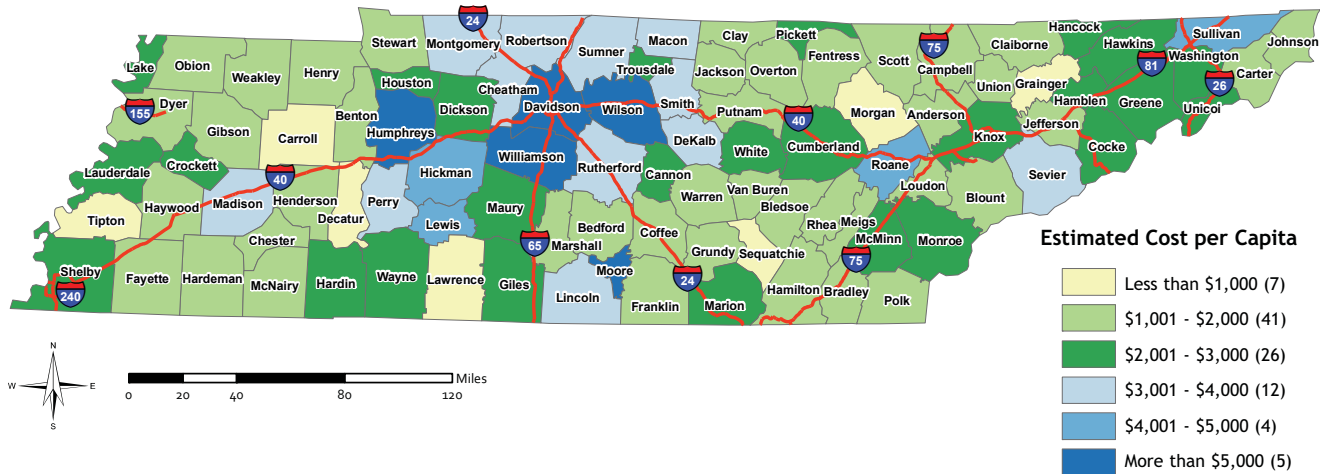








**Map 2. Estimated Cost of Total Local Infrastructure Needs Per Capita  
Five-year Period July 2018 through June 2023**



**Public infrastructure needed for transportation, utilities, and education accounts for 89% of the increase in this year's inventory.**

Of the \$4.8 billion increase in infrastructure needs reported in this year's inventory, almost \$4.3 billion (88.7%) is attributable to increases in the estimated cost for transportation and utilities (76.8%), followed by education (11.9%). Infrastructure needs for transportation and utilities, which increased for the fourth year in a row, increased this year by \$3.7 billion mainly because of new road projects and the remainder of projects developed as part of the Improve Act.

The \$575 million increase in needed improvements for education infrastructure also contributed to the overall increase in the total estimated cost of the inventory. Most of this increase is from the \$395 million increase in needed improvements at institutions of higher education across the state, while the need for renovations to existing public K-12 schools increased \$242 million. The increase in the estimated cost in needed school renovations is mainly from Metro Nashville Public Schools (MNPS), which added over \$220 million. MNPS' increase resulted from the condition of their school buildings, rising construction costs in the Nashville-Metro Area, and a policy change MNPS adopted in the spring of 2016 that included new design guidelines, education specifications, and better estimating practices for school renovations and construction.

Increases in needs reported for other categories in the inventory—Health, Safety and Welfare (\$208 million), Recreation and Culture (\$206 million), and General Government (\$195 million)—are relatively small in comparison. Reported needs decreased in one category: Economic Development (\$65 million). See table 1.

**The total estimated cost for needed transportation infrastructure continues to be the largest in the inventory.**

Transportation and Utilities is and always has been the largest category, based on total estimated cost, of infrastructure in the inventory and totals \$29.6 billion this year—54.1% of the inventory. Transportation alone, at \$29.0 billion, accounts for nearly all of this category and is larger than all other categories in the inventory—Education at \$14.2 billion (26.0%), Health, Safety, and Welfare at \$7.6 billion (13.9%), Recreation and Culture at \$2.1 billion (3.9%), General Government at \$894 million (1.6%), and Economic Development at \$300 million (0.5%).

**Remaining Improve Act projects increased the estimated costs for needed transportation infrastructure.**

The net increase in the total estimated cost of transportation needs is \$3.6 billion (14.0%) in this year’s inventory, which includes \$3.7 billion in new projects (Improve Act accounts for \$2.3 billion) and \$2.0 billion in project cost increases (Improve Act accounts for \$1.0 billion). But these increases are partially offset by \$928 million in completed projects (Improve Act accounts for \$9 million), \$397 million in canceled projects (Improve Act accounts for \$22 million), and \$131 million for postponed projects no longer deemed necessary within this report’s five-year window. Moreover, state and local officials reported \$298 million in reduced costs for projects already in the inventory (Improve Act accounts for \$197 million). Projects totaling \$421 million were removed from the inventory because improved methods of project tracking and quality control identified duplicates and invalid information.

In 2017, Governor Bill Haslam signed the Improve Act,<sup>11</sup> which is in the middle of a three-year period of raising taxes on gasoline and diesel fuel by 6 cents and 10 cents to help pay for Tennessee’s highly publicized \$10.6 billion transportation backlog. Of the 966 projects totaling \$10.6 billion in the Improve Act, 925 projects totaling \$10.8 billion are now in TACIR’s inventory this year compared to 189 projects totaling \$5.6 billion in last year’s report. See table 2.

Table 2. Estimated Cost of Improve Act Projects by Type of Need  
Five-year Period July 2018 through June 2023

Project Type	Number of Matched Projects	Total Estimated Cost	Percent of Total Estimated Cost
Road	242	\$ 9,528,014,332	90.3%
Bridge	665	1,213,824,148	11.5%
ITS*	14	63,780,000	0.6%
Other	4	14,350,000	0.1%
<b>Matched Projects</b>	<b>925</b>	<b>\$ 10,819,968,480</b>	<b>102.5%</b>
<b>Total</b>	<b>966</b>	<b>\$ 10,554,499,096</b>	<b>100.0%</b>

\* Intelligent Transportation System

Note: The total estimated cost for matched projects exceeds the original estimated total for the Improve Act projects because some projects have progressed since the adoption of the Act in 2017.

<sup>11</sup> Public Chapter 181, Acts of 2017.

***The need for other utilities increased, while the need for broadband infrastructure decreased slightly.***

Needs reported for other utilities increased by \$133 million (27.1%) in this year's inventory and now total \$622 million. In just the third year of reporting, local officials report the need for \$15 million in broadband infrastructure, a decrease of about \$793,000 from last year. Only the need for broadband development by government entities is allowed in the inventory and very little is expected to be reflected in the inventory because the nature of broadband deployment in rural areas relies less on municipal utility districts, which are sub-entities of municipal governments.

**Increases in needed infrastructure improvements on college campuses, K-12 school renovations, and the rising cost of construction materials caused the increase in education needs.**

School systems must comply with the Tennessee Constitution's guarantee of the right of access to public education,<sup>12</sup> as well as with the Tennessee Education Improvement Act of 1992,<sup>13</sup> which places limits on the number of students in classrooms. School systems with growing enrollment face the challenge of providing enough space for students, while other school systems need to renovate or replace their schools because of age, condition, or issues concerning school restructuring or consolidation all while costs increase. Similar issues face Tennessee's public institutions of higher education—dormitories need to be replaced because of their age, and classrooms and labs need to be added or upgraded to meet today's market demands.

In this year's inventory, most of the overall increase in the Education category is attributable to the \$395 million (8.0%) increase in needed improvements on the campuses of Tennessee's public institutions of higher education, which totals \$5.3 billion. The increase was caused by the addition of \$1.6 billion in new projects and \$166 million in cost increases to existing needs. This was partially offset by \$749 million in completions, \$218 million in canceled projects, \$29 million in cost decreases, and \$291 million in postponed projects.

The need to renovate public K-12 schools also drove the overall increase with a \$242 million increase, up 4.9% from last year and now totals \$5.2 billion. This increase in needed improvements to existing space results almost entirely from the \$250 million increase in school renovations—which itself is primarily attributable to a \$220 million increase reported for MNPS discussed above—and the \$5 million increase in needs

<sup>12</sup> Article XI, Section 12, Constitution of the State of Tennessee.

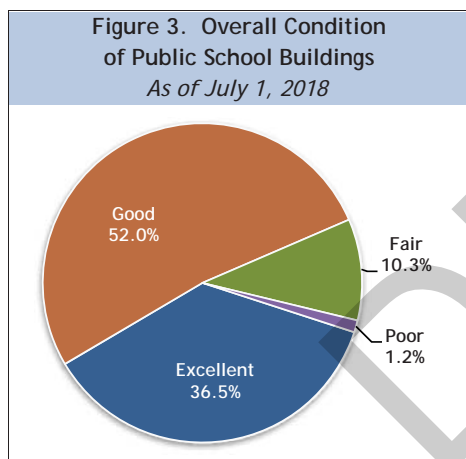
<sup>13</sup> State of Tennessee Comptroller of the Treasury. 2004. "The Education Improvement Act: A Progress Report." <http://comptroller.tn.gov/repository/RE/educimproveact.pdf>.

related to federal mandates. This is only partially offset by the \$12 million decrease in needs reported for technology infrastructure, which has been steadily decreasing over the years as technology changes from hardwired infrastructure to wireless tablets that are not considered public infrastructure. See table 3.

Table 3. Estimated Cost of School Infrastructure Improvements by Type of Need  
July 2017 Inventory vs. July 2018 Inventory

Type of Infrastructure	July 2017 Inventory	July 2018 Inventory	Difference	Percent Change
<b>New School Space</b>	<b>\$ 3,648,486,898</b>	<b>\$ 3,640,642,176</b>	<b>\$ (7,844,722)</b>	<b>-0.2%</b>
New Schools Additions	3,012,145,000	2,975,682,606	(36,462,394)	-1.2%
	636,341,898	664,959,570	28,617,672	4.5%
<b>Improvements to Existing Schools</b>	<b>\$ 4,909,106,948</b>	<b>\$ 5,151,395,228</b>	<b>\$ 242,288,280</b>	<b>4.9%</b>
Renovations	4,692,875,354	4,942,752,629	249,877,275	5.3%
Technology*	124,448,836	112,079,485	(12,369,351)	-9.9%
Mandates	91,782,758	96,563,114	4,780,356	5.2%
<b>System-wide Needs</b>	<b>\$ 49,937,717</b>	<b>\$ 37,433,717</b>	<b>\$ (12,504,000)</b>	<b>-25.0%</b>
<b>Statewide Total</b>	<b>\$ 8,607,531,563</b>	<b>\$ 8,829,471,121</b>	<b>\$ 221,939,558</b>	<b>2.6%</b>

\*Technology includes school 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 \$3,919,305 in 2018 and \$4,718,144 in 2017.



Because of the condition of many Tennessee schools, improvements to existing space are necessary. Although just under 11.5% of public schools (198) in Tennessee were rated by their local school officials in fair or poor condition, 182 of those schools need improvements to existing space and account for 48.2% of total estimated existing space needs. See figure 3, table 4, and appendix E.

Table 4. Renovation Costs by School Condition  
Five-year Period July 2018 through June 2023

School Condition	Number of Schools	Estimated Cost to Renovate	Average Cost Per School
Good or Excellent	862	\$ 2,556,176,459	\$ 2,965,402
Fair or Poor	182	2,376,867,028	13,059,709
<b>Total</b>	<b>1,044</b>	<b>\$ 4,933,043,487</b>	<b>\$ 4,725,137</b>

Note: Does not include facility upgrades captured in the school system-wide category used for the total renovation cost in Table 3.

The need for new school space decreased in this year’s inventory—\$8 million (0.2%) to a new total of \$3.6 billion. Local officials reported a \$29 million (4.5%) increase in the need for additions to existing schools, and

a \$36 million (1.2%) decrease in reported needs for new schools, mainly because nine schools worth \$334 million were completed in seven school systems. See table 3.

Another reason for the increase in the cost of needed education infrastructure could be the rising cost of construction materials and labor. The US Bureau of Labor Statistics' new school construction price index rose almost 29 points (21.8%) from July 2010 to July 2018,<sup>14</sup> and RSMMeans data by Gordian, an industry-leading construction cost estimating company, shows growth in square foot costs for schools increasing similarly.<sup>15</sup> In 2010, the average cost of a completed new school was \$18 million in Tennessee. Nine schools, ranging from a new \$100 million high school in Collierville to a \$15 million replacement school for Seymour Intermediate in Sevier County, were completed since last year's report for a total cost of \$334 million, averaging \$37 million per school. Over the next five years, local officials report needing 79 more schools at an average of \$38 million.

**The need for public health facilities, upgrades to water and wastewater infrastructure, and new infrastructure to protect us from fires accounts for most of the increase in the Health, Safety, and Welfare category.**

Public health facilities range from local emergency medical service or EMS stations to substance abuse centers to state-operated mental health institutions and are vital for our health and well-being. This year's inventory includes a large increase in the estimated cost of public health infrastructure—\$148 million (31.6%) to a new total of \$614 million. Most of this increase was caused by the addition of \$162 million in new projects, mainly \$131 million to replace the Moccasin Bend Mental Health Institute, and \$36 million in cost increases to existing projects. This was partially offset by \$14 million in completions and \$32 million in data corrections.

This year's inventory also includes an increase in the estimated cost for water and wastewater infrastructure—\$103 million (2.2%) to a new total of \$4.7 billion. Most of this increase is attributable to the addition of \$587 million in new projects, one of which is for an \$82 million water treatment plant in Clarksville along with over \$80 million in improvements to existing treatment plants in Knoxville. This increase was partially offset by \$226 million in completed projects, \$158 million in cost decreases to existing projects, \$93 million in cancelations, and \$96 million in postponed projects. The need for fire protection also increased—up \$58 million (28.8%) and now totals \$260 million, mainly because Nashville needs \$28 million for four new fire stations and needs \$10 million to renovate the downtown fire station. The rest of the needs reported are much smaller and scattered across the state.

<sup>14</sup> US Bureau of Labor Statistics. 2018. <https://data.bls.gov/timeseries/PCU236222236222>.

<sup>15</sup> RSMMeans data by Gordian. 2017. "Square Foot Costs With RSMMeans Data."



## The need for projects that support recreation and cultural assets continue to increase.

Among needs reported for recreation and cultural assets, the estimated cost for recreational infrastructure increased for a second year by \$121 million (9.2%) to a total of \$1.4 billion. The estimated cost for libraries, museums, and historic sites increased for a fifth year by \$29 million (6.3%) and now totals \$479 million. The need for infrastructure improvements that support community development flipped from last year's decrease and now shows an increase of \$57 million (37.0%), totaling \$210 million in this year's inventory.

The cost for infrastructure needed for other facilities—structures that are publicly owned but not typically open to the public, like maintenance facilities and salt bins—increased \$28 million (24.0%) to a total of \$145 million. After seeing a decrease in last year's report, the estimated cost of needed infrastructure for public buildings increased \$167 million (28.8%) and now totals \$749 million.

The estimated cost for needed infrastructure at industrial sites and parks decreased \$55 million (21.9%) to a new total of \$196 million, while the estimated cost of infrastructure supporting business districts also decreased \$10 million (9.1%) and now totals \$104 million.

## In this year's inventory, funding is lacking for more than two-thirds of the estimated cost of the needed improvements.

Information about funding for public infrastructure needs reported by officials indicates that 67.0% of the funds required to meet those needs was not available at the time the inventory was conducted, relatively unchanged from last year's 68.7%. Excluding improvements needed at existing schools and those drawn from capital budget requests submitted by state agencies, neither of which includes funding information, only \$13.6 billion in funding is available for the remaining \$41.1 billion in needs (see table 5). Typically, as a project evolves, funding sources are identified and pursued. Regarding the infrastructure inventory process, planning and design cannot take place without acquiring some funds. Of course, a lack of funding will prevent some projects from ever being completed. In

Table 5. Public Infrastructure Needs Summary of Funding Availability\*  
Five-year Period July 2018 through June 2023

	Funding Available [in billions]	Funding Needed [in billions]	Total Needed [in billions]
Fully Funded Improvements	\$ 12.7	\$ 0.0	\$ 12.7
Partially Funded Improvements	0.9	3.9	4.8
Unfunded Improvements	0.0	23.6	23.6
<b>Total</b>	<b>\$ 13.6</b>	<b>\$ 27.5</b>	<b>\$ 41.1</b>

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

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

fact, most of the infrastructure needs reported in the July 2013 inventory, and not already fully funded, were still needed five years later. As in prior years, funding for needs reported in the inventory comes from federal, state, and local sources.

The government that owns infrastructure typically funds the bulk of its cost, and a variety of revenue sources are used. For example, the state collects taxes and appropriates funds to its own projects but also provides grants to local governments through programs in various state agencies. Even so, cities and counties fund most of their infrastructure improvements with their own property and sales tax revenues, while utility districts fund their improvements primarily with dedicated revenue sources in the form of user fees.

Because most of the state's infrastructure needs are not included in this analysis, local government sources—mainly counties and cities—provide the majority of funding for all fully funded needs presented here. Exceptions include transportation, which is funded primarily by the federal and state governments. Industrial sites and parks also receive a substantial portion of funding from the federal and state governments. Broadband, recreation, storm water, housing, and libraries, museums, and historic sites also rely on the federal government for significant portions of their reported funding (see table 6). It may appear that the state does not help pay for school buildings even though it does—although counties report funding 86.2% of new public school construction, the state provides an equivalent amount through its Basic Education Program (BEP) funding formula. The formula includes funds for capital outlay, an amount that topped \$776 million for fiscal year 2018-19.<sup>16</sup> The state's share accounts for half of that amount, but those funds are not earmarked for that specific purpose; therefore, school systems have the flexibility to use those funds to meet various school needs,<sup>17</sup> and some systems use them for operating costs rather than capital outlay.

<sup>16</sup> Tennessee Comptroller of the Treasury, Office of Research and Education Accountability. 2017. BEP Calculator 2018-19.

<sup>17</sup> Tennessee Comptroller of the Treasury. 2017. "Basic Education Program: A Funding Formula, Not A Spending Plan." <http://www.comptroller.tn.gov/orea/Files/FUNDING%20BEP.pdf>.

Table 6. Funding Source by Category and Type of Infrastructure for Fully Funded Improvement Needs [in millions]  
Five-year Period July 2018 through June 2023

Category and Project Type	State		Federal		Other		City		County		Special District		Total
	Amount	Percent	Amount	Percent	Amount	Percent	Amount	Percent	Amount	Percent	Amount	Percent	Amount
Transportation and Utilities	\$ 1,140.7	15.2%	\$ 4,378.0	58.2%	\$ 5.8	0.1%	\$ 915.2	12.2%	\$ 1,053.2	14.0%	\$ 23.7	0.3%	\$ 7,516.7
Transportation	1,139.5	16.1%	4,373.0	61.9%	0.8	0.0%	499.2	7.1%	1,052.5	14.9%	0.0	0.0%	7,065.0
Other Utilities	1.3	0.3%	5.0	1.1%	5.0	1.1%	416.0	92.1%	0.7	0.2%	23.7	5.2%	451.7
Broadband	0.0	0.0%	4.0	49.4%	0.0	0.0%	4.1	50.6%	0.0	0.0%	0.0	0.0%	8.1
Health, Safety and Welfare	\$ 29.4	0.8%	\$ 109.0	2.9%	\$ 18.4	0.5%	\$ 1,903.3	50.9%	\$ 1,360.8	36.4%	\$ 316.3	8.5%	\$ 3,737.2
Water and Wastewater	8.0	0.2%	91.1	2.8%	18.4	0.6%	1,732.3	53.4%	1,115.2	34.4%	277.6	8.6%	3,242.6
Law Enforcement	0.0	0.0%	0.0	0.0%	0.0	0.0%	64.1	23.6%	206.1	75.9%	1.5	0.6%	271.7
Housing	19.7	14.1%	14.4	10.3%	0.0	0.0%	60.5	43.3%	8.6	6.2%	36.4	26.1%	139.6
Fire Protection	0.0	0.0%	0.1	0.3%	0.0	0.0%	36.4	86.4%	5.6	13.3%	0.0	0.0%	42.1
Public Health Facilities	1.2	6.0%	0.8	4.1%	0.0	0.0%	0.0	0.0%	17.9	89.9%	0.0	0.0%	19.9
Storm Water	0.0	0.0%	1.8	16.6%	0.0	0.0%	7.9	73.1%	1.1	10.3%	0.0	0.0%	10.7
Solid Waste	0.5	4.9%	0.8	7.4%	0.0	0.0%	2.2	20.9%	6.3	59.9%	0.7	6.9%	10.5
Education	\$ 0.8	0.1%	\$ 0.0	0.0%	\$ 1.0	0.1%	\$ 88.7	13.3%	\$ 578.1	86.5%	\$ 0.0	0.0%	\$ 668.6
New Public Schools	0.0	0.0%	0.0	0.0%	1.0	0.2%	88.7	13.6%	561.9	86.2%	0.0	0.0%	651.6
School System-wide	0.8	4.6%	0.0	0.0%	0.0	0.0%	0.0	0.0%	16.2	95.4%	0.0	0.0%	17.0
Recreation and Culture	\$ 16.3	3.5%	\$ 142.4	30.1%	\$ 17.3	3.7%	\$ 169.3	35.8%	\$ 127.0	26.9%	\$ 0.0	0.0%	\$ 472.4
Recreation	14.9	4.3%	132.4	38.6%	6.1	1.8%	115.4	33.7%	73.7	21.5%	0.0	0.0%	342.5
Libraries, Museums, and Historic Sites	0.6	1.0%	6.6	11.1%	11.2	19.0%	15.4	26.1%	25.1	42.7%	0.0	0.0%	58.8
Community Development	0.8	1.2%	3.5	4.9%	0.0	0.0%	38.6	54.3%	28.1	39.6%	0.0	0.0%	71.0
Economic Development	\$ 27.5	16.7%	\$ 18.3	11.1%	\$ 6.7	4.1%	\$ 71.5	43.5%	\$ 38.5	23.4%	\$ 1.9	1.1%	\$ 164.4
Industrial Sites and Parks	27.4	27.3%	16.2	16.1%	4.0	4.0%	12.4	12.4%	38.5	38.4%	1.9	1.8%	100.4
Business District Development	0.1	0.1%	2.2	3.4%	2.6	4.1%	59.1	92.4%	0.0	0.0%	0.0	0.0%	64.0
General Government	\$ 0.9	1.0%	\$ 0.4	0.4%	\$ 0.0	0.0%	\$ 69.3	78.6%	\$ 17.6	20.0%	\$ 0.0	0.0%	\$ 88.1
Public Buildings	0.9	2.1%	0.4	0.8%	0.0	0.0%	24.9	58.2%	16.6	38.9%	0.0	0.0%	42.8
Other Facilities	0.0	0.0%	0.0	0.0%	0.0	0.0%	44.4	97.9%	1.0	2.1%	0.0	0.0%	45.4
<b>Grand Total</b>	<b>\$ 1,215.7</b>	<b>9.6%</b>	<b>\$ 4,648.0</b>	<b>36.8%</b>	<b>\$ 49.2</b>	<b>0.4%</b>	<b>\$ 3,217.4</b>	<b>25.4%</b>	<b>\$ 3,175.3</b>	<b>25.1%</b>	<b>\$ 341.9</b>	<b>2.7%</b>	<b>\$ 12,647.3</b>

DRAFT