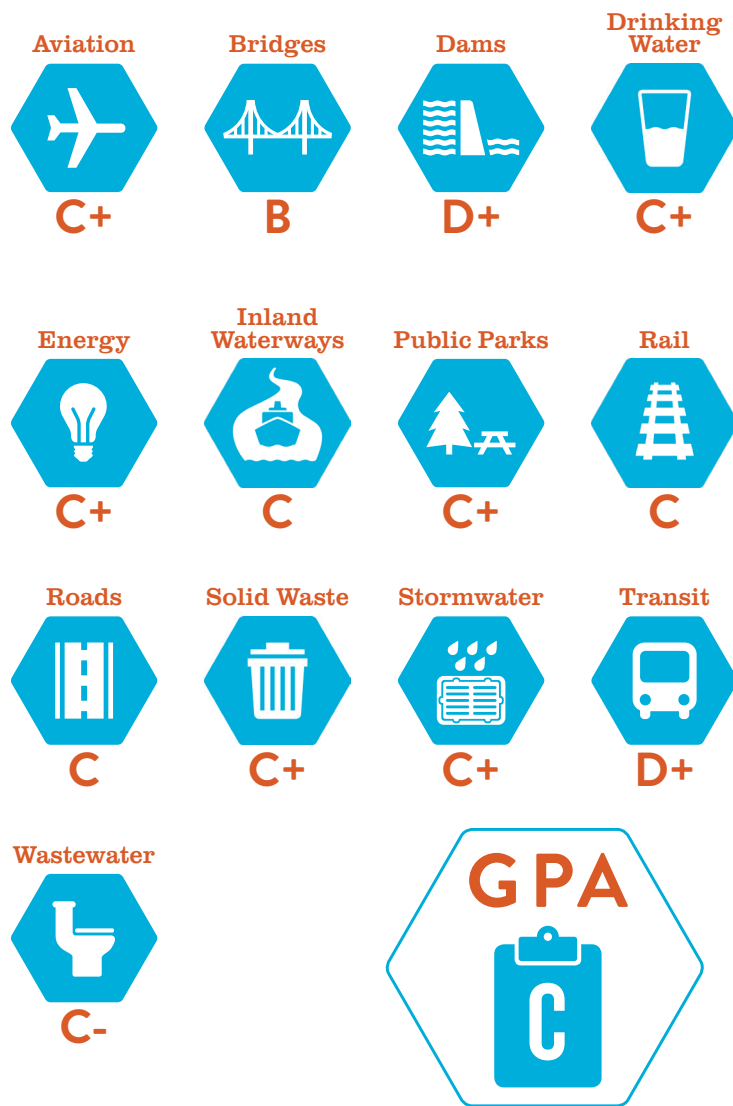


## TENNESSEE GRADES



## About the Grades

The 2022 Report Card for Tennessee's Infrastructure was written by a committee of more than 35 civil engineers across Tennessee who volunteered their time to collect and analyze data, prepare and review their findings and present their conclusions. The committee worked with staff from ASCE National and ASCE's Committee on America's Infrastructure to provide a snapshot of our state's infrastructure, as it relates to us locally and on a national level. The Report Card Sections are graded based on the following eight criteria: capacity, condition, funding, future need, operation and maintenance, public safety, resilience and innovation. ASCE defines these grades as follows:



## SOLUTIONS TO RAISE THE GRADE

- 1 INCREASE AVAILABILITY AND ACQUISITION OF DATA USED FOR DESIGN, PLANNING, AND OTHER DECISION-MAKING PROCESSES.** TN collects a lot of data on transportation-related areas of infrastructure. However, data on other infrastructure networks is limited. Although improvement in this area has been seen specifically in the areas of water & wastewater, there is still limited to no data on locally or privately owned infrastructure components including stormwater, dams and parks.
- 2 FULLY FUND INFRASTRUCTURE PROJECTS AS NEEDED TO ELIMINATE BACKLOG AND/OR DEFERRED MAINTENANCE SO AGENCIES ARE BETTER ABLE TO ADDRESS AGING SYSTEMS IN THE FUTURE.** Although strides have been made across the state to eliminate work backlog and reduce local matches for some projects, there are still areas with large amounts of deferred maintenance.
- 3 INCLUDE CONSIDERATIONS FOR POPULATION GROWTH AND EXTREME WEATHER EVENTS WHEN PLANNING AND FUNDING FUTURE PROJECTS.** TN has seen heavy increases in both population and the incident of extreme weather events in the past few years. For our infrastructure to keep up with these changes, special attention must be paid to these trends when planning and funding for future projects.

## About ASCE-TENNESSEE

The American Society of Civil Engineers (ASCE) is America's largest and oldest national engineering society. Before the Tennessee Section was formed in 1988, there were three sections in Tennessee: Tennessee Valley Section (East Tennessee), the Nashville Section, and the Mid-South Section (West Tennessee). The Sections then transitioned into Branches, and the Tennessee Section became the overarching entity for the State of Tennessee and the Branches. There are now five Branches and they are Chattanooga, Holston, Knoxville, Nashville, & West Tennessee. The Branch Presidents sit on the Section Board of Directors with the Section Officers.

## CONTACT US

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**ASCE**  
 AMERICAN SOCIETY OF CIVIL ENGINEERS

## REPORT CARD FOR TENNESSEE INFRASTRUCTURE

2022

## INFRASTRUCTURE MATTERS

"Unprecedented" – a description that has been used almost to exhaustion in the past few years. It's been used to describe COVID, severe weather events, workplace disruptions, and the list goes on. Unprecedented can also be used to describe where we find ourselves with regards to infrastructure. Tennessee, like the rest of the country, is seeing its roads, bridges, drinking water systems and more reach the end of their service lives. However, state action – along with more robust federal support – is coming at a crucial time and allowing us to rehabilitate much of our built environment. And not a moment too soon, as Tennessee communities grapple with closures of the I-40 bridge in Memphis, pipe breaks that prevent water from reaching homes and businesses, and power outages that last days or weeks.

Fortunately, Tennessee has seen progress in some areas thanks in large part to increased funding from passage of state and federal legislation. Since 2016, the last time an Infrastructure Report Card was released for our state, multiple initiatives have been used to make strides in improving many areas of our state's infrastructure. The increase of the state gas tax has allowed Tennessee to continue as a "Pay as you Go" state, one of only five in our country, while improving the overall condition of our roads and bridges and reducing or eliminating the local match required to fund some projects. Investment into the state's parks systems included major renovations of lodges and camping areas at some of the state's most popular destinations. Local utilities continue to provide safe and reliable drinking water with low interest rate loan programs. However, as our state's population grows, use of transit systems is not increasing accordingly, and the additional stress on local solid waste and wastewater systems continues to mount.

Overall, there's still work to be done. Much of our state's infrastructure, similar to that across the country, is over 50 years old, and in some cases even older. Federal support is now on the way thanks to the 2021 Bipartisan Infrastructure Law, and the American Rescue Plan (ARP). While funding mechanisms look different for each area of infrastructure, the hope is that these laws allow significant gains to our state's infrastructure in terms of condition, capacity, and resilience.

The opportunity for unprecedented improvement in our state's infrastructure is apparent. However, along with being unprecedented, the hope is that it will also be long-lasting and impactful, ultimately improving the lives of the people of Tennessee, the users of the state's infrastructure. As we look to the future of infrastructure in our state, let's move from using the word unprecedented to using the word resilient.

## How You Can Get Involved

- 1 Get the full story behind this Report Card at [www.infrastructurereportcard.org/tennessee](http://www.infrastructurereportcard.org/tennessee).**
- 2 Ask your elected leaders what they're doing to keep up with your neighborhood's infrastructure. Use your zip code to get your list of elected officials' at [www.infrastructurereportcard.org/](http://www.infrastructurereportcard.org/)**

# 2022 REPORT CARD FOR TENNESSEE'S INFRASTRUCTURE

The 2022 Report Card on Tennessee's Infrastructure gave the state an overall G.P.A. of C. Tennessee's civil engineers studied thirteen infrastructure categories. Of those thirteen, one infrastructure category is in good condition, ten are in mediocre condition, and two categories are in poor condition.

The good news is there are solutions to all these challenges, and we can raise the grades of Tennessee's infrastructure. By learning more today about the conditions of the infrastructure you use every day, you too can help raise the grade.

## AVIATION C+

There are 78 public-use airports in Tennessee, including five primary commercial service airports and 72 general aviation airports. Memphis International Airport is a major freight hub and consistently ranks first nationally in the nation by tons landed. The aviation economy accounts for 221,000 jobs, \$13 billion in payroll, and \$40 billion in business revenue in 2019. Paved surfaces are in acceptable condition, with 68% rated as fair or better. Current and future aviation infrastructure in Tennessee is critically harmed by the state legislature's vote in 2015 to cap aviation fuel taxes, creating an investment gap that widens as the legislation continues lowering the nominal cap amount each year – a sum losing value because of inflation.

## BRIDGES B

With over 20,000 bridges within Tennessee, their impact on connectivity, commerce, safety, prosperity and a myriad of other aspects is far-reaching. 43% of bridges in the state are in good condition, 53% are in fair condition, and 4% of bridges are in poor condition. However, locally owned bridges are typically in worse condition than the statewide average. To help with local challenges, the Tennessee legislature decreased the required local match and provided funding in the 2017 IMPROVE Act for 536 local bridge replacement projects. The 2021 Bipartisan Infrastructure Law will provide a 56% increase in available transportation funding over the next five years, which can also help address the local bridge maintenance backlog.

## DAMS D+

Tennessee is home to 1,238 dams that serve a variety of purposes: drinking water, flood control, recreation, and more. Most Tennessee's dams – approximately 67% – are privately owned. Unless these privately-owned dams are large enough to be classified as "high-hazard," potentially causing loss of life and property damage in failure, not much is known about their condition and maintenance practices. Of the 148 state-regulated high-hazard potential dams (HHP), 85% are in satisfactory condition. While all state regulated HHP dams have emergency action plans, just 46% of all HHP dams in the state can say the same. While some funding is allocated for dam safety through federal funding from the 2021 Bipartisan Infrastructure Law, state-regulated dams still lack adequate budgets and staff to carry out critical dam inspections.

## DRINKING WATER C+

The reliability of safe and plentiful drinking water is critical to Tennessee's communities. EPA's 6th Drinking Water Infrastructure Needs Survey and Assessment (2020) shows that \$8.7 billion is needed to maintain and improve Tennessee's drinking water infrastructure over the next 20 years. Tennessee's share of the 2021 American Rescue Plan Act has started to flow through to utilities and more drinking water infrastructure projects are being implemented across the state. 43 utilities report struggling with treated water loss rates north of 40%, a costly occurrence. Overall, however, increases in investment and an exemplary public safety record suggests improving drinking water infrastructure conditions across the state.

## ENERGY C+

In 1933, Congress established the Tennessee Valley Authority (TVA) to foster economic development, control flooding, and promote the integration of its natural resources. Almost 90 years later, TVA operates the nation's largest public power system: generating and transmitting power to a population of nearly 10 million people and 700,000 businesses including Tennessee, Alabama, Mississippi, Kentucky, Georgia, North Carolina, and Virginia. TVA has operated with 99.9% reliability over the past twenty years while utilizing ASCE standards. Local power companies (LPC) take electricity from TVA and distribute to residents. Much greater public data from LPCs are necessary for decision-makers to understand Tennessee's energy infrastructure needs.

## INLAND WATERWAYS C

Tennessee's locks and dams are located across 950 miles of inland waterways made up of the Cumberland, Mississippi, and Tennessee Rivers. Long-deferred capacity and condition improvements are finally taking place along the system. However, most efficiency enhancements have yet to be realized. At the Chickamauga Lock, 5-inches concrete expansion caused by chemical reaction is threatening the structure. A new lock, measuring 110 feet by 600 feet, is under construction, but the earliest completion date is 2024. At the Kentucky locks on the Tennessee River, tows frequently exceed 600 feet, requiring double locking that drives the average delays up to nine hours – the highest in the inland waterways system. A new project is underway to add a 1,200-foot navigation lock on the landward side of the existing locks. This will greatly increase the capacity of this section of waterways by allowing longer tows to pass through without double locking.

## PUBLIC PARKS C+

The overall condition of Tennessee State Parks facilities infrastructure is improving and safe. Parks funding has improved significantly with a surge of \$28 million for maintenance from the FY2021 budget compared to prior average annual spend of \$5. Tennessee State Parks are actively reducing the deferred maintenance backlog through state appropriations with about 35% of deferred maintenance needs being met over the last three budget cycles, and an estimated elimination of the deferred maintenance needs in three to four years. A permanent, dedicated funding source should be created to expand and improve park facilities without again collecting a list of necessary but unfunded projects.

## RAIL C

Tennessee has a total of 34 railroads, including six Class I rail lines with a total track mileage of 2,133 and 23 Class III rail lines with a total track mileage of 806. Memphis is the third largest freight rail center in the nation. Freight volumes transported on tracks in Tennessee are forecasted to grow 130% by 2040 when compared to 2012. The state added supplemental track mileage with new short-line and corridor capacity improvements, but this support is not sufficient when compared to the population increase and the demand growth in rail freight movement. One study showed varying infrastructure conditions on Class I and Class II track operations: an estimated 64% and 26% of tie conditions rated as sufficient, respectively. The same study determined 41% of mileage examined within the state must be upgraded to accommodate heavier rail cars. The main passenger rail in the state operates on a rail line owned by CN, where Amtrak riders will benefit from a \$55 million redevelopment project at Memphis' Central Station.



## ROADS C

Tennessee has over 95,000 miles of highway that are critical for residents, visitors, and the movement of approximately \$812 billion of goods shipped annually to and from the state. Tennessee's population has grown by 9% since 2010. This steady growth has in turn increased the total vehicle miles travelled (VMT) by 7.4% since 2016. Increased vehicular traffic throughout the state has led to increased pavement deterioration, congestion, and traffic fatalities. In 2021, 50% of interstates and 44% of state routes were in good condition. However, deferred maintenance and funding shortfalls have resulted in declining pavement conditions over the past five years: the state's average pavement quality index dropped from 4.2 in 2016 to 3.9 in 2021 for interstates and from 3.6 to 3.3 between those years on state surface roads.

## SOLID WASTE C+

Statewide, approximately 60% of municipal solid waste (MSW) is disposed in municipal sanitary landfills. With a fast-growing population, decision-makers in Tennessee must balance the regional benefits of waste disposal with localized harms: legal action has stopped expansion of landfills citing harms to adjacent communities, but long-distance waste removal is more expensive and generates regional climate impacts. In 2019, Nashville was diverting only 18% of its solid waste away from landfills and into recycling streams. Even if waste diversion increases, challenges attracting workers harm solid waste systems. In an effort to attract a bigger workforce, the City of Chattanooga increased starting wages for waste drivers by more than 40%, from just over \$31,500 to \$45,000.

## STORMWATER C+

22 Tennessee municipalities have implemented stormwater utility fees over the last two decades. These fees form a funding backbone to maintain stormwater pipes and drains, manage flooding and erosion issues, and increasingly create or support green infrastructure. However, water quality in the state remains an issue, as seen by prevalence of contaminants. Of the 46% of waterways that have been assessed, 56% of rivers and streams are impaired with at least one pollutant and 38% of the state's reservoir acreage is listed as impaired. Tennessee's population is growing, increasing the amount of impervious surface area (e.g., roads, parking lots) that catches and conveys stormwater runoff after adding harmful chemicals. New rules, finalized in May 2022, will help regulate new development sites and encourage the utilization of green infrastructure, including bioswales and rain gardens.

## TRANSIT D+

Tennessee features transit service in every county, including bus services on fixed-routes, express buses, dial-a-ride transit vehicles, local shuttles, and paratransit service for patrons with qualifying disabilities. Transit ridership statewide was only up to 60% of pre-pandemic levels in April 2022, but Tennessee's Department of Transportation found pronounced need for service during weeknights and weekends, when Tennesseans depending on transit are more likely to make essential trips. Residents with mobility options are choosing transit less and clogging roads with private vehicles. For those "choice riders" to return to transit, dedicated funding streams like regional sales taxes are necessary for significantly enhanced service in Tennessee's four large urban areas – including rail transit and bus rapid transit using dedicated lanes on the state's most congested corridors.

## WASTEWATER C

Over the past 10 years, Tennessee's wastewater infrastructure successfully supported a 9% population increase and substantial economic growth. However, capacity enhancements were accomplished at the expense of maintenance, as evidenced by combined & sanitary sewer overflows that result in sewer tap moratoriums. In 2019 there were 12 systems under a sewer tap moratorium due to overflows; in October 2022, there were moratoriums restricting new customers in some part of 45 municipalities. Overall, wastewater infrastructure owners report a \$5.9 billion, 13-year funding gap for needed capacity and to bring the systems back to a state of good repair. A one-time infusion of \$1.35 billion from the 2021 American Rescue Plan Act is going toward Tennessee's water, wastewater, and stormwater projects. Additional support will be available from the Bipartisan Infrastructure Law passed last year. This will help supplement user fees, which average \$26 per month and are a necessary component of safe systems collecting, cleaning, and delivering plentiful water to a growing state.