs, ownership is more evenly distributed across cities (19.7%), counties (31.6%), and the state (37.7%), with 1.4% in joint ownership, 9.5% owned by other types of governmental entities such as utility districts, and only a tiny fraction (0.1%) in federal ownership.

The estimated cost of infrastructure improvements in all three stages of development continues to trend upward.

Infrastructure needs are reported as being in one of three stages—conceptual, planning and design, or construction (see figure 3). The percentage of projects in the conceptual stage gradually has increased over the last seven years as the percentage for both the planning and design stage and the construction stage gradually decreased. While the distribution has shifted slightly over time, the estimated cost of infrastructure improvements has trended upward for each stage (see figure 4).

Projects in the conceptual stage increased the most because of the process change for bridges in the inventory this year; they now make up nearly half (47.8%), \$20.2 billion, of all reported needs. Improvements in the planning and design stage total \$13.3 billion (31.5%), and improvements under construction total \$8.8 billion (20.7%). See table 7. The estimated cost of infrastructure in the construction stage in the Economic Development category dropped from \$953 million to \$278 million because the Nashville convention center is now complete.

Figure 3. Percent of Total Reported Cost of Infrastructure Improvements by Stage of Development

Five-year Period July 2013 through June 2018

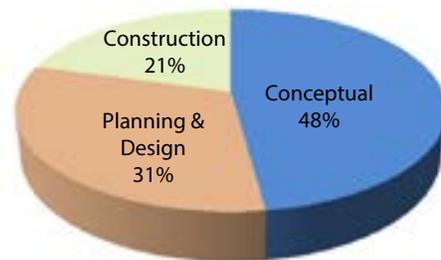


Figure 4. Percent of Total Reported Cost of Infrastructure Improvements by Stage of Development

2007 through 2013

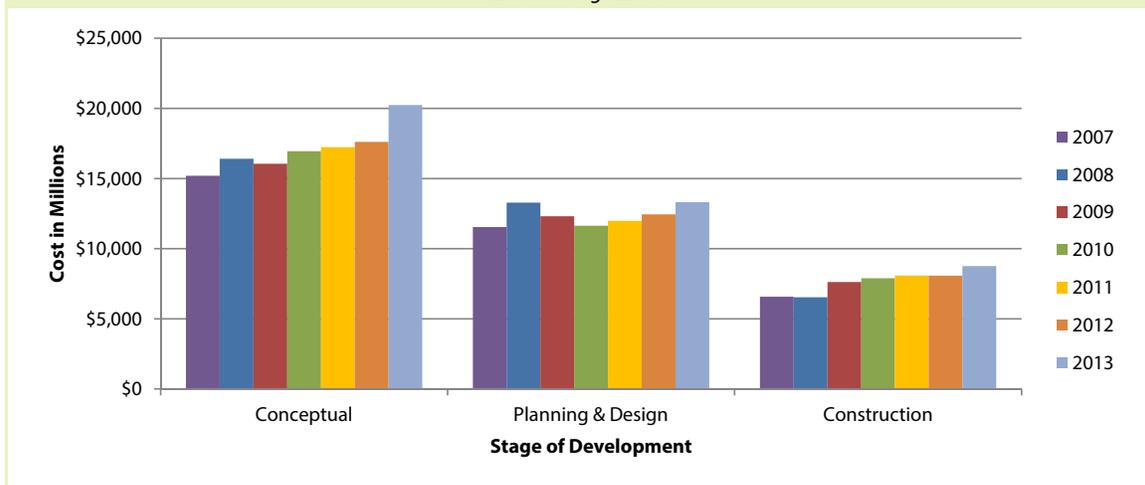


Table 7. Needed Infrastructure Improvements in Millions and Percent of Total by Category, Project Type, and Stage of Development
Five-year Period July 2013 through June 2018

Category and Type of Infrastructure	Conceptual		Planning & Design		Construction	
	Number	Cost	Number	Cost	Number	Cost
Transportation and Utilities	7,305	\$ 12,036.8	874	\$ 9,560.0	507	\$ 4,303.7
Transportation	7,264	11,901.2	851	9,486.7	491	4,283.0
Other Utilities	41	135.5	23	73.3	16	20.6
Education	2,296	\$ 4,678.9	867	\$ 1,627.1	931	\$ 2,188.8
Post-secondary Education	219	1,931.6	132	903.6	192	1,733.9
School Renovations and Replacements	1,800	1,399.6	644	369.0	703	350.1
New Public Schools and Additions	257	1,303.1	85	318.0	31	97.3
Other Education	10	36.3	5	36.3	2	3.6
School System-wide	10	8.3	1	0.2	3	3.8
Health, Safety, and Welfare	884	\$ 2,185.3	398	\$ 1,363.9	263	\$ 1,444.4
Water and Wastewater	625	1,327.7	297	991.5	192	1,096.0
Law Enforcement	101	449.8	41	225.3	37	215.9
Public Health Facilities	31	261.1	11	24.3	8	68.1
Fire Protection	71	76.1	22	82.3	12	17.1
Storm Water	33	51.7	16	17.8	8	39.5
Solid Waste	14	14.3	11	12.8	6	7.7
Housing	9	4.6	0	0.0	0	0.0
Recreation and Culture	422	\$ 718.0	206	\$ 577.6	122	\$ 395.0
Recreation	333	405.1	156	390.5	97	242.9
Libraries, Museums, and Historic Sites	48	201.2	28	149.7	10	19.5
Community Development	41	111.6	22	37.4	15	132.6
General Government	152	\$ 450.2	48	\$ 123.5	29	\$ 146.9
Public Buildings	116	354.5	37	104.3	24	124.2
Other Facilities	36	95.7	11	19.2	5	22.7
Economic Development	76	\$ 173.6	30	\$ 57.2	26	\$ 277.7
Business District Development	12	20.0	10	21.7	10	233.9
Industrial Sites and Parks	64	153.6	20	35.5	16	43.8
Grand Total	11,135	\$ 20,242.8	2,423	\$ 13,309.1	1,878	\$ 8,756.5

Note: The project count includes all projects at a school. A school can have more than one project and those projects can be in different stages. For complete listings of cost by project type, stage of development, and county, see appendix D.

State and federal mandates affect 3.3% of all projects.

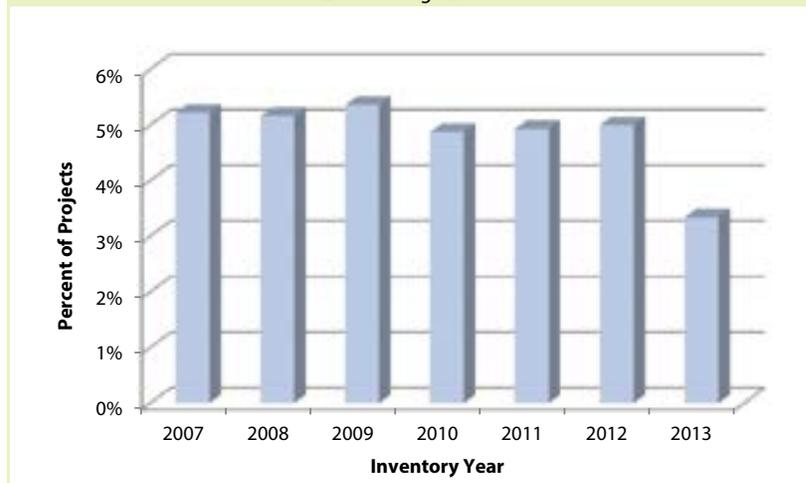
Commission staff do not ask local or state officials to identify costs related to state and federal mandates (except for infrastructure at existing schools) because officials reporting their needs often do not have the detailed information necessary to separate those amounts out of total project costs (e.g., the cost of ramps and lowered water fountains required by the Americans with Disabilities Act). They are asked, however, to indicate whether the costs of any projects are affected by mandates. While it is impossible to determine how much of the estimated total costs are associated with state and federal mandates, it is possible to determine the overall number of projects that mandates affect. Other than schools, the numbers are small (see table 8) and have been a small percentage, around 2%, for many years. The inclusion of all bridges rated insufficient by a state inspector with an identified remedy and associated cost estimate, as discussed above, brings this year's percentage down to 3.3%. See figure 5. Since the bridge improvements are not mandated, their inclusion increases the total number of projects but not the number of mandated projects, producing a lower percentage.

Table 8. Percent of Projects Affected by Mandates
Five-year Period July 2013 through June 2018

Type of Infrastructure	Number of Projects or Schools Reported	Projects or Schools Affected by Mandates	
		Number	Percent
School Renovations and Replacements	1,283	242	18.9%
Transportation	8,606	54	0.6%
Post-secondary Education	543	53	9.8%
Recreation	586	32	5.5%
Water and Wastewater	1,114	25	2.2%
Public Buildings	177	10	5.6%
Law Enforcement	179	9	5.0%
Public Health Facilities	50	6	12.0%
Community Development	78	5	6.4%
Fire Protection	105	5	4.8%
Libraries, Museums, and Historic Sites	86	3	3.5%
New Public Schools and Additions	271	2	0.7%
Solid Waste	31	1	3.2%
Storm Water	57	1	1.8%
Business District Development	32	1	3.1%
Other Education	17	1	5.9%
School System-wide	0	0	0.0%
Housing	9	0	0.0%
Industrial Sites and Parks	100	0	0.0%
Other Facilities	52	0	0.0%
Other Utilities	80	0	0.0%
Grand Total	13,456	450	3.3%

Note: The project count includes only the number of schools that have projects.

Figure 5. Number of Projects Affected by Mandates
2007 through 2013



Building Tennessee's Tomorrow: Anticipating the State's Infrastructure Needs

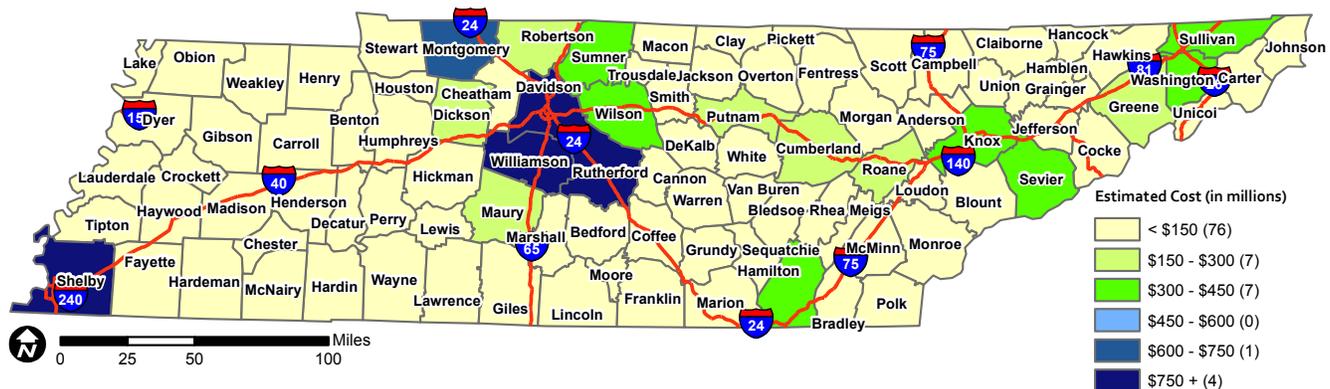
July 2013 through June 2018

INFRASTRUCTURE NEEDS BY COUNTY

Infrastructure needs vary widely across Tennessee's counties.

In general, the more people a county has and the more its population grows, the more infrastructure it will need and, fortunately, the more wealth it will likely have to pay for those needs. The relationships among these factors are strong and well demonstrated by the variation reported for each Tennessee county, although they are not perfectly aligned in any county. Some counties are able to meet their infrastructure needs more easily than others, some continue to report the same needs year after year, and even fast growing counties can find it difficult to meet their needs. Map 1 shows how the total estimated cost of public infrastructure improvement needs varies across the state.

**Map 1. Total Estimated Cost of Infrastructure Improvement Needs
Five-year Period July 2013 through June 2018**

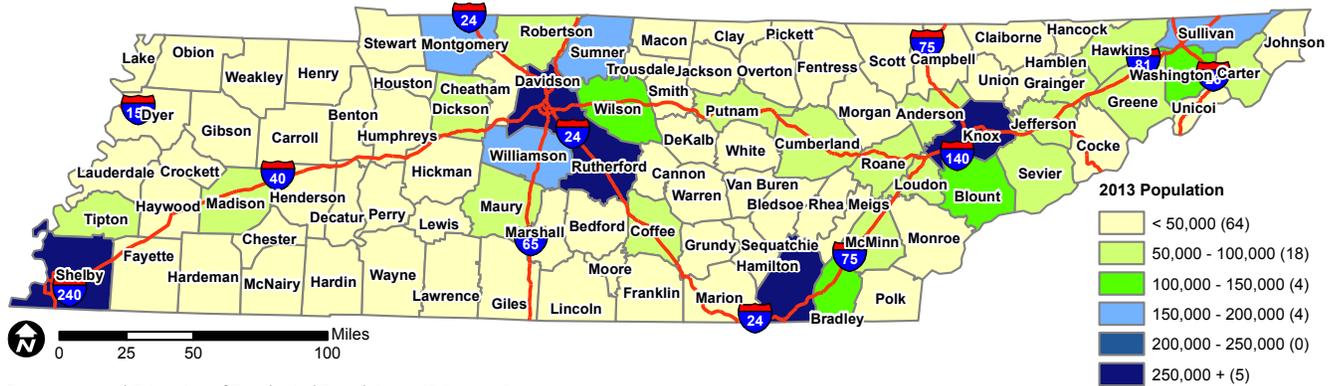


Four counties—Davidson, Shelby, Williamson, and Rutherford (shaded dark blue in map 1)—account for 39% (\$5.5 billion) of the needed \$14.1 billion in infrastructure improvements reported by local officials. Shelby and Davidson are also in the top tier (shaded dark blue) for total population in map 2, but Shelby falls into the second tier for population change in map 3. Both Davidson and Shelby are in the top tier for cost of completed improvements in map 4, property values in map 5, and taxable sales in map 6. They are the first and second most populous counties and are home to a quarter of the state's population. Between 2000 and 2013, Davidson and Shelby experienced the second and sixth greatest population growth in the state—Davidson grew by 88,282 and Shelby by 41,186. Not surprisingly, these two counties report needing the most infrastructure improvements, between them nearly 30% of the state total,⁹ and they also completed the most (see map 4). The surprising difference between these two counties is that Davidson completed the fifth most improvements per capita (\$1,789) while Shelby completed the 75th most (\$423). This is noteworthy because Davidson and Shelby have the two largest property and sales tax bases in

⁹ There are another \$28.2 billion in regional needs across the state.

the state, factors usually related to a county's ability to complete projects. It isn't clear why there is a large difference between the two—it may be that infrastructure needs and improvements in Shelby County are not being fully reported in the inventory.

**Map 2. Total Population by County
2013**



Source: Annual Estimates of Residential Population, US Census Bureau.

Rutherford and Williamson counties round out the top four for infrastructure needs in map 1. Rutherford, the larger of the two (fifth for population) and the county that grew the most since 2000 (by 97,452 residents), reported needing the fourth most infrastructure improvements and completed the fifth most improvements. It has both the sixth largest property and sales tax bases. Williamson, third for unmet needs, is the sixth most populous county. Between 2000 and 2013 its population grew by 70,804 residents, the third largest change behind Davidson and Rutherford. Like Davidson County, Williamson has completed more infrastructure improvements than most counties (fourth) and is fourth for property and fifth for sales tax bases.

**Map 3. Population Change by County
2000 to 2013**



Source: Annual Estimates of Residential Population, US Census Bureau.

Knox and Hamilton, shaded dark green in map 1, are the third and fourth largest counties in the state (shaded dark blue in map 2) but rank only ninth and 12th for unmet infrastructure needs. Knox is also fourth in the state in population growth, increasing by 61,563 residents, while Hamilton, seventh in population growth, grew by 40,570. However, Knox, shaded dark blue

in map 4, completed far more infrastructure improvements than Hamilton (shaded light green). Both counties are also in the top five for property and sales tax bases (see maps 5 and 6).

**Map 4. Estimated Cost of Completed Infrastructure Improvements
Infrastructure Needs Reported July 1, 2008 and Completed by July 1, 2013***



*See appendix E for infrastructure improvements completed since 2008.

Montgomery County, the seventh largest, ranked fifth for population growth, adding 48,894 residents since 2000, and reported the fifth greatest need for infrastructure improvements. Montgomery was not among the top ten for completing infrastructure improvements even though it has the eighth largest sales tax base and the tenth largest property tax base.

Sullivan and Sumner counties are in the same population tier as Montgomery and Williamson counties (light blue in map 2) but fall below that tier for infrastructure needs (see map 1). Sullivan is among the slower growing counties, but Sumner, like Wilson, is in the third tier for growth (light blue in map 3). All three plus Sevier and Washington counties fall in the fourth tier for infrastructure needs with Knox and Hamilton (dark green in map 1). All three fall in the fourth tier for infrastructure improvements completed (dark green in map 4) and are in the fourth tier for property tax base (dark green in map 5).

**Map 5. Equalized Assessed Property Values by County in Millions
2013**



Source: Division of Property Assessments, Tennessee Comptroller of the Treasury.

**Map 6. Taxable Sales by County in Millions
2013**



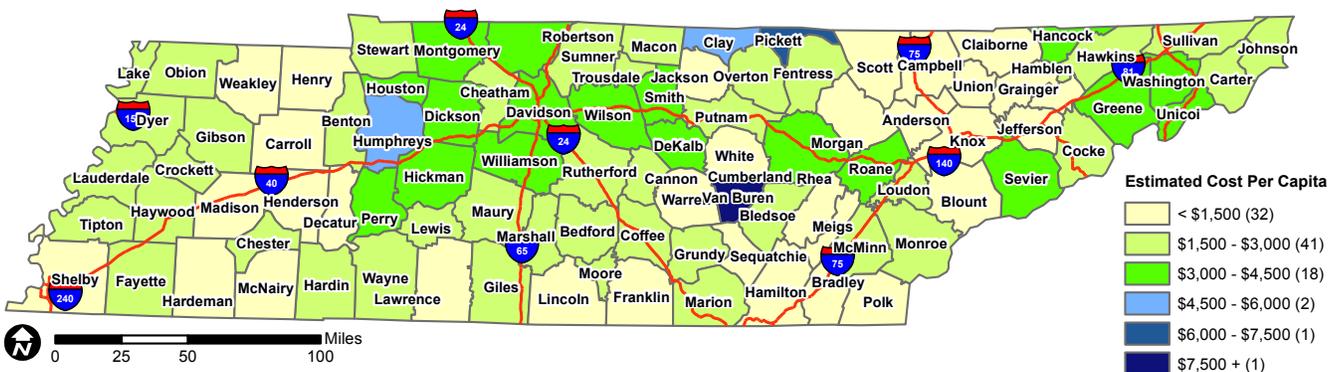
Source: Tennessee Department of Revenue.

Patterns become less obvious at this point and vary more among counties with smaller populations and fewer needs. Upon further examination, it becomes clear that infrequent but large projects in smaller counties can affect their ranking for completion of infrastructure improvements. Property tax bases seem to be a better predictor than sales tax bases of ability to get things done—map 4 aligns better with map 5 than with map 6. However, sales tax bases may explain why counties such as Anderson, Loudon, and Bradley have not completed as many improvements as Washington and Blount and are found in the bottom tier in map 4.

Relative to their populations, counties with small populations need and complete just as much or more infrastructure than counties with large populations.

Relative to population, infrastructure needs do not vary all that much, and only four small counties stand out—Van Buren, Pickett, Humphreys, and Clay. These four counties are in the lowest tier for needs in map 1 but are the only counties outside the bottom three tiers in map 7. The largest counties with the greatest needs in map 1 fall in line with all of the others when their needs are viewed relative to population in map 7.

**Map 7. Estimated Cost of Total Infrastructure Improvement Needed Per Capita
Five-year Period July 2013 through June 2018**



The state’s second smallest county, Van Buren, with a population of only 5,583, has needed \$25 million since 2005 to install and replace water lines. Pickett County, with a population of 5,090, has needed a new high school for nine years now, estimated to cost a relatively modest \$15 million. Humphreys County with a population of 18,243 needs \$10 million to replace a bridge and \$8 million for water and sewer at an industrial park. They have needed these two projects since 2008. Clay, with a population of 7,774, has since 2002 needed \$20 million to construct gas lines throughout the county and in the city of Celina. Needs of this size would not be significant in a county with a large population, like Shelby or Davidson, but they are big enough to cause these small counties to have the largest infrastructure needs per capita. Outside of these four counties, infrastructure needs appear to be reasonably in line with population.

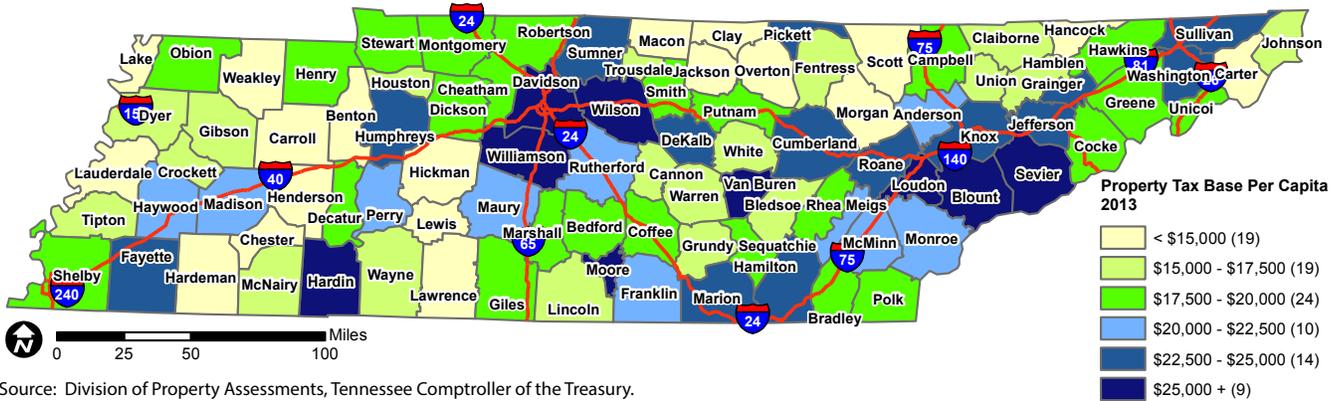
However, when you look at completed infrastructure improvements per capita in map 8, the counties are spread more evenly and with more in the top tier than on any of the first 7 maps. Each of the ten counties in the top tier for getting things done—Van Buren, Unicoi, Smith, Johnson, Davidson, Haywood, Wilson, Williamson, Warren, and Hardeman—completed multiple improvements, including transportation and water and wastewater projects. Davidson, Wilson, and Williamson—the three relatively large, fast growing, and well-off counties in this group—completed many improvements from a number of categories. Just two of the many completed projects in Davidson County accounted for over half a billion dollars: a \$405 million electric system upgrade completed in 2010 and a \$119 million wastewater system built in 2011. Wilson County built two high schools at a combined cost of \$95 million. Williamson County has been adding schools at a fast pace, building four elementary schools, two middle schools, and a high school, totaling \$150 million.

Map 8. Estimated Cost of Infrastructure Improvements Completed Per Capita
Infrastructure Needs Reported July 1, 2008 and Completed by July 1, 2013



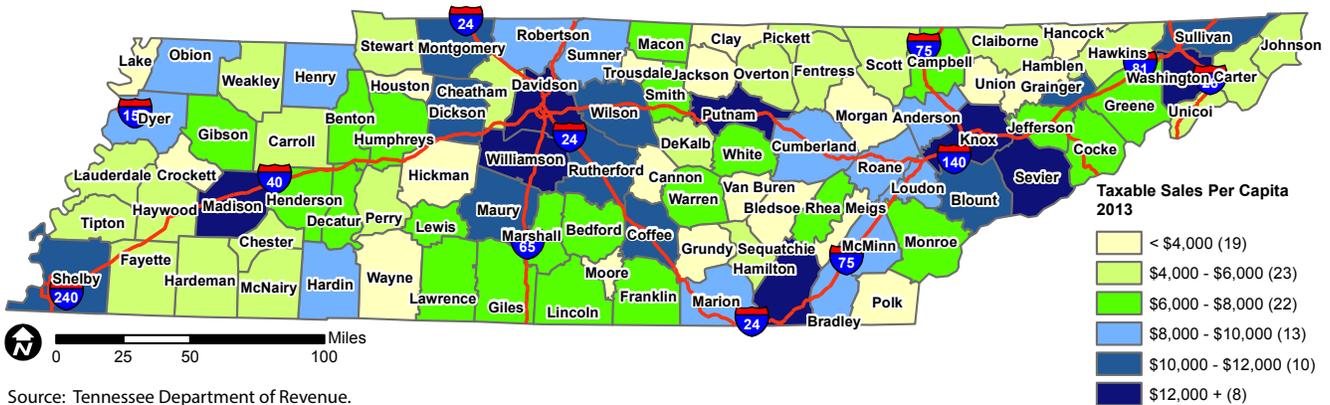
The following maps suggest an explanation for the contrast between maps 7 and 8. There are exceptions of course, but counties in the top three or four tiers for infrastructure needs per capita (map 7) are more likely to be in one of those tiers for improvements completed per capita (map 8) if they are also in one of those tiers in map 9 or 10, which illustrate the relative size of the counties’ tax bases. This is true even for the four small counties in the top two tiers in map 7.

Map 9. Equalized Assessed Property Values Per Capita by County 2013



Source: Division of Property Assessments, Tennessee Comptroller of the Treasury.

Map 10. Taxable Sales Per Capita by County 2013



Source: Tennessee Department of Revenue.

Van Buren is an example of the huge difference one project can make in a county with a small population. It has the highest reported per capita completed improvements, at \$3,224, largely due to the completion of a \$13.3 million interchange at state routes 111 and 284. Arguably, in design and funding the project could be considered regional and therefore would not be part of the \$18 million in improvements included in the per capita calculation, but the reporting local government and development district feel that it serves mostly local residents.¹⁰ Without this project Van Buren would be in the middle of the pack for completed improvements per capita at \$824.

Wealth and population factors greatly influence infrastructure needs and completed needs.

The maps in this chapter seem to indicate that population along with population growth and access to the resources needed to fund infrastructure are tied to both how much infrastructure is

¹⁰ See <http://www.tn.gov/assets/entities/tdot/attachments/studies-VanBurenSR-111atSR-284IJS.pdf> for more details.

needed and how much is completed. Statistical analysis supports this observation. Correlation measures are the simplest and most common approach.

Correlation coefficients measure the strength of the relationship between two sets of numbers. The strength is reported as a range from zero for no correlation to one for perfect correlation. The coefficient will be positive if one set of numbers increases as the other increases or decreases as the other decreases; it will be negative if one increases as the other decreases. Because Tennessee’s 95 counties vary so much in size—for instance, “Big Shelby,” with 755 square miles of land area, is almost seven times the size of Trousdale, which is only 114 square miles—dividing each of the factors by square miles ensures that land area does not distort the analysis.

Five factors stand out when analyzed in isolation, both in relation to needs and the ability to meet needs. All six factors rank the same for needs as they do for completed needs, with wealth factors (revenue sources for local governments) coming first. See tables 9 and 10. Population change rates, which get a lot of attention, are only weakly correlated with unmet needs and with completed improvements and have been the least important factor for the last four inventories.

While correlation allows comparison of two factors at a time, regression analysis can compare a group of factors all together rather than in isolation to determine how they compare to each other. Regressions for the factors in tables 9 and 10 show that the set is a strong predictor of what a county needs and is able to complete per square mile. The factors describe 86% of the variation in what is needed and 89% of the variation in what is completed. See table 11.

Table 9. Correlation Between Infrastructure Needed and Related Factors Divided by Land Area

Factor per Square Mile	Correlation with Improvement Needs per Square Mile
Taxable Property	0.89
Taxable Sales	0.88
Income	0.87
Population	0.83
Population Gain or Loss	0.79
Population Change Rate	0.36

Table 10. Correlation Between Infrastructure Completed and Related Factors Divided by Land Area

Factor per Square Mile	Correlation with Infrastructure Completed per Square Mile
Taxable Property	0.90
Taxable Sales	0.89
Income	0.87
Population	0.82
Population Gain or Loss	0.78
Population Change Rate	0.31

Table 11. Significance of Factors Affecting Infrastructure Needs and Completed Infrastructure

Factors	Order of Significance	
	Infrastructure Needed	Completed Improvements
Population	#1**	#1**
Income	#2**	#2**
Population Gain or Loss	#3*	#4*
Taxable Sales	Not Significant	#3**
Taxable Property	Not Significant	Not Significant

** Highly Significant

* Significant

Building Tennessee's Tomorrow: Anticipating the State's Infrastructure Needs

July 2013 through June 2018

FUNDING THE STATE'S INFRASTRUCTURE NEEDS

Nearly two thirds of infrastructure needs in the current inventory are not fully funded.

Information about the availability of funding to meet Tennessee's public infrastructure needs indicates that 65% of the funding needed was not available at the time the inventory was made, an increase from last year's 62%. Excluding improvements needed at existing schools and those drawn from the capital budget requests submitted by state agencies for which funding information is not available leaves \$33.9 billion for which funding information is available. Of this amount, \$11.0 billion is fully funded, slightly under the \$11.3 billion that was fully funded in the previous inventory. Another \$852 million is available for improvements that are partially funded, bringing the total available to \$11.8 billion or about 1.0% more than the \$11.7 billion that was available for the infrastructure needs reported in last year's inventory. That leaves a need for another \$22.1 billion, about 17.9% more than last year's \$18.7 billion. See table 12.

Local officials reported that \$11.8 billion is available to fund public infrastructure; of that amount, \$11.0 billion is for infrastructure that is fully funded.

Table 12. Summary of Funding Availability*
Five-year Period July 2013 through June 2018

	Funding Available [in billions]	Funding Needed [in billions]	Total Needs [in billions]
Fully Funded Needs	\$ 11.0	\$ 0.0	\$ 11.0
Partially Funded Needs	0.9	4.6	5.5
Unfunded Needs	0.0	17.4	17.4
Total	\$ 11.8	\$ 22.1	\$ 33.9

*Excludes infrastructure improvements for which funding availability is not known.

Note: Totals may not equal 100% because of rounding.

Improvements that were entirely unfunded in July 2013 comprise slightly more than half of the total funding needed, slightly up from last year's 49%. As always, more of the funding needed will become available as projects move from the conceptual stage to the planning and design stage. The percentage of available funding for needs that progressed from the conceptual stage in 2012 to the planning and design stage in 2013 was 50% compared with 13% for needs that remained conceptual. Needs must be fully funded to move from the planning and design stage to the construction stage.

Of the infrastructure that was needed in 2008 and completed by 2013, 46% is owned by the state, 31% by counties, and 18% by cities. Special districts own 4%, and the remaining 2% is jointly owned. This may be true because the government that owns infrastructure typically funds the bulk of its cost, and a variety of revenue sources are tapped. For example, the state collects taxes and appropriates those funds to their own projects and provides grants to the local level via programs at various agencies. Cities and counties fund most of their infrastructure improvements with revenue property and sales taxes, while utility districts have a dedicated revenue source in the form of user fees. The federal government owns very little of the infrastructure in the inventory but provides a significant level of funding for transportation infrastructure.

Governments build infrastructure for many different reasons, including enhancing communities, accommodating population growth, improving public health and safety, supporting economic development, and meeting government mandates. The purpose of the infrastructure also can play a role in determining funding sources and availability. See appendix G for more information about the reasons given by state and local officials for needing different types of infrastructure.

The percentage of available funding varies greatly across types of infrastructure.

Table 13. Percent of Improvements Fully Funded by Type of Infrastructure
Five-year Period July 2013 through June 2018

Category and Type of Infrastructure	Total Needed [in millions]	Fully Funded Improvements [in millions]	Percent of Total Needed
Transportation and Utilities	\$ 25,821.8	\$ 8,136.0	31.5%
Transportation	25,599.2	8,070.0	31.5%
Other Utilities	222.5	66.0	29.7%
Health, Safety, and Welfare	\$ 4,170.4	\$ 1,678.2	40.2%
Water and Wastewater	3,415.2	1,477.6	43.3%
Law Enforcement	422.4	118.0	27.9%
Fire Protection	163.2	15.8	9.7%
Storm water	109.0	43.9	40.3%
Solid Waste	34.8	11.1	32.0%
Public Health Facilities	21.2	11.8	55.3%
Housing	4.6	0.0	0.0%
Education	\$ 1,753.1	\$ 284.9	16.3%
New Public Schools*	1,730.5	280.2	16.2%
School System-wide	12.4	3.8	31.2%
Post-secondary Education	10.3	0.8	8.0%
Recreation and Culture	\$ 1,237.4	\$ 464.1	37.5%
Recreation	828.6	272.5	32.9%
Community Development	272.7	141.8	52.0%
Libraries, Museums, and Historic Sites	136.0	49.8	36.6%
Economic Development	\$ 508.4	\$ 290.1	57.1%
Business District Development	275.5	237.3	86.1%
Industrial Sites and Parks	232.9	52.8	22.7%
General Government	\$ 402.3	\$ 130.2	32.4%
Public Buildings	286.3	90.4	31.6%
Other Facilities	116.0	39.9	34.4%
Grand Total	\$ 33,893.4	\$ 10,983.5	32.4%

Table 13 breaks down the \$11 billion available for fully funded needs by type of infrastructure, and then compares it with the total needed for each type. Although transportation and water and wastewater represent the largest portion of needs, neither is the type most fully funded. That would be business district development at 86.1% fully funded, and this isn't a surprise because of the nature of these types of projects. Business district development can have complex negotiations between partners, both private and public, and in many cases, partners have reached some level of agreement about the level of funding before the project is announced.

Next after business district development are public health facilities at 55.3% and community development at 52.0%. Public health facilities are funded by many federal sources. For example, Houston County is using the Rural Development Fund of the US Department of Agriculture (USDA) for purchasing and rehabilitating a rural hospital. Most community development infrastructure is lumped into a couple of large projects, and in some cases it's similar to business district development because partners need to be

in agreement before announcing the project. The two largest fully funded community development projects were the \$45 million LeConte Pigeon Forge Civic Center (Sevier County) and the \$35 million Beale Street Landing project in Memphis (Shelby County), both under construction.

Water and wastewater comes next with 43.3% of needs fully funded. Two fully funded sewer projects in Davidson account for 12.9% of water and wastewater needs. Without these two projects, the percentage of water and wastewater fully funded needs would be 30.4%. Water and wastewater infrastructure, needed to ensure clean drinking water and protect water supply sources, is completed at a greater rate than other types of infrastructure, likely because it has a reliable funding source—the revenue collected from its customers. Many of those customers are in sparsely populated areas that are expensive to reach with new water and sewer lines.

More densely populated areas have a larger percentage of the surface area that is impervious to rain water (e.g., buildings, roads and streets, and parking lots), increasing the risk of flooding and contamination of drinking water. Two-fifths (40.3%) of new storm water infrastructure needs are fully funded and nearly all of it is needed to meet increasing environmental standards meant to encourage low-impact development. A new permit for cities and counties issued by the US Environmental Protection Agency will require developments to reduce runoff by landscaping or collecting rainwater.¹¹ Additionally, the massive flood of 2010 brought greater awareness to the importance of maintaining, improving, and building storm water infrastructure. The city of Greeneville needs \$20 million for city-wide storm water controls, representing 18.3% of total storm water needs, but the project is not funded. If that project were to receive funding, the percentage of storm water needs that are fully funded would increase to 58.6%.

Libraries, museums, and historic sites along with General Government projects categorized as other facilities are next in percent of needs fully funded at 36.6% and 34.4% respectively. More than three-fourths (77.1%) of the state-owned libraries, museums, and historic sites are fully funded compared with only 38.0% of needs that will be locally owned. All of the needs for other facilities will be owned locally. One \$46 million project in Shelby makes up most (60.7%) of the other facilities that are not fully funded. It is to move the main vehicle maintenance shop for Memphis to allow for expansion of St. Jude Children's Hospital.

Recreation has an average amount of projects that are fully funded (32.9%). Nearly one-third (30.2%) of the recreation total is for an \$82 million project in Davidson County that includes facility improvements currently under construction at parks and greenways throughout the county. Besides parks and greenways, recreation needs include hiking trails, public swimming

Despite infrastructure's fundamental role in the health and safety of the American people and the economy, the United States has underinvested for decades. Today, infrastructure spending as a share of gross domestic product is about 2.5%, much lower than the 3.9% in peer countries such as Canada, Australia, and South Korea. The figure for Europe as a whole is closer to 5% and between 9% and 12% for China.

Robert Puentes, The Philadelphia Inquirer, U.S. Infrastructure has been Neglected for Decades, May 18, 2015
<http://www.govtech.com/transportation/US-Infrastructure-Has-Been-Neglected-for-Decades.html>

¹¹ <https://www.nashville.gov/Water-Services/Developers/Low-Impact-Development.aspx>

“The quality of Tennessee’s transportation and infrastructure system always ranks at or near the top when compared to the rest of the country. We have no transportation debt, and we do a great job maintaining our roads, but we know we have challenges on the horizon. We know that we can’t depend on the federal government to be the funding partner that it once was. We also know that as our infrastructure ages, maintenance becomes more important and more expensive. And we know that maintaining our roads is only part of the equation. Right now we have a multi-billion dollar backlog of highway projects across this state that address key access, safety and economic development issues, and that’s only going to grow.”

Governor Bill Haslam,
WRCB, *Haslam: Multi-billion Dollar Backlog of Road Projects in TN*,
September 9, 2015
<http://www.wrcbtv.com/story/29991917/haslam-multi-billion-dollar-backlog-of-road-projects-in-tn>

pools, public marinas, ballparks, soccer fields, tennis courts, basketball courts, playgrounds, and auditoriums.

The remaining project types—solid waste, public buildings, transportation, school system-wide, other utilities, law enforcement, industrial sites and parks, new public schools, fire protection, post-secondary education, and housing—all have less than the average amount of fully funded projects. Solid waste ranks 10th in percent of needs fully funded (32.0%), though total needs for this type of infrastructure is just \$34.8 million. Three landfills, one each in Anderson, Lawrence, and Smith counties, account for four-fifths (79.1%) of fully funded solid waste needs.

At 31.6% of projects fully funded, public buildings include mainly county courthouses, county offices, city halls, and public works offices, which are funded mostly with general tax revenue. Other utility infrastructure—infrastructure owned by public gas and electric utilities—follows with 29.7% of its projects fully funded. These projects rely on customers to fund infrastructure. Electric and gas utilities charge a fixed fee per customer and a fee that varies with the number of kilowatt hours or cubic feet of gas used. Industrial and commercial electric customers are also charged for their maximum electricity usage (demand). Overall demand determines how much infrastructure is needed to ensure reliable electricity and gas service.

Coming next at 31.5%, transportation is somewhat below average in the amount of projects that are fully funded. Although there are several dedicated funding mechanisms, such as federal and state fuel taxes and local wheel taxes, to help pay for transportation infrastructure, those sources have been coming up short in recent years. Fuel is taxed by the number of gallons consumed, and according to a 2015 report by the Tennessee Comptroller, fuel consumption in 2012 remained below its peak in 2007 and is expected to continue to decline as a result of several factors, including increased fuel efficiency of vehicles, reduced growth in vehicle miles traveled because of higher fuel prices, and increased use of alternative fuel vehicles, such as electric vehicles, which are not currently subject to highway fuel taxes. Because of the decline in fuel revenue, federal fuel tax revenue in recent years has been insufficient to pay Highway Trust Fund commitments to states. Congress has transferred money into the federal Highway Trust Fund for eight years—the latest transfer was \$9.7 billion in October, 2014¹²—to avoid reducing funding to all states, but the resulting uncertainty in funding makes it difficult for states to plan.

School system-wide is 31.2% funded and is needed for a variety of reasons. It is needed to support K-12 education and includes central offices, support buildings, and maintenance and transportation facilities.

¹² United States Department of Transportation, Highway Trust Fund Ticker: <http://www.dot.gov/highway-trust-fund-ticker>

At 27.9% fully funded, law enforcement infrastructure is funded with general tax revenue, though in some cases federal loans and grants may be used. For example, the US Department of Agriculture has the Community Facilities Direct Loan and Grant Program for rural police stations. Industrial sites and parks, at 22.7% fully funded, can be complex, with multiple components such as roads, rail spurs, ports, and utilities that are classified as other types of infrastructure (e.g., transportation and water and wastewater) and have different funding sources.

While new public school construction is third in total infrastructure needs, it ranks 16th of the 19 project types in percent fully funded at 16.3%. School systems in Tennessee are not fiscally independent, which may hamper school officials' abilities to project funding and may at least partially account for the small percentages in table 14. Although the Education Improvement Act of 1992 mandates a maximum class size of 25 to 35, depending on grade level, only two new schools in Rutherford County, at a total cost of \$32 million, are needed to meet that state mandate. The other \$1.7 billion in new schools needed across the state are not considered state mandates but would likely help keep class sizes down as well. The ability of local government to pay for that varies greatly. Because different local governments cannot raise the same amount of revenue per student with the same tax rates, the state provides considerable funding for school capital outlay, though it does not earmark those funds for that specific purpose. School systems have the flexibility to use those funds to meet various school needs and generally report using them for operating costs.

Table 14. Percent of Improvements with no Funding by Type of Infrastructure
Five-year Period July 2013 through June 2018

Category and Type of Infrastructure	Total Needed [in millions]	Improvements with No Funding [in millions]	Percent of Total Needed
Transportation and Utilities	\$ 25,821.8	\$ 13,620.7	52.7%
Transportation	25,599.2	13,489.2	52.7%
Other Utilities	222.5	131.5	59.1%
Health, Safety, and Welfare	\$ 4,170.4	\$ 1,670.3	40.1%
Water and Wastewater	3,415.2	1,301.4	38.1%
Law Enforcement	422.4	210.9	49.9%
Fire Protection	163.2	74.7	45.8%
Storm Water	109.0	51.7	47.4%
Solid Waste	34.8	17.5	50.3%
Public Health Facilities	21.2	9.5	44.7%
Housing	4.6	4.6	100.0%
Education	\$ 1,753.1	\$ 1,274.1	72.7%
New Public Schools*	1,730.5	1,259.2	72.8%
School System-wide	12.4	8.3	67.4%
Post-secondary Education	10.3	6.5	62.9%
Recreation and Culture	\$ 1,237.4	\$ 480.7	38.9%
Recreation	828.6	314.3	37.9%
Community Development	272.7	110.2	40.4%
Libraries, Museums, and Historic Sites	136.0	56.2	41.3%
Economic Development	\$ 508.4	\$ 176.8	34.8%
Business District Development	275.5	23.2	8.4%
Industrial Sites and Parks	232.9	153.6	66.0%
General Government	\$ 402.3	\$ 215.8	53.6%
Public Buildings	286.3	141.6	49.5%
Other Facilities	116.0	74.1	63.9%
Grand Total	\$ 33,893.4	\$ 17,438.3	51.5%

* Includes replacements of existing schools.

Public school construction is one type of infrastructure that is greatly affected by mandates—schools are needed to meet Tennessee’s constitutional requirement to provide a system of free public schools to all students.¹³ That mandate requires the state to fund schools, which it does through the Basic Education Program (BEP) funding formula. The formula includes money for capital outlay—an amount that tops \$700 million this year, of which the state pays around half.

¹³ Article 11, Section 12 of the Tennessee State Constitution, recognizing the inherent value of education and encouraging its support, directs the General Assembly to provide for the maintenance, support, and eligibility standards of a system of free public schools.

Although the state makes a substantial contribution to funding public schools, they are owned by local governments.

Although most fire departments are primarily funded by taxes, many rely on donations, subscription fees, or other funding sources, and only 9.7% of fire protection needs are fully funded. Most of the funds available for fire protection needs are concentrated in large cities like Nashville, Chattanooga, and Memphis, but the fire stations that have recently been completed are in smaller cities like Bristol, Jamestown, Clarksville, and Mount Juliet.

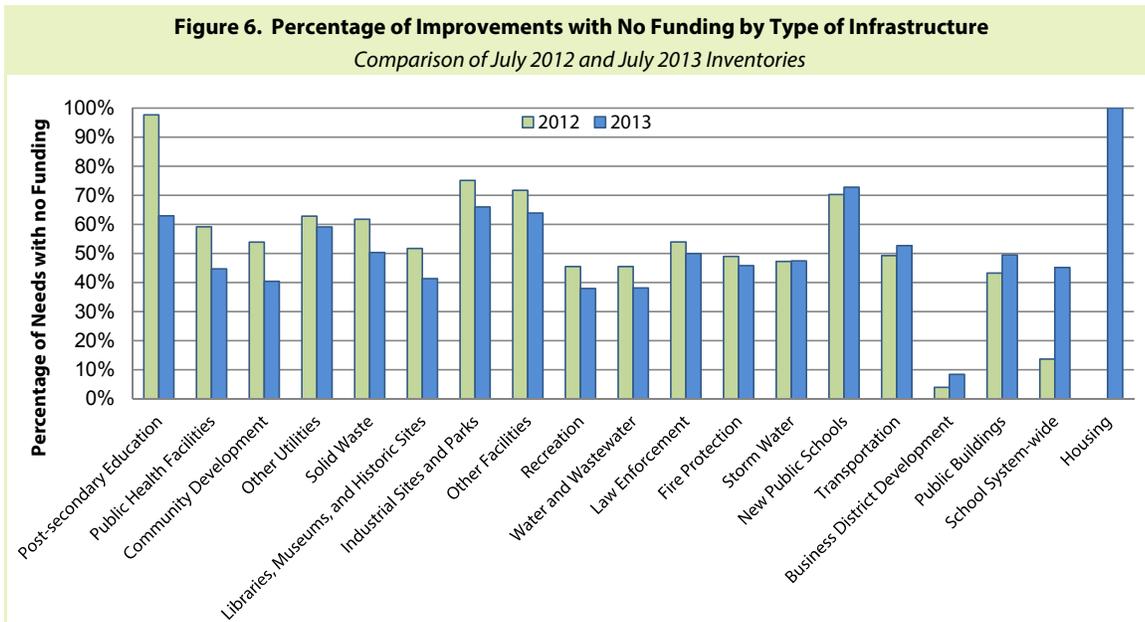
The only type of infrastructure with a percentage of fully funded projects less than fire protection is housing. All of the fully funded housing needs from the 2012 inventory were completed, and all of the needs in the 2013 inventory are unfunded. The current inventory includes nine housing projects at \$4.6 million; six are in Claiborne County.

Overall, nearly \$22 billion of infrastructure needs are not yet funded.

Overall, unfunded needs comprise about half (51.4%) of total estimated costs. At least half of the needs in nine types of infrastructure have no funding—housing (100%), new public schools (72.8%), school system-wide (67.4%), industrial sites and parks (66.0%), other facilities (63.9%), post-secondary education (62.9%), other utilities (59.1%), transportation (52.7%), and solid waste (50.3%). See table 14.

The overall percentage of infrastructure needs that are not fully funded increased from 48.8% to 51.5% since 2012, mainly because of a \$3 billion increase in unfunded transportation needs. Four other types had large increases in the percentage of needs that are unfunded: housing, school system-wide, public buildings, and business district development. As discussed above, all of the housing needs from 2012 (\$14.0 million) were fully funded and completed by 2013, leaving \$4.6 million needed for housing rehabilitation that has no funding. The percentage of school system-wide needs that are unfunded increased from 13.6% to 67.4% because only half of newly identified needs are funded. Most of the additional funding needed is \$4 million needed for a new schools technology center in Washington County and \$2 million needed for energy improvements for DeKalb County Schools. All but \$903,000 of the \$8.5 million in public building needs identified for the first time in 2013 needed additional funding, increasing the percentage of unfunded needs from 43.2% to 49.5%. After the completion of a fully funded \$624 million convention center in Nashville, the percentage of business district development needs with no funding increased from 3.9% to 8.4%. This is despite the decrease of unfunded needs from \$38.5 million to \$23.2 million, mostly \$12 million of unfunded aesthetic improvements to public property around the Rivergate Mall in Davidson

County postponed to 2020. Transportation, new public schools, and storm water are the other types of needs whose percentage of unfunded needs increased. See figure 6.



State and local funding declined, but federal funding increased from last year.

While state and local revenue sources for fully funded infrastructure decreased since last year, an increase in federal sources offset most of the decline, though the state remains the principal funding source for fully funded projects (see table 15). All of the decrease in local funding sources is attributable to the completion of the \$624 million convention center in Nashville. The decrease was only somewhat offset by a \$56 million increase in funding by cities. Funding from federal sources, increased by \$745 million; almost half of that increase came from the \$324 million increase for the repair and expansion of the Chickamauga dam lock, attributable to barge fuel tax revenue set aside through the Inland Waterways Trust Fund.

Table 15. Funding Sources for Fully Funded Public Infrastructure Improvement Needs
Comparison of July 2012 and July 2013 Inventories

Funding Source	July 2012 Inventory		July 2013 Inventory		Difference
	Amount [in millions]	Percent	Amount [in millions]	Percent	Amount [in millions]
Local	\$ 3,388.5	30.1%	\$ 2,901.4	26.4%	\$ (487.0)
State	4,909.2	43.6%	4,369.0	39.8%	(540.2)
Federal	2,722.5	24.2%	3,467.3	31.6%	744.8
Other	245.1	2.2%	245.8	2.2%	0.7
Total	\$ 11,265.3	100.0%	\$ 10,983.6	100.0%	\$ (281.7)

Funding sources for fully funded needs vary by type of infrastructure.

The government that owns infrastructure typically funds the bulk of its cost. For example, local officials reported that 85% of the funding for county-owned projects will come from county sources. The same is true of improvements reported in the 2008 inventory that have since been completed—counties paid 86% of the cost of meeting their infrastructure needs. Cities provided 68% of the funds necessary for improvements they needed in 2008 and have completed since then, and they expect to provide 61% of the funds for current and future improvements. Special districts paid 81% of the cost of meeting their 2008 infrastructure needs and expect to fund 63% of their current and future costs.

Table 16. Funding Source by Category and Type of Infrastructure for Fully Funded Improvement Needs [in millions]
 Five-year Period July 2013 through June 2018

Category and Type of Infrastructure	State		Federal		Other		City		County		Special District		Total	
	Amount	Percent	Amount	Percent	Amount	Percent	Amount	Percent	Amount	Percent	Amount	Percent	Amount	Percent
Transportation and Utilities	\$ 4,285.1	52.6%	\$ 3,174.0	38.9%	\$ 11.5	0.1%	\$ 308.6	3.8%	\$ 347.9	4.3%	\$ 8.9	0.1%	\$ 8,149.0	0.1%
Transportation	4,285.1	53.1%	3,172.1	39.3%	11.4	0.1%	254.1	3.1%	347.2	4.3%	0.0	0.0%	8,070.0	0.0%
Other Utilities	0.0	0.0%	1.9	2.9%	0.1	0.2%	54.4	82.4%	0.7	1.1%	8.9	13.5%	66.0	0.8%
Health, Safety, and Welfare	\$ 59.7	3.6%	\$ 182.2	10.9%	\$ 15.1	0.9%	\$ 451.1	26.9%	\$ 790.3	47.1%	\$ 179.9	10.7%	\$ 1,678.3	10.7%
Water and Wastewater	59.1	4.0%	154.8	10.5%	15.1	1.0%	375.8	25.4%	693.3	46.9%	179.6	12.2%	1,477.7	12.2%
Law Enforcement	0.0	0.0%	9.8	8.3%	0.1	0.0%	24.5	20.8%	83.6	70.8%	0.0	0.0%	118.0	0.9%
Storm water	0.3	0.7%	4.5	10.2%	0.0	0.0%	38.3	87.3%	0.8	1.8%	0.0	0.0%	43.9	0.4%
Fire Protection	0.0	0.0%	2.8	17.4%	0.0	0.0%	9.2	57.9%	3.9	24.6%	0.0	0.0%	15.8	0.1%
Public Health Facilities	0.0	0.0%	10.3	87.6%	0.0	0.0%	0.5	4.3%	1.0	8.1%	0.0	0.0%	11.8	0.1%
Solid Waste	0.3	2.2%	0.0	0.0%	0.0	0.0%	2.8	25.2%	7.8	69.9%	0.3	2.7%	11.1	0.1%
Housing	0.0	0.0%	0.0	0.0%	0.0	0.0%	0.0	0.0%	0.0	0.0%	0.0	0.0%	0.0	0.0%
Education	\$ 0.0	0.0%	\$ 0.4	0.1%	\$ 0.0	0.0%	\$ 63.7	22.4%	\$ 220.8	77.5%	\$ 0.0	0.0%	\$ 284.9	0.2%
New Public Schools*	0.0	0.0%	0.0	0.0%	0.0	0.0%	63.0	22.5%	217.3	77.5%	0.0	0.0%	280.2	0.2%
School System-wide	0.0	0.0%	0.0	0.0%	0.0	0.0%	0.3	7.8%	3.6	92.2%	0.0	0.0%	3.8	0.0%
Post-secondary Education	0.0	0.0%	0.4	48.2%	0.0	0.0%	0.4	51.8%	0.0	0.0%	0.0	0.0%	0.8	0.0%
Recreation and Culture	\$ 15.6	3.4%	\$ 94.1	20.3%	\$ 25.9	5.6%	\$ 192.7	41.5%	\$ 135.8	29.3%	\$ 0.0	0.0%	\$ 464.1	3.4%
Recreation	6.2	2.3%	53.0	19.5%	12.7	4.6%	106.1	38.9%	94.5	34.7%	0.0	0.0%	272.5	2.3%
Community Development	7.1	5.0%	32.4	22.9%	3.0	2.1%	74.4	52.5%	24.9	17.6%	0.0	0.0%	141.8	1.2%
Libraries, Museums, and Historic Sites	2.3	4.5%	8.7	17.5%	10.2	20.5%	12.2	24.6%	16.4	32.9%	0.0	0.0%	49.8	0.4%
Economic Development	\$ 8.2	2.8%	\$ 12.5	4.3%	\$ 3.3	1.1%	\$ 71.6	24.7%	\$ 193.7	66.8%	\$ 0.8	0.3%	\$ 290.1	2.3%
Business District Development	3.1	1.3%	1.8	0.8%	0.0	0.0%	65.8	27.7%	166.6	70.2%	0.0	0.0%	237.3	2.0%
Industrial Sites and Parks	5.1	9.7%	10.7	20.3%	3.3	6.2%	5.8	11.0%	27.1	51.4%	0.8	1.4%	52.8	0.4%
General Government	\$ 0.5	0.4%	\$ 4.2	3.2%	\$ 0.3	0.3%	\$ 81.7	62.8%	\$ 43.5	33.4%	\$ 0.0	0.0%	\$ 130.2	1.0%
Public Buildings	0.5	0.6%	2.2	2.5%	0.3	0.4%	44.9	49.7%	42.4	46.9%	0.0	0.0%	90.4	0.7%
Other Facilities	0.0	0.0%	1.9	4.9%	0.0	0.0%	36.8	92.4%	1.1	2.8%	0.0	0.0%	39.9	0.3%
Grand Total	\$ 4,369.0	39.8%	\$ 3,467.3	31.6%	\$ 56.2	0.5%	\$ 1,169.5	10.6%	\$ 1,731.9	15.8%	\$ 189.6	1.7%	\$ 10,983.6	10.0%

* Includes replacements of existing schools.

As shown in table 16, local government sources—mainly counties and cities—provide the majority of funding for all needs except transportation, which is primarily funded by the state, and public health facilities, which are primarily funded by the federal government. Overall, counties provide funds for 15.8% of fully funded needs. School system-wide needs depend on counties for funding (92.2%) more than any other type. Counties are also the principal source of funding for five other types of infrastructure needs: new public school construction (77.5%), law enforcement (70.8%), business district development (70.2%), solid waste (69.9%), and industrial sites and parks (51.4%).

Although cities fund just 10.7% of all fully funded infrastructure needs, they contribute heavily to six types of infrastructure: other facilities (92.4%), storm water (87.3%), other utilities (82.4%), fire protection (57.9%), community development (52.5%), and post-secondary education (51.8%). And more than 25% of fully funded public buildings, recreation, business district development, water and wastewater, and solid waste infrastructure are funded by cities. For public buildings and recreation, this constitutes the largest portion of the funding.

Special districts, another local government source, do not provide the majority of funding for any type of infrastructure. Although almost all (94.7%) special district funding is for water and wastewater needs, that funding makes up only 12.2% of the total needed for that type. Most of the rest of special district funding is for other utilities (4.7%), making up 13.5% of that type.

Unfunded needs are much less likely to be completed.

Needs that were not fully funded on July 1, 2008, were much less likely to be completed than needs that were, in part because unfunded needs usually remain unfunded. Less than one-quarter (24.0%) of the needs that were not fully funded on July 1, 2008, were completed by July 1, 2013, much less than the 41.7% completion rate of those that were fully funded. The difference is even greater for some project types. Fully funded industrial sites and parks, new public schools, fire protection, and law enforcement needs were completed at rates of 88.5%, 89.2%, 92.6%, and 95.7%, respectively; only 15.6%, 31.3%, 15.7%, and 18.7% that were not fully funded at that time have been completed since.

Nearly three-fourths of the unfunded needs from the 2008 inventory remained unfunded in the 2013 inventory. For inventory year 2013, \$17.4 billion in needs were unfunded compared with \$13.9 billion in 2008. Of the \$13.9 billion needed in 2008, \$3.7 billion was identified by July 2013. Most of the needs that were funded were funded sooner rather than later. Two-thirds (\$2.4 billion) of that amount came in the 2009 or 2010 inventories; only one-third (\$1.3 billion) came in the following three inventories (2011-2013).

Because some money must be spent for needs in the planning and design stage, only conceptual needs can be completely unfunded,¹⁴ and needs that spend many years in the conceptual stage become less and less likely ever to be funded and completed. Needs that have been in the conceptual stage for three years are 50% funded, and those that remain conceptual for six years or more are only 3% funded. Four-fifths (79.0%) of that 3% is transportation, and one such need is the \$256 million widening of I-26 in Washington County, which has been conceptual since 2007 and remains unfunded. Besides transportation, storm water, public health facilities, fire protection, community development, solid waste, and post-secondary education have the most needs in the conceptual stage for six years or more when compared with their share of overall need.

¹⁴ Some planning and design expenses are "in house" and cannot be attributed to a single project.

Building Tennessee's Tomorrow: Anticipating the State's Infrastructure Needs

July 2013 through June 2018

PUBLIC SCHOOL INFRASTRUCTURE NEEDS

Estimated cost of public school building infrastructure improvements increases for second year.

Tennessee's 135 public school systems¹⁵ need infrastructure improvements estimated to cost a total of \$3.8 billion to be in some stage of development during the five-year period July 2013 through June 2018, a \$290 million increase since last year (see table 17). This is the second year in a row the total has increased, though it has been relatively flat overall since 2007 (see figure 7). Improvements in public school facilities include both new space—entirely new schools and additions to existing schools—and upgrades at existing schools.

The cost of adding new space (new schools and additions) has fluctuated since 2007 but is now the largest it has been since 2008. The need for both new schools and additions increased for the second year. The need for new schools increased by \$187 million (15.6%), and now totals \$1.4 billion, while the estimated cost for additions to existing schools increased just \$11 million (3.3%) and now totals \$333 million.

The cost of improving existing space (renovations, replacement schools, technology, and mandates) has steadily increased since

Table 17. Change in Needed School Infrastructure Improvements by Type of Need

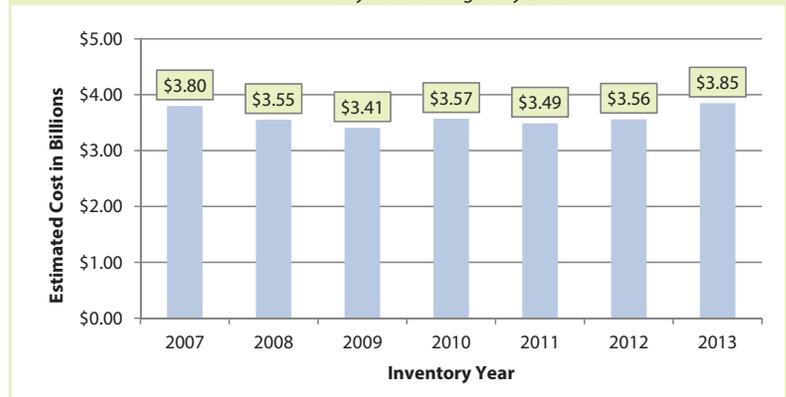
July 2012 Inventory Compared with July 2013 Inventory

Type of Infrastructure	July 2012 Inventory	July 2013 Inventory	Difference	Percent Change
New School Space	\$1,521,085,932	\$1,718,465,453	\$ 197,379,521	13.0%
New Schools	1,198,598,360	1,385,329,383	186,731,023	15.6%
Additions	322,487,572	333,136,070	10,648,498	3.3%
Improvements to Existing Schools	\$2,032,782,160	\$2,118,710,913	\$ 85,928,753	4.2%
Renovations	1,474,211,591	1,524,931,669	50,720,078	3.4%
Replacement Schools	319,080,400	345,122,400	26,042,000	8.2%
Technology*	117,183,961	129,455,931	12,271,970	10.5%
Mandates	122,306,208	119,200,913	(3,105,295)	-2.5%
System-wide Needs	\$ 5,971,000	\$ 12,356,000	\$ 6,385,000	106.9%
Statewide Total	\$3,559,839,092	\$3,849,532,366	\$ 289,693,274	8.1%

*Technology includes projects with estimated costs below the \$50,000 threshold used for other types of infrastructure in the inventory. Individual technology projects under the threshold totaled \$4,012,845 in 2012 and \$4,529,749 in 2013.

Figure 7. Total Needed School Infrastructure Improvements

July 2007 through July 2013



¹⁵ Memphis and Shelby County school systems consolidated in 2013, reducing the number of school systems to 135 for this inventory. Next year's inventory report will include public school infrastructure improvements for the six new school systems that were created in Shelby County in 2014.

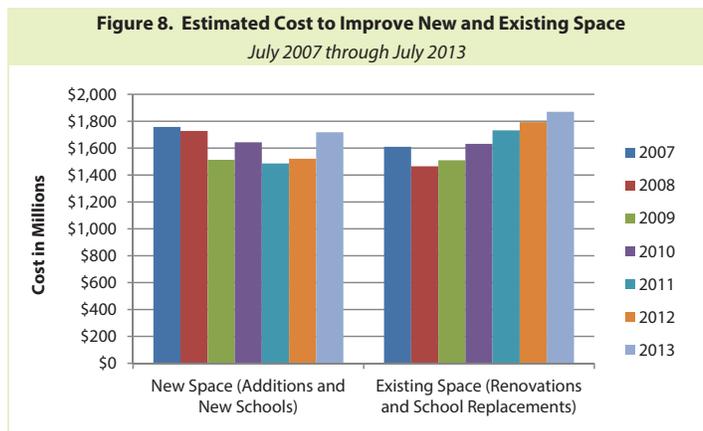


Table 18. 2007 to 2013 Student Enrollment Growth for School Systems Reporting a Need for a New School
Five-year Period July 2013 through June 2018

School System	July 2013 Estimated Cost for New Schools	2007 to 2013	
		Change in Number of Students	Compound Growth Rate
Davidson County	\$ 131,334,000	5,960	1.3%
Williamson County	220,500,000	5,611	3.2%
Rutherford County	72,000,000	5,585	2.5%
Montgomery County	147,722,362	2,422	1.4%
Sumner County	42,239,021	2,087	1.3%
Wilson County	165,199,000	1,955	2.2%
Bedford County	12,000,000	639	1.4%
Robertson County	37,575,000	632	1.0%
Cleveland	12,000,000	569	2.0%
Murfreesboro	20,950,000	490	1.2%
Johnson	14,000,000	435	1.0%
Putnam County	26,000,000	381	0.6%
Alcoa	30,000,000	202	2.0%
DeKalb County	42,000,000	150	0.9%
Marshall County	31,000,000	103	0.3%
Sevier County	37,810,000	102	0.1%
Pickett County	15,000,000	58	1.4%
Cumberland County	14,000,000	11	0.0%
Macon County	10,000,000	(12)	-0.1%
Van Buren County	15,000,000	(49)	-1.1%
Humphreys County	7,000,000	(82)	-0.5%
Dickson County	21,000,000	(89)	-0.2%
Fentress County	12,000,000	(90)	-0.7%
Washington County	70,000,000	(196)	-0.4%
Tipton County	42,500,000	(272)	-0.4%
Cheatham County	30,000,000	(452)	-1.1%
Roane County	50,000,000	(570)	-1.3%
Shelby County	56,500,000	(12,078)	-1.3%
Total	\$1,385,329,383	13,501	

2008 and is now the most ever reported (see figure 8). The estimated cost for renovations, which has steadily increased since 2009 as both more needs are reported and old ones remain unfinished,¹⁶ increased \$51 million (3.4%) since last year, and the cost to replace existing schools, which has fluctuated since 2007, increased by \$26 million (8.2%) since last year.

Technology infrastructure improvements increased \$12 million (10.5%), ending a six-year downward trend, and the cost for improvements needed for such things as bus garages and central office buildings, which serve entire school systems, also reversed a downward trend and more than doubled last year's amount, increasing by \$6 million (106.9%). The only decrease since last year was for the estimated cost of meeting state and federal mandates, which continues a two-year downward trend with a decrease of \$3 million (2.5%). Some of the needed improvements in existing facilities are related to the condition of schools,¹⁷ but others are not. Local officials reported average needs of almost \$6 million per school for the 79 schools in fair or poor condition. Schools in good or better condition (1,131) can also have significant needs for improvement, with parts of the school requiring renovation or replacement—an average of a little over \$1 million per school.

The need for new schools and additions is often related to enrollment, consolidation, or school condition.

Each year since 2007, local officials have reported needing more public schools. Statewide, local officials reported a \$1.4 billion need for 67 new schools, averaging \$21 million per school. Most of the net \$187 million increase was for 11 new schools totaling \$245 million in six school systems. Student enrollment growth could be a factor for four of the six—Davidson, Robertson, Sumner,

¹⁶ Of the 961 schools reporting a renovation need in last year's inventory, 530 (55%) did not add needs for renovations nor did they complete any from the previous inventory (\$656 million). Another 272, including 81 schools that had no renovation needs last year, added \$256 million in renovation needs this year.

¹⁷ Overall school conditions used in this inventory are self-rated by the school official based on definitions located in Appendix C.

and Wilson counties each reported enrollment growth since 2007. The other two systems' enrollments are down, and they (Roane and Washington counties) are choosing to build schools that will eventually replace or consolidate aging schools.

Officials in 28 school systems reported a need for at least one new school in 2013. Since 2007, only 16 of those systems experienced enrollment growth greater than 100 students; seven systems had relatively flat growth; and five systems, most notably Shelby County, decreased enrollment by more than 100 students. See table 18. Just because a school system has decreasing enrollment doesn't mean it doesn't need new schools. The five systems with large enrollment decreases (Shelby, Roane, Cheatham, Tipton, and Washington counties) need these new schools for various reasons—consolidation, school age and condition, or localized growth at a particular school.¹⁸ For example, Collierville High School, located in Shelby County, has been experiencing enrollment growth since 2009 because of school system boundary reconfiguration.¹⁹

While some systems need to build new schools, others need additions to existing school buildings such as additional classrooms, a gym, or a cafeteria. Since the last inventory, there was a slight increase in additions (\$11 million) spread across 204 schools in 69 school systems and now totals \$333 million, an average of \$2 million per school. Additions newly reported in this inventory total \$67 million and were mostly offset by \$57 million in cancelled or completed additions. The largest net increase for additions (\$13 million) was in Davidson County, most of which was for classrooms at six schools. The second largest net increase (\$8 million) for additions was in Sevier County and included two gyms, vocational and science classrooms, a library, and administrative space at Gatlinburg-Pittman High School and at Sevier County High School. Nineteen other school systems reported an increased need for additions at 29 schools. Loudon County added \$6 million to the inventory for four classrooms at Highland Park Elementary, auditorium and cafeteria at Loudon High School, more administrative space at Loudon Elementary, and a portable classroom and cafeteria at Philadelphia Elementary. The remaining 18 systems are both large and small with a combined increase for additions of less than \$35 million spread over 25 schools.

¹⁸ Washington County is considering the consolidation of four schools into two because of school ages and conditions.

¹⁹ Collierville will have its own school system in the 2014 inventory.

School Facility Rating Scale

Excellent

Can be maintained in a “like new” condition and continually meet all building code and functional requirements with only minimal routine maintenance.

Good

Does not meet the definition of “excellent,” but the structural integrity is sound and the facility can meet building code and functional requirements with only routine or preventive maintenance or minor repairs that do not hinder its use.

Fair

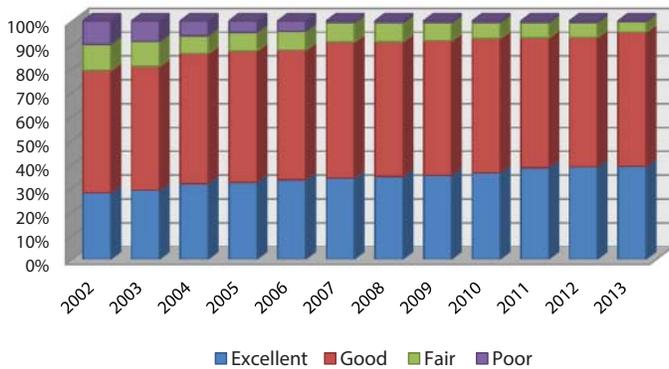
Structural integrity is sound, but the maintenance or repairs required to ensure that it meets building code or functional requirements hinder—but do not disrupt—the facility's use.

Poor

Repairs required to keep the structural integrity sound or to ensure that it meets building code or functional requirements are costly and disrupt—or in the case of an individual component may prevent—the facility's use.

Ratings used in the TACIR's Public Infrastructure Needs Inventory.

Figure 9. Overall Condition of Public School Buildings
July 2002 through July 2012



The need to improve existing school buildings continues to increase and now stands at \$2.1 billion.

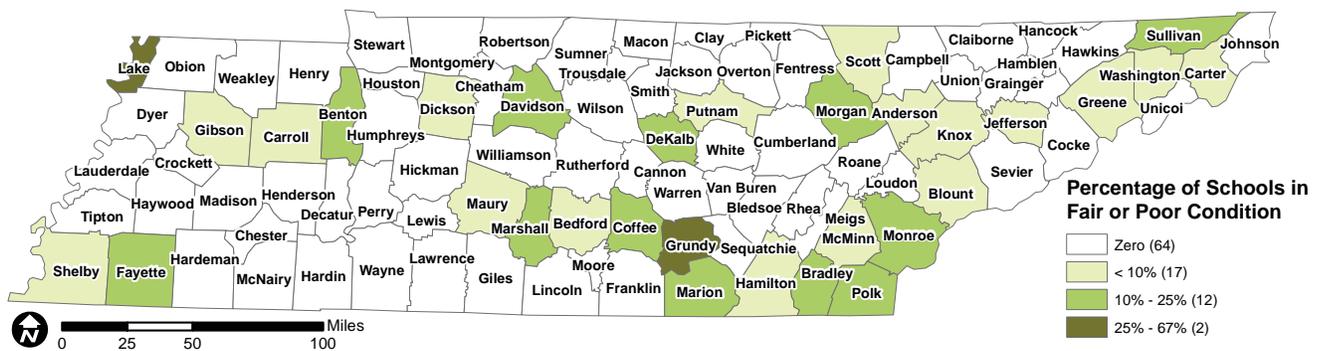
The estimated cost of improving existing schools increased by almost \$86 million, from \$2.0 billion to \$2.1 billion (see table 17), since the last inventory and includes renovations, replacements, technology upgrades, and changes prompted by state or federal facility mandates. The increased cost for existing school infrastructure is driven mainly by the condition of schools and is mostly for renovations and to a lesser extent for replacements. The cost of meet-

ing mandates has fluctuated over the years but remains a relatively small percentage of total improvement costs and decreased slightly, from \$122 million to \$119 million, since the last inventory.

The number of schools in good or excellent condition continues to increase.

For each inventory, school officials rate the overall condition of their school buildings as well as the condition of each building component. As figure 9 shows, most of Tennessee's public school buildings have been in good or better condition for several years; a very small percentage have been in fair or poor condition.²⁰ The number of school buildings in excellent condition decreased from 683 in the last inventory to 679, and the number rated good increased from 953 to 985. The number in fair or poor condition (82) decreased by 40 since last year's inventory and is now only 5% of the total. Most of these schools have been in fair or poor condition for some time, and as indicated in map 11, they are located all across the state.

Map 11. Percentage of School Buildings in Fair or Poor Condition by County
As of July 1, 2013



Schools in fair or poor condition tend to be older buildings.

Not surprisingly, older schools are more likely to be in worse condition. Half of the public school buildings in use today were built in the 1950s, 1960s, and 1970s when the Baby Boom generation was making its way through school. And more than 60% of the schools in fair or poor condition

²⁰ These condition ratings are defined in appendix C.

today were built during that period. Only 11% of schools in use today were built before 1950, but 24% of school buildings rated fair or poor date to that period. By contrast, 40% of all schools were built in 1980 or later, and only 13% of those are in fair or poor condition. See figure 10.

The relatively few schools in fair or poor condition are located throughout the state.

Although most systems (103) reported no schools in fair or poor condition, 16 reported just one, and another 16 reported two or more. Nearly 30% of the 82 schools in fair or poor condition are in Davidson County (24) where these fair or poor schools are mainly older, having been built on average 52 years ago. Another seven are in Hamilton County, which has the second largest number of schools in fair or poor condition and where these buildings are on average 62 years old. The other 14 systems with more than one school in fair or poor condition have two to four schools rated fair or poor. Shelby County stands out because the average age of schools there is 43 years, but the county reported only three out of its 235 schools as fair and none as poor.

While more schools in fair or poor condition are in urban and suburban areas, the districts with the highest percentage of their schools rated fair or poor are in rural areas. Only two school systems reported half or more of their schools in fair or poor condition—the Lake and Grundy county systems. Lake County has only three schools, two of which are in less than good condition and were built before 1963. Grundy County reported half of their schools—four elementary schools built between 1927 and 1979—in fair or poor condition. See table 19.

Figure 10. Fair or Poor Schools vs. All Schools by Year Built

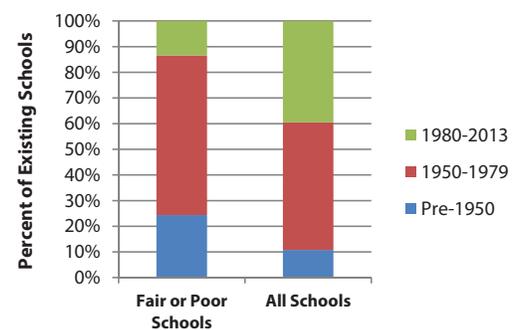
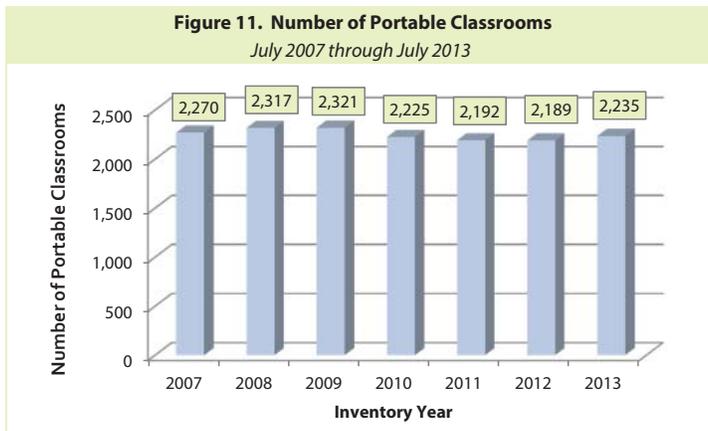


Table 19. Renovation and Replacement Costs for the 16 Systems with Two or More Schools in Fair or Poor Condition

Five-year Period July 2013 through June 2018

School System	All Schools		Schools in Fair or Poor Condition			
	Number of Schools	Estimated Cost to Renovate and Replace	Number of Schools	Percent Fair/Poor	Estimated Cost to Renovate and Replace	Percent of Renovation Needs
Davidson County	137	\$ 629,680,300	24	17.5%	\$ 179,585,000	28.5%
Hamilton County	74	20,028,000	7	9.5%	13,428,000	67.0%
Grundy County	8	6,765,000	4	50.0%	6,015,000	88.9%
Bradley County	18	13,115,000	3	16.7%	5,360,000	40.9%
Knox County	89	9,225,037	3	3.4%	3,755,000	40.7%
Sullivan County	22	35,930,000	3	13.6%	660,000	1.8%
Bristol	8	40,607,000	3	37.5%	28,857,000	71.1%
Shelby County	235	247,459,194	3	1.3%	4,130,000	1.7%
Oak Ridge	8	15,073,133	2	25.0%	14,000,000	92.9%
Coffee County	9	33,550,000	2	22.2%	33,550,000	100.0%
Fayette County	11	14,160,000	2	18.2%	13,130,000	92.7%
Lake County	3	10,660,000	2	66.7%	10,660,000	100.0%
Marion County	10	8,050,000	2	20.0%	7,870,000	97.8%
Monroe County	13	32,685,660	2	15.4%	15,919,920	48.7%
Morgan County	8	5,995,882	2	25.0%	2,393,000	39.9%
Putnam County	20	31,380,000	2	10.0%	30,250,000	96.4%
Subtotal	673	\$ 1,154,364,206	66	10%	\$ 369,562,920	32.0%
All Others	1,073	715,689,863	16	1%	187,994,780	26.3%
State Total	1,746	\$ 1,870,054,069	82	5%	\$ 557,557,700	29.8%

The number of portables at Tennessee's public schools remains steady as enrollment growth has flattened out.



School systems use portables to deal with unanticipated space shortages, such as those caused by natural disasters, to substitute for space that's in bad shape, and to provide temporary classrooms for large influxes of new students while they plan more permanent solutions. Statewide, school systems reported having 2,235 portable classrooms, down by 86 since the peak of 2,321 in the 2009 inventory but up by 46 since last year (see figure 11). Dyer County is a good example of a system that used portables as a temporary solution while building new schools. Both Fifth Consolidated School and Newbern Grammar used portable classrooms until 2012

because the existing school buildings were old and in bad shape. Those schools were replaced by larger facilities and officials ceased using portable classrooms when they opened in 2012.

This year's total of 2,235 portable classrooms (see figure 11) is 3.1% of all classrooms in the state. As illustrated in map 12, which sums system-level information on portables to the county level, most counties (62 of 95) rely on portables for 2.5% or less of their total classrooms. Thirty-one counties rely on portables for between 2.5% and 7.5% of their classrooms, and only two, Clay and Unicoi, rely on them for more than 7.5%. These two counties are shaded dark blue in map 12. Clay County's use of portables peaked in 2010 at 12.6% and is now 10.8%. Unicoi County's percentage of portable classrooms is currently at 10.5%, up from 1.7% last year, when Love Chapel Elementary had to be moved into portable classrooms because a large sink hole opened up next to the school building. Information about each school system's use of portables can be found in appendix I-7.

Map 12. Portable Classrooms as a Percentage of all Classrooms by County
As of July 1, 2013



Twenty-two school systems had more portable classrooms in 2013 than in 2007. While most school systems added only a few, four added more than ten—Unicoi (19), Knox (86), Montgomery (16), and Cumberland (12). Unicoi is a special case because of the emergency noted above. While the number of portables used in the county increased by a net of 19 from 2007 through 2013, it would

actually have decreased if not for the 21 portables in use at Love Chapel Elementary School. Knox County, with growing student enrollment, increased the number of portables in the district from 158 in 2007 to 244 through 2013, adding 49 in 2013 alone. Slightly more than half of Knox's schools (48 out of 89 schools) have at least one portable on site compared with 43% in 2007. Montgomery County, where the student population has grown substantially (6th overall in student growth since 2007) increased its use of portables from 58 in 2007 to 74 in 2013. Their portables are located at 14 of their 38 schools, nine of which increased portable usage, while two reduced their usage. Cumberland County, with nearly no student growth since 2007, increased their portable usage from eight portable classrooms at two schools in 2007 to 25 at six schools in 2013 while renovating these schools.

Overall, 30 school systems reported fewer portable classrooms in 2013 than in 2007. Shelby County Schools, which consolidated with Memphis Schools in 2013, eliminated the most portables (47) since 2007 but still has 444.²¹ Hardin County eliminated 25 of the 28 portable classrooms it had in 2007 by consolidating five existing schools that used portables into two schools that do not. Davidson County has eliminated 21 portables since 2007 but still has 330. They no longer need as many because of new schools and additions. Similarly, Dyer County has only five portable classrooms, down from 25 in 2007. They replaced two schools in 2012. The other 26 systems with decreases used from one to 14 fewer portable classrooms, and four systems that used portables in 2007 now use zero portables.

The number of systems not using portables increased from 47 in 2007 to 48 in 2013, but four that had portables in 2007 no longer do, and three that did not have portables now have them. Of the 44 systems that had no portables in 2007 and still don't have any, 29 decreased in enrollment by an average of 157 students, and 14 increased by an average of 163 students. Athens, Manchester, Hawkins and Moore counties had portable classrooms in 2007 but no longer do, possibly because of slow-growing or shrinking enrollment. Athens' enrollment decreased by 180 students and Hawkins County's decreased by 383, but Moore County's decreased by only 3, and Manchester's enrollment increased by 22 students. The three systems that now use portables are Lauderdale (4), Rhea (3), and Wayne (2) counties. Rhea is the only one experiencing student growth and may need portables for that reason. The other two reported renovation and addition needs and use portables while projects are under construction.

Some school systems (39) still have the same number of portable classrooms they had in 2007. Of those, the system with the most portables is Carter County, which has a total of 41 at ten of their 17 schools. Of those ten schools, four averaging 54 years in age reported a need for \$14 million in renovations and upgrades. A sixth needs to be replaced at an estimated

²¹ Separately, Shelby County reduced their portables from 147 to 118 and Memphis reduced theirs from 344 to 326 since 2007.

cost of \$17 million, and a seventh awaits completion of an addition. McMinn County has the second largest number of portables, using 26 of them at the same six schools in each of the past seven inventories. The average age of those schools is 50 years, and they reported needing an average of \$471 thousand for renovations and upgrades (ranging from \$200 thousand to \$1.2 million per school). Enrollment in both systems has been trending downward: by 417 since 2007 and 11 since 2012 for Carter and 71 since 2007 and 76 since 2012 for McMinn.

Like Carter and McMinn counties, Fayette, Marshall, and Tipton counties—each with 19 portables since 2007—have declining enrollment. Fayette County officials reported five out of six schools with portables need to be renovated or replaced. In addition, they rated two of these five schools in fair overall condition. Marshall County officials reported that five schools have been using the same number of portable classrooms since 2007 and that they need to renovate only two. Tipton County's 19 portables are used at just three of its 14 schools, and each has maintained the same number since 2007. The three schools all reported renovation needs in 2007, but only one has since completed those needs.

Estimated cost to improve school buildings continues to increase, mainly for renovations.

Systems seeking to improve school buildings have two choices: renovate or replace them. In some cases entire schools need to be renovated or replaced; in other cases, only parts of schools need to be upgraded. The estimated cost to renovate or replace existing schools increased by \$77 million, from \$1.8 billion to \$1.9 billion (see table 17), since the last inventory. Most of the increase (\$51 million) is for renovations, following the pattern of the last four years. The estimated cost of replacing schools has been relatively flat at about \$325 million for the last seven years, down slightly from a high of \$374 million in 2007.

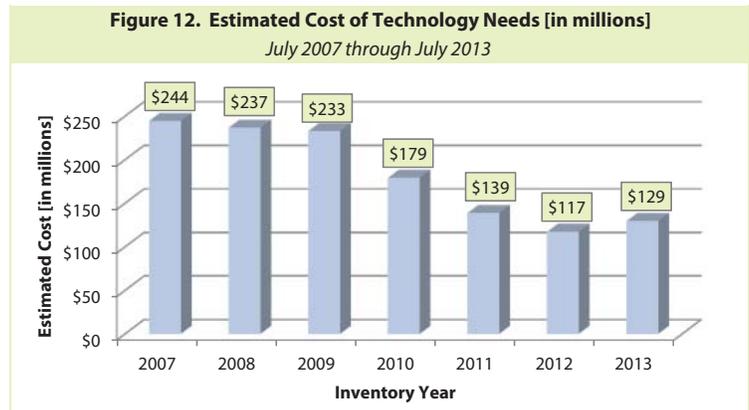
Table 20. Renovations and School Replacement Costs by School Condition
Five-year Period July 2013 through June 2018

School Condition	Number of Schools	Estimated Cost to Renovate	Estimated Cost to Replace	Totals	Average Cost Per School
Good or Excellent	797	\$ 1,101,216,969	\$ 207,246,400	\$ 1,308,463,369	\$ 1,641,736
Fair or Poor	78	419,681,700	137,876,000	557,557,700	7,148,176
Total	875	\$ 1,520,898,669	\$ 345,122,400	\$ 1,866,021,069	\$ 2,132,596

The average amount per school needed to renovate or replace those in fair or poor condition is over four times larger than the average cost to upgrade the 797 schools in good or excellent condition, \$7 million versus \$2 million (see table 20). Since the last inventory, costs for school renovations increased slightly and still total roughly \$1.5 billion. This is the fourth consecutive year the estimated cost of renovations has increased. While on a per school basis school buildings in fair or poor condition cost more to fix than those in better condition, renovations at the 797 schools in good or excellent condition make up a larger part of the inventory—\$1.1 billion, an average of almost one million dollars per school. Renovations needed to bring the 78 schools in fair or poor condition to good or excellent condition will require an estimated \$420 million, an average of \$5 million per school.

Sometimes renovating a school is not enough to meet the needs of students, and schools have to be replaced. Local officials reported that they need \$345 million to replace a total of 16 schools, an increase of 8.2% (\$26 million) from last year's report. The average cost to replace these schools is \$22 million. Of the 16 schools, eight are in good condition, five are in fair condition, two are

in poor condition, and the one that had been in excellent condition needs to be replaced because of a dangerous sinkhole that threatens the building. These eight schools in good condition are, on average, at least 50 years old. School systems that cannot immediately afford to replace schools may renovate them in the meantime. Watertown High School, built in 1962, is a great example. They need \$37 million to replace the school and \$6 million to upgrade the existing building, both so it can remain in use until the new high school is built and so it can be used as a middle school thereafter.



The cost to improve technology infrastructure at existing public schools increased by \$12 million since the last inventory and now totals \$129 million (see figure 12). The cost of these upgrades, which include wiring, new computer labs, and security systems, increased for the first time since the 2007 inventory. Knox County's technology needs—estimated at almost \$10 million—were the main reason for the increase and include needs for personalized learning environments where each student above third grade will either have a tablet or laptop by 2019. Technology infrastructure for new schools is included in their overall cost rather than in these figures.

Larger systems reported greater total costs, while smaller systems often have greater costs per student.

School systems with more students have more school buildings and therefore greater infrastructure improvement needs than smaller systems. The ten systems with the greatest infrastructure needs account for 64% of the total cost (see table 21). Seven of them are among the ten with the most students. The other three systems are Maury County (12th in enrollment), Robertson County (14th in enrollment), and Washington County (20th in enrollment). Some systems, such as Davidson, Shelby, and Maury counties, reported a greater need to improve existing schools, while others,

Table 21. Ten Systems with the Highest Total Improvement Costs
Five-year Period July 2013 through June 2018

School System	2013 Students		Estimated Cost				Total Per Student
	Number	Rank	Improvements to Existing Schools	New Space	System-wide	Total	
Davidson County	77,964	2	\$ 633,884,500	\$ 190,723,000	\$ 0	\$ 824,607,500	\$ 10,577
Shelby County	148,295	1	351,616,229	65,100,000	0	416,716,229	\$ 2,810
Williamson County	32,912	6	48,336,000	236,500,000	0	284,836,000	\$ 8,655
Montgomery County	29,871	7	66,655,000	171,722,362	0	238,377,362	\$ 7,980
Wilson County	16,002	9	57,801,430	165,199,000	0	223,000,430	\$ 13,936
Sevier County	14,303	10	24,848,868	83,892,000	0	108,740,868	\$ 7,603
Rutherford County	39,969	5	21,533,488	79,000,000	180,000	100,713,488	\$ 2,520
Maury County	11,554	12	94,199,800	2,873,500	0	97,073,300	\$ 8,401
Washington County	8,927	20	19,659,250	70,175,500	4,300,000	94,134,750	\$ 10,545
Robertson County	11,182	14	41,167,000	37,575,000	5,050,000	83,792,000	\$ 7,493
Top Ten Total	390,979		\$ 1,359,701,565	\$ 1,102,760,362	\$ 9,530,000	\$ 2,471,991,927	\$ 6,323
All Others	565,994		759,009,348	615,705,091	2,826,000	1,377,540,439	\$ 2,434
State Total	956,973		\$ 2,118,710,913	\$ 1,718,465,453	\$ 12,356,000	\$ 3,849,532,366	\$ 4,023

such as Williamson, Montgomery, Wilson, Sevier, Rutherford, and Washington counties, reported a greater need to build new schools. The lone exception in the top ten, Robertson County, reports a more balanced approach to addressing school infrastructure needs.

Small school systems can be overlooked when considering overall costs. Compared with larger school systems, those with fewer students may report lower total infrastructure improvement costs but larger costs per student. Wilson, Davidson, and Washington counties are the only large systems that are among those with the highest total cost per student. See table 22.

Table 22. Ten Systems with the Highest Improvement Costs Per Student
Five-year Period July 2013 through June 2018

School System	2013 Students		Estimated Cost				Total Per Student
	Number	Rank	Improvements to Existing Schools	New Space	System-wide	Total	
Van Buren County	729	125	\$ 564,247	\$ 16,000,000	\$ 0	\$ 16,564,247	\$ 22,727
Pickett County	733	124	187,500	15,000,000	0	15,187,500	20,732
Alcoa	1,797	98	400,000	30,000,000	0	30,400,000	16,920
DeKalb County	2,886	77	2,382,000	43,820,000	0	46,202,000	16,009
Alamo	595	129	510,000	8,250,000	0	8,760,000	14,719
Wilson County	16,002	9	57,801,430	165,199,000	0	223,000,430	13,936
Lake County	870	122	10,810,000	90,000	0	10,900,000	12,523
Bristol	3,895	57	43,319,500	2,000,000	0	45,319,500	11,636
Davidson County	77,964	2	633,884,500	190,723,000	0	824,607,500	10,577
Washington County	8,927	20	19,659,250	70,175,500	4,300,000	94,134,750	10,545
Top Ten Total	114,398		\$ 769,518,427	\$ 541,257,500	\$ 4,300,000	\$ 1,315,075,927	\$ 11,496
All Others	842,576		1,349,192,486	1,177,207,953	8,056,000	2,534,456,439	\$ 3,008
State Total	956,973		\$ 2,118,710,913	\$ 1,718,465,453	\$ 12,356,000	\$ 3,849,532,366	\$ 4,023

The five school systems reporting the highest costs per student mainly need new schools. Van Buren and Pickett counties are first and second, at \$22,727 and \$20,732 per student compared with the statewide average of \$4,023. Van Buren and Pickett both need new high schools at a cost of \$15 million each. Both have been in the inventory since 2005 and remain conceptual. Van Buren also needs \$1 million for new classrooms and a gym at Spencer Elementary. Alcoa needs \$30 million (\$16,920 per student) to build a new high school, DeKalb County needs a new \$42 million high school (\$16,009 per student), and Alamo needs \$8 million (\$14,719 per student) to enlarge Alamo Elementary. All four systems reported needing smaller amounts to renovate space at existing schools.

Lake County and Bristol reported large costs per student, but these costs were mainly to upgrade rather than add space. The amount per student Lake County needs to upgrade its schools (\$12,523) is more than three times the state average; this includes \$7 million to renovate the cafeteria, the library, administrative offices, the gym, and over half of the classrooms at Margaret Newton Elementary School, as well as \$4 million to renovate Lake County High School. Lake County also needs \$90,000 for a new music classroom at Laura Kendall Elementary School.

Like Lake County, Bristol needs almost three times the state per pupil average to upgrade its schools (\$11,636), including \$23 million to renovate Vance Middle School, \$10 million to completely renovate Anderson Elementary, and \$5 million to renovate 22 classrooms, the gym, the library, and the cafeteria at Haynesfield Elementary. Bristol also needs \$2 million for eight new classrooms at Avoca Elementary school and \$3 million to renovate Tennessee High School, as well as \$2 million to renovate Holston View Elementary.