

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

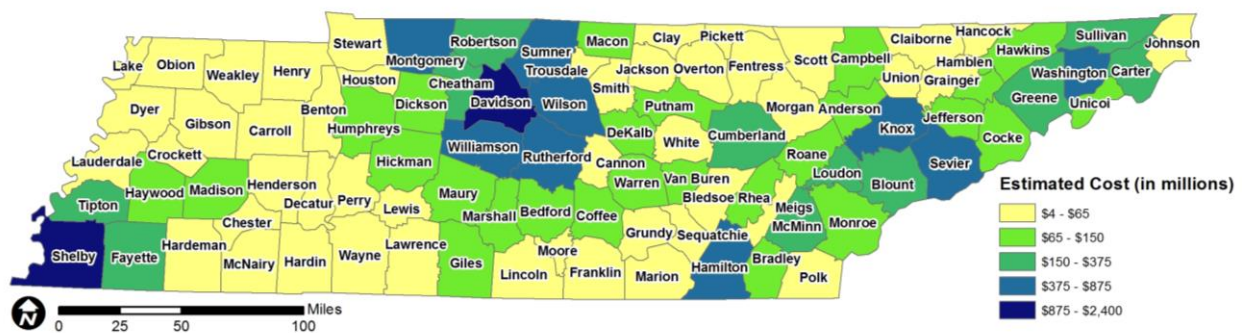
July 2011 through June 2016

INFRASTRUCTURE NEEDS BY COUNTY

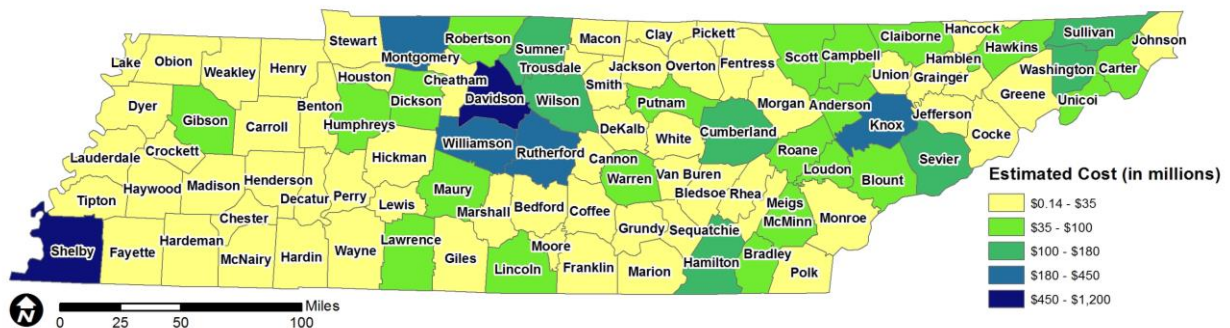
Infrastructure needs and the ability to meet them vary widely across Tennessee's counties.

Public Infrastructure needs and the ability to meet them vary across Tennessee. It is no surprise that counties with the largest populations, growth rates, and tax bases need the most infrastructure and are able to build the most. Davidson County, with the greatest density and second largest population, gets the most done, while Shelby, with the largest population, needs the most. Knox needs more than most and relatively speaking gets even more done, as do Rutherford, and Williamson Counties. Other populous counties—Hamilton, Montgomery, Sevier, Sullivan, Sumner, Washington, and Wilson Counties—need more than most and build more than the rest of the state. Madison, having a relatively large population, is the exception; it has less than average needs and gets less done. See maps 1 and 2.

Map 1. Estimated Cost of Total Infrastructure Needs
Five-year Period July 2011 through June 2016



Map 2. Estimated Cost of Completed Infrastructure Needs¹
Infrastructure Needs Reported July 1, 2007 and Completed by July 1, 2011



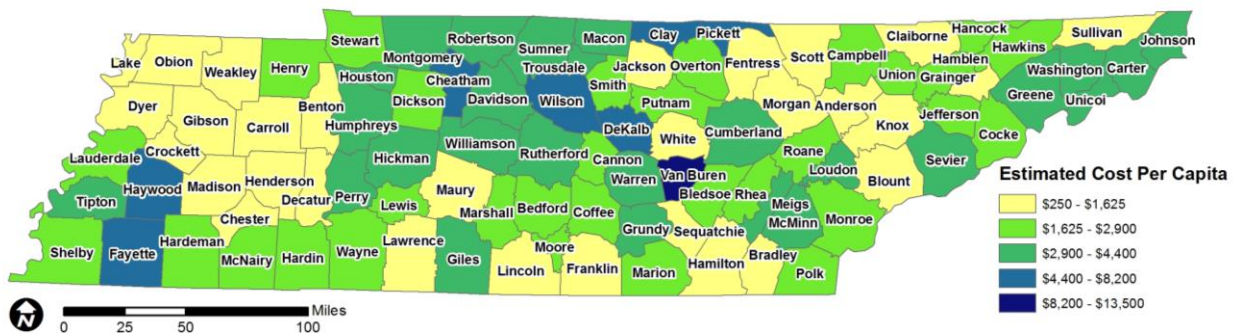
¹This year for the first time, to better compare with reported needs, staff looked at completed projects for four years, fiscal years 2007-2008 through 2010-2011, rather than just one year. Staff looked at what infrastructure projects were reported as needed for the July 2007 inventory and then looked to see how many were completed by July 1, 2011.

It is not clear from looking at these maps what is driving infrastructure needs in Madison County and the other 82 counties. For example, Cheatham, Tipton, and Fayette need an average amount of infrastructure but complete much less than average. In contrast, Lawrence needs little but falls near the middle for meeting its needs.

As with last year's report, staff looked at public infrastructure needs relative to population to gain insight into differences in needed and completed infrastructure among counties. The results might seem surprising. Even though the most populous counties need and complete more infrastructure, an examination of infrastructure improvements per capita indicates that population alone does not explain the differences. For instance, the most populous counties do not need the most infrastructure per capita and do not necessarily get the most done. In fact, the smallest counties may have the greatest need per capita and, as those needs are met, the largest infrastructure costs per capita.

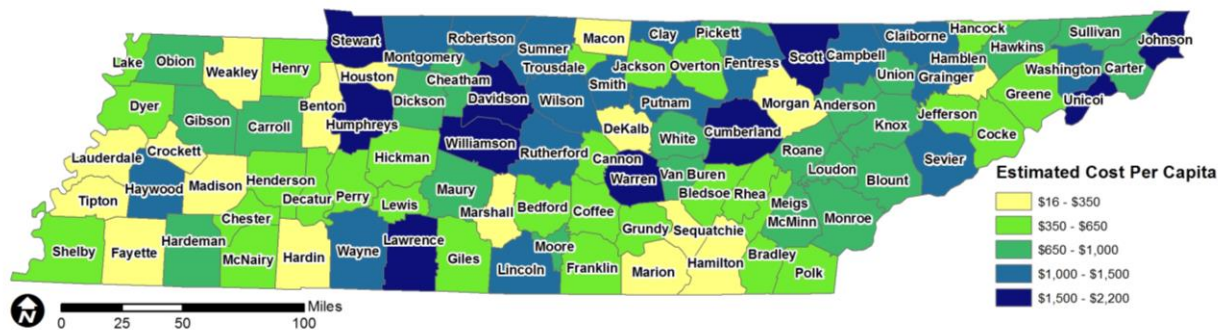
The state's smallest county, Pickett with a population of only 5,100, has needed a new high school for seven years now, estimated to cost a relatively modest \$15 million. The state's second smallest county, Van Buren with a population of only 5,628, needs \$25 million to install and replace water lines. Projects 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. Van Buren is first and Pickett is second. See map 3.

Map 3. Estimated Cost of Total Infrastructure Needs Per Capita
Five-year Period July 2011 through June 2016



The same effect can be found when looking at completed infrastructure per capita. Unicoi ranks 71st in population but has the second highest completed infrastructure per capita, largely because of the completion of the new, \$15.6 million Unicoi Middle School in 2010. If not for this project, Unicoi would have ranked 20th for completed infrastructure per capita. See map 4.

Map 4. Estimated Cost of Completed Infrastructure Needs Per Capita
Infrastructure Needs Reported July 1, 2007 and Completed by July 1, 2011



Financial resource factors are strongly tied to infrastructure needs and the ability to meet them.

So what factors might explain the variation in needed and completed infrastructure among counties that the size of the population does not? Likely candidates include financial resources, population gain, and population growth rates. Financial resources in the case of public infrastructure means revenue sources for local governments and residents’ ability to pay taxes based on their income. Staff used a simple statistical method called correlation analysis to measure the strength of the relationship between each of these factors, as well as population, and needed infrastructure and between each and completed infrastructure. This analysis can suggest explanations for things that general observation cannot. The strength of the relationship in a correlation is reported as a range from zero to one, with zero indicating no relationship and one indicating the closest possible relationship. 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” at 755 square miles, is almost seven times the size of Trousdale, which is only 114 square miles—staff divided each of the factors by square miles to make sure that land area did not distort the analysis.

Both the need for infrastructure and infrastructure that has been completed are closely related to financial resources and population. Infrastructure that is still needed is also highly correlated with population gain, but completed infrastructure is only weakly correlated with that factor. Both needed and completed infrastructure are weakly correlated with population growth rate. These results are similar to last year’s analysis of the same factors except that the correlation between population gain and completed infrastructure is weaker (.63 this year versus .83 last year). See tables 10 and 11.

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

Factor per square mile	Correlation with reported needs per square mile
Income	0.94
Taxable Property	0.93
Population	0.92
Taxable Sales	0.91
Population Gain or Loss	0.90
Pop Growth Rate	0.48

Table 11. Correlation Between Completed Infrastructure Needs and Related Factors Divided by Land Area

Factor per square mile	Correlation with completed needs per square mile
Taxable Property	0.91
Taxable Sales	0.91
Income	0.89
Population	0.85
Population Gain or Loss	0.63
Pop Growth Rate	0.40

Staff used another common statistical technique, regression analysis, to look at how well the factors as a group explain differences among counties in needed infrastructure projects and the ability to meet them. The regression analysis indicated that the factors are sound, with their combined effect explaining 90% of the difference among counties’ reported infrastructure needs and 95% of the difference for their completed infrastructure.