2024 Report Card for Georgia's Infrastructure

Georgia Section of the
American Society of Civil Engineers

InfrastructureReportCard.org/Georgia

ASCE
AMERICAN SOCIETY OF CIVIL ENGINEERS

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2024 Georgia Report Card Executive Summary

Georgia's 10.9 million residents, a quickly growing population, are benefiting from infrastructure systems with increasing investments and modernizing operations. Businesses are moving to Georgia to capitalize on expanding airports and improved road networks. While the state thrives with this growth, the increase brings many challenges to its infrastructure. However, civil engineers are dedicated to tackling these challenges and ensuring a safe and reliable infrastructure.

Georgia's Section of the American Society of Civil Engineers (ASCE) produces a state infrastructure report card to provide the public with an accessible evaluation of performance across many categories and to create a roadmap to success for its infrastructure. The 2024 *Report Card for Georgia's Infrastructure* is the 5th evaluation of this kind, covering 14 categories. The overall grade remained at C+, with six categories seeing grade increases, three experiencing reduced grades where funding streams are unpredictable and inadequate for life-cycle costs, and five categories seeing stable marks.

Improvements occurred in several areas in recent years. Georgia's transportation system mostly progressed, thanks to projects completed with improved state funding from major legislation in 2012 and 2015. In 2022, 98 percent of Georgia's bridges were rated fair or good condition – better than 93 percent in 2017 and much improved from 78 percent in 2013. The state's aviation system budget, allocated from the state's general fund, grew significantly from $13 million in 2017 to $44 million in 2023. Georgia Port Authority's marine and inland port infrastructure achieved a 35 percent increase in cargo handling capacity from 2018 to 2022, with a workforce one-third larger than a few years prior. Critical dam infrastructure also improved. Seventy-eight percent of Georgia's High-Hazard Potential dams had Emergency Action Plans in 2023, up 33 percent from 2018.

Despite this progress, new threats have arrived, and old challenges persist. Atlanta is the 10th most congested city in the United States. State funding in Georgia accounts for less than 2% of total public transit funding and transit costs are outpacing transit revenue. Statewide drinking water investment needs were estimated to be $19.7 billion in 2023, up from $12.5 billion in 2018. Utility rates for drinking water, wastewater services, and electricity, as well as funding for stormwater, have not kept up with the recent significant cost increases and trail national averages. In water systems, new regulations on treatment, pipeline replacements, and addressing extreme weather conditions increase needs. Additionally, 1,982 Georgian road users lost their lives in 2022, including 339 pedestrians, 11 percent higher than in 2021 and completing a 5-year trend of annual increases.

About the Report Card for Georgia's Infrastructure

While you may not think about infrastructure daily, civil engineers do because we have pledged to build it, maintain it, and keep the public safe. As an organization of civil engineers who live and work in Georgia, we want to share what its condition is and what can be done to improve it.

Methodology

The purpose of the Report Card for Georgia's Infrastructure is to inform the public and decision-makers of the current condition of our state's infrastructure in a concise and easily accessible format of a school report card. Each of the categories of infrastructure covered in the Report Card is assessed using rigorous grading criteria and recent data to provide a comprehensive assessment of the area's infrastructure. ASCE has used the following criteria to discuss and grade the state of the infrastructure:

CAPACITY
Does the infrastructure's capacity urrent and future demands?

CONDITION
What is the infrastructure's existing and near-future physical condition?

FUNDING
What is the current level of funding from all levels of government for the infrastructure category as compared to the estimated funding need?

FUTURE NEED
What is the cost to improve the infrastructure? Will future funding prospects address the need?

OPERATION AND MAINTENANCE
What is the owner's ability to operate and maintain the infrastructure properly? Is the infrastructure in compliance with government regulations?

PUBLIC SAFETY
To what extent is the public's safety jeopardized by the condition of the infrastructure, and what could be the consequences of failure?

RESILIENCE
What is the infrastructure system's capability to prevent or protect against significant multi-hazard threats and incidents? How can it quickly recover and reconstitute critical services with minimum consequences for public safety and health, the economy, and national security?

INNOVATION
What new and innovative techniques, materials, technologies, and delivery methods are being implemented to improve the infrastructure?

Grading Scale

A: EXCEPTIONAL, FIT FOR THE FUTURE
The infrastructure in the system or network is generally in excellent condition, typically new, or recently rehabilitated, and currently meets capacity needs for the future. A few elements show signs of general deterioration that require attention. Facilities meet modern standards for functionality and are resilient to withstand most disasters and severe weather events.

B: GOOD, ADEQUATE FOR NOW
US infrastructure in the system or network is in good to excellent condition; some elements show signs of general deterioration that require attention. A few elements exhibit significant deficiencies. Safe and reliable, with minimal capacity issues and minimal risk.

C: MEDIOCRE, REQUIRES ATTENTION
The infrastructure in the system or network is in fair to good condition. It shows general signs of deterioration and requires attention. Some elements exhibit significant deficiencies in conditions and functionality, with increasing vulnerability to risk.

D: POOR, AT RISK
American infrastructure is in poor to fair condition and mostly below standard, with many elements approaching the end of their service life. A large portion of the system exhibits significant deterioration. Condition and capacity are of serious concern with a strong risk of failure.

F: FAILING/CRITICAL, UNFIT FOR PURPOSE
The infrastructure in the system is in unacceptable condition with widespread advanced signs of deterioration. Many of the components of the system exhibit signs of imminent failure.

2024 Report Card for Georgia's Infrastructure

Overall Grade: C+

- Aviation: C+
- Bridges: B
- Dams: D+
- Drinking Water: C+
- Energy: B
- Ports: B+
- Public Parks: C
- Rail: B
- Roads: C+
- Schools: B
- Solid Waste: C+
- Stormwater: C-
- Transit: D
- Wastewater: C-

Recommendations to Raise the Grade

Deliver dedicated state transit funding.
Establish a robust, sustainable, and reliable state-level transit funding source to address the annual $1.7 billion additional funding need and reinstate the motor fuel tax exemption for public transit agencies.

Set responsible, resilient utility rates and user fees.
Pursue utility rate increases to fully account for the full cost of service, including capital, maintenance, and operating needs. Analysis should include life-cycle costs amid materials, labor inflation, and resilience upgrades necessary for extreme weather.

Expand safety funding and oversight in dams and roads.
Amend the Georgia Safe Dams Act to implement "Significant Hazard Potential" dams and increase funding to reduce the backlog of classification of dams. Improve traffic safety with state and local funding for designing and constructing "complete streets" with robust enforcement.

Invest in new electricity generation and a resilient grid.
State and local authorities should fund and facilitate new forms and greater scales of energy generation. Retrofits and new connections in the energy grid will ensure resilience to extreme weather and a backbone supporting population and business growth.

Increase funding and coordination of intermodal freight projects.
Additional state funding would develop projects in Georgia's Statewide Freight and Logistics Plan more quickly to capitalize on increased goods movement. Coordinate with regional and local communities where freight movements create benefits and burdens for nearby stakeholders.

Aviation: C+

Summary
New projects and upgrades created progress across Georgia's 103 public-use airports, which generate an annual economic impact of $73.7 billion. Hartsfield-Jackson Atlanta International Airport (ATL), the busiest airport in the world for passenger traffic and Georgia's largest employer with 383,000 jobs, creates 91 percent of that impact. State funding for aviation grew from $13 million in 2017 to $44 million in 2023, partially due to a one-time investment in 2023 supporting the statewide aviation plan. From 2017 to 2023, the amount of primary-use runway pavement rated as good or fair increased from 56 percent to 62 percent. Despite these positive trends in recent years, public data available while writing our 2019 aviation chapter significantly overestimated runway pavement conditions – a matter reflected in the lower aviation grade for 2024. With a clearer assessment of Georgia's aviation infrastructure, the sector can better serve the state and nation's air travel needs.

Background
Georgia is served by a system of 103 publicly owned, public-use airports, ranging from small general aviation airports to the busiest commercial service airport in the world by passenger traffic, ATL. Of the 103 publicly owned, public-use airports in Georgia, the FAA's National Plan of Integrated Airport Systems (NPIAS) report for fiscal years (FY) 2023 to 2027 included 97 Georgia airports. The NPIAS identifies airports that are in the national airport system, the roles the airports currently serve, and the types and quantities of airport development eligible for federal funding under the Airport Improvement Program (AIP) over a five-year period.

The growth in general aviation operations reflected in the table below is within normal forecasted ranges for projected growth in activity. During the COVID-19 pandemic, general aviation flights provided an alternative to commercial travel and, therefore, remained consistent with enplanements. Commercial flight activity faced a reduction in flight activity during the pandemic and has been in a slow recovery following. While most primary airports have returned to or exceeded pre-pandemic levels, to date, ATL has still not recovered to pre-pandemic flight operations levels as indicated below. Growth in Georgia airports with 5,500-feet runways shows increased capacity to serve business aviation, the fastest-growing segment of general aviation.

Table 1 - Georgia Aviation System General Information

Criteria	2017	2022	Difference
Total Number of Airports	103	103	0
General Aviation Airport Arrivals and Departures	1,716,000	1,963,528	+247,528
Air Carrier Airport Arrivals and Departures (not including ATL)	141,895	153,661	+11,766
Average Number of Daily Arrivals and Departures at ATL	2,401	1,983	-418
Aircraft Based at Georgia Airports	4,923	4,913	-10

Airports with Runway Length of 4,000 feet or greater	89%	89%	0%
Airports with Runway Length of 5,000 feet or greater	78%	82%	+4%
Airports with Runway Length of 5,500 feet or greater	43%	50%	+7%
Airports in the National Plan of Integrated Airport Systems (NPIAS)	98	97	-1
Airports that Meet or Exceed PCI Rating of 70 for their Primary Runway*	56%	62%	+6%

The 2019 *Report Card for Georgia's Infrastructure* stated that 98% of primary runways in Georgia had a Pavement Condition Index (PCI) of 70 or greater as stated in the plan. However, this government-published data point was incorrect. It was later updated to 56% through the update of Georgia's airport pavement management plan.

Capacity

Between 2017 and 2022, general aviation operations in Georgia increased from 1.7 million to over 1.9 million. The Federal Aviation Administration Aerospace Forecasts, Fiscal Year 2017-2037, predict general aviation operations in Georgia to grow 0.3%. General aviation instrument flight rules (IFR) operations are projected to increase 0.8% per year. Hours flown by general aviation aircraft are projected to increase 0.9% per year.

For commercial service airports, capacity can be looked at in terms of operations and passenger enplanements. In 2017, Georgia airports, excluding ATL, had a total of 1.5 million enplanements and almost 50,000 commercial operations. In 2022, the passenger enplanements, excluding ATL, have grown to almost 2.2 million and commercial operations have increased to 57,000. Statewide enplanements are projected to grow by 3.0% per year to 2.6 million by 2035 and operations by 1.5% per year to 63,000.

As the busiest airport in the world, ATL supports passenger traffic with a daily average of 124,000 enplanements and 1,980 flight arrivals and departures. In 2022, ATL had the highest number of total commercial service airport enplanements in the nation at 45.3 million, or 10 million enplanements higher than the second-place airport, Dallas-Fort Worth International. This is a 23% increase in total enplanements at ATL from 2021. Many passengers utilizing ATL have been faced with growing security lines and full vehicle parking lots. To overcome these challenges and to accommodate future growth, the City of Atlanta has embarked on a massive project called ATLNext.

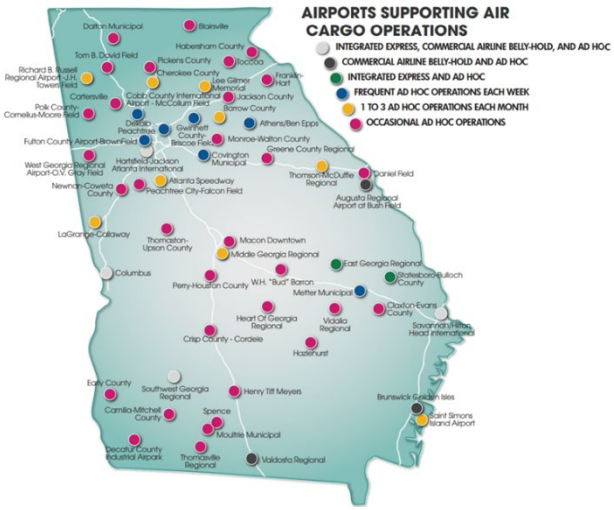
ATLNext is the Airport's new development program. It consists of a series of projects over the next 20 years designed to boost capacity, renew and replace existing facilities, and enhance ATL's aesthetic appeal. The ATLNext program includes many system updates and construction of facilities covering the central passenger terminals, parking decks, hotel, and travel support facilities, air cargo, and airside facilities updates. Within the domestic flight passenger terminal alone, this project will renovate five concourses and add fifteen additional gates for use by passengers. The project will also replace the North and South domestic vehicle parking decks and

will construct a new West domestic parking deck and Park-Ride lot providing increased capacity for passenger vehicle parking. The ATLNext projects aim to meet present and upcoming passenger demand while maximizing the efficiency of current and new facilities.

Photo from Habersham County constructing taxiway to meet Runway/Taxiway Separation Standards

The movement of air cargo is a staple of the aviation industry and is also an important underpinning for the global economy. According to the International Air Transport Association (IATA), air cargo accounts for 35% of world trade. Furthermore, according to estimates by Boeing, air cargo volume is expected to double worldwide over the next 20 years. Currently, 58 of the 103 airports in Georgia accommodate some type of air cargo operations as reflected on Figure 1.

Figure 1 – Georgia Airports Supporting Air Cargo Operations



In 2019, Georgia airports facilitated the movement of 711,000 metric tons of air cargo (676,000 at ATL), equating to $30 billion dollars in commodities, into and out of the state. The movement of air cargo is projected to increase to 1.45 million metric tons per year by 2040.

Condition, and Operations and Maintenance

Many of the airports in the state were constructed to design standards that are now outdated or were significantly different from what is currently mandated. Because some of the new design standards are more stringent, some of these airports will require significant improvements to meet current standards. Below is a summary of significant aspects of these standards at Georgia airports:

- Pavement Condition Index (PCI) is a method to measure the condition of pavement. A PCI of 100 refers to new pavement and, as the pavement ages, this number is reduced as the pavement is damaged and worn. In 2023, 62% of all primary use runways at public-use non-primary airports in Georgia have a PCI rating of 70 or greater, which is an increase from 56% in 2017, according to the Georgia Airports Pavement Management Plan Update. The next Georgia Airports Pavement Management Plan Update is scheduled to be completed in 2024 and should show substantial gains in PCI conditions as the state has made this a priority since 2017.
- Runway/taxiway separation refers to the distance between the primary runway centerline and any full or partial parallel taxiway centerline. The percentage of runways meeting this standard has remained at 95% since publication of the last Georgia Infrastructure Report Card.
- The Runway Safety Area (RSA) is the surface surrounding the runway prepared or suitable for reducing the risk of airplane damage in the event of an undershoot, overshoot, or excursion from the runway. One of the FAA's highest safety goals is for all runways to have sufficient RSA for all aircraft with 500 operations or more annually. As a result of strategic investment, the percentage of airports meeting the RSA standards for primary runways has increased from 95% to 97% since the 2019 Georgia Infrastructure Report Card.
- There aren't data on the condition and operations of landside facilities (terminals, cargo facilities, roadways, parking garages, etc.) to compare to these runway and taxiway statistics.

Funding and Future Need

Georgia relies on a variety of sources to maintain funding. These include bonds, grants, and Passenger Facility Charges (PFCs). For the Georgia airport system to remain viable, significant investment will be required. The average annual investment needed to maintain recommendations from the most recent state system plan, excluding ATL, is at least $261 million. On average, annual funds available to the Georgia airport system, apart from ATL, from both the FAA and the Georgia Department of Transportation (GDOT), have averaged $79 million leading to a significant funding gap.

Over the past three years, the state received an average of about $544.6 million in federal Airport Improvement Program (AIP) funds, with an average of almost $42 million being administered annually through GDOT Aviation Programs via the State Block Grant Program.

Table 2 Federal Funding for Georgia Airports

Federal Fiscal Year	2020	2021	2022	Three-Year Average
Total Funding – State of Georgia	$986,235,110.00	$186,478,995.00	$461,117,509.00	$544,610,538.00
Hartsfield-Jackson Atlanta International Airport	$867,123,186.00	$98,504,364.00	$396,844,601.00	$454,157,384.00
Primary Airport Grants	$71,425,990.00	$44,794,663.00	$29,589,920.00	$48,603,524.00
State-Block Grant Program Funds	$47,685,934.00	$43,179,968.00	$34,682,988.00	$41,849,630.00

*The amount of federal funding received in Table 5 above includes COVID Relief funding.
Source: https://www.faa.gov

The state aviation program budget has grown significantly over the last 10 years, aiming to improve the condition of aviation assets within the state, from just under $2 million in 2013 to

$35.5 million in 2022. Of the available $35.5 million in state funding, approximately $2 million went toward paying the 5% state match on federal grants. Georgia airports also received a total of $907.3 million in COVID relief funding under (Coronavirus Aid, Relief, and Economic Security Act (CARES), Coronavirus Response and Relief Supplemental Appropriation Act (CRRSAA), and American Rescue Plan Act (ARPA).

ATLNext projects are estimated to cost over $11.5 billion, utilizing various funding sources such as Airport Improvement Plan funding, bonds, and other grants to fund the airport's capital improvement needs. In addition to this funding, ATL also received over $420 million dollars in PFCs from the more than 93 million passenger enplanements that occurred at the airport in 2022. In FY22 ATL was awarded $40 million in Bipartisan Infrastructure Law (BIL) funds to update and modernize the 40-year-old Concourse D. The rehabilitation project also includes enlarging hold rooms, restrooms, and the central corridor. These updates will increase passenger capacity, improve Americans with Disabilities Act (ADA) compliance for individuals with access and functional needs, and achieve Leadership in Energy and Environmental Design (LEED) gold certification. ATL was also awarded $43 million in FY22 BIL money to reconstruct an apron, and $48 million in FY22 BIL money to improve a passenger terminal.

Excluding ATL, an estimated $103.7 million dollars in capital investment is needed to meet the projected demand for air cargo operations at airports across the state. This investment in air cargo alone will lead to a $202 million dollar increase in annual economic activity and will support 1,406 jobs. To accommodate additional growth, ATL will invest more than $200 million in upgrades adding up to 1 million square feet of warehouse space and constructing a vehicle staging area to relieve cargo truck congestion while adding parking capacity for cargo aircraft and vehicles.

Public Safety and Resilience

Implementation is underway across Georgia airports of the Next Generation Air Transportation System (NextGen) system, including capabilities such as the Automatic Dependent Surveillance-Broadcast (ADS-B), Cockpit Display of Traffic Information (CDTI) and Time-Based Flow Management (TBFM) improve the ability of controllers to reduce separation between aircraft, boosting arrival capacity. Equivalent Lateral Spacing Operations (ELSO) also allow reduced separation between departures and new Standard Instrument departure procedures provide more precise guidance. ATL is the first airport where the FAA implemented ELSO, and the technology is increasing capacity by enabling more aircraft to take off from the same runway during the same time period, resulting in an estimated increase of eight to twelve more aircraft departures per hour due to freed up airspace and reduced taxi times.

Resilience in Georgia's aviation system can be accomplished with redundancy, where passengers and goods can re-direct between airports in case of challenges at the first choice arrival or departure points. The most recent system plan indicates that 92% of Georgia's residents are within a 30-minute or less drive to an airport while 81% of Georgia residents are within a 60-minute or less drive to a commercial service airport.

Innovation

Advanced Air Mobility (AAM) is a rapidly emerging new sector of the aerospace industry which aims to safely and efficiently integrate highly automated aircraft into the National Airspace System. AAM is not a single technology, but rather a collection of new and emerging technologies

being applied to the aviation transportation system, particularly in new aircraft types, such as electric vertical takeoff and landing (eVTOL) aircraft. This technology will provide new capabilities for the transport of people and goods within Georgia but will also require strategic private and public investment in planning and infrastructure to support its implementation. In 2023, the Covington Municipal Airport and Archer Aviation, a leading operator within the AAM industry, partnered in the development of a new 350,000 square foot facility that will manufacture an estimated 650 eVTOL aircraft while creating 1,000 new jobs within the Covington community. Furthermore, in 2023, GDOT launched an Advanced Air Mobility Strategic Plan that will provide a pathway for a future regulatory environment and infrastructure funding programs related to AAM and eVTOL operations within the state.

Solutions to Raise the Grade

- **Plan and fund for the future**: While the system continues to enjoy excess capacity and increased accessibility, it still needs continued focus on funding projects that remedy non-standard conditions (conditions that do not comply with FAA regulatory guidelines). Funding fluctuates, and the limited amount requires large projects to be phased, resulting in less effective use of funds. Also, plan for future industry needs such as electric grid infrastructure for electrified airline/tenant tugs and/or other equipment, plus landside facilities such as EV charging stations for customers and fleet operators. On-site energy grids could become more complex with airports adding electrical supply redundancy for resiliency purposes through backup supply, emergency generators, and on-site generation. More severe storms will require more expensive and resiliently designed capital projects, plus operations spending for anti-fragile workforce training.
- **Keep Airport Layout Plans up to date:** While the FAA and GDOT Aviation Programs permit the airports to rely on their most recent Airport Layout Plan beyond a five-year period if there are no new requirements, there are still improvements to be accomplished from the most recent plans. Continuous monitoring and identification of immediate needs should be incorporated into plans.
- **Improving pavement conditions:** The next Georgia Airports Pavement Management Plan Update is scheduled to be completed in 2024. This update to the pavement management plan should show substantial gains in PCI conditions as the state has made this a priority since 2017. This effort will continue as the state's objective is to have the PCI value raised to 80% of the pavement condition to be at or above a 70 PCI.
- **Use technology to improve:** Encourage airports to use innovative technology and processes when expanding and enhancing their infrastructure. Use the NextGen system to maximize the capacity of existing infrastructure.
- **Improve and Publish Asset Data Collection:** Georgia can improve aviation infrastructure investments by tracking and publishing data on the condition, operations, and maintenances landside facilities (terminals, cargo facilities, roadways, parking garages, etc.) to provide a balance with runway pavement in a similar metric such as a building condition index. In addition, there would be benefits from collecting data on pavement rehabilitation projects at commercial service airports between Pavement Management Studies, even though the state does not fund them all.

Definitions

- **Enplanements** — Individual trip segments for each passenger.
- **Large Hub Airports** — The FAA defines as airports that account for 1% or more of total U.S enplanements.
- **Medium Hub Airports** — The FAA defines as airports that account for between 0.25 and 1% of the total U.S. enplanements.
- **Small Hub Airports** — The FAA defines as airports that account for between 0.05 and 0.25% of the total U.S. enplanements.
- **Non-hub Primary Airports** — The FAA defines as airports that enplane less than 0.05% of all commercial passengers, but more than 10,000 annual enplanements.
- **Non-primary Commercial Airports** — The FAA defines as airports that have between 2,500 and 10,000 commercial passenger enplanements annually.

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Bridges: B

Summary
ASCE observes strong infrastructure improvements across Georgia's portfolio of nearly 9,400 bridges and almost 5,700 culverts. About 76 percent of those are in good condition, and less than 2 percent are in poor condition. That substantially bests the national averages. Because of state leadership through the 2015 Transportation Funding Act, a gas tax continues to support investments for significant upgrades. The portion of bridges in good or fair condition has increased from 78 percent in 2013, to 93 percent in 2017, to 98 percent in 2022. These improvements are threatened by funding pressures of vehicle efficiency and electrification, project cost escalation from input materials and labor shortages, and state legislative proposals for increased weight limits on roads other than federal highways. As Georgia works to sustain bridge improvements, infrastructure owner-operators can invest in new and innovative materials, technologies, and methods to build efficient, safe, resilient bridges.

Background
Georgia's bridge infrastructure consists of approximately 9,382 bridges and 5,676 culverts. Of these, the Georgia Department of Transportation (GDOT) owns and operates 4,783 bridges and 2,075 culverts. Local governments and other entities own the remaining structures. "Bridges" are defined as structures having a span length exceeding 20 feet and usually have some combination of deck, beam, substructure, and foundation elements, while culverts are buried structures. The following discussion focuses primarily on bridges.

Condition and Capacity
Currently, the Federal Highway Administration (FHWA) collects data from GDOT regarding the condition of the bridges and bridge culverts in the state. The lowest condition of a structural component determines the overall condition of a bridge. ridges are assigned a condition from good to fair to poor. Georgia's bridges are in great shape compared to peer states.

Overall, 75.5% of Georgia's bridge inventory are rated in good condition, 22.9% in fair condition, and 1.6% in poor condition as per the National Bridge Inventory (NBI) data reports. Nationwide, 44.3% of bridges are in good condition, 48.9% in fair condition, and 6.8% in poor condition, meaning Georgia is well above the national average for bridge conditions. In Georgia's 2019 ASCE Report Card, it was reported that 39.6% of bridges were in good condition, 55.2% were in fair condition, and 1.3% were in poor condition. The improvements can be seen in the NBI data plots for the condition rating of bridges in Georgia extracted from FHWA's InfoBridge portal and shown below in Figures 1-4.

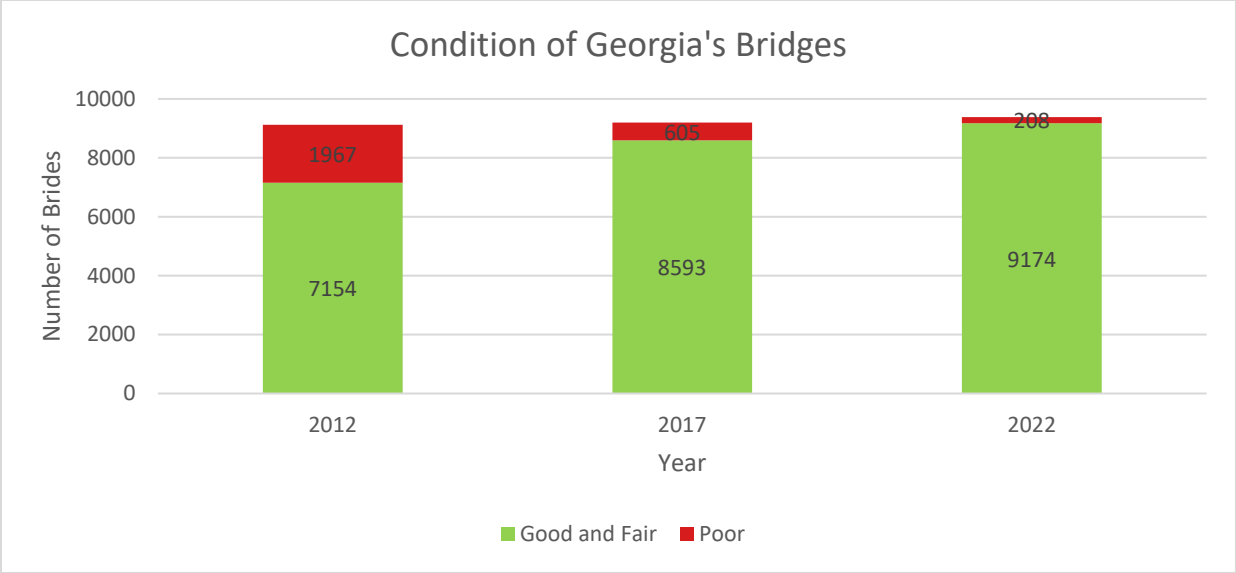

Figure 1: Condition of Georgia's Bridge over the years

State and local governments targeted to the most "at risk" bridges to be prioritized for replacement. However, the inversion in the number of good and fair bridges after 2019 as seen in Figure 3, is largely due to re-classification of bridge condition definition by FHWA standards in 2017.

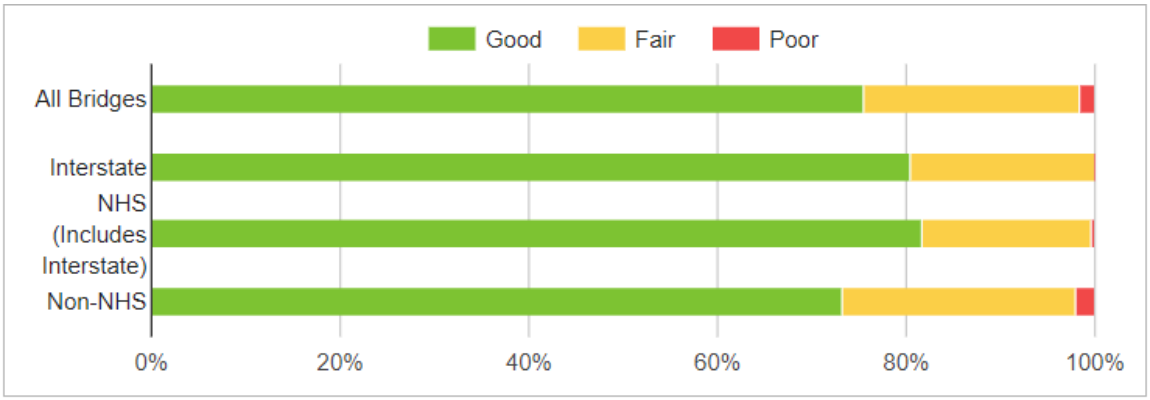

Figure 2: Condition of bridges in Georgia in 2023

Structural capacity is another critical feature of bridge infrastructure. Some bridges with inadequate structural capacity are "posted" to limit the weight of vehicles they carry. Posted bridges can have significant impacts on communities. School buses and emergency vehicles may be forced to use alternate routes. Further, the presence of structurally inadequate bridges can severely hinder economic growth by limiting commercial vehicle access. Since the 2019 ASCE Report Card, GDOT has reduced the number of posted bridges from 1.5% to 0.2% of all bridges on the state system. The number of posted local bridges has been reduced from 31.1% to 14.9% of all local bridges. GDOT assigns all posted bridges on the state system for repair or replacement. In addition to replacing and rehabilitating structurally deficient bridges, the state has implemented asset management programs and focused on preventive maintenance.

Recent state legislation increased allowable gross vehicle load 10%, up to 80,000 lbs for double-axle tractor trailers. That means 733 additional state and county bridges will be posted in the near future.

	Good	Fair	Poor
All Bridges	11,362 (75.45%)	3,457 (22.96%)	239 (1.59%)
	Total: 15,058		
Interstate	955 (80.39%)	232 (19.53%)	1 (0.08%)
	Total: 1,188 % of Total: 7.89%		
NHS (Includes Interstate)	3,347 (81.55%)	743 (18.10%)	14 (0.34%)
	Total: 4,104 % of Total: 27.25%		
Non-NHS	8,015 (73.17%)	2,714 (24.78%)	225 (2.05%)
	Total: 10,954 % of Total: 72.75%		

Figure 3: Condition of bridges and culverts in Georgia in 2023 by the numbers

Much of the progress made since the last report card is attributed to the increased investment in transportation as well as GDOT's Low Impact Bridge Program (LIBP) and Local Bridge Replacement Program (LOBCR). These programs have identified the needs of Georgia's 159 counties and hundreds of municipalities and have assisted with funding issues, procurement, and expertise. The LIBP was introduced in 2014 and has replaced and reopened 36 bridges. Another 11 have been let or are currently under construction and 43 more are programmed for replacement within the next two to three years with projects let totaling $54 million. These projects must meet low impact criteria such as no geometry or grade changes, low environmental impacts, and all detours must be off-site and approved by local entities. LIBPs are completed with expedited delivery using prefabricated bridge components.

GDOT owns, operates, and manages 96% (by deck area) of the bridges in Georgia that are on the National Highway System (NHS). The average age of an NHS bridge in Georgia is 44 years, which is close to the design service life for most GDOT bridges (50 - 75 years). GDOT proactively preserves NHS bridge structures and has high condition standards for the NHS roadways, as demonstrated by the fact that only 0.9% of the bridges constructed before 1960 are currently in poor condition.

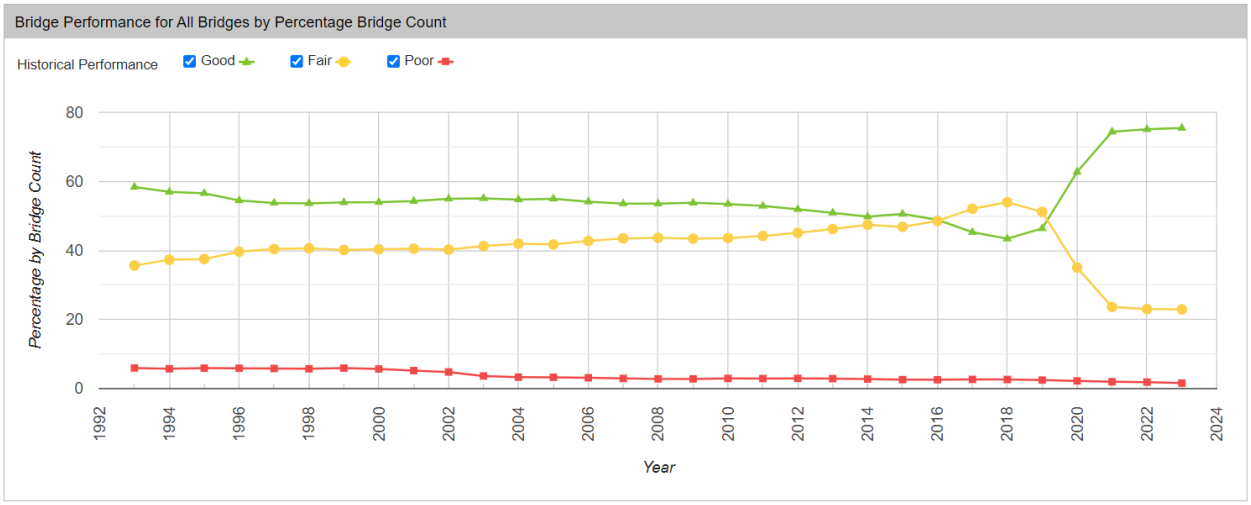

Figure 4:Condition of bridges over the years. Note that the increase in 2019 is due to re-classification of bridge condition definition by FHWA standards

Funding and Future Need

GDOT's operating budget is derived from three primary funding sources: federal, state, and other regional and local sources.

Most of the funding comes from federal sources. This includes revenues from the Highway Trust Fund, which is supported by a national fuel tax on gasoline and diesel. Highway Trust Fund dollars are dispersed to states based on a formula spelled out in the transportation spending bill passed by Congress. In November 2021, the Infrastructure Investment and Jobs Act (IIJA) was signed into law.

The IIJA, or the "Bipartisan Infrastructure Law" (BIL), provides funding to improve the condition of Georgia's infrastructure systems and better ensure our infrastructure is prepared for the future through formula funding and grant programs. Based on formula funds alone, Georgia bridges are slated to receive $45 million per year for fiscal years 2022 through 2026. However, owing to the relatively good condition of bridges in the state, this amount is the lowest and minimum allocation among states. Grant programs, however, will offer additional funding for specific projects.

Georgia's landmark transportation legislation, the Transportation Funding Act (TFA) of 2015, continues to provide significant transportation funding at the state level. The primary source is a fuel tax, which automatically increases with inflation and fuel economy standards. In 2020, the tax rate was set at 27.9 cents per gallon for gasoline and 31.3 cents per gallon for diesel fuel. The fuel tax is supplemented by a variety of fees imposed on electric vehicles, heavy vehicles, and hotel lodging. Since the COVID-19 pandemic, the gas tax has been suspended for multiple periods as a relief measure. The impact of this suspension on funding has yet to be seen.

Three years prior to the TFA, Georgia passed the Transportation Investment Act (TIA). It provides a process for regions in Georgia to fund necessary transportation infrastructure projects through a voter-approved 10-year one-cent sales tax. The program started in 2012 with three participating regions, and an additional region joined the program in 2018. Combined, these four

regions are supporting 1,022 TIA projects valued at approximately $1.7 billion, and 845 of those projects have already been delivered to their communities. Special Purpose Local Option Sales Taxes (SPLOST) and Transportation Special Purpose Local Option Sales Taxes (TSPLOST) are similar to TIA as a sales tax, but the funds are solely expended at the county level. While these additional funding sources are not used uniformly throughout the state, they are available and establish a pathway for possible funding sources.

The GDOT Office of Bridge Desing and Maintenance (GDOT Bridge Office) has programmed the replacement of all state route bridges categorized in poor condition. They have added programs to assist in the repair and replacement of off-state system bridges through the Local Maintenance and Improvement Grant (LMIG), Low Impact Bridge Program (LIBP), and Local Bridge Replacement Program (LOCBR). These programs enabled GDOT to increase its bridge replacement program from about 67 bridges per year between 2011 and 2015 to more than 232 bridges per year between 2016 and 2020. The increased transportation funding levels have enabled GDOT to maintain traditional operation, as well as to facilitate the development of the Major Mobility Investment Program (MMIP) to address future needs through a series of "mega" projects. The current level of transportation funding allows the state to conduct vital bridge maintenance and bridge replacement projects to serve Georgia's transportation needs in the upcoming decade.

Operations and Maintenance

The operation and maintenance of over 15,000 structures in Georgia are managed by GDOT and local municipalities. There are numerous quality control and quality assurance methods which are meticulously followed throughout design and construction. GDOT follows state and federal design standards to establish the proper loading conditions. With a certified inspector on site ensuring compliance with specifications, stringent quality control measures are in place during construction. Quality materials are also selected for projects due to a requirement that all supplies be procured from a quality product list.

In accordance with federal regulations, bridges are inspected every two years, with some requiring yearly inspections. These inspections provide the GDOT Bridge Office with detailed ratings of the bridge's deck, superstructure, and substructure condition, allowing prioritization based on need. Numerous maintenance practices are implemented to slow the deterioration of the structure. These maintenance practices include protective coatings for corrosion control, concrete sealing, expansion joint replacement, and posted limits on weight-restricted structures.

One challenge GDOT faces is the lack of experienced engineers, contractors, technicians, and inspectors to be able to handle the amount of work being released. The retention of skilled personnel must be addressed and the recruitment of a new workforce into the industry should be a priority. While this systemic issue can be seen in various regions outside Georgia, GDOT is taking a proactive stance in recruitment by partnering with K-12 students, colleges, and trade schools. Specifically on the engineering side, GDOT has partnerships with numerous ASCE student chapters to recruit entry-level engineers and provide early exposure to bridge design for civil engineering students.

Public Safety
When evaluating the current bridge structural conditions for safety, it's important to note that only 2% of all Georgia bridges are in poor condition. If a bridge were to fail, resulting in a partial or total collapse, it would cause immediate harm to the public. Since these failures would be catastrophic, GDOT continues to make improvements by reducing the number of bridges in poor condition since the last state report card. A future concern for safety is the legal load, the load at which bridges must be evaluated, which has been raised by 10% in 2023 as discussed earlier. This will affect the load rating of bridges, meaning more will be posted with a weight restriction. Another concern for vehicle loads is the electrification of truck fleets. As freight vehicles evolve, electric trucks are becoming a more popular choice. These electric trucks are heavier than current tractor-trailers, raising concerns about additional loads that must be carried in the future.

Resilience
Resilience is defined as the infrastructure system's capability to protect against multi-hazard threats and how quickly it can recover critical services with minimum consequences for public health and safety, the economy, and national security. It is important that individual infrastructure assets exhibit resiliency, but this quality must also be true for the entire infrastructure system. Georgia is addressing resilience through an alternative approach outlined in the Transportation Asset Management Plan (TAMP). Through this plan, GDOT is incorporating risk considerations into the prioritization of bridge preservation projects, moving towards a "most at risk" approach. This methodology considers the asset condition and evaluates that against the inherent risk associated with failure. The Bridge Prioritization Formula (BPR) is a tool currently used to identify and manage these asset risks by examining combined asset risk to the overall infrastructure system.

Over the past few years, Georgia has faced many weather-induced and catastrophic emergency events that have strained its infrastructure system, including the 2009 catastrophic flood of Atlanta, the 2014 'Snowmageddon', the Interstate 85 fire and bridge collapse in March 2017, multiple hurricanes (including 2016's Matthew, 2017's Irma, and 2018's Michael), numerous bridge overpass hits, the 2017 airport blackout, and the COVID-19 pandemic. The closure of the bridge over I-16 in Treutlen County after a truck impact in 2021 challenged GDOT's ability to cope with emergency closures. GDOT worked quickly to demolish the damaged bridge and reopen the interstate lanes in just a few days.

GDOT understands the importance of defining and integrating resiliency into every aspect of its strategic goals and planning. With (Promoting Resilient Operations for Transformative, Efficient, and Cost-saving Transportation Program (PROTECT) funds, GDOT will be developing projects to further strengthen its infrastructure. Currently, GDOT satisfies and aims to continue to satisfy in the future the federal requirement of having less than 5% of interstate pavements and less than 10% of total NHS bridge deck area in poor condition. The goal to keep 70% of the bridge inventory in good condition will continue to be met based on the investment strategy established in the Transportation Asset Management Plan (TAMP).

Innovation
Georgia is making significant strides in the use of innovative techniques, materials, technologies, and delivery methods to improve the infrastructure. Conventional substructure materials

currently exhibit a service life of approximately 40 years in coastal environments. The use of high-strength stainless steel prestressing strands in concrete piles improves substructure durability, and it is anticipated to achieve a 100+ year service life. GDOT currently outlines a procedure to recommend corrosion-resistant prestressed concrete piles for these specific project applications. GDOT has also evaluated and implemented the use of bridge girders constructed with high-strength lightweight concrete. This approach allows for a 20% reduction in the weight of the girders. Ultra-high-performance concrete (UHPC) is being investigated for use in piles and beams. The Bridge Maintenance Unit (BMU) is also looking at instrumenting bridges to gather real-time data to help guide decision making.

GDOT continues to explore the use of alternative delivery methods to further reduce project costs and expedite project schedules. The Construction Manager/General Contractor (CMGC) method is now approved for use in the state and GDOT is looking to use it for complex projects in urban areas.

Solutions to Raise the Grade

- Identify the harms of loosening weight restrictions for freight support and account for those costs in bridge funding, where more frequent maintenance and replacement will likely be necessary.
- Provide additional, consistent funding for bridge replacement and maintenance – particularly at the local government level.
- Continue programs to identify and fund local bridge replacement and repair needs.
- Continue to work with universities and the private sector to identify and research innovative materials, technologies, and programs to advance the design, construction, and maintenance of Georgia's bridges.
- Build the pipeline for workforce development of engineers by engaging K-12 students and colleges.

Sources

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- Georgia Department of Transportation, FY 2022 Accountability and Investment Report https://www.dot.ga.gov/GDOT/Pages/Publications.aspx
- FHWA Infobridge
- https://infobridge.fhwa.dot.gov/Home
- Atlanta Regional Commission – Transportation Funding
- https://atlantaregional.org/transportation-funding
- Interview of State Bridge Engineer, Donn Digamon, P.E. on September 12th 2023, by the ASCE GA Section Report Card Committee – Bridge Group

Dams: D+

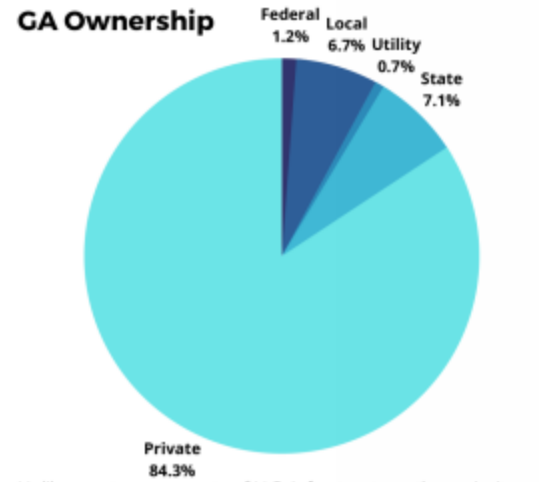
Summary
Dam safety in Georgia has increased in recent years thanks to increased investment and preparedness. In 2023, 78 percent of the state's 542 High-Hazard Potential dams had Emergency Action Plans, up from 58 percent in 2018. Georgia's Safe Dams Program was staffed by 11 full time employees in 2023, up from 10 in 2018, with 35 percent more state funding than the latter year. 84 percent of Georgia's dams are privately owned, and those operations face difficulty paying for inspections and other compliance. Owners have found help with the Federal Emergency Management Agency (FEMA), accessing over $500,000 in the last five years from a new National Dam Safety Program State Assistance Grant Award. Additional state dam safety spending would unlock greater federal support. State dam safety staffers could also use backup; they cover almost twice as many dams per person as their peers in other states. Put another way, Georgia provides funding per regulated dam at only one-quarter of the national average.

Background
Georgia's 5,416 dams are owned by federal, state, and local governmental jurisdictions, private organizations, and citizens. These owners are responsible for mitigating potential risks these structures pose if they fail. The Georgia Safe Dams Act sets the guidelines for managing and maintaining dams across the state. Dams under the jurisdiction of a federal agency (such as those regulated by the Federal Energy Regulatory Commission) are required to meet federal requirements.

Dams in Georgia serve a variety of purposes, including fire protection, flood control, irrigation, and water supply. The vast majority however – 3,120 according to the National Inventory of Dams (NID) – are for recreational purposes. Almost all dams in the state are constructed of earthen embankment, although there are a few that are concrete or rockfill as well.

In the last 45 years, developing and managing dam infrastructure has lagged the demand for the resource itself. Additionally, as this infrastructure ages, the cost of maintaining it in a workable, usable, and safe condition increases while more dams fall into disrepair. Innovative solutions will be needed to lessen the risk posed to people, property, and the environment. These solutions cannot be provided solely by engineers but will require cooperation from engaged stakeholders, including users, owners, and local governments.

Condition and Capacity
According to the NID, there are 5,455 dams in Georgia. The vast majority of these dams – 4,599 (84 percent) – are privately owned. 65 dams are owned by federal agencies, 365 are owned by local governments, 387 by the state, and 39 by public utilities.



Unlike most components of U.S. infrastructure, the majority of dams listed in the National Inventory of Dams are privately owned. (Dam Ownership percentages are based on the most recent NID dataset for the state for total NID-sized dams.)

State-regulated dams are classified as Category I dams, meaning failure of the structure would cause probable loss of human life. The Act also requires inspection of high-hazard (Category I) dams to ensure federal regulatory compliance. Further, the Georgia Safe Dams Act requires regular inventory of Category II (non-high hazard) dams.

Per Georgia Environmental Protection Division's Safe Dams Program, Category I, State regulated dams in Georgia are categorized as follows:

- Satisfactory – 209 dams
- Fair – 65 dams
- Poor – 198 dams
- Not Rated – 37 dams

Although the total number of dams in the federal inventory has increased slightly since 2018, the number of High Hazard Dams under state oversight that are classified as deficient has decreased. Additionally, the Georgia Safe Dams budget has increased 35 percent since 2018.

	TOTAL DAMS IN FEDERAL INVENTORY	TOTAL DAMS UNDER STATE OVERSIGHT[1]	HIGH HAZARD DAMS[2]	STATE HIGH HAZARD DEFICIENT DAMS[3]	STATE DAM SAFETY BUDGET ($ THOUSANDS)	NO. STATE STAFF ON DAM SAFETY	NO. DAMS UNDER STATE OVERSIGHT PER FTE STAFF
Change	+35	-3	+20	-19	+$237	-1	+103
As of 2023*	5,455 (2021)	4109	510	198	$910 (2021)	9[4]	457
As of 2018	5,420 (2016)	4,112 (2017)	490	217	$673 (2017)	10	411
As of 2013**	4,053 (2011)	4,053	484	130	$600 (2013)	4	1,013
As of 2008**	4,883	3,703	450	155	$727 (2005)	8	463
As of 2003**	4,977	3,412	399	105	$682	10	341

Source: Association of State Dam Officials and the Environmental Protection Division of Georgia Department of Natural Resources
*Data as of September 2023.
**Indicates figure taken from National Inventory of Dams (NID) and based on NID definitions.
1 Estimated number of dams under state oversight. Data for 2013 could not be verified and thus is not reported for some national categories.
2 Includes dams, not regulated by the US government that are 25 feet high or greater or impound a volume of 100 acre-feet or greater at the maximum dam height.
3 High-hazard dams with identified deficiencies marked as 'Poor' by ASDSO Georgia Dam Safety Performance 2022 Report.
4 Two (2) Staff Positions are open as of September 2023.

Since 2018, categorical usage of dams in Georgia has remained slightly decreased. Although the number of state-regulated dams slightly decreased, the estimated Georgia population has increased 1.1 percent since 2020 and is expected to continue into the foreseeable future.

Operations and Maintenance

One of the most significant challenges facing dams in Georgia remains operation and maintenance. With most dams in Georgia in private hands, the significant cost associated with dam operation and maintenance remains a daunting challenge. The 9 inspectors in the Georgia Safe Dams Program devote significant resources to working with private property owners to help in bringing their dams into compliance. Recently, there has been a noticeable improvement in dam owners' response to regulatory communication/notification. This is demonstrated by the reduction in high hazard dams that are considered deficient. Many owners do not have the means to repair their dams, and the best option to deal with a deficient dam can be a controlled breach to eliminate the risk of failure.

Public Safety

According to the NID, including those under federal and state purview, there are 542 high-hazard dams, 12 significant hazard dams, and 4,612 low-hazard dams in the state, with a hazard potential classification unknown for the final 291 dams. Please note that the 12 significant hazard dams are not defined under Georgia Law. They are considered under Federal purview. Hazard classification is an indication of the impact of a dam failure, should one occur. The failure of a high-hazard dam would result in probable loss of human life, while a significant hazard dam failure would result in probable economic loss.

Every high-hazard dam in Georgia is required to have an Emergency Action Plan (EAP). EAPs create standard procedures in case of dam breach or failure. These standard procedures include lists of which agencies to alert, as well as flood inundation maps so officials know who needs to evacuate. These plans help people get out of harm's way in advance of a catastrophe. Although the need to develop EAPs for high-hazard dams is a regulatory requirement, the effort falls on the shoulders of dam owners. EAP development in Georgia has lagged behind regulatory requirements, but large strides have been made in recent years, and currently 78 percent of Category I dams in the state have EAPs. Additionally, over the last 5 years, almost 130 dam breach models have been completed by consultants on behalf of the State to determine the proper classification of Category II dams. This analysis has been funded with a combination of Federal and State funding. These models were in addition to and/or in support of models performed internally by the State.

These largely regulatory changes demonstrate significant progress during the period. These regulatory changes lay the groundwork for real improvement in dam infrastructure which will occur among owners and operators. Continued review and updating of EAPs will be a necessity.

Funding and Future Need

The 2019 Georgia's ASCE State Report Card contained four recommendations for increases and improvements considered fundamental for improving the state of dams. These included increases in funding and staffing for regulatory functions, ensuring Emergency Actions Plans are in place for the most critical dams, and public education dam safetyon the importance of dam safety activities such as repair and maintenance for dam owners and operators. The funding for dam repairs and operations and maintenance remains the responsibility of owners.

In 2019, the application process for the federally-funded HHPD grant program was initiated. Although this program may provide - for the first time ever in Georgia - some funding assistance to private dam owners for needed repairs, it might not be sufficient because private dam owners are required to partner with an agency or non-profit to secure funding. The 2021 Infrastructure Investment and Jobs Act – or Bipartisan Infrastructure Law – provided a historic investment in the nation's dam safety infrastructure. The National Dam Safety Program (NDSP) received approximately $217 million in resources for FEMA state assistance grants and other NDSP activities. According to the FEMA website: NDSP's Program State Assistance Grant Award provided to the State of Georgia approximately $426,000 over the last five years.

Given the typical cost of dam repairs, continuing the existing grant program with additional funding is necessary with these expenses. Also, as state dam safety staffing has decreased since 2018, additional efforts (e.g., increased compensation, signing and performance-based bonuses, etc.) to fill open positions should be made to reduce the workload of the existing staff.

With Georgia's population forecast to increase an additional 30 percent by 2060, it is reasonable to expect that water supply needs will continue to rise, possibly resulting in the need for more dam structures. As the number of dams under state regulation continues to increase, the needs for funding and staffing for the Georgia Dam Safety Program will continue to increase.

Resilience and Innovation

The Georgia Safe Dams Program has coordinated with the Association of State Dam Safety Officials (ASDSO) to organize, prepare, and present educational training seminars and materials on dam safety for businesses and homeowners responsible for dams. Of particular note, is their training entitled "Georgia Dam Safety Workshop for Owners and Operators" which includes educational materials developed and provided to homeowners and businesses responsible for dam repair and maintenance. These materials should be made available to realty companies, chambers of commerce, libraries, and on-line through Georgia Safe Dams Program and local governments. Professional organizations such as ASCE can assist in developing these materials.

The decrease in high-hazard deficient dams from 217 in 2018 to 198 in 2023 represents progress in reducing the deficient dams, i.e., addressing the issues and getting the issues corrected. However, Georgia will still need to rely on innovation to increase owner awareness and facilitate

the funding needed to address deficiencies.

RECOMMENDATIONS to Raise the Grade

- PUBLIC AWARENESS: Increase awareness of dams to help bolster support for additional funding to mitigate the risks associated with potential dam failures.
- INCREASE STATE FUNDING: Additional funding and hiring additional staff are needed to assist with the backlog of classification of dams to be reviewed by the state Georgia Environmental Protection Division's Safe Dams Program.
- IMPROVE EMERGENCY PLANNING: With the vastly improved recognition and development of EAPs, it will be imperative to provide the outreach to dam owners and communities and begin systematic training and exercising of EAPs to enhance the purpose, function, and effectiveness of these living documents.
- OWNER ASSISTANCE: In line with the new HHPD program, continue to support and fund grant programs that provide funding mechanisms that will support dam owners in the fulfillment of dam safety and rehabilitation requirements.
- CHANGE THE LAW: The change needs to implement funding for Significant Hazard Potential Dams (SHPD).

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Drinking Water: C+

Summary
Georgia generally has adequate supply and treatment capacity for the 95 percent of its 10.9 million residents connected to centralized drinking water services. However, higher utility rates are necessary to meet the needs of a growing state. Statewide drinking water investment needs were estimated at $19.7 billion over 20 years in 2023, up from $12.5 billion five years earlier. Those projections don't fully account for materials and labor costs due to inflation and impacts from regulated hazards. The median monthly water bill in Georgia was $29.90 in 2022, well below the national average of $39. That limits capabilities to cover the full cost of service, including capital, maintenance, and operating needs. Utilities must also comply with new federal regulations on "forever chemicals" and lead removal. New state requirements mean Georgia utilities must prepare an asset management plan, coordinated with permit renewals, identifying conditions and risks, and must establish reserve funds based on those data.

Background
Georgia's drinking water infrastructure system serves nearly 10 million people; less than 5% of the state relies on self-supplied water from private wells. The state's population continues to expand with another 5 million people expected by 2060. Georgia was recently named the best state for business growth, with a 13.5% growth of businesses in 2022[1] and recognition that the state exceeded economic development records for the 3rd year in a row, with 426 economic development projects resulting in 38,400 new jobs from July 2022 to June 2023.

Residential needs from that growing population and economic development in growing companies result in significant water needs, placing pressure on our water systems to expand. Those expansions are necessary in terms of water supply, treatment, and distribution. Drinking water systems are struggling to balance expanding for growth while maintaining asset replacement and renewal in existing areas of the system.

Capacity
Overall, water planning assessments conducted through the Georgia Regional Water Planning process indicate that the State has adequate water supply; treatment capacity is sufficient for current water demand, often exceeding current demands for years into the future. A number of utilities have seen future forecasted water needs drop due to system efficiencies and a growing conservation mindset among customers. There are localized areas of water supply concerns, such as coastal saltwater intrusion, and the Flint River basin, as identified in the Regional Water Plans updated in 2023. Both areas have restrictions in place to protect resources and downstream users.

Since the 2019, additional water supply sources have come online including Paulding County's Richland Creek Reservoir and the City of Atlanta's Bellwood Quarry. Walton County's Hard Labor Creek Reservoir is complete, and a new water treatment plant is under construction. These three reservoirs add 18 billion gallons of storage capacity to support drought resilience.

[1] US Bureau of Labor Statistics

Condition
Georgia Environmental Planning Division (EPD) has initiated a new requirement for drinking water systems to develop an asset management plan in coordination with permit renewals beginning in January 2024. The focus of these plans is to establish the amount of reserve funding needed to support the utility's asset replacement and renewal. EPD estimates that Georgia is roughly 20 years behind in asset management practices, and the implications of that estimate may indicate that the state is behind on replacing aging infrastructure. However, the state has led the country by requiring water loss audits for the last 12 years, promoting annual assessments of the water system. Overall, the mid-size to large water systems are found to be in good condition, while smaller systems may be incurring more challenges due to funding limitations.

Operations and Maintenance
Management of assets is critical to maintaining service level goals. Aging infrastructure requires additional planning to identify funding mechanisms for asset replacement and renewal. Further,

For the past several years, finding qualified personnel to fill key roles has proven challenging. However, at the utility level, staffing vacancies are beginning to decline, with much needed qualified operators filling roles. Maintaining personnel in those key roles is mission critical for successful operations and maintenance activities. Automation, machine learning and artificial intelligence are shifting the traditional operations skillset, and opportunities for advanced training are an important retention strategy.

At the State level, EPD has implemented a requirement for asset management plans that are tied to water production permits but continues to be understaffed, losing its institutional knowledge to retirement or to higher paying opportunities. Identifying ways to attract and retain high caliber, capable technical staff at EPD is important to maintaining the safety and reliability of water systems in Georgia as these plans are implemented.

Funding
Drinking water infrastructure operation, rehabilitation, replacement and expansion are typically funded by rates paid by customers. When setting rates, utilities must consider full life cycle costs to manage assets. The median monthly water bill in Georgia is $29.90, which is well below the national average of $39/month in 2022. Additionally, new regulations on forever chemicals and lead have added new costs making overall funding insufficient to meet the drinking water needs of our state. Additional funding is needed for infrastructure to keep pace with these operational needs, facilitate new economic development opportunities, and the impacts of climate extremes with the goal of developing more resilient water supplies.

Funding for water system improvements varies; large projects are often funded through capacity fees paid by those expanding the system or the issuance of municipal bonds. The Georgia Environmental Finance Authority (GEFA) administers federally funded drinking water state revolving funds through low interest loans, as well as other state funds, such as the Georgia Reservoir Fund for water supply projects. This office administers additional funding from the 2021 Infrastructure Investment and Jobs Act (IIJA) from 2022-26. Rural communities and smaller systems may qualify for funding through economic incentive grants from the U.S. Department of Commerce, U.S. Department of Agriculture and Community Development Block Grant programs, administered through the Georgia Department of Community Affairs. Less common, but often

more innovative funding mechanisms may include public-private partnerships.

Future Need
Improvements to Georgia's drinking water infrastructure are essential for safe, reliable drinking water into the future. A significant challenge is the treatment and removal of emerging contaminants, such as PFAS/PFOA – commonly referred to in the news as "forever chemicals." These pollutants will require new expensive treatment technologies to remove to proposed limits. Another regulatory driven near term cost is the replacement of lead service lines; the U.S. Environmental Protection Agency (EPA) 2023 Drinking Water Infrastructure Needs Survey and Assessment (DWINSA) estimates Georgia's lead service lines are 0.5% of the total service lines in the state, with roughly 46,000 pipes to replace. Utilities are currently faced with identifying, sampling, and remediation and, while there is some limited federal funding available, most of these costs will ultimately be transferred to the rate payers.

According to DWINSA, Georgia is facing a funding need of $19 billion over the next 20 years to meet capital improvement needs; these values do not include the enhanced treatment technologies that are anticipated. The estimates may be low overall since the survey completion is voluntary and not all capital needs qualify to be included in the survey.

Public Safety
The safety of drinking water in Georgia is regulated by the EPA, with permitting and enforcement delegated to EPD. Overall, Georgia utilities have a strong public safety record in terms of drinking water; no major incidents have been reported and less than 1 percent of systems have enforcement actions in progress. Georgia EPD, in coordination with the Georgia Association of Water Professionals, established a boil water advisory notification program, which provides an easy-to-follow protocol for notifying the public in the event of an emergency. The America's Water Infrastructure Act of 2018 (AWIA) provided utilities with the opportunity to assess hazards to the drinking water system and develop emergency response plans to be prepared for the worst situations.

Resilience
The AWIA Risk and Resilience Assessments strengthened the water industry overall, improving awareness of a variety of hazards and threats. These plans assessed various risks and prepared responses and protocols to protect public safety and utility staff.

Recognizing the importance of unified management of assets, in 2008 Georgia enacted the State Water Plan. Ten Regional Water Planning Councils completed their respective Regional Water Plans in 2011. These plans identify policies and actions to improve water quantity and water quality. Updated Regional Water Plans were adopted in 2017, and again in 2023, and provide water supply and water quality assessments to inform management practices to improve water system resilience. Regional water planning through the State encourages emergency interconnectivity of systems to improve water supply availability. The state has encouraged new water supplies through the Governor's Water Supply Act. The development of additional storage is needed in areas of the state more susceptible to flash drought.

Innovation
Georgia's utilities are realizing increased efficiencies and water loss reductions with applications

of Advanced Metering Infrastructure, or AMI. This technology provides granular data to operators and, in some systems, directly to customers for more sophisticated water management practices.

New innovations are needed as the industry manages emerging contaminants like PFAS/PFOA. Reverse osmosis, granular activated carbon, powdered activated carbon, and ion exchange resins are being assessed and considered for large scale water treatment solutions. Each present positives and negatives, but all are a large costs water utilities currently do not have included in their budgets.

Solutions to Raise the Grade

To maintain and improve Georgia's drinking water infrastructure, the following key strategies are needed:

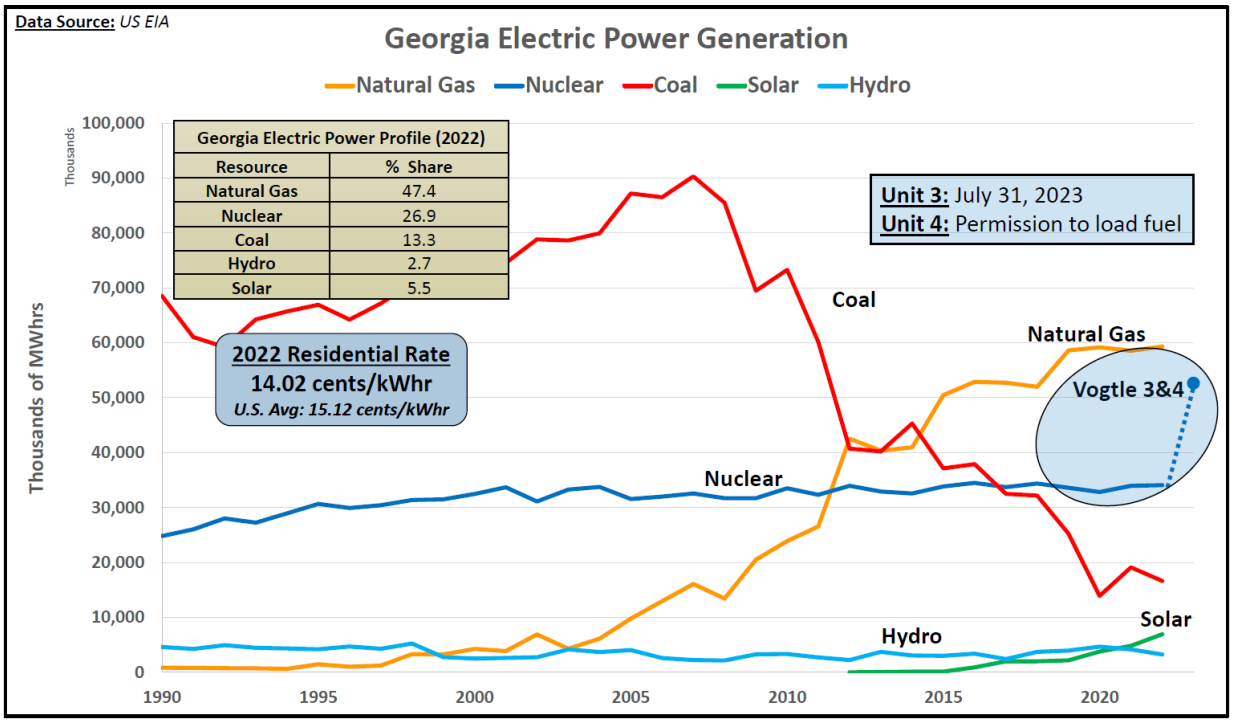
- FUNDING: Increase the amount of funding available to utilities for infrastructure improvements, consider encouragement of innovative approaches to funding.
- PLANNING: Utilities should implement asset management plans, considering condition and risk to support prioritization for capital improvements.
- INNOVATING: Enhance water system resilience by considering additional water supply options, where appropriate, and employing the use of smart water technologies to improve efficiencies and avert water quality challenges in real-time.
- WORKFORCE RECRUITING: As the workforce ages, publicize the need for engineers and operators who will commit to a career in drinking water innovation.
- ADJUSTING RATES: Utility rates should provide for the full cost of service, including operation, maintenance and capital needs.

Energy: B

Summary
Energy is critical for Georgia, supporting 10.9 million residents and 1.4 million businesses. The state continues to invest in grid upgrades, with Georgia Power Company spending $1.3 billion across their integrated network from 2020 through 2022 and planning $7 billion of work from 2023 through 2025. Georgia's energy generation remains level, with about 4,000 MW of coal retiring in recent years and about the same capacity installed with nuclear, solar, and natural gas. However, Georgia Power Company's latest demand forecast shows a significant supply increase is needed. The state's average residential rate of $0.140/kWh is below the national average of $0.151/kWh. Those rates were frozen from 2016 to 2020, meaning steeper rate hikes are possible to recover costs from new energy generation projects, increase interconnections in a grid hardened for extreme weather, bolster resilience, and support techniques like utility-scale storage and smart microgrids.

Condition and Capacity
In 2022, Georgia's electric power generation mix was 48.5% natural gas, 27.9% nuclear, 13.6% coal, 5.7% solar, 2.6% hydroelectric, 1.5% biomass and 0.1% petroleum. Georgia's Integrated Transmission System (ITS), a unique network covering 90 percent of the state, is jointly owned by Georgia Power Company (GPC), Georgia Transmission Corp., Municipal Electric Authority of Georgia (MEAG), and Dalton Utilities. In collaboration with the investor-owned utility, member-owned utilities (cooperatives), and government-owned utilities (municipals), the ITS covers 17,800 miles (of the 18,500 total miles) to generate, transmit, and distribute power throughout the state.

Since 2018, the energy resource portfolio for Georgia's electric power sector has shifted fundamentally with a reduction of 3,938 MW of coal-fired generation capacity at Plants Hammond, McIntosh, Wansley and Scherer. A similar amount of new generation has come online, with a 1,110 MW increase in nuclear capacity with Vogtle Unit 3, a 2,795 MW increase in solar PV capacity and an increase of 299 MW in natural gas capacity. This shift in plant capacity translated to a change in power generation as the state's dependency on coal decreased from 24.9 percent in 2018 to 13.3 percent in 2022. During this same period, natural gas dependency increased from 40.2 percent to 45.6 percent and solar PV increased from 1.5 percent to 5.5 percent.



Plant Vogtle's Units 3 and 4 are the first new generation of nuclear energy facilities and only active units under construction in the U.S. These units will generate enough electricity to power 500,000 homes and businesses for the next 60 years. Plant Vogtle Unit 3 is now serving customers and in 2024, Unit 4 will provide an additional 1,100 MW increase in nuclear for a total of 2,200 MW of new nuclear capacity. While other nuclear facilities across the US never came to fruition, Georgia persisted and gained valuable insights with Vogtle. Designing and constructing simultaneously added challenges as did maneuvering supply chain shortages. Many large projects across the nation faced similar constraints and an untrained workforce contributed to the delays. These lessons learned and investments now position Georgia to engineer the next site more predictably and cost effectively. Since cost is a large consideration, utilities should consider partnering with large technology firms who have committed to advancing clean energy to help share the financial risk with large scale projects.

Hydroelectric generation is an important part of GPC's reliable, carbon-free generation mix and the PSC approved additional investments in Plants Sinclair and Burton to help ensure they can continue to reliably serve Georgia.

Solar Energy Industries Association ranks Georgia as the 6th highest producer of utility-scale solar generation, constituting 4.9 percent of all solar PV in the U.S. In the next 3 years, Georgia Power will be adding 2,300 MW renewable energy resources, part of the goal of 6000 MW by 2035 per Georgia Power's 2022 Integrated Resource Plan (IRP). With the retirement of Georgia Power controlled coal units by 2030, the decision to keep Plant Bowen online was strategic in ensuring Georgia would have readily accessible baseload during critical need.

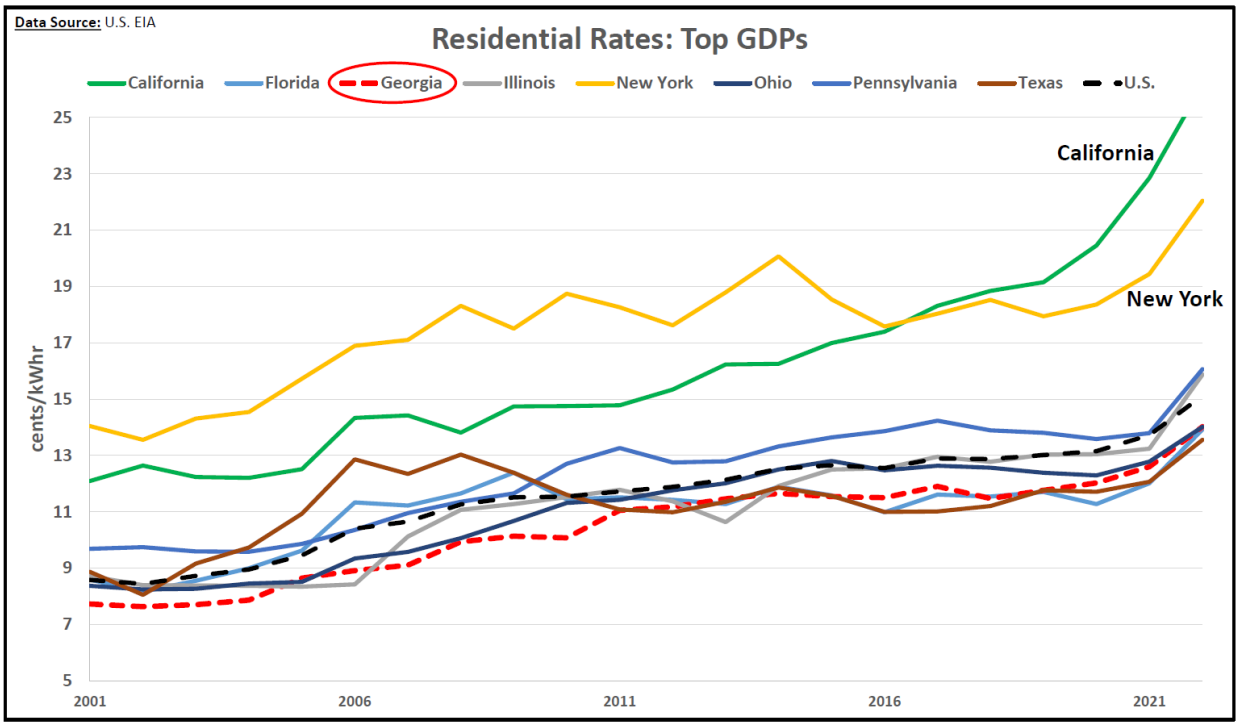
The Georgia Public Service Commission (PSC approved 2000 MW of capacity from natural gas power purchase agreements (PPA's) in the coming years. While natural gas is another

consideration for increasing generation capacity, the associated carbon capture costs make it comparable to nuclear generation and should be carefully analyzed. Georgia is the only state in the country offsetting baseload coal with dispatchable natural gas, baseload nuclear and renewables while also reducing carbon emissions and prioritizing and maintaining reliability.

Because the grid is aging, evaluating and upgrading infrastructure is vital for a safe, resilient, and reliable system. GPC's 2020-22 $1.3 billion dollar Grid Investment Program was a multi-year initiative to enhance service and reliability in communities across Georgia by also improving the distribution and substation assets of the grid. The Company followed that Program up with $7 billion of planned grid upgrades in their 2023-25 PSC filings. The goal is to improve reliability for customers by enhancing miles of overhead and underground distribution lines including implementing smart grid technology for faster reaction times. Additionally, critical transmission feeders and many transmission and distribution substations will be upgraded also.

Funding

In 2022, Georgia's residential electricity rates average 14.02 cents/kWhr, ranking lower than the U.S. average of 15.12 cents/kWhr, Georgia has the 8th largest GDP among U.S. states. Among these top eight, Georgia's electricity rates are the 4th lowest. Georgia Power Company's (GPC) base electricity rates were frozen from 2016 to 2020 with average rates increasing over the past two years. These decisions indicate potential risks to Georgia's residents and businesses. Georgia's low energy rates may have been possible because not enough work was being done to harden transmission and distribution networks against extreme weather and other hazards. These decisions indicate potential risks to Georgia's residents and businesses. Georgia's low energy rates may have been possible because insufficient work was being done to harden transmission and distribution networks against extreme weather and other hazards. Rates are expected to increase in the next 3-5 years from cost recovery for completion of reactor Units 3 and 4 at Nuclear Plant Vogtle.

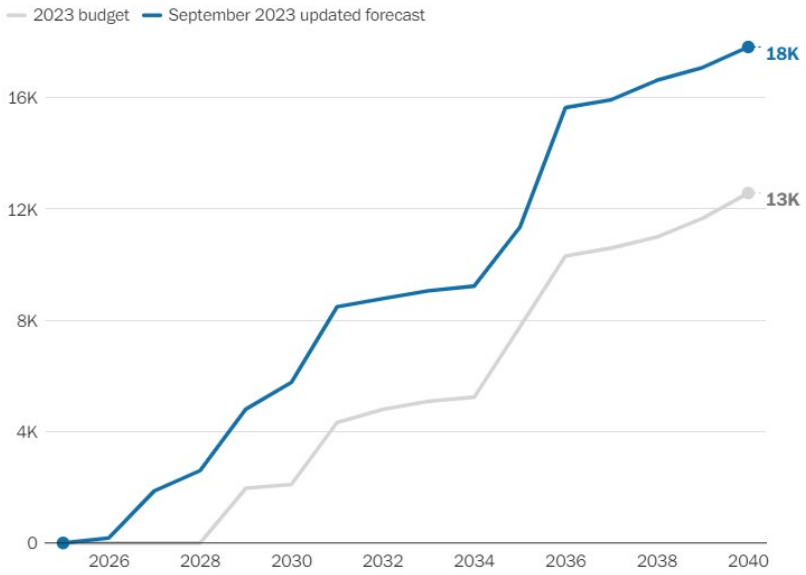


Operations and Maintenance and Future Need

Demand for energy in our digital world is increasing with the influx of electric vehicles (EVs) and artificial intelligence-driven data centers, all of which require processing power to be successful. Georgia embarked on a strategic effort to expand the state's industrial and manufacturing capacity in EVs and batteries, a thoughtful decision as it represents fundamental change in both the transportation and electric power sectors. New EV registrations in Atlanta have nearly doubled in the last year, therefore electric utilities must plan for the long-term effects of rising EV implementation and how the increased load will affect the grid. Electric utilities need to analyze where distribution feeders and transformers need upgrading and prepare the grid for this additional burden.

In summer 2023, GPC updated their initial 2023-25 energy plan with significantly higher estimates for demand – and thus greater need for power generation with grid enhancements and interconnections.

Forecasted Demand for Power, Georgia Power Company, in MW



With the global interest of reducing carbon emissions, it is imperative to deliver reliable power efficiently to customers today while meeting the growing demand of the future. Transportation accounts for 47.2 percent of Georgia's total CO2 emissions while the electric power sector accounts for 33 percent. CO2 emissions from Georgia's electric power sector decreased 55.7 percent from its peak in 2007 to 2021 and are currently at 1977 levels. Georgia's CO2 intensity on a per GDP basis in 2021 was lower than the national average, ranking Georgia 21st lowest in the country for the electric power sector.

As energy diversity is key, offering tax credits for renewable investment, storage, and redeployment of stored energy – and for deploying in disadvantaged areas – will stimulate development. The Inflation Reduction Act (IRA) of 2022 committed approximately $392 billion to accelerate progress to meet America's climate goals and build a clean energy economy. The

Powering Affordable Clean Energy (PACE) Program offers certain electric utilities loans with partial forgiveness for renewable power generation projects or storage for or with renewable energy. The U.S. Department of Energy announced up to $3.5 billion in Grid Resilience and Innovation Partnerships (GRIP) Program investments for 58 projects across 44 states to strengthen electric grid resilience and reliability across America. To truly accelerate progress, funding should be provided as full grants, timelines and schedules should be extended to better handle supply chain delays and critical epicenters should be considered in addition to rural, disadvantaged communities. Permitting continues to be a bottleneck therefore partnerships, agreements and design guidelines with environmental agencies should be put in place now to expedite the process.

It is vital Georgia identify and invest in future forms of generation to offset the decrease in coal generation. Vogtle Unit 3 and 4 will provide additional baseload. Georgia's investment in solar development will soon push the state to the top 5 in the nation for solar generation and baseload nuclear is foundational to these carbon-reducing efforts. However, in perhaps only five years, Georgia will be lacking in capacity if we continue to decommission coal generation at our current rate. Additional generation will be needed to compensate the difference of decommissioning coal generation and renewable energy resources alone cannot supplement the balance. In May 2023, the U.S. Environmental Protection Agency (EPA) proposed new carbon pollution standards for fossil-fuel fired power plants, including natural gas power plants. Georgia has little to no natural gas reserves or production so plans to design and build new pipelines should happen now. Adding small modular nuclear reactors, as considered by the Tennessee Valley Authority, and increasing combined cycle natural gas capacity will be necessary by 2030. When the value of building new nuclear power plants is linked to carbon emissions, the expense of building a plant becomes viable. Adding grid-scale battery storage should be planned in addition with nuclear, which provides baseload zero-carbon electricity and must be considered.

Public Safety; Resilience; Innovation

Hospitals, first responders, water and sewer departments all depend on the lifeline of the grid, and it is essential for utilities to strengthen and plan for the impact of electric service interruption. There are three reliability metrics referenced in the U.S. The Customer Average Interruption Duration Index (CAIDI) score for Georgia was 108.9 minutes per interruption, well under the national average, ranking Georgia as 7th lowest in the U.S. The System Average Interruption Duration Index (SAIDI) score of 140.5 minutes, also well under the national average, ranking Georgia as the 14th lowest in the U.S. The System Average Interruption Frequency Index (SAIFI) metric was 1.3 times per year compared with the U.S. average of 1.4. This ranked Georgia as 25th in the U.S.

Because of Georgia's Atlantic coastal location, the frequency and severity of extreme weather events increases the need for reliability and resilience. Ice, snow, strong winds, lightning, and typically more than 50 days per year with temperatures higher than 90°F (32°C) all contribute to potential life-threatening interruptions.

Changes should be made to ensure our system can withstand the elements and meet the public's expectation for affordable, reliable power. Transmission and distribution power poles, regardless of material type, should be designed for weather elements and loading per the most up-to-date codes, standards, manuals of practice, and guidelines. As cyber and physical security threats

increase and become more serious, vigilance to create a reliable and resilient system should be at Georgia's forefront. With the increase of utility scale solar development so should the research in renewable distributed energy resources, battery energy storage systems and smart grid technologies. Advanced energy technologies and smart grid investments have improved system reliability, but more efforts are needed. To improve customer reliability and resiliency to grid disturbances, funds should be granted to invest in microgrids, a load center that can connect and disconnect from the grid to operate through outages. Utilities should also develop resiliency plans for existing distribution circuits that provide life essential power services by creating contingency plans and stocking critical long-lead time materials to reduce outage durations. Utilities should continue to assess their grid vulnerabilities and plan for contingencies. Large storm events impacting large geographic rejoins should be included in these resiliency plans including "black sky" events that have the potential to impact several utilities simultaneously within the State.

Diversification of generation allows for continuous service against the severe and extreme weather that Georgia faces. Georgia must expand natural gas combined cycle capacity, invest in small modular nuclear reactors and continue to support research in energy storage. The state should continue to encourage utility scale solar development with tax credits, fund and upgrade the aging infrastructure, invest and expand energy efficient programs such as demand-side management programs, continue implementation of smart grid energy technologies and stay vigilant in protecting against security threats.

Solutions to Raise the Grade

While technical, regulatory and financial obstacles may slow down progress, addressing the recommendations below can improve Georgia's energy grade in the future:

- Funding should be allocated to meet life-cycle costs of infrastructure so the grid is built to the most up-to-date, resilient codes and standards.
- Streamline permitting processes to facilitate prompt construction of critical new transmission lines, natural gas pipelines and nuclear generation.
- Georgia's power stakeholders should plan for nuclear generation with additional AP1000's and/or small modular nuclear reactors, expansion of natural gas combined-cycle capacity
- Utilities should also develop resiliency plans, and leverage federal funding to implement smart grid technologies in addition to creating microgrids for critical infrastructure facilities to weather storm events and other potential outages.
- Utilize partnerships between grid companies and large industry firms through tax credits or incentives to help share the financial risk in next generation nuclear
- Institute grants for renewable investment, storage and redeployment of stored energy and for developing in critical epicenters in addition to disadvantaged areas.
- Continue the state's calculated and measured integration of utility-scale solar PV into the state's resource portfolio.

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Ports: C

Executive Summary
Georgia has marine terminals in Savannah and Brunswick and two inland ports – the Appalachian Regional Port and Port Bainbridge – operated by the Georgia Port Authority (GPA). These ports have a significant economic impact, supporting 561,000 jobs, contributing $33 billion in personal income and $3.8 billion in state and local taxes. GPA's marine and inland port infrastructure achieved a 35 percent increase in Twenty-Foot Equivalent Unit (TEU) handling from 2018 to 2022. GPA has recently made many operational and maintenance improvements, expanding its workforce by one-third and adding 1.2 million TEUs of annual container yard capacity. The Port of Savannah now features the largest rail terminal on a port in North America, with the 85-acre Mason Mega Rail Terminal, which features 24 miles of on-terminal track. Facility improvements completed within the past 5 years and those currently planned will continue to improve operations as GPA plans to invest over $4.5 billion in capital investment over the next 10 years.

Background
Georgia's ports are critical to the economies of Georgia, the Southeast and the and the nation. They support over 561,000 jobs in Georgia, $140 billion in revenue, $33 billion in personal income and $3.8 billion in state and local taxes.

The Georgia Ports Authority (GPA) oversees the operation of its facilities and maintains a state of good repair – on which its business heavily depends. While GPA controls some aspects of state infrastructure, many infrastructure classes, including highway and rail connections, are beyond its jurisdiction. This report card covers both "inside" and "outside the fence" infrastructure and focuses on the inner workings of the comprehensive port system.

Georgia has marine terminals in Savannah and Brunswick as well as two inland ports – the Appalachian Regional Port and Port Bainbridge. The Port of Savannah has two terminals: Garden City and Ocean. The Port of Brunswick has three terminals: Mayor's Point, Colonel's Island, and East River. A terminal is where cargo is transferred between ships and other modes of transportation, such as rail and roads.

Condition and Capacity
Ensuring adequate capacity on roads, rail, and inland port terminals to carry goods to and from the ports will be critical to the success of Georgia's ports. In 2022, GPA handled nearly 5.9 million TEUs, an increase of 5.4% over the previous year. Currently, the Port of Savannah is the busiest U.S. port for exports. There were 558,327 intermodal container moves in 2022, GPA's second busiest year for rail cargo on record. Over the four-year period from 2018 to 2022, the Port of Savannah grew cargo from 4.35 million TEUs per year to 5.89 million TEUs, representing a 35% increase.

In addition to record container cargo in 2022, GPA achieved a 16% increase in breakbulk tonnage, which rose to nearly 3.3 million tons last year; an improvement of 443,000 tons compared to 2021. In roll-on/roll-off (RORO) cargo, which refers to wheeled cargo such as cars and tractors, Colonel's Island Terminal in Brunswick handled 651,101 units of autos and

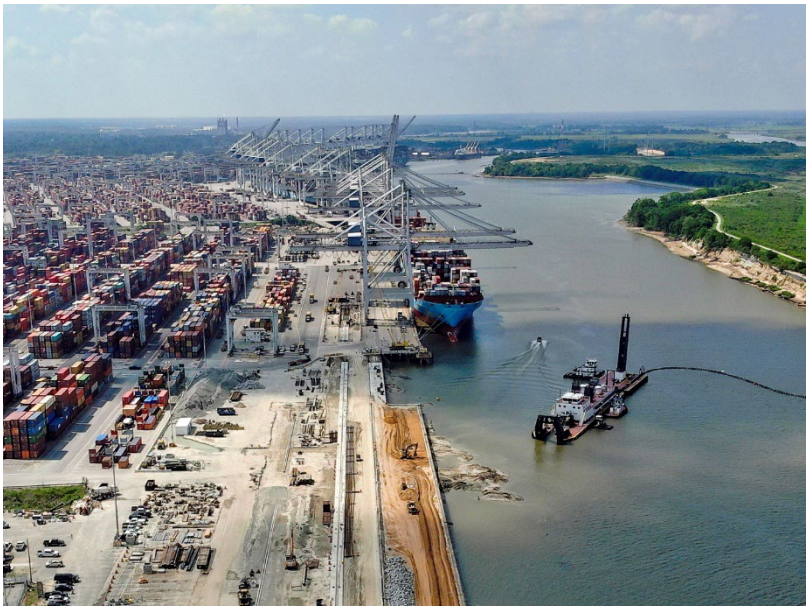
machinery. Ocean Terminal in Savannah moved another 19,630 RORO units, for a total of 670,731, an increase of 0.4%. Total tonnage crossing all GPA docks reached 42.4 million tons last year, an increase of about 2% or nearly 760,000 tons.

To accommodate business growth, GPA expedited infrastructure projects, increasing annual container yard capacity, or annual throughput, by a total of 1.2 million TEUs in 2021 and 2022. Another $1.9 billion in improvements are underway in fiscal year (FY) 2024, which will add another 3.5 million TEUs of annual capacity, as well as space for another 200,000 vehicles each year.

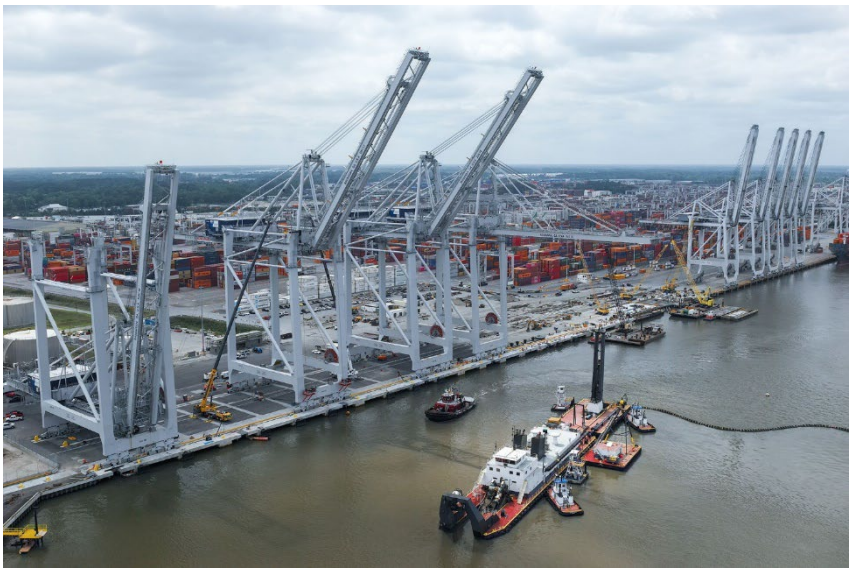
These terminal improvements will complement projects such as the Savannah Harbor Expansion Project completed in 2022, which deepened the shipping channel to 47 feet at low tide; the Mason Mega Rail Terminal (2022), which increased the Port of Savannah's rail lift capacity to one million containers per year; and the 2023 renovation of Garden City Terminal's Berth 1 to accommodate vessels equipped to carry 16,000 or more TEUs.

Modifications of properties and facilities behind Berths 7, 8, and 9 to provide additional container storage and equipment for the Port of Savannah were completed in April 2023, and cost approximately $66.5 million.

With the renovation of Berth 1 at Garden City Terminal to handle 16,000+ TEU vessels, the 90-acre Garden City Terminal West expansion, and the transition of Ocean Terminal, from largely breakbulk and RORO facility to an all-container facility, the Port of Savannah is set to increase annual capacity from 6 million to 7.5 million TEUs in 2023, and to 9 million by 2025.



Caption: Garden City Terminal Berth 1 undergoing construction



Caption: Garden City Terminal Berth 1 post-construction and ship-to-shore crane delivery

Garden City Terminal at the Port of Savannah is the fourth-busiest container port in the U.S. and the largest single-terminal operation in North America. Garden City Terminal consists of over 1,500 acres and nine containership berths, as well as access to two interstates and two Class I rail carriers. The terminal averages 12,500 gate moves per day, reporting only 33 minutes for single container moves and 54 minutes for import-export moves. Garden City Terminal also boasts four gates, 48 lanes (including 28 pre-check lanes), and 12 portal approach lanes. There is unrestricted double-stack rail service and overnight service to Atlanta. Additionally, there are dozens of high-volume retail import distribution centers in the Savannah area. GPA uses the interactive Global Carrier Services tool to provide worldwide transit times to and from Savannah, as well as rail and road transit times for major inland U.S. hubs.

The Colonel's Island's RORO facility at the Port of Brunswick specializes in automobile transportation and is used by carmakers and industrial and agricultural equipment manufacturers. In 2022, GPA RORO capacity was 1.2 million units. However, the expansion of Colonel's Island will bring annual capacity to 1.4 million units. Mayor's Point Terminal specializes in forest products, such as wood pulp, linerboard, plywood, and paper products. East River handles a mix of bulk cargo, such as wood pellets, fertilizers, gypsum, and other minerals.

There are other, smaller ports within the GPA network. Port Bainbridge is located on the Chattahoochee River and has rail connections and a large storage facility. The Appalachian Regional Port is an inland rail hub for containers in Northwest Georgia. A second regional rail container terminal is under construction in Gainesville, and a third is planned for west-central Georgia. Table 1 summarizes these ports and their access.

PORT	TERMINAL	AVAILABLE RAIL	INTERSTATE ACCESS
Savannah	Garden City	Norfolk Southern	I-95 – 5.6 miles
		CSX	I-16 – 6.3 miles
	Ocean	Norfolk Southern	I-16 -1.2 miles

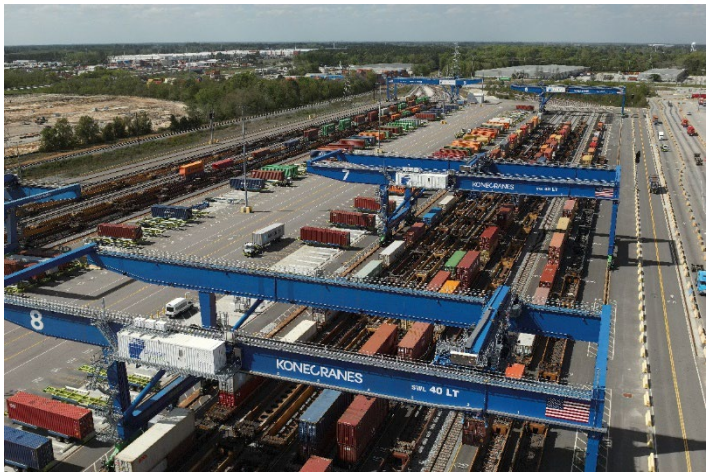
		CSX	I-95 – 10 miles
Brunswick	Colonel's Island	Norfolk Southern	I-95 – 2.5 miles
		CSX	
	Mayor's Point	Norfolk Southern	I-95 – 5 miles
		CSX	
	East River	Norfolk Southern	I-95 – 5 miles
		CSX	
Bainbridge		CSX	I-85, I-185
Appalachian Regional		CSX	I-16, I-75

As noted in the 2019 Report Card, several infrastructure projects were necessary to raise the grade of local logistics infrastructure. Recently completed projects include:

- **Savannah Harbor Deepening** The U.S. Army Corps of Engineers (USACE) completed this project in March 2022, delivering a new depth of 47 feet at low tide and 54 feet at high tide – five feet depth increases allowing vessels to add cargo and transit the river during more hours of the day. According to a USACE study, the project is expected to generate benefits to the nation of approximately $7.70 for every dollar invested in the project.

Caption: A barge dredging during the Savannah Harbor Expansion Project

- **Rail Infrastructure Enhancements**: The Port of Savannah's 85-acre Mason Mega Rail Terminal is now the largest of its kind on a port terminal in North America. In November 2021, GPA commissioned the final set of nine working tracks (out of a total of 18) at the rail yard. The Network Georgia initiative will establish a series of inland ports including Appalachian Regional Port (ARP) & the Blue Ridge Connector focused on shifting containers to rail, avoiding millions of truck miles and reducing demands on state roads. These inland terminals will provide more economical supply chain alternatives and extend Georgia's rail advantage into key markets. ARP is currently in operation while construction for the Blue Ridge Connector is currently underway.



Caption: A portion of the Mason Mega Rail Terminal post-construction.

- Accommodating Larger Vessels: Ocean carriers are transitioning to larger 16,000+ TEU vessels for improved efficiency and GPA GPA has begun the modernization process, with the completion of the harbor deepening, the Mason Mega Rail Terminal, renovation of Berth 1 at Garden City Terminal, commissioning new ship-to-shore cranes, rubber-tired gantry cranes and rail mounted gantries, and the current project to renovate the berths and container yard at Ocean Terminal.

Compared to a 2021 baseline, GPA's operational capacity is expected to nearly double over the next five years. To reach that goal, a series of projects will be completed:

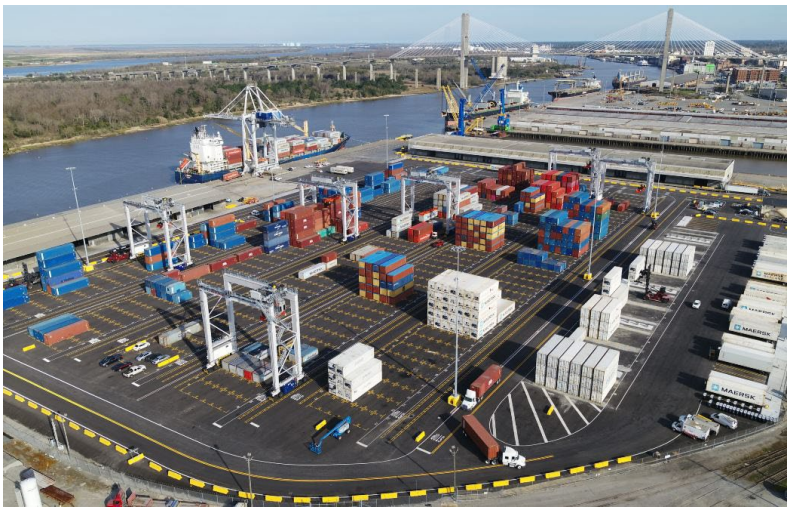
- **New Savannah Transload Facility:** Just upriver of Garden City Terminal, the 300,000 square-foot Savannah Transload Facility will move goods from containers to over-the-road trailers for delivery. This completed December 2023.

Caption: Savannah Transload Facility under construction.
Garden City Terminal and ship-to-shore cranes can be seen in the background.

- **Garden City West Expansion:** The terminal's West expansion will add one million TEUs of annual capacity. Supported by 15 electric rubber-tired gantry cranes, the 100-acre site will be completed in phases in 2023 and 2024.

Caption: Garden City Terminal West Expansion under construction

- **Ocean Terminal Expansion:** In addition to berth improvements at this Port of Savannah facility, the container operation expansion will make full use of the 200-acre site for handling containerized cargo. The terminal could serve two big ships simultaneously and expand the terminal's annual capacity to two million TEUs when two project phases complete in 2026.



Caption: Ocean Terminal's existing container yard (pre-container yard expansion construction)

- **Colonel's Island Terminal Expansion**: At the Port of Brunswick, construction has started on landside improvements that started coming online in August 2023. The additional acreage will increase Brunswick's RORO capacity from 1.2 million to 1.4 million vehicles per year.

Caption: Berths 1-3 can be seen along with two new warehouses under construction at Colonel's Island.

- **GDOT - Jimmy DeLoach Parkway:** In 2022, the Georgia Department of Transportation (GDOT) completed a major $51-million project to extend the Jimmy DeLoach Parkway, which runs near the Port of Savannah. The parkway now provides a direct link from the Port of Savannah to Interstates 95 and 16, separating truck traffic from surface streets. The connector carries 5,000 trucks per day and cuts 11 minutes from the drive time between the port and the I-95.
- **GDOT – Brampton Road Connector:** This project will construct a new 4-lane state route spur to connect Brampton Road, GPA Gate 3 and Foundation Drive to SR 25, SR

21, and U.S. Route 80. This project will provide direct access to the interstate system for the heavy commercial truck traffic related to the intermodal terminal transfers and will improve the efficiency of the transfer of goods between the port, rail, and interstate highway systems.

Caption: Georgia Department of Transportation's Brampton Road connector under construction.

Operations and Maintenance

The port industry is very competitive, requiring GPA to be proactive in modernizing its infrastructure, operations, and maintenance. The GPA's future success depends on these investments. GPA invests in maintaining port infrastructure, while also making strategic investments in state-of-the art logistic supply chain facilities. Since 2019, GPA has expanded its workforce by 32.7%. from 1,352 employees to 1,794.

Funding and Future Need

Port projects are funded with a combination of private investment and state and federal dollars. Federal support for landside projects is provided through grant programs, including Rebuilding American Infrastructure with Sustainability and Equity (RAISE) grants and Infrastructure for Rebuilding America (INFRA) grants. However, port projects must compete with other surface transportation projects in both programs. Additionally, the federal Harbor Maintenance Trust Fund is designed to pay for dredging in harbors. The fund collects revenue through a 0.125% user fee on the value of the cargo in imported containers.

GPA has a longtime investment philosophy of maintaining capacity at least 20% over current demand to ensure the free flow of cargo. Rapid growth outpaced its construction schedule, so GPA expedited projects planned for completion years into the future. Current projects will increase annual capacity from 6 million Twenty-foot Equivalent container Units (TEUs) in 2021 to 10 million TEUs by 2026.

Striving to keep capacity well ahead of demand, GPA intends to invest $4 billion over the next 12 years. This is necessary for continued growth to compete. Other port authorities and their business partners are making major investments as well. Meanwhile, studies show intermodal links such as rail links, roads, bridges, tunnels, and federal navigation channels allowing access to port facilities require continued support by state and federal agencies responsible for their upkeep to eliminate traffic bottlenecks, reduce product costs, and decrease greenhouse gases.

Public Safety

The Georgia Ports Authority's Police Department has made significant advancements since 2019. In staffing, the department has grown from 140 officers to approximately 200. Within the past four years, the Georgia Ports Police Department received accreditation from the Georgia Association of Chiefs of Police. Today, it is among the top 20% of agencies in Georgia that are now certified. The department has transitioned from an antiquated video management system to the state-of-the-art system, Avigilon. Additionally, the department is beginning to employ video analytics to help monitor cameras instead of relying solely on people watching screens.

Additionally, the completion of the Mason Mega Rail project, which relocated track for Norfolk Southern out of an adjacent neighborhood, resulted in various safety benefits. The rerouting allows the Port of Savannah to better accommodate 10,000-foot-long trains, bring all rail switching onto the terminal, eliminate six at-grade railroad crossings, reduce noise pollution, and improve safety, vehicle traffic flow, and overall residential quality of life.

Resilience and Innovation

Signaling its commitment to continued improvement, GPA has joined Green Marine, a voluntary environmental certification program for North America's maritime industry. GPA is also developing a long-range Climate Action Plan to lay out additional options for future decarbonization.

While GPA is expected to nearly double its 2021 operational capacity by 2028, its emissions per container are expected to remain flat or possibly drop by up to 3%. This can be attributed to GPA's investments in clean cargo-handling equipment, particularly zero-emission electric ship-to-shore cranes and the use of electric rubber tire gantry cranes.

Sustainable elements of GPA infrastructure projects include:

- Garden City Terminal West: Service from 15 all-electric rubber tire gantry cranes will result in 2,100 metric tons of greenhouse gas (GHG) reduction per year compared to diesel machines.
- Savannah Transload Facility: Through improved supply chain efficiency, the facility is expected to offset GHG emissions by 1,200 metric tons per year.
- Berth 1 Renovation: Faster vessel service allowed by the additional capacity will reduce vessel idling offshore, therefore lower emissions per container.
- Electric vehicle (EV) infrastructure: EV charging stations were installed at Garden City Terminal in Savannah and at Colonel's Island Terminal in Brunswick, supporting a cleaner transportation alternative for staff.

GPA innovation extends to project funding models, such as the partnership with Class I railroad CSX with the Network Georgia freight rail improvements at Appalachian Regional Port. The inland port offers a direct, 388-mile rail route to and from the Port of Savannah.

Solutions to Raise the Grade

- INLAND INTERMODAL TRANSPORTATION While GPA provides unrivaled rail connectivity to several key markets, continued investment in rail infrastructure is needed to support greater inland access for GPA customers. Congress should pass a reauthorized multi-year transportation bill targeting federal dollars toward economically strategic multimodal freight transportation infrastructure of national and regional significance.
- INFRASTRUCTURE IMPROVEMENTS: Increase education efforts to state and federal policymakers about the importance of the interconnectivity of the multimodal freight network. For example, while GPA is making major investments into Georgia's port facilities, the intermodal links such as roads, railroads, bridges, and federal navigation channels to access these facilities require sustained attention by state and federal agencies responsible for their upkeep. Georgia's major interstate highways linking Savannah, I-16 to Atlanta, and I-95 along the Atlantic seaboard, are critical to future growth.
- SAVANNAH RIVER CROSSING FEASABILITY STUDY: The Port of Savannah is a significant economic engine for Georgia and the nation. Potentially stifling future growth, however, is the port's accessibility to larger ships. These larger ships, which are becoming increasingly common on the world's oceans, are limited by the 185-foot clearance of the Talmadge Memorial Bridge (US 17). The study seeks to address that limitation, presenting feasible alternatives and proceeding into conceptual engineering/scoping, detailed cost estimates, and preliminary environmental studies. In the interim, GDOT is moving forward with a bridge maintenance program that will replace the suspension cables with shorter cables, lifting the bridge by an estimated 20 feet.

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Public Parks: C

Summary
Upgrades are making a difference to Georgia's parks and recreation facilities, of which cities and counties own the majority. Those cherished places span 10 percent of Georgia's land area. 71 percent of Atlanta residents are within a 10-minute walk of a park, ranking 28th among American cities – better than 43rd in 2018. Eighty-four percent of Georgians visited a public park at least several times yearly, according to a 2020 state Department of Natural Resources survey. Fewer survey respondents (13 percent) listed poor facilities are an issue limiting participation, down from 34 percent in 2016. Capacity concerns remain, with one-quarter of 2020 respondents complaining of overcrowding. Outside of population centers, park access is a significant barrier. Residents identified distance to outdoor recreation (24 percent) and lack of transportation (14 percent) as issues. State and regional leaders can fund and coordinate park-oriented transportation services, facility upgrades, and construction of new parks in less-populated areas.

Background
Georgia is blessed with many forms of outdoor recreation, both passive and active, ranging from national parks and forests and wildlife refuges totaling over 2.3 million acres, to small local playgrounds, for a total of 3.65 million acres. This constitutes almost 10 percent of Georgia's total land area. Parks and open spaces are owned and operated by every level of government, from local to federal, as well as school boards and some private entities

The chart below depicts the number of sites owned by different entities. Cities own 40 percent of parks in Georgia, 26 percent at the county level, and 21 percent are privately owned. The Federal and State governments only own 4 percent and 6 percent of those facilities, respectively, but their physical footprints are the largest of the collection. Noteworthy park facilities in Georgia include the Okefenokee swamp and the southern portion of the Appalachian Trail. The Rails to Trails Conservancy identified 53 new walk/bike trails within Georgia in its 2023 annual report[7].

Source: SCORP, 2022-26

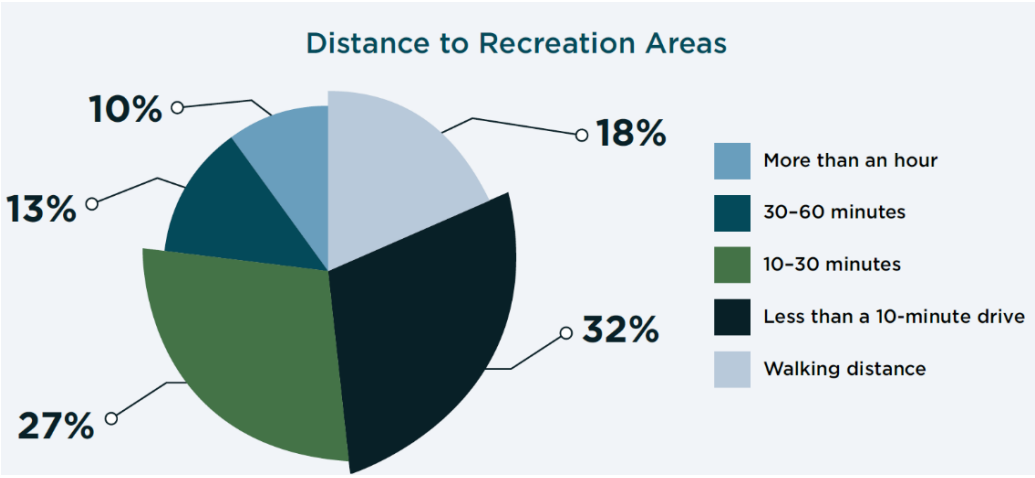
Capacity and Condition

Despite the tenth of Georgian land devoted to recreation, parks capacity remains a major challenge. Survey respondents to Georgia's 2022-26 Statewide Plan for Outdoor Recreation listed overcrowding as the most prevalent issue limiting participation in parks, among the infrastructure-related matters. Demand for park space is shown elsewhere in the survey. 43percent of respondents reported visiting a public park least once a month and an additional 41percent visiting several times during the year. Over 90 percent of residents surveyed in 2020 had engaged in at least one form of outdoor recreation during the year, despite COVID restrictions.

Issues limiting participation	Responses
Lack of time	32%
Overcrowding	25%
Distance to outdoor recreation	24%
Health issues	23%
Safety concerns	19%
Cost of visiting	17%
Lack of transportation	14%
Poor condition of outdoor recreation facilities	13%
Prefer different types of recreations	11%
None of the above	20%

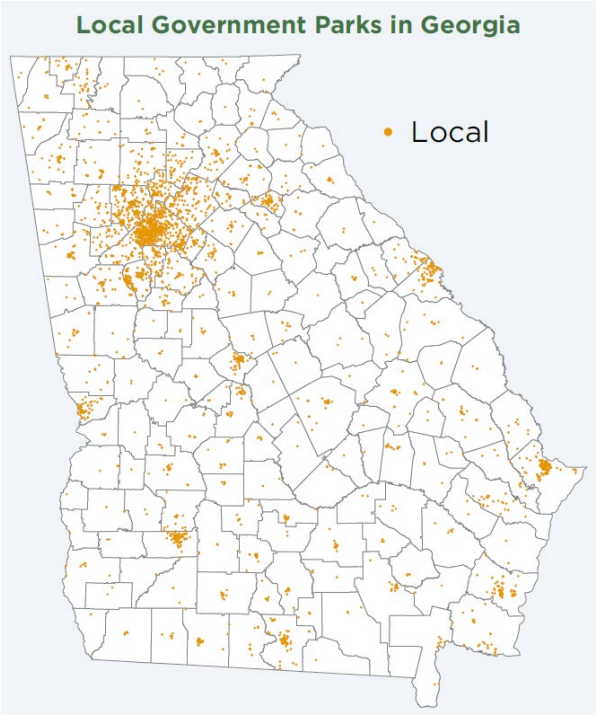
Source: SCORP, 2022-26

Almost one-quarter of DNR survey respondents said they needed to drive at least 30 minutes to reach a recreation area, and another quarter needed at least 10 minutes. Only 18 percent of Georgians live within walking distance of a public park, even though the largest concentrations of recreation areas are centered around population centers. Two-thirds of Georgia cities and counties manage less than 100 acres of recreation land, meaning there are limited opportunities for public recreation in some rural areas. So, adding new parks in low-density areas could help with overcrowding and increase visitation, while also increasing the size of existing parks.



Source: SCORP, 2022-26

The map below demonstrates the distribution of park sites relative to areas of higher population in the State. With the burgeoning population growth in Georgia concentrating around the Atlanta region, this trend of parks concentration is expected to continue, unless additional State, Federal or private funding is made available to assist the lower-populations counties.



Source: SCORP, 2022-26

Within the Atlanta metroplex, parks access has increased. 71 percent of Atlanta residents live within a 10-minute walk of a park, according to the Trust for Public Land (TPL), close to the national median of 74 percent among the 100 cities and towns. That puts the Georgia capital at the 28th most walkable urban park network, an improvement from 43rd in TPL's 2018 ranking. The Trust's database estimates only 55 percent of residents living in American urban areas of all sizes enjoy that proximity to a public recreation space.

Across the state, conditions of park facilities have appeared to improve, based on DNR surveys. Only 13 percent of Georgia residents listed "poor condition of recreation facilities" as an issue limiting participation in 2020, placing condition below seven other factors. In the prior survey, from 2016, poor facilities were the second-most cited barrier to participation at 34 percent. Overcrowding was the most frequently cited infrastructure-related barrier in both surveys.

The National Recreation and Parks Association (NRPA) facilitates an accreditation program for state and local parks agencies which meet standards for park facilities and maintenance, with renewal evaluations every five years[3]. 13 of the 192 accredited parks agencies nationwide are from Georgia, and only four states have more within their jurisdiction. The chart below shows some of the services and amenities offered at Georgia's public parks.

Amenity	# of Parks with Amenity	Amenity	# of Parks with Amenity
Baseball/Softball field	866	Paved trails	516
Campground, horse camp, group camp, or RV camping	197	Play area, tot lot, etc.	1,267
Football, soccer, or lacrosse	434	Pool, beach, spray pool, wading pool, etc	275
Fresh or saltwater fishing	347	Shooting range, paintball, archery, trap or skeet	52
Golf course	78	Skate park or rock climbing	55
Group shelter	1,246	Tennis, baskeyball, horseshoes, or volleyball	960
Nature area, botanical garden, or large natural area	589	Track for running	119
Padding	264	Unpaved trails	857

Source: SCORP, 2022-26

The table below depicts residents' assessment of conditions statewide in the Georgia DNR survey. There is definite room for improvement, despite condition concerns falling below transportation accessibility. Unavailable or poorly maintained restrooms were most problematic.

Need "some" of "a lot of" improvement	Responses
Availability of restrooms	55%
Maintenance/cleanliness of restrooms	54%
Maintenance/cleanliness of facilities other than restrooms	47%
Parking	45%
Information at site	42%
Programs and classes	42%
Safety	40%
Accessibility for people with disabilities	40%
Outdoor recreation activities offered	39%

Source: SCORP, 2022-26

A limited ASCE survey of local government park agencies found programs in Georgia compare favorably to other states and national norms. On a nationwide basis, there are an average of 10.8 acres of parks per 1,000 residents, while the comparable figures for a small survey of Georgia governments range from 9.24 to 66. Condition assessments (self-evaluated) are generally very good to excellent, with one agency reporting a range of conditions over a large number of parks.

Funding and Future Needs; Operations and Maintenance

There are one or more recreation facilities funded by the National Land and Water Conservation Fund in 91 percent of Georgia counties, which translates to $226 million in parks investment. Georgia DNR evaluates both the supply and demand for outdoor recreation approximately every four to five years in the State Comprehensive Recreation Plan (SCORP).

Maintenance and facility management costs range from 33 percent to 60 percent of operating budgets, and all agencies responding to ASCE's survey mentioned capital improvements planned pending funding availability. Some of those respondents mentioned success winning competitive grant awards. They noted increasing interest and demand for parks facilities. There were no reports received of ongoing shortfalls of funds or deferred maintenance. 91 percent of Georgia counties have received grants from the National Land and Water Conservation Fund, and 226 Georgia projects have received funding from the Trust for Public Land.

Lake Lanier - https://www.atlantaoutdoorclub.com/image/events/5208.jpg

Public Safety and Resilience

Public safety in parks and open space facilities is a top concerns of Georgia DNR poll respondents. While most agencies provide for some form of police and emergency worker presence, approximately 19 percent of survey participants cite "safety concerns" as the primary factor limiting park usage, third only behind transportation and park conditions. Resident feedback regarding park safety is reflected in the table below.

Which of the following safety issues is more important to you when you visit an outdoor recreation area?	Responses
Ability to leave in case of an illness or injury	22%
Other people	22%
Lack of emergency cell phone service	19%
Weater	18%
Wildlife	14%
Other	3%

Source: SCORP, 2022-26

To increase resilience to extreme storms and bolster local ecosystems, more Georgia governments are converting marginal or sensitive lands into parks and open space with nature-based "green infrastructure" and joint-purpose open space where, for example, a trail can become a stormwater conveyance with native planting to filter rainfall before it sinks below the ground. These settings provide a venue for educational opportunities. By using wetlands and other low-lying properties for passive parks, damages are minimized and the overall environment is enhanced.

Innovation

While all parks departments in Georgia operate a range of sports courts and fields, a significant percentage of programs have additional special and unique facilities. Among these are pools (both indoor and outdoor and including therapeutic), indoor and outdoor cultural and performing arts centers, adaptive facilities for special needs persons, age-oriented facilities for both very young children and senior adults, a boxing gym, forest trails for both hiking and biking, a whitewater rafting/kayaking center and at least one equestrian center. Albany, Georgia operates an open-air wild animal park that was designed by noted wildlife expert Jim Fowler. Anecdotal evidence indicates high interest and demand for these specialty facilities.

Recommendations to Raise the Grade

- **Increase dedicated, predictable parks funding at the state and regional level.** Public parks have seen increased usage in recent years and Georgians are reporting greater interest in recreational activity. To meet this demand and improve community wellbeing, greater dedicated funding is necessary to the state and municipal park authorities. The number of counties with very small or no public park facilities remains high, presumably due to very limited funding availability. Over 30 counties in Georgia have populations less than 10,000, where local funding sources are difficult to find and sustain.
- **Increase public transit service with parks connectivity.** Georgians now report lack of transportation as their primary barrier to park visitation, climbing above poor park facilities. Georgia park agencies and transit operators should coordinate route operations and planning so that more residents have a one-seat bus or rail ride to the nearest park, with a reasonable door-to-gate travel time. State and regional funding for transit and parks should coordinate support for these bus-to-park and rail-to-trail services.
- **Focus facilities improvements on restrooms, wayfinding, and activities programming.** Survey respondents cite bathroom availability and cleanliness as their biggest concern regarding park conditions. Those residents then explained park signage and other displays lacked helpful park information. Finally, Georgians report a lack of programmed activities as a reason they didn't utilize the facilities more frequently.
- **Identify and implement goals set by the National Parks and Recreation Association (NRPA), the Trust for Public Land (TPL) and the Rails-to-Trails Conservancy.** Georgia park authorities should identify and implement attainable goals from the accreditation benchmarks of the NRPA and increase community accessibility to parks without motor vehicle per the TPL. Georgia can expand its off-street trail network in urban and rural contexts on already-planned alignments, such as the East Coast Greenway.
- **Think proactively about public safety and increase inter-agency partnerships.** While not a widespread problem, survey respondents list public safety in parks as a growing

concern. Decision-makers and parks leaders can address this concern in some cases with improved infrastructure (e.g., lighting, emergency call beacons, surveillance cameras) and partnerships with local law enforcement agencies.

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Rail: B

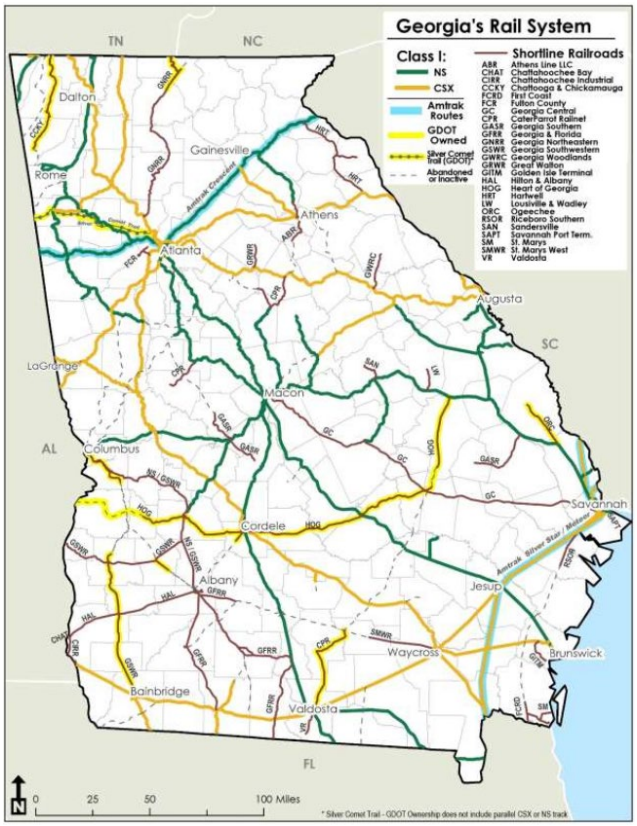
Executive Summary

Georgia's rail network operated well in recent years, moving 92.5 million tons of freight and 715,000 passengers annually over the 7th most extensive number of track miles. Georgia ranks in the top six nationally in many freight rail categories, with intermodal cars hauling containers to and from Georgia ports being the top commodity. The Class I railroads are privately owned and operate profitably on 70 percent of Georgia's network, but private Class III owner-operators struggle to generate revenue necessary to improve their infrastructure or upgrade their aging equipment. Class I railroads reduced collisions and associated fatalities by approximately 50 percent from 2019 to 2022 thanks to investments in safety devices for at-grade crossings. Amtrak provides daily service along two corridors in the state, via Atlanta going East/West and via Savannah going North/South. To improve passenger ridership, the state can fund increases in frequency and upgrade track infrastructure to boost the speed of Amtrak service on existing and new alignments.

Background

Like other states, Georgia's rail system comprises two distinct classes of railroads: Class I owner-operators with $1 billion annual operating revenue and Class III networks with revenues less than $46 million. There are currently only seven Class I railroads operating in the U.S., two of which operate in Georgia: CSX Transportation (CSX) and Norfolk Southern Corporation (NS). CSX, headquartered in Jacksonville, owns or operates 1,535 route miles in five main corridors throughout the state. NS, headquartered in Atlanta, owns or operates 1,706 route miles located primarily in two main corridors with the heaviest rail traffic density in Georgia. Passenger rail service is carried on two main corridors through the state, one on CSX lines along the Atlantic coast and one on NS lines passing through Atlanta.

There are currently 27 Class III railroads operating within the state. Altogether, these railroads own or operate 1,362 route miles in Georgia – about 30 percent of the state's rail system. The Class III railroads do not carry passengers and primarily use freight or line haul services. Terminal railroads primarily restrict their operations to the performance of local switching operations or to the operations related to a specific railroad terminal facility. GDOT owns line segments on six different Class III railroads operating over 535 miles of track, making GDOT the third largest owner of rail route mileage in the state. Georgia also leases a 135-mile corridor from Atlanta to Chattanooga, known as the Western & Atlantic, to CSX.



Condition and Capacity

Georgia's Rail System as a Whole

There are three major components of rail infrastructure: track, bridges, and communications and signaling (C&S). All three of these components are rated and monitored by a system established by the Federal Railroad Administration (FRA). Most of the track over which the Class I railroads operate within the state is FRA Class 4, meaning the track is maintained in good condition. This track classification is what is required for the Class I railroads to consistently operate at train speeds of up to 60 miles per hour (mph) for freight and 80 mph for passenger service. Most of the track over which the Class III railroads operate within the state is FRA Class 1 or 2 track, or fair condition, with maximum operating speeds of 15 mph (FRA Class 1) and 30 mph (FRA Class 2). The slower operating speeds are acceptable for the Class III railroads, as most of their operations involve service to local industries. Upgrading this shortline track for faster speeds is beneficial, but rarely pursued unless the owner sees demand for additional traffic and local land-use constraints don't prevent faster, more extensive operations.

Most of the bridges over which the Class I railroads operate within the state carry a Cooper E-80 Load Rating. That Cooper rating, a long-standing, conservative design system, allows rail bridges to safely pass the most modern locomotives and 110-ton railcars over their structures at their typical operating speeds. By comparison, most of the Class III railroads typically operate over structures that carry a load rating somewhere between E-60 and E-80. These structures will generally still pass the heavy traffic, but at lower operating speeds. Passing traffic beyond bridge load ratings shortens the operational life of these structures.

Over the past five years, the Class I railroads have invested significant funds into the improvement of their rail corridors throughout Georgia. They have been highly proactive in identifying future service requirements and improving their rail corridors to accommodate the anticipated future needs. Nearly all their corridors have been designated to carry two mainline tracks in the future, with their more critical corridors carrying as many as four mainline tracks.

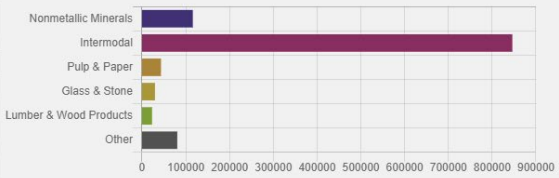
Georgia's rail system usage is divided into two categories: freight and passenger. But rail system improvements in Georgia are driven in large part by growth of the global oceanic shipping trade, where more vessels are arriving to Georgia's ports – each of them carrying more cargo on average. The state is heavily dependent on this rail system for the distribution of containers arriving at the Port of Savannah to all points in the eastern U.S. The Georgia Port Authority (GPA) and rail operators in the state have coordinated on numerous projects to enhance capacity and upgrade condition. Some of those projects benefit passengers, since most of the passenger service in the state is carried on Class I freight lines.

Freight Rail System

The chart below shows a summary of the top commodities shipped on Georgia's rail system in 2021. Georgia heavily relies on its rail infrastructure as both a producer and consumer of these commodities. Intermodal shipments constitute most of the carloads originating or terminating in Georgia. Although the carloads of coal, which is exclusively inbound to Georgia, and nonmetallic minerals represented much fewer carloads than intermodal, they accounted for the majority of the tonnage shipped by rail in 2021. The long-term trend is a shift from bulk commodities (primarily coal) to intermodal, which increases the number to carloads, but decreases the total tonnage on the rail system. Intermodal traffic (finished goods) is typically more valuable than bulk commodities (raw materials).

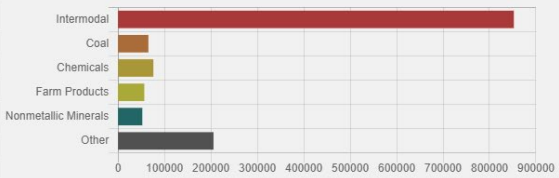
Originating In Georgia

COMMODITIES	CARLOADS	PCT
Nonmetallic Minerals	116,100	10.2%
Intermodal	846,200	74.3%
Pulp & Paper	43,400	3.8%
Glass & Stone	29,600	2.6%
Lumber & Wood Products	23,000	2.0%
Other	80,600	7.1%
Total	1,138,900	100%



Terminating In Georgia

COMMODITIES	CARLOADS	PCT
Intermodal	852,500	65.2%
Coal	65,400	5.0%
Chemicals	76,100	5.8%
Farm Products	56,600	4.3%
Nonmetallic Minerals	52,300	4.0%
Other	205,600	15.7%
Total	1,308,400	100%



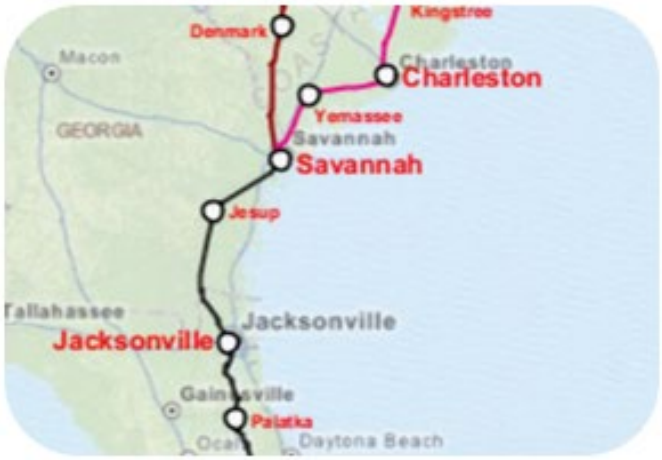
In addition to the improvement of the Class I rail corridors leading to and from Georgia's ports, the state of Georgia, Murray County, GPA and CSX collaborated to complete the construction of an inland port in August 2018 to facilitate the handling of intermodal freight containers near the Georgia-Tennessee state line. Known as the Appalachian Regional Port (ARP), this facility allows intermodal freight containers to be hauled by rail from the deepwater Port of Savannah a

more convenient distribution point serving the target markets in Georgia, Alabama, Tennessee and Kentucky. The subsequent elimination of an all-truck dray reduces the freight tuck congestion through the city of Atlanta and provides pavement damage relief. The ARP currently has an annual capacity of 75,000 containers but was designed to provide the opportunity for future capacity increases based on demand.

During this same period, the Class III railroads have not been able to materially increase the capacity of their corridors due to a lack of profit in their operations that would allow for capital improvements. Although some of these rail lines will also benefit somewhat from the improvements to the Port of Savannah, the impact on their operations will not be as significant as it will be for the Class I railroads.

Passenger Rail System

Two Amtrak corridors pass through Georgia. Services on both routes provide Wi-Fi, a lounge car, a café car, sleeper cars and flexible dining options for passengers who book sleeping accommodations. The northernmost corridor, the Crescent Route, runs from Northeast to Southwest, from New York to New Orleans. It operates on NS rail lines within Georgia, providing passenger service through Atlanta and the northern part of the state. The easternmost corridor, the Silver Service Route, runs along the Atlantic Coast from New York to Miami, operates on CSX rail lines within Georgia, and provides passenger service through Savannah.



Crescent Route (NS), left; Silver Service Route (CSX), right

Amtrak's Crescent Route provides once-per-day service in each direction along this route with a train departing from New Orleans in the morning and another train departing from New York City in the afternoon. Two additional trains depart from Atlanta, one heading to New Orleans in the morning and another heading towards Washington D.C. and New York City late at night. Regional travel can be difficult in part because northbound trains stop in North Carolina in the middle of the night with Charlotte departure times being less than ideal as they occur in the middle of the night and very early the next morning. There are thirty-three stops along this route with three of them in Georgia at Toccoa, Gainesville and Atlanta. Customer on-time performance for this route in 2022 was only 53%.

Amtrak's Silver Service Route also provides once-per-day service in each direction between New York City and Miami. Two services are provided along this route, the Silver Meteor, and the Silver Star. One train per day is scheduled each day by the Silver Meteor service in each direction along this route with a train departing from New York City and Miami in the morning. The total trip time along this route for the Silver Meteor service is twenty-seven hours for northbound passengers and twenty-eight hours for southbound passengers without delay. One train per day is scheduled each day by the Silver Star service in each direction along this route with a train departing from New York City and Miami in the middle of the day. The total trip time along this route for the Silver Star service is thirty-one and a half hours for both northbound and southbound passengers without delay. There are thirty-two stops for the Silver Meteor service with two of them in Georgia at Jesup and Savannah. There are thirty-six stops for the Silver Star service with only one stop in Georgia at Savannah.

Although ridership along these routes has substantially increased from the record lows in 2021 to 2022, it has still generally not recovered to the level achieved in 2019. Amtrak's Crescent Route saw a 175% increase in ridership from 2021 to 2022 but was still only operating at 68% of the level achieved in 2019. Amtrak's Silver Service Route saw a 137% increase in ridership from 2021 to 2022 but was still only operating at 70% of the level achieved in 2019. The Silver Star service significantly outperformed the Silver Meteor service in both categories with Silver Star ridership increasing by 232% from 2021 to 2022 as compared to a ridership decreasing to 42% during the same period for the Silver Meteor service. These route pairs fare even worse than the Crescent with on-time performance: the Silver Meteor service in 2022 was 44% as compared to the Silver Star's 26%.

Operations and Maintenance

Communications and signaling are improving Georgia's Class I railroads through the development and implementation of Positive Train Control (PTC) systems that will automatically slow or stop a train under certain circumstances. PTC is a major technological advancement in the railroad industry designed to reduce the number of train-to-train collisions by eliminating human error. Class III railroads generally do not possess the resources to implement this technology in train control and continue to primarily rely on radio communications to facilitate their movements.

The FRA requires O&M in accordance with the track classification and operating speed of each rail line. Due to the higher operating speeds and greater tonnage of annual rail shipments, the Class I railroads require significantly more maintenance than the Class III railroads. But the higher Class I revenue is generally sufficient to meet their needs, as well as provide the necessary funding for capital improvements, equipment upgrades, and capacity increases. Class III railroads have fewer upkeep requirements but are much more limited in revenue – mostly spent to maintain operations. Class III railroads typically need some measure of federal and/or state financial assistance to upgrade their infrastructure to handle heavier railcars, improve safety, and increase their operating speeds.

Careful communication and coordination between freight owners and passenger rail operators is necessary to safely deliver the faster speeds and more restrictive timetables of the passenger services. Improved negotiations on operations between passenger and freight services could

unlock low-cost increases to each service. Freight operations have historically taken precedent, but all stakeholders have an interest in their services pulling vehicles off the road.

Funding

Both Class I railroads operating in Georgia are privately-owned and publicly traded. Their revenue is generated from carload movements, lease agreements for the use of their rights-of-way, and other service-generating activities. They are self-sufficient in terms of their daily operations but can require additional state or federal funding for very large-scale capital improvements that are of direct benefit to the state or the nation.

Class III railroads owned by GDOT generally receive more funding than those that are privately owned, but GDOT's funding sources for railroads are limited. GDOT invested $12M in 2019 and received some additional federal funding to increase the total investment for the year to $20.3M. GDOT invested an all-time annual high of $35M in 2020 to fund some badly needed track improvements. Data are not available on more recent years.

State funding for improvements to the freight network and passenger rail services are severely limited by Georgia's constitutional restriction of motor fuel tax revenue from supporting rail or transit uses. GDOT's rail grant programs are therefore oversubscribed and federal rail grants are limited with competition for them being fierce.

The 2021 State Rail Plan, pictured below shows short- and long-range projects the funding for which significantly trails the estimated costs. The longer planned-for projects sit without project development money, the more expensive they become and more complicated their coordination when funded with inconsistent state support.

Project Type	Total Number of Projects	Total Estimated Cost (YOE$)
Short-Range Projects		
Short-Range Projects on State-Owned Railroads (2021-2022)	7	$71.1 M
Short-Range Projects on State-Owned Railroads (2023-2025)	24	$92.2 M
Short-Range Crossing Projects (2021-2025)	66	$51.3 M
Short-Range Crossing Needs Shortfall	N/A	$96.6 M
Short-Range Passenger Rail Improvements (Amtrak)	1	$55.4 M
TOTAL: Short-Range	**98**	**$366.6 M**
Long-Range Projects		
Passenger Rail Studies	6	$25.5 M
Projects on State-Owned Rail Lines	23	$112.3 M
Ongoing Maintenance of GDOT-owned short line railroads	N/A	$319.8 M
Track and Bridge Upgrade of GDOT-Owned short line railroads to carry 286,000 lb railcars	N/A	$453.2 M
Projects on Privately-Owned Rail Lines	22	$193.7 M
Inland Ports	3	$217.3 M
Blocked Crossing Projects	6	$586.6 M
TOTAL: Long-Range	**60**	**$1,908.4 M**
TOTAL: Short-Range and Long-Range	**158+**	**$2,275.0 M**

Notes: Project count indicates the number of defined projects in each category. Any listing of programmatic costs was not included in this count, as the number of projects for these programmatic costs would likely to depend on available funding and type of delivery.

Future Need
Additional funding will certainly be required to meet the future needs of the state's rail system, particularly as it applies to the Class III railroads. The 2021 State Rail Plan shows $375 million in short-term project needs, plus another $1.9 billion in the long-term. At the 2020 state investment rate, that means "short-term" applies to a project receiving construction money 8-10 years from now. Georgia would benefit from these rail investments uniquely, with the Port of Savannah and the Hartsfield-Jackson International Airport as anchor nodes in national networks for passengers and freight who could connect air with rail services.

Amtrak continues to improve their operations with station, system and operation upgrades on an annual basis, however no significant improvements to the passenger rail system in the state can be reasonably expected until significantly more state funding is invested. Today and in the short-term, Georgia benefits only from Amtrak's very limited national service, with corresponding minimal financial support from in state. Other states and regional coalitions, by contrast, invest significant sums of capital and operating dollars into frequent services between high-interest destinations. Georgia has yet to, for example, join North Carolina, South Carolina, Florida, and Louisiana for a regional service as do the Atlantic coast states for the Downeaster service extending north from Boston through Maine.

In the long-range, Georgia will benefit from federal investments in high-speed rail due to the economic significance of passenger and freight nodes mentioned above. Federal allocation of $8.2B to construct the high-speed rail line from Charlotte to Atlanta is a huge victory for both Georgia and North Carolina. The next step for the state would be the extension of a high-speed rail line to Savannah. Given the fact that the overall freight value of goods, anchored by the Port of Savannah and Atlanta, is expected to double to $1.6 trillion by 2050, the extension of a high-speed rail line from Atlanta to Savannah is far more likely to become a reality in the future. The Port of Savannah is currently expanding capacity to increase capacity by 25%.

Both Class I and Class III railroads remain subject to future federal mandates, such as the Rail Safety Improvement Act of 2008, that will increase their need for funding. The continued implementation of PTC, the FRA Bridge Management Program, and improvements to the Port of Savannah have placed an additional burden on Georgia's rail system in recent years. Improving public safety will continue to be a goal for the railroads and the state and federal agencies. The continued investment in the steady maintenance of track, bridge, and crossing protection systems will continue to be critical in ensuring that our state's rail network remains a viable transportation system for the movement of goods throughout Georgia.

Public Safety and Resilience
Class I railroads are investing in signalization of Georgia's 5,300 at-grade grade crossings to better protect the public and warn of oncoming traffic. Their active efforts to improve at-grade crossing safety have reduced the number of collisions, and associated fatalities, in the state by approximately 50% during the period from 2019 to the last reporting date of October 2022. Most of the at-grade crossings associated with the Class III railroads continue to carry only passive warning devices, such as crossbucks without flashers and gates, although they do have some access to state and federal programs, such as the federal aid crossing safety program

commonly referred to as the Section 130 Program administered by the Georgia Department of Transportation, that are dedicated to improving the safety of at-grade crossings throughout the nation.

Due to their extensive network of tracks, coupled with the financial resources at their immediate disposal, Class I railroads are well prepared for dealing with incidents and natural disasters whenever they occur. In general, the Class I railroads can quickly and effectively respond to natural calamities and implement the necessary repairs to restore their infrastructure to operation in a short period of time.

By comparison, the Class III railroads operate at a much greater risk because they often lack alternate route options and material resources to overcome natural calamities. If they are unable to serve their local shippers for any extended period, the Class III railroads run the direct risk of losing their limited revenue base to other forms of transportation, which can have a very damaging, long-term effect on the local rail service.

Innovation

Railroads in the state continue to focus on improving system efficiency and safety. The use of defect detection vehicles to detect internal flaws in rails serves to greatly facilitate maintenance and prevent derailments caused by failures in the track structure. Improvements continue to be made in the areas of metallurgy and rail fastening systems which enhance track life, reduce maintenance costs, and improve safety. Advancements have also been made to improve the security of the railroad's computer systems by identifying and addressing future threats to railroad operations before they occur.

Recommendations

Class I railroads are generally self-sufficient in their operations but do need to have a working partnership with various state and federal agencies to improve their rail corridors to accommodate the ever-increasing volume of rail traffic through the state. Georgia should:

- Coordinate state bridge projects to replace structures that have insufficient clearances to pass double stack trains.
- Work closely with the Class I railroads to facilitate the installation of additional tracks in critical rail corridors.
- Where appropriate, consolidate and/or replace existing at-grade crossings with grade-separated structures that will greatly improve safety and directly benefit the travelling community.
- Consider funding improvements when capacity needs or FRA-mandated changes make this necessary.
- Assist Class I railroads in identifying corridor improvements that would qualify for federal funding under the Bipartisan Infrastructure Act of 2021 due to improved, national economic benefits.

Class III railroads need both state and federal assistance to upgrade their operations. Georgia should:

- Continue to provide maintenance funding to private and GDOT-owned railroads to ensure these lines are kept operational and in good repair.

- Continuously monitor the short line railroads to prevent the abandonment of rail corridors that could result in economic harm to portions of the state.
- Actively encourage the closure of superfluous at-grade crossings to improve public safety and reduce operational maintenance costs.
- Provide support for economic development of underutilized corridors to encourage more industry growth through the improvement of local rail infrastructure.

Passenger rail improvements will rely almost entirely on the future allocation of state and federal funds. Georgia should:

- Assist the federal government in all possible ways to construct and complete the high-speed rail line from Charlotte to Atlanta now that the federal funding has been allocated.
- Deliver state-level funding in the short- and long-range so that existing passenger services increase frequency and the future, proposed high-speed rail line continues from Atlanta to Savannah.
- Continue to assist Amtrak in their short-term and lower cost efforts to improve their ridership through the state.

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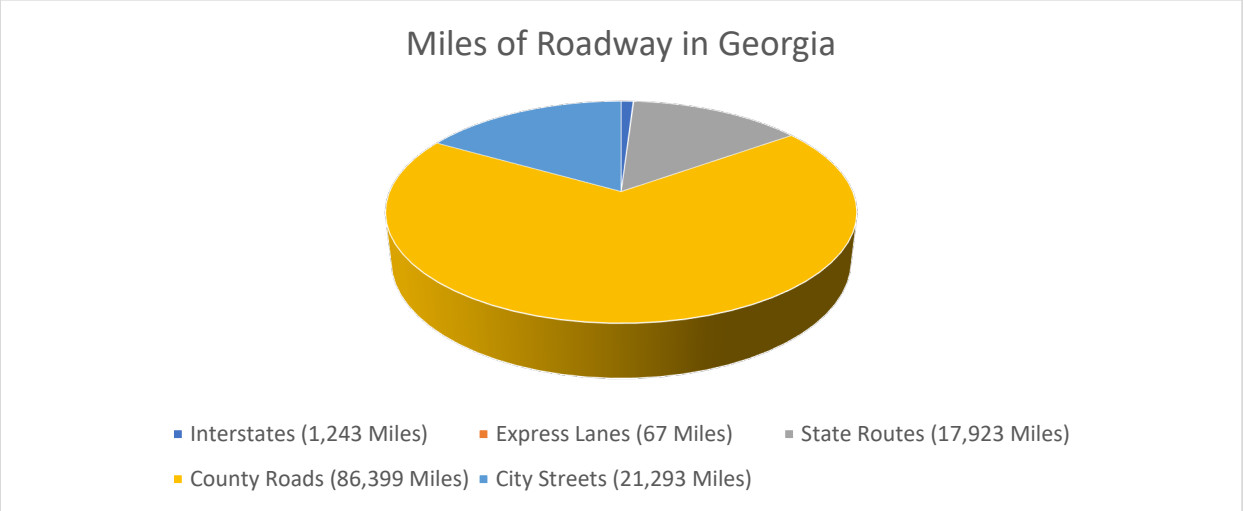
Roads: C+

Summary
Georgia's 125,000-mile road network continues to move travelers and goods well between origins and destinations throughout the state. Road infrastructure has benefited from the Transportation Investment Act of 2012 and the Transportation Funding Act of 2015, with the state gas tax increasing automatically with inflation. Georgia ranked 6th-best among states for road conditions in 2023. 67 percent of interstate roads are in good condition – seven percentage points higher than in 2019. Despite this progress, Georgia still faces congestion in major corridors and must move more people and goods in all travel modes, specifically around Atlanta and Savannah. In addition, roads have become less safe. 1,982 road users lost their lives in 2022, 33 percent higher than 2019. The total included 339 pedestrians. Decision-makers can improve traffic safety on Georgia roads with road diets, "complete streets" engineering, and multimodal investments.

Capacity
Georgia has the nation's 7th largest public road network, with 125,701 centerline miles and 267,803 lane miles. This inventory, reported in 2021, has remained fairly level since 2015. While state routes represent only 19% of all lane miles within the state, they serve nearly 60% of all traffic, equivalent to about 209 million Vehicle Miles Traveled (VMT). Furthermore, while interstates account for only about 3% of the state's lane miles, these roadways carry 26% of all traffic. The state's largest lane miles belong to county roadways carrying the remaining 14% of the state's traffic.



Since 2019, Georgia's population has increased from 10.6 million people to 10.9 million people, according to 2022 census data. With this growth in mind, the population of the state is predicted to reach about 13.66 million by 2054, resulting in a 25.15% increase over the current population. Ultimately, a population increase of this magnitude will potentially result in a substantial increase of vehicles on Georgia roadways and presenting the need to address the potential challenges associated with the growth.

The Georgia Department of Transportation (GDOT) has addressed the state's increasing population and need to carry more people on roads with the introduction and construction of express lanes. The Northwest Corridor Express Lanes, completed in September 2018, run 29.7 miles and have served over 7 million trips in their first four years in operation, with an average of over 600,000 trips per month. These lanes create additional capacity in the adjacent general-purpose lanes and enhance transit opportunities due to more reliable trip times. The success of the Northwest Corridor has established a framework for growing Georgia's Express Lanes network through MMIP projects to include tolled lanes along major corridors of State Route (SR) 400 and Interstate 285.

While motor vehicle capacity in some portions of Georgia's roadway network has increased, the Georgia constitution currently restricts motor fuel tax revenue from supporting rail or transit uses that deliver congestion relief. Without a robust multimodal strategy, the state still faces issues with congestion along major corridors, specifically around the Atlanta and Savannah areas.

Texas Transportation Institute's 2021 Urban Mobility Report ranked Atlanta 8th in the nation for delay per commuter. The report considers some of the nation's worst bottlenecks, including the intersections of I-285 and I-85 (North) and I-20 and I-285 (West). These two interchanges specifically rank 4th and 5th in the nation for truck bottlenecks, according to a publication from the American Transportation Research Institute. Congestion has also grown around major corridors leading from the Savannah and Brunswick port areas, which have grown in annual total tonnage by 15% from 2018 to 2022. Major highways in this area have felt the impact of this supply chain activity, which will continue to be a factor as the Port of Savannah undergoes planned expansion that will increase the throughput of cargo by 4-6 percent a year in the coming years.

Condition

Georgia ranks 6th nationally for pavement condition based on reports from the Bureau of Transportation and Statistics. The 2021 assessment reports 67 percent of interstate pavements are in good condition, which exceeds the minimum acceptable threshold of 50 percent. Interstate pavement in poor condition is less than half a percent, which is far below maximum threshold of 5 percent. Additional state funding provided by the Transportation Funding Act (TFA) of 2015 has likely benefited the non-interstate highways by elevating the percentage of roads in good condition by 7.2 percent from 2018 to 2022. The performance measures for both interstate and non-interstate pavement conditions suggest that the pavement management system utilized, the maintenance and rehabilitation strategies employed, and funding levels allocated have been effective.

Operations & Maintenance

The state's Capital Maintenance Program is crucial in providing the traveling public with a safe and well-maintained system. Each year, the state spends approximately $350 million on interstate and state route maintenance and resurfacing. Even with this level of investment, GDOT still has to prioritize capital projects within each year's available funding. Georgia House Bill 189 passed in 2023, allowing. an increase in weight limit by 10% for trucks hauling agricultural products on roads other than federal highways. The state will need to closely monitor potential changes in road and pavement conditions through the utilization of road sensors.

While the exact impact of this bill cannot yet be known, it is certain that specific regions within Georgia will see an adverse effect.

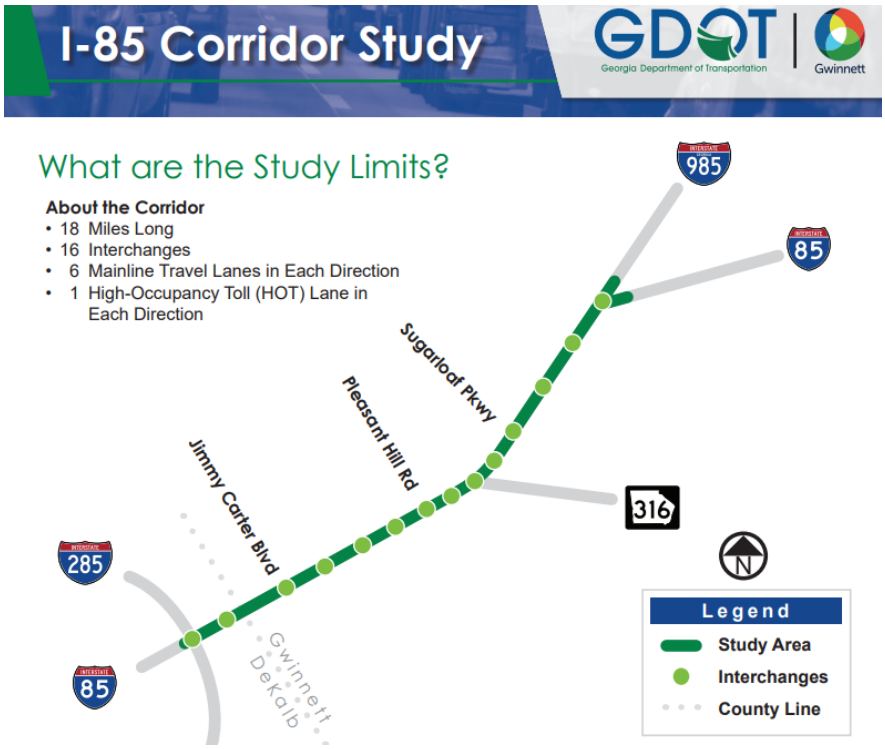
Funding

GDOT's operating budget is derived from two primary funding sources: federal and state. The automatic, "formula" federal transportation funding comes from the Highway Trust Fund (HTF), which is funded with revenues from transportation-related excise taxes, primarily taxes on gasoline and diesel fuel. In recent years, however, the HTF has needed significant transfers of general revenues to remain solvent, including funding from the passage of the Infrastructure Investment and Jobs Act (IIJA). This legislation provides funding certainty for fiscal years (FY) 2022 through 2026 for transportation infrastructure, such as roadway funding. The Atlanta Regional Commission (ARC) developed a tool to help local governments identify and pursue available funding options under the new legislation: https://atlantaregional.org/infrastructure-investment-jobs-act-resource-database/

State transportation funding comes from a number of sources, including the Transportation Funding Act (TFA) and Transportation Investment Act (TIA). In 2015, the Georgia General Assembly passed the TFA (House Bill 170). The TFA replaced the existing motor fuel tax with an excise tax while increasing it by 6 cents per gallon to 26 cents per gallon on gasoline and 29 cents on diesel. In addition, it added a $200 fee on personal electric vehicles (EVs), a $300 fee for commercial EVs, a $5 per night hotel room tax, and a heavy truck impact fee. The legislation provided an additional $5.4 billion for transportation from 2016 to 2021, or approximately $900 million per year.

It is important to note that due to inflation's impacts on the economy Georgia's governor did suspend collections of state motor fuel taxes in September, October, and November of 2023. While this will impact funding it has yet to be seen if and how it will impact GDOT's program.

The GDOT 2021 Statewide Strategic Transportation Plan (SSTP) is organized into three investment categories, reflecting the major ways people and freight move in Georgia. Those three investment categories are statewide freight and logistics (Major Mobility Investment Program or MMIP), people mobility in Metro Atlanta, and people mobility in emerging metros and rural Georgia. Federal HTF and TFA funding has supported the advancement of the MMIP, the implementation of rural broadband infrastructure for transportation technologies, and other programs identified in SSTP. Items that could be delivered with additional funding include key initiatives identified in the SSTP and the Georgia Statewide Freight and Logistics Plan, both of which identify the bottleneck of Interstates 285 and 85 (North) and the portion of I-85 between I-285 and SR 316 as needed expansions.

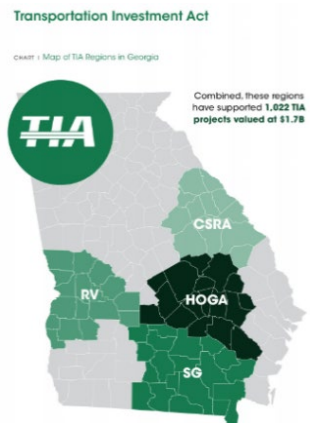


Further north along I-85, the I-85 widening phase 1 project, the first of the MMIP projects to break ground, widened mainline I-85 from two to three lanes from Hamilton Mill Road to SR 53. The project was completed over a month ahead of schedule and opened to traffic in June 2020. This project supports Georgia's growing freight industry and commercial vehicle movement by providing more capacity in a limited, strategic set of locations. The I-85 widening phase 2 project widened I-85 from SR 53 to U.S. 129. Like phase 1, this project was completed ahead of schedule and opened to traffic in June 2023, making way for GDOT's continued widening of I-85 to the South Carolina border.

GDOT continues to advance vital MMIP projects, including the I-285 Westbound Auxiliary Lane Extension, I-285 Eastside Bridge Replacements, and SR 400 Phase I (Bridge Replacements). These projects were accelerated to deliver critical infrastructure improvements to I-285 and SR 400 in metro Atlanta. Other projects in the MMIP include:

- The I-16/I-95 improvements project, including opening of the new "partial turbine" bridge ramps in metro Savannah.
- The I-285/I-20 East interchange project, awarded in April 2022, which started construction in late 2023 in metro Atlanta.

The SR 400 Express Lanes project and I-285/I-20 West interchange project are in procurement, with developer selections anticipated in the second quarter of 2024 in metro Atlanta.



TIA provides a process for the regions in Georgia to fund necessary transportation infrastructure projects through a voter-approved 10-year, 1-cent sales tax. Project lists are selected by regional community roundtables. The program started in 2012 with three participating regional commissions: River Valley (RV), Central Savannah River Area (CSRA), and Heart of Georgia Altamaha (HOGA). The Southern Georgia (SG) regional commission joined the program in 2018. Combined, these four regions are supporting 1,022 TIA projects valued at approximately $1.7 billion, with 845 of those projects having already been delivered to their communities. These projects include resurfacing, roadway, bike/pedestrian, bridge, airport, and transit type projects.

Future Need

As the state moves forward with embracing EV infrastructure and changes in freight movement, Georgia roadways will be faced with new challenges. In 2021, the company Rivian announced plans to locate their largest manufacturing plant in Walton and Morgan Counties, with production set to begin in 2026, and a max capacity of 400,000 EVs from the facility being added on the roadways each year. Shortly after, in 2022, the Hyundai Motor Group followed suit and announced the location of its first fully committed EV and battery manufacturing plant in Bryan County near Savannah. These additions, coupled with the Kia West Point Assembly Plant and other e-mobility companies, are turning Georgia into an EV manufacturing leader in the country.

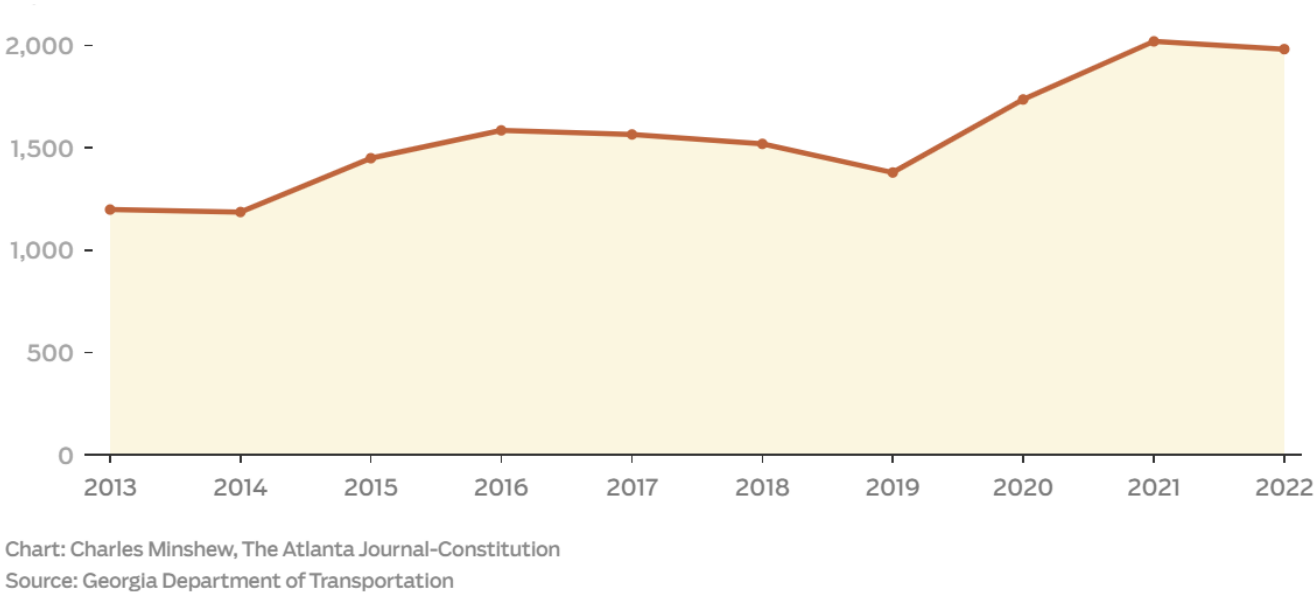
The Georgia National Electric Vehicle Infrastructure (NEVI) Deployment Program is derived from the federal IIJA. The goal of the Georgia NEVI program is to deploy a national network of EV charging stations that provide a convenient, reliable, affordable, and equitable experience for all users.

While the e-mobility economy looks to grow within Georgia, leaders in the state are also seeking ways to accommodate the demands this infrastructure requires. Key components of this investment include discovering ways to quicken the charging speed of vehicles, as well as standardizing electric vehicle supply equipment (EVSE) throughout the state. Furthermore, the progression towards increased EV use requires formulating solutions to recovering funds lost from federal fuel tax revenue, as well as discovering ways to make this method of transportation more equitable to people of all economic backgrounds.

Public Safety

1,982 road users lost their lives on Georgia roads in 2022, including 339 pedestrians. That was slightly lower than 2,020 roadway fatalities in 2021 but brings the multi-year trend stubbornly high relative to levels prior to the COVID-19 pandemic. In 2022, Georgia's road fatality rate was 1.55 fatalities per 100 million vehicle miles traveled, up from 1.49 and 1.43 in 2021 and 2020 respectively. According to a projected 2022 measure of pedestrian fatalities by the Governors Highway Safety Association (GHSA). Georgia is rated 7th in the nation for fatalities per every

100,000 people, falling behind states including South Carolina and Florida.



Caption: Georgia Crash Fatalities, 2013-22

Some GDOT and local projects are deploying new engineering into roadway design for safer driving with interventions like traffic calming, road diets, and complete streets. Clarkston, Georgia won a Federal-to-Local grant to improve safety as part of the Safe Streets for All competitive funding program. The historically disadvantaged community connected with technical assistance from the Local Infrastructure Hub and will create a street safety plan with the federal investment. Like many Georgia communities, residents walk or ride bikes to essential destinations on roads designed to move large volumes of traffic at high speeds.

Education programs can also assist traffic safety. GDOT and the Scholastic organization have partnered to teach students from a young age the importance of non-distracted driving. "Drive Alert Arrive Alive" is another recent campaign to educate drivers on the importance of safe driving practices.

To help with highway traffic-related incidents, GDOT continues to use Highway Emergency Response Operators (HEROs) in Metro Atlanta. Currently, the program patrols 382 miles of roadway and has performed 88,747 assists to date. These assistances involve clearing vehicles from traffic flow and helping stranded motorists. Outside of Metro Atlanta, the Coordinated Highway Assistance & Maintenance Program (CHAMP) provides highway assists. CHAMP currently patrols 1,062 miles of roadway. In 2022, an advancement was made to both programs with the use of "motorist location identification technology," which informs operators of the motorist's exact location, thereby reducing dispatch time by 85%.

Resilience

Over the coming decade, Georgia's roadways will be forced to adapt to the growing challenges presented by sea level rise, increased inland and riverine flooding, and other extreme weather events. Since 1935, coastal areas have experienced a sea level rise of approximately 10 inches, with this amount predicted to grow by another six inches in the next 50 years. In 2016, Tybee

Island was the first community in Georgia to implement a "Sea Level Rise Adaptation Plan," which included improving the resiliency of U.S. 80, the sole roadway traveling on and off the island. Since then, other coastal communities in Georgia have followed suit with developing their disaster recovery and redevelopment initiatives. While different solutions for combating increased flooding exist, such as raising roadways, as seen on U.S. 80, reinforcing sand dunes, and increasing culvert size, coastal areas continue to face legal and funding obstacles when attempting to implement these solutions. Several solutions exist for combatting increased flood risks, including reinforcing sand dunes, increasing culvert size, and raising the roadway surface - as seen on U.S. 80. However, coastal areas still continue to face legal and funding obstacles when implementing these techniques.

In north Georgia, state officials are exploring alternative solutions for keeping Georgia drivers safe during hazardous winter weather conditions. GDOT continues to investigate and implement improved methods for winterizing their roadway surfaces by exploring different brine and asphalt mixtures. By reviewing various brine solutions, officials are hoping to better prepare Georgia drivers for the risks caused by freezing temperatures and potentially dangerous driving situations.

Innovation

Georgia DOT's Office of Traffic Operations is actively working to connect vehicles and systems to infrastructure through the deployment of technology. GDOT utilizes a statewide program to communicate with 7,500 of the 9,000+ signals that are operated and maintained by more than 100 agencies to improve operations. Within these 7,500 signals GDOT and local agencies have deployed over 1,200 roadside units across the state to support vehicle-to-everything (V2X) communications that enable signal priority to regional transit and freight traffic.

Alternative delivery has been an innovative approach to successfully completing projects for GDOT and local agencies like Gwinnett and Cobb Counties. Innovative methods to highlight include design-build (DB) with variable scope, construction management/general contractor (CM/GC), design-build-finance (DBF), design-build-finance-operate-maintain (DBFOM) and operate-maintain-commercialize (OMC).

In 2021, Alternative Contracting Method Legislation (House Bill 577) was passed, allowing GDOT to deliver projects utilizing comprehensive development agreements (CDAs), project development agreements (PDAs), and CMGC. GDOT published its CMGC Manual in October of 2022 and is using CMGC on the proposed U.S. 17/SR 404 Spur Bridge Major Maintenance project located in Chatham County. The project will replace the existing cables as part of planned maintenance of the cable-stayed bridge and explore shortening the cables to raise the profile of the bridge to accommodate access for larger ships navigating beneath the bridge to access the Port of Savannah's terminals.

GDOT is using various public-private partnership (P3) delivery methods to deploy technology in Georgia, including DBFOM for express lane projects, OMC for broadband implementation, and DBF for alternative fuel initiatives in the state.

Recommendations

- TRAFFIC SAFETY: improve safety for people walking, biking, and driving with funding and project prioritization of design interventions per FHWA, AAHSTO, and NACTO guidelines. Safety improvements include "complete streets" with "road diets" delivering pedestrian enhancements with raised medians, physically protected bike lanes, and designing roadways to include sidewalks on both sides of the roadway.
- FUNDING: Increase dedicated state funding streams to fill the gap between the cost estimates of planned projects and forecasted revenue. Proritize projects that deliver the opportunities identified in the Georgia Statewide Freight and Logistics Plan.
- CONGESTION: Relieve congestion with increased funding to multimodal projects that increase roadway capacity in strategic locations, such as the interchange of I-285 and I-85 north, including recommendations identified in the I-85 Planning and Environment Linkages (PEL) comprehensive corridor study along I-85 between I-285 and I-985. Reduce freight delays by pulling vehicles off the road transit and rail for freight and passengers.
- PROJECT DELIVERY: Continue to pursue alternative delivery methods to accelerate the advancement of projects.

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Schools: B

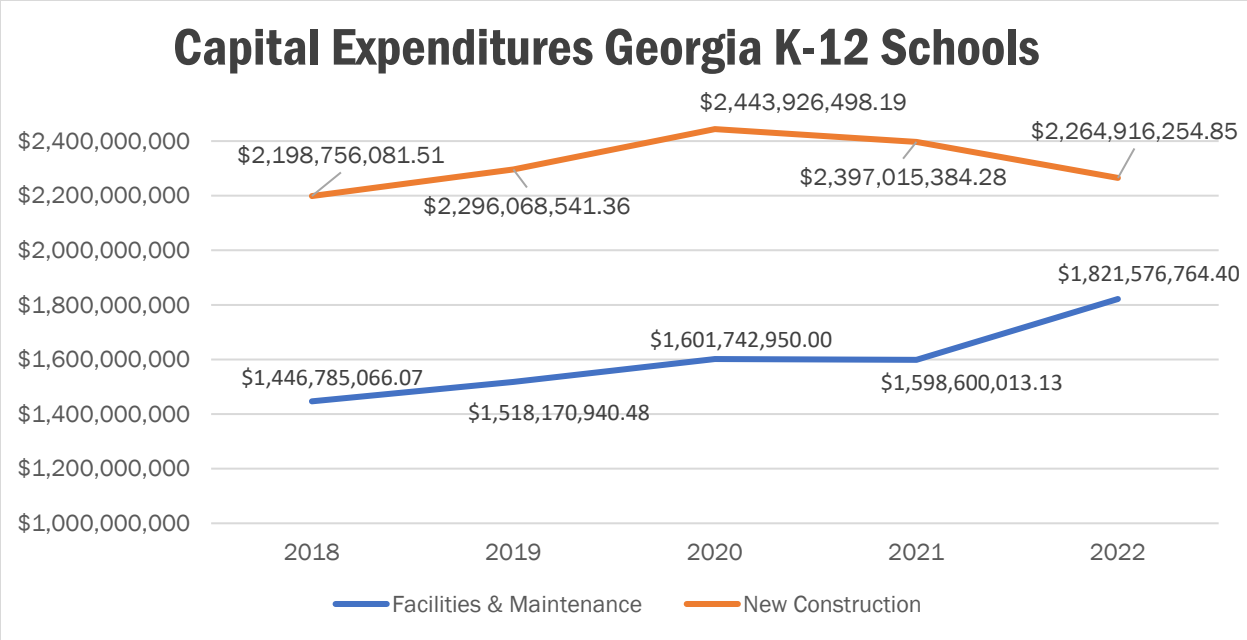
Summary
Georgia is investing unprecedented levels in the state's 2,200 public K-12 schools, serving 1.86 million students. The state sent $13.1 billion down to its 181 school districts in FY2024. The rise of COVID-19 temporarily shifted some Georgia school facility spending from new campuses to upgrades of current facilities with improved ventilation systems, enhanced cleaning protocols, and upgraded technology with broadband connectivity. But those notable projects obscure the overall picture: Georgia schools still spent more on new campuses than maintenance projects. Capital spending, improvements to the physical infrastructure and facilities on campus, only amounts to 7 percent of Georgia's total school spending. That's below the already very low national average of 10 percent. As Georgia gains residents and public schools potentially regain enrollment, decision-makers should prioritize state-of-good repair work and account for inflation, among other factors increasing project costs.

Condition and Capacity
While school facilities are primarily utilized for education, they also serve as spaces for community meetings, polling sites, emergency centers, and shelters. To ensure public safety and provide quality education, it is imperative for school facilities to be in good condition and provide adequate space for children of all ages to learn and grow.

Georgia has more than 2,200 public schools serving grades kindergarten through high school. These facilities are dispersed across the state's 181 school districts and are supervised by the Georgia Department of Education (GaDOE). Approximately 1.86 million pupils, down 8,841 from 2019, are taught in these institutions daily by over 114,800 teachers.

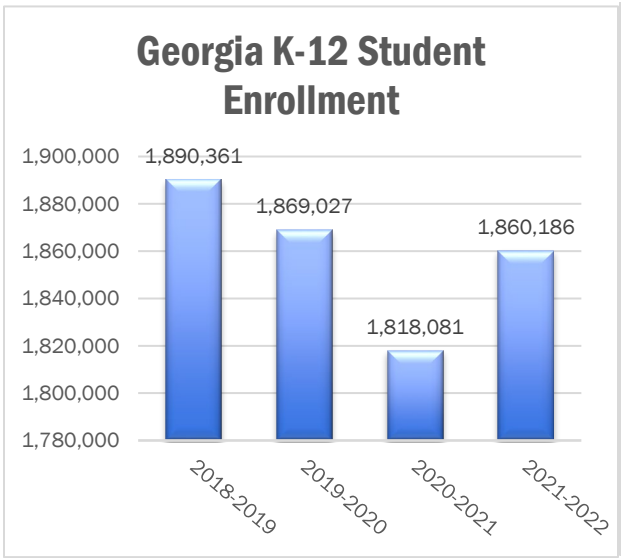
Georgia's K-12 facilities are in varied states of repair, depending on several variables, including funding, the age of the infrastructure, and the general socioeconomic status of the community. Although some schools may have state-of-the-art facilities and ample resources and space, others have found themselves with outdated facilities, limited access to online educational materials, and overpopulated classrooms.

As seen in the graph below, the rise of COVID-19 caused a shift in Georgia K-12 school's new construction and facilities & maintenance capital expenditures. With the decline in school attendance in 2020, Georgia had to reevaluate where its funds were being used. There was no longer as much of a need for new construction as there was for upgrades/renovations to current facilities. This shift in capital expenditures allowed Georgia to prioritize the safety and future of students and staff by investing in measures such as improved ventilation systems, enhanced cleaning protocols, upgraded technology, and the implementation of social distancing measures. Additionally, redirecting funds towards facility maintenance ensured that existing infrastructure remained in optimal condition and provided its students with the necessary resources to excel.

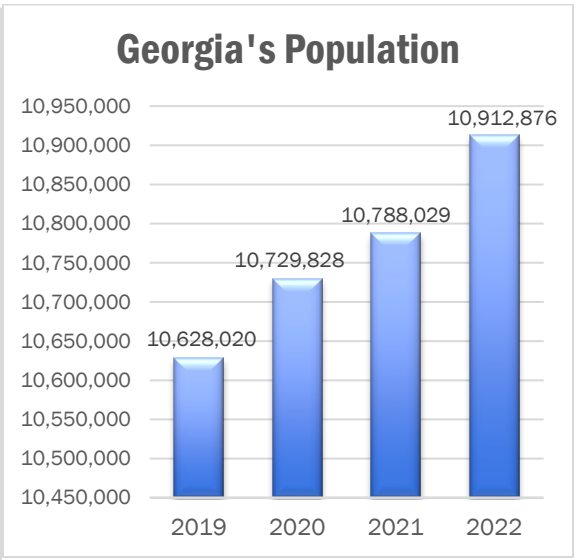


(District Financial Information. Georgia Insights - Georgia Department of Education.)

Georgia's population and K-12 student enrollment trends since 2019 are depicted in the graphs below. Although the number of students enrolled in Georgia schools has declined since 2019, the population has continued to grow. This growth in population may lead to increased demand for educational resources and infrastructure in Georgia.



(*K-12 Public Schools Report Card*, n.d.)



(*Georgia Population 1900-2022*, n.d.)

It is important for policymakers and educators to anticipate and plan for this potential increase in student enrollment to ensure that all students have access to quality education. If the state does not respond in sufficient time to financially prepare for the influx of students, this growth will impose an added strain on infrastructures that are nearing or already at capacity.

Funding and Future Needs

Public K-12 school facilities receive their funds through a combination of local, state, and federal dollars in portions that vary within the state. In the fiscal year 2024, Georgia's budget funds the Quality Basic Education program, totaling an unprecedented $13.1 billion in state funds to K-12 education.

As noted above, Georgia has increased facilities expenditures, developing strategic plans for the longevity of both older and newer facilities, and improving safety and security. However, there is still room for improvement. Some areas that require attention include upgrading infrastructure to meet growing demands, enhancing energy efficiency measures, and addressing maintenance backlogs. Additionally, continuing to invest in advanced technology and promoting sustainable practices can further enhance Georgia's facilities management capabilities.

A large portion, 72%, of the additional dollars is being used to increase the pay of public school employees and to hire additional employees. Although these employees are a vital part of our school system, the dollars spent on their salaries eat away at the state funds that are needed to invest in building maintenance. There must be a balance between investing in employee salaries and allocating funds for building maintenance. Neglecting infrastructure upkeep can lead to potential safety hazards and deteriorating learning environments for students.

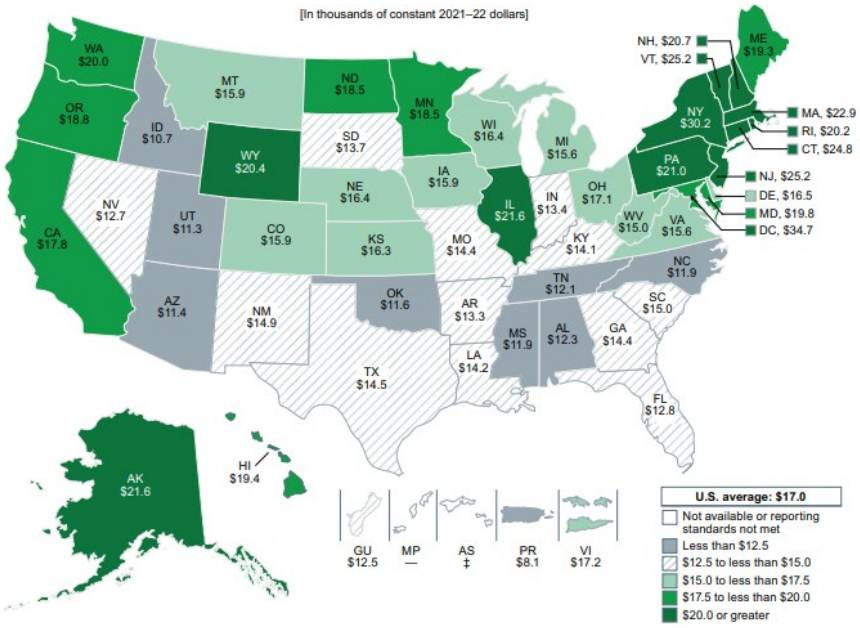
Over the past year, rapid inflation brought to light a longstanding issue with the state's allocation of education funding: cost of living increases are not being factored into the state's formula. The periodic raises, like the one set for FY 2024, have not kept up with the consumer price index, which means that schools must make up the difference with the local property tax collection. Each school district vastly varies in the amount of local taxes that can be collected. Without adequate funding and resources, schools may struggle to accommodate the increased number of students, leading to overcrowded classrooms and limited access to educational facilities.

Operations and Maintenance

Maintaining school infrastructure on a regular basis is one of the biggest issues the state faces. Students and staff spend most of the year occupying these facilities, so it is easy for the buildings to exhibit signs of deterioration. Among the need for standard upgrades, the COVID-19 pandemic brought about several concerns regarding the lack of technology, space, and HVAC systems. Without proper operations and maintenance, these facilities may become unsafe or inadequate for the students' needs. Additionally, neglecting these responsibilities can hinder the overall quality of education provided to the children and can lead to costly repairs down the road.

According to the United States Department of Education's Report on the Condition of Education 2023, total expenditures per pupil in 2021-22 were $17,000 on average. A total of $1,760, or 10% of the total, was spent on facilities and maintenance. In 2021-22, the average total expenditure per pupil in the state of Georgia was approximately $14,400, with $979, or 7%, spent on facilities and maintenance. These figures indicate that, on average, schools in Georgia allocate a lower percentage of their total expenditures towards facilities and maintenance compared to the national average. This suggests that the state of Georgia prioritizes other areas of expenditure over facilities and maintenance. It is necessary for the state to strike a balance

between allocating funds for educational resources and ensuring the proper upkeep of their facilities.



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Public Safety, Resilience, and Innovation

The state of Georgia continues to enact legislation and regulations to guarantee that school buildings continue to be a safe environment for all students, teachers, and staff.

Georgia's budget for fiscal year 2024 allots $115.7 million for grants that cover operating costs associated with school security at a rate of $50,000 per school facility. These dollars are to only be used toward school security needs and/or enhancements. Each school facility should be required to have updated surveillance, instruction, safety gear, and physical infrastructure. These improvements enhance the overall safety and security measures within school premises, as well as ensure a proactive approach to preventing and responding to potential threats. By investing in surveillance systems, schools can effectively monitor and identify any suspicious activities while providing proper safety gear and training, equipping staff and students with the necessary tools to handle emergency situations effectively. Additionally, allocating funds for new physical infrastructure allows for the implementation of access control systems and reinforced structures that further fortify the school environment against potential risks.

HVAC and air quality also play a large role in a school's infrastructure. A well-maintained HVAC system ensures a safe learning environment for all by regulating temperature and humidity levels. Additionally, proper air quality control helps prevent the spread of airborne illnesses and improves overall health and productivity within the school community. Regular maintenance and repair on these HVAC units will prolong the life of school buildings and prevent costly repairs in the future. The Improved Learning Environment Infrastructure Activity will help Georgia schools with these repairs. This activity is sought to address critical characteristics of the learning

environment, such as insufficient heating systems, poor indoor air quality, and insufficient lighting. At the school level, the compact-enforced interventions included: complete interior and exterior rehabilitation of classroom and support facilities; new or major upgrades to utilities such as power, water, and wastewater; and new laboratory classrooms. Designs to improve student health and safety in restored schools followed domestic rules and international best practices.

Sustainability was also included in the Improving General Education Quality Project from the start. The GoG's budgetary contributions provided the groundwork for the Millennium Challenge Corporation's future commitments. Close collaboration with implementing bodies (such as ESIDA, TPDC, and NAEC) – an approach that was previously effective in the first Georgia compact's Energy Rehabilitation Activity – was designed to assist Georgia in creating long-term institutional capacity. Building capacity has always been an important aspect of strengthening an institution's sustainability.

Each of these techniques, projects, and delivery methods help innovate public school's infrastructure and provide students, staff, and the community with a safe place to learn and grow.

Solutions to Raise the Grade

- **Conduct regular evaluations of school infrastructure, and make data from these assessments readily available in yearly reports.** These reports can serve as a valuable tool for school administrators and stakeholders to allocate resources effectively and prioritize maintenance projects based on the severity of the issues identified. By addressing these concerns promptly, schools can prevent costly repairs or replacements in the future, ensuring a safe and conducive learning environment for students and staff. Additionally, proactive maintenance and upgrades can help schools accommodate growing student populations and evolving educational needs, ultimately maximizing the longevity and functionality of the school facilities.
- **Increase the percentage of school spending dedicated to facility upkeep.** Despite the need to upgrade existing facilities, it is paradoxically easier to obtain capital funds now for construction of new schools – despite stagnant enrollment. By securing adequate funding and support for school modernization and construction projects, educational institutions can ensure that they have the necessary resources to meet the demands of growing student populations. This proactive approach will not only address immediate needs but also provide long-term solutions to accommodate future educational requirements.

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Solid Waste: C+

Executive Summary

Increased funding to Georgia's statewide waste agency has allowed better oversight, data gathering, and overall management of the regulated community. Landfill capacity remains strong, with over 36 years of capacity currently remaining. Household trash disposal, estimated at 9.22 pounds/person/day in 2022, is down 3 percent from 2017. Georgia's Solid Waste Trust Fund was bolstered by 2021's constitutional amendment limiting the repurposing of fees and appropriations to be dedicated back to their intended waste programs. Meaningful improvement, however, hasn't been shown in conservation. Despite some positives at the local household level, there is still only a limited concerted effort by the government in aspects related to reuse, recycling, reclamation, and materials recovery. That said, the state's nascent Municipal Measurement Program for Waste Diversion and Recycling shows promise, with its first survey identifying a 20 percent diversion rate within responding agencies.

Background

In Georgia, the management of solid and hazardous waste is regulated by the Land Protection Branch (LPB) within the Department of Natural Resources (DNR). The LPB manages the treatment, processing, storage, disposal, and cleanup of solid and hazardous wastes through programs for landfills, industry, and contaminated sites. The branch oversees recovered materials, underground storage tanks, scrap tire cleanups, lead-based paint and asbestos, and surface mining.

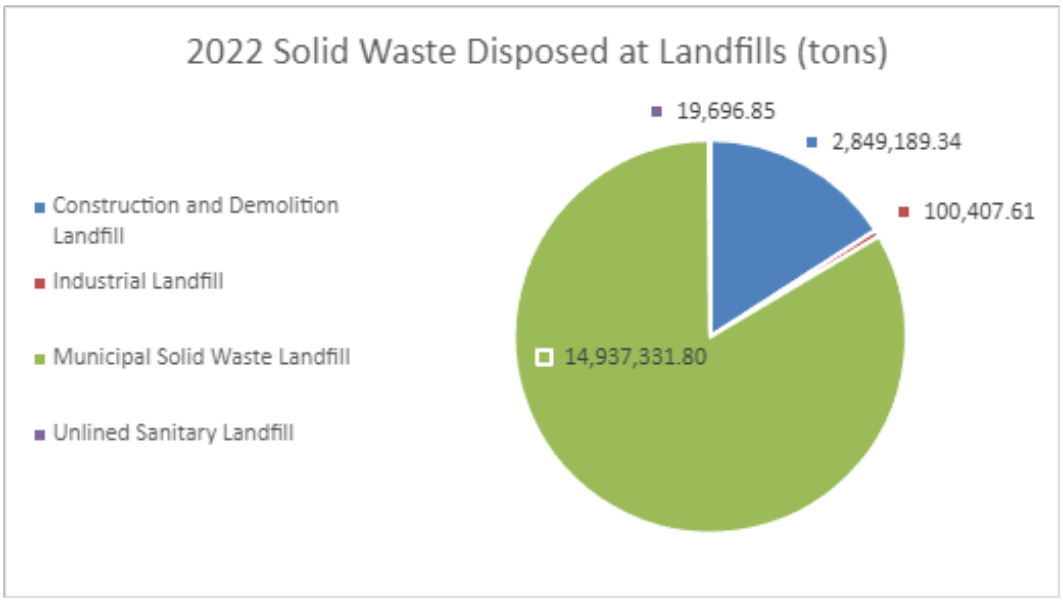
Condition and Capacity

Georgia's population has continued to see a steady growth rate on par with the national average, however, the state's waste disposal rates over that same period appears to be declining, which may seem out of sync with the general growth trends. The amount of solid waste disposed in Georgia landfills decreased approximately 1.8% over the past five years. Approximately 17.9 million tons were disposed of in 2022 compared to 18.2 million tons in 2017. As a result of this decrease, the generation rate for 2022 was 9.22 lbs/person/day compared to 9.51 lbs/person/day rate measured in 2017. Though Georgia does import some out of state waste, these quantities are not tracked by the EPD. Generation rates were determined using the Georgia population; thus rates may be slightly lower to account for waste disposal from neighboring states. Volumes of out of state waste appear from public data to be lower in 2022 from 2017.

There are a total of 5,917 permitted public and private solid and hazardous waste facilities in Georgia regulated by the EPD, including municipal solid waste (MSW) landfills, construction and demolition (C&D) dumps and inert impoundments, treatment/ storage/ disposal facilities (TSDFs), materials recovery facilities (MRFs), transfer stations, composting facilities, CCR impoundments, medical waste landfills, and other similar type facilities. Ninety-seven of these facilities are considered more traditional permitted landfills (MSW, C&D and Industrial) filling at an average rate of 892 cubic yards (cy)]/day. The remaining capacity of these landfills is approximately 733 million cy providing an average fill period (years remaining) of over 36 years.

As depicted in the chart, of the over 17.9 million tons disposed in 2022, over 83% was disposed in lined MSW landfills while close to 16% of the total waste was disposed in construction and

demolition (C&D) landfills.



Hazardous Waste

Georgia manages its hazardous waste sites and facilities through five state programs; two federally authorized programs and three state-initiated programs. The two federally authorized programs closely follow the national Resource Conservation and Reauthorization Act (RCRA). One program, the Hazardous Waste Management Program (HWMP), allows the Georgia EPD to manage hazardous wastes that are generated, stored or treated and associated compliance activities. EPD also oversees investigations of spills and releases and cleanups involving hazardous chemicals and evaluates the impact to human health and the environment under the Hazardous Waste Corrective Action Program (HAZCAP).

In 2022, there were 4,926 Hazardous Waste Generators reporting in Georgia. These include 225 universal waste handlers (Large Quantity Generators [LQG]), 169 used oil management facilities, 120 transporters/transfer facilities, 20 hazardous secondary material (HSM) handlers, and 3 pharmaceutical reverse distributors (medical waste). Together, over 99,000 tons of hazardous waste was generated and disposed of in 2022 from 349 LQGs, 1131 Small Quantity Generators (SQGs), and 3451 Very Small Quantity Generators (VSQG).

The three state programs that round out Georgia's Hazardous Waste Branch include the Hazardous Sites Response Act (HSRA), the Voluntary Remediation Program (VRP), and the Brownfields Program. EPD maintains a hazardous sites inventory (HSI) which documents the number of contaminated sites in the state. There has been a significant decrease of sites on the HSI over the last decade starting with 552 sites in 2013 and dropping to 521 in 2018 then to 481 in 2022 and finally 469 in 2023. The total sites listed in the VRP have also been under a steady decline since its high of 575 in 2009 when the VRP became law. Currently, the number of sites in this program is 469 which has seen an 8.5% decrease since the report card was last prepared 5 years ago.

<u>Special Wastes</u>

Coal Combustion Residuals (CCR)
Recent changes in federal Coal Combustion Residuals (CCR) regulations have required Georgia EPD to oversee the proper disposal of the material as a "new" waste material in adequately designed and monitored landfills and/or impoundments. Though not a newly generated waste stream, Georgia is now managing this material under strict guidance to minimize the risk and exposure while ensuring the generators have mitigated the impact to the environment. Currently, there are 18 permitted coal ash ponds in Georgia with 42,902,599 cy of ash that has already been or will be removed for proper disposal. An additional 44,333,000 cy of coal ash will be closed in place with properly designed covers and monitoring networks installed. There are also 12 CCR landfills with 3 new ones that came online in 2023. These landfills contain over 1,188,500 cy of CCR with another 7,090,570 cy of ash to be closed in place with properly designed caps and monitoring networks. The total amount of CCR that Georgia manages is currently over 95.51 million cy.

Asbestos and Lead Based Paint
The regulatory oversight of both the asbestos abatement and lead based paint (LBP) abatement programs is managed by the Recovered Materials and Abatement Program of EPD. Unfortunately, the quantities of ACM or LBP are not quantified for evaluation and documentation. ACM amounts are only reported to EPD for the sole purpose of fee calculation and therefore their disposal volumes are not reported to the state.

Scrap Tires
According to the Solid Waste Trust Fund 2022 Annual Report, 303,358 passenger tire equivalents (PTE) were removed or cleaned up through investigations, local government partners, or state sponsored abatement. These tires were kept out of landfills and were reused or recycled through a variety of state programs.

Recycling and Composting
According to the most recent Solid Waste Trust Fund annual report (2022), surveys were sent in 2020 through the newly established Municipal Measurement Program for Waste Diversion and Recycling (MMP) tracking system for solid waste in Georgia. This voluntary tracking system is administered by EPD and replaces the annual reports that were generated by local governments and maintained by the Georgia Department of Community Affairs. According to the 19 municipalities that responded to the 2020 survey, 552,697 tons of material was processed. As a result of recycling, over 110,000 tons of waste was kept out of Georgia landfills.

Funding
The funding for the solid waste management program comes from various programs within EPD. The solid waste trust fund (SWTF) is primarily funded by a $1 fee on every new tire sold in the state of Georgia. Historically since 2008, much of the fees collected in the SWTF were diverted by the legislature to support other government programs. However, in May 2021 a constitutional amendment authorizing the Georgia Legislature to dedicate tax or fee revenue directly to the public purpose for which the taxes or fees were imposed was passed following overwhelming resident support. As of July 2023, all funds collected through the fee on new tires are now available for EPD to use in its solid waste management programs. The legislature appropriation has allocated

$2.82M in FY 2022 for the Solid Waste Trust Fund to clean up illegal scrap tire sites, properly close abandoned landfills, fund waste reduction and recycling programs, and fund administrative and operational costs.

The hazardous waste trust fund is financed by various fees based on the amount of hazardous waste a generator creates or releases to the environment. However, it excludes small hazardous waste generators. In 2022, the collections into the trust fund totaled $23.59M which came from hazardous and solid waste tipping fees ($0.75/ton), hazardous materials substance fees, and penalties and fines. Additional revenue the department receives includes $8.56M from legislative appropriations, interest, and cost recovery from the regulated community. The expenses to run the department total $6.59M for administrative, local government support, paying state contractors, financing the cleanups at abandoned sites.

Additional federal grant programs through the Environmental Protection Agency (EPA) were put into place over the last few years as a result of the Bipartisan Infrastructure bill. GA EPD implemented Recycling Waste Reduction (RWR) grants program in July 2022. This was a result of the work of the Georgia Recycling Coalition (GRC) and others did to constitutionally protect the SWTF for its intended purpose. The amount of funding awarded in 2023 was $2M. Information on a second round coming up for fiscal year 2024 is expected in the Fall of 2023.

Future Needs

Georgia has invested heavily in becoming a hub for the electric vehicle industry, which has significant waste implications. Since 2018, 35 EV-related projects have contributed $23 billion in investments in Georgia. In 2022, Hyundai Motor Group (HMG) announced plans to open its first fully dedicated EV and battery manufacturing facility in Georgia and began construction on the new facility in January 2023, with full production expected in the first half of 2025, with annual capacity of 300,000 units. In late 2021, Rivian announced their largest manufacturing facility in Georgia, slated to start production in 2026 with annual capacity of 400,000 vehicles. This is in addition to the many battery manufacturing plants that have already begun production and continue to build. Major companies such as HMG, Rivian, Kia, SK Battery, Ascend, Freyr, Club Car, Blue Bird, Caterpillar, and Yamaha are all part of the electrification projects in Georgia. The added waste streams from these unique industries will require GA to continue to effectively regulate hazardous wastes from these industries, promote waste minimization and recycling efforts, and ensure landfill capacity remains available as the EV industry continues to grow,

Operations and Maintenance; Resilience

Additional data collection and analysis is necessary to improve solid waste infrastructure in Georgia. Staffing needs and threats to more extreme weather are both factors illuminated with data.

In 2019, EPD introduced the simple and free Municipal Measurement Program (MMP) tool for waste diversion and recycling. This tool was designed to measure the effectiveness of waste and recycling programs for local governments, benchmarking performance compared to national averages. Using sophisticated analytical tools to standardize data, reports are generated that can support initiatives to implement more aggressive recycling and conservation markets in Georgia. In 2020, 19 cities and counties uploaded data using the program. As more local governments

continue to report material collection and processing, performance of waste and recycling initiatives can be better understood.

Public Safety

Landfills and material recovery facilities have the potential for negative environmental and social impact including emissions, unwanted wildlife and pests, odor, smoke, and noise. Additionally, environmental justice issues may arise when selecting the location for new landfills, which could expose a community to higher risks for water supply contamination and impact their health. However, the proper disposal and recycling of solid waste reduces the amount of waste that enters the environment, including on land and in the water. Regulation of permitted solid waste facilities is also critical to mitigate leaching of harmful chemicals into soil and nearby water bodies. These, in turn, reduce the negative impacts solid waste can have on public health (vector for disease), wildlife (plastic entanglement) and water quality (oil, heavy metals, chemicals). Using methane gas capture/reuse systems to convert traditional landfills to energy producing landfills also helps to lessen these environmental impacts. Georgia has mitigated many of these issues by incorporating a rigorous permitting program that looks at environmental impacts, (environmental justice (EJ) issues, and associated costs to determine a cost benefit rating prior to siting new facilities. This has worked well for the state.

Innovation

According to EPA's Landfill Methane Outreach Program (LMOP), out of 97 traditional landfills on file for the state, there are 18 operational projects and 20 candidate landfills for methane production. Additionally, out of the 18 operational projects, 14 are open landfills and 4 are closed landfills. This puts Georgia 7th in the nation for the number of landfill gas energy projects.

In addition to energy capture from landfills, valuable post-consumer resources from within Georgia and around the country are being recycled and delivered back to the user pool instead of going to landfills. One-third of all plastic beverage containers recycled in North America end up in Georgia and are turned into carpet. Georgia is also a leader in recycling paper, with almost 8% of all paper consumed in the US being recycled in Georgia.

Solutions to Raise the Grade

Recommendations primarily revolve around the incentivization of waste reduction methods, conservation, and reclamation/recycling. The following provide simple ideas that may help Georgia track, minimize, and prepare for the future waste management influx into the state.

- PLANNING: Georgia should produce an updated, overall statewide solid waste management plan, aggregating data and coordinating goals from different local municipalities who develop their own plans. Local governments are required to have current solid waste management plans. But those plans are no longer reviewed by a state entity prior to approval.
- RECYCLING DATA: There are inadequate methods to document the programs in place for accurate measurement of waste minimization methods and diversion of waste streams for reuse (recycling). Most states rely on their Departments of Community Affairs (DCA) to document the solid waste gains at the local level. However, Georgia disbanded that option years ago and has left it to industry trade groups or NGOs to track these numbers.

Unfortunately, not many municipalities do this, so there is not good data to rely on to show the effects that organized programs have on the goal to reduce waste and recycle where appropriate. Funding to these agencies could help incentivize the regulated community and allow them to documentation progress.

- INTERSTATE WASTE: Better methods for tracking out of state waste importation is another recommendation along with potentially implementing a significant tax for these out of state generators thus generating revenue to fund the tracking programs and waste reduction goals.
- ELECTRIC VEHICLE WASTE: With the goal for Georgia to be the national leader as an electric mobility hub coming to fruition, Georgia must be proactive in mandating proper waste management of the electric vehicles and supply chain in a truly sustainable manner. In 2021, more than 4,000 EVs were sold in Georgia, representing a total annual growth of 29%, and as of September 2022, more than 42,500 electric vehicles were registered in Georgia. Georgia is rapidly expanding across multiple eV segments: cathode and anode manufacturing, chemical and mineral solutions; battery manufacturing; metals and aluminum manufacturing. This industry will generate a significant amount of hazardous waste. Though recycling will most certainly be part of the facility process, new waste streams from these plants will enter Georgia's landfills. It would be wise to prepare for these new wastes and work with manufacturers in waste reduction and reclamation to minimize the negative effects and strains to the system from these new generation sources.

Stormwater: C-

Executive Summary

Georgia's stormwater infrastructure has continued to improve in recent years. However, progress has not kept up with threats from increased runoff and pollutant loads. Changing land use and development supercharge those hazards. Water planning documents addressing stormwater needs were updated across the state in 2022-2023, but consistent, flexible funding mechanisms have not been established to meet needs. Sixty-four local governments in Georgia have stormwater utilities, about the same as five years ago. Only some of those utilities have increased fees to fully account for aging infrastructure and project cost increases. Analysis of available data provided by the Atlanta Regional Commission (ARC) indicates there is an annual gap of over $620 million between stormwater infrastructure needs and funding in Metro Atlanta alone. Resilience threats are also growing. The Georgia Stormwater Management Manual Coastal Supplement will soon address current and future needs related to sea level rise and changing storm patterns for the coastal area. However, areas beyond the coast face changing storm patterns that will need to be addressed in design standards.

Background

Stormwater infrastructure consists of structures such as storm drains and manholes and conveyance components such as pipes, culverts, ditches, and streams. Also included are best management practices (BMPs) intended to minimize the water quality and quantity impacts associated with development. Stormwater BMPs include water quantity controls, such as ponds and green infrastructure practices (buffers, filter strips, and bioretention) that provide water quality improvement filtering. MS4 permits statewide now include requirements for implementing BMPs that reduce runoff from a site through infiltration into the soil or reuse, mitigating pollution and runoff quantity impacts. These nature-based solutions are an important component of mitigating the effects of land development since their purpose is to mimic the natural process that captures rainwater in undeveloped conditions.

Stormwater challenges tend to be most severe in highly developed areas with higher populations. Increasing population numbers and density increase the volume of runoff, resulting in insufficient capacity of the stormwater infrastructure. Pollutant loads are also increased, resulting in water quality degradation of streams and lakes. Aging stormwater infrastructure requiring rehabilitation or replacement puts a financial strain on communities without sufficient funding for construction of these projects. Poor farming practices, industrial activity, and construction also contribute to increased stormwater flow and water quality degradation.

Sources of stormwater pollution are managed and regulated under the National Pollutant Discharge Elimination System (NPDES). The Georgia Environmental Protection Division (EPD) is responsible for implementation of the permit in four categories:

- Urban Areas - Municipal Separate Storm Sewer System (MS4) permits issued to 171 Georgia municipalities and counties and the Georgia Department of Transportation
- Industrial Facilities – Industrial Stormwater permits issued to over 2,000 Georgia facilities
- Construction – General Permits for Stormwater Discharges Associated with Construction Activities to ensure proper erosion and sediment control at construction

sites with over 1 acre disturbed.
- Agricultural practices – overseen by Georgia Department of Agriculture

Condition
A fully functioning stormwater infrastructure system is essential to public health and safety. Since ownership of the system is split between local governments, which generally maintains the system within the public right-of-way, and private entities, who are responsible for structures, pipes, and BMPs on their own property, maintenance of this infrastructure is lacking consistency. Proper maintenance of stormwater systems must include regular inspections and removal of accumulated pollutants, especially sediment. However, many local governments are struggling to simply maintain their basic stormwater pipes and structures. Enforcement of private stormwater infrastructure maintenance is even more challenging due to a lack of enforcement personnel and property owners lacking funds for maintenance. This can be further complicated by transfers of property ownership that result in a new owner who may not know the infrastructure they acquire with the property, including its condition and maintenance requirements.

Streams and lakes throughout Georgia are used for fishing, recreation, and drinking water. Urban runoff and non-point source pollution are the most common impairment causes and can impact these uses. Currently, 65 percent of the 15,778 miles of streams and beaches and 70 percent of the 670 square miles of lakes and harbors assessed by the Georgia Department of Natural Resources were found to be impaired (i.e., not supporting their designated uses) by violating at least one water quality criterion. This is an increase of 6 percent of impaired streams and beaches and 43 percent of impaired lakes and harbors since 2018.

Capacity
Georgia's existing stormwater infrastructure has been constructed over decades using various design criteria. Current standards for water quality have been in place since 2001, and flow reduction measures were added to MS4 permit requirements in the last five years. Although MS4 permits require inventory of stormwater systems, very few communities have detailed capacity models of the system to help inform development decisions and system improvements. As the intensity, time, and duration of storm events continue to change, design standards remain the same, such as the design capacity regulated by the state through the GA Stormwater manual (Blue Book) that was last updated in 2016 and originally published in 2001. This creates a situation where our stormwater infrastructure can no longer handle the more frequently occurring intense storm events due to climate change. ARC's Metropolitan North Georgia Water Planning District (MNGWPD) stormwater forecast predicts the volume of required stormwater management will more than double in the next 20 years based on development and changing rainfall trends.

Funding
The funds needed for stormwater infrastructure construction, operations, inspection, maintenance, educational programs, regulatory coordination, and other activities generally come from local government general tax funds, competing for budget with other government functions such as public safety, transportation and parks. Other funding methods include general obligation bonds, development impact fees, and special assessment or tax districts. These sources are often insufficient to fully fund operations and maintenance needs and to construct new projects to

improve the system and mitigate the effects of increased impervious area from development. Another option for funding is a stormwater utility, which provides the benefit of a dedicated funding source.

Sixty-four local governments in Georgia have stormwater utilities, with user fees calculated based on the impact a property has on the stormwater system using the amount of impervious surfaces (e.g., roofs, driveways, parking areas, sidewalks). This number has not largely increased in the last 5 years. Stormwater utility fees create a dedicated funding source that can be used for activities related to water quality and quantity and their impacts on natural resources, as well as maintenance of failing infrastructure, such as pipes and dams. Eighty-nine percent of the stormwater utilities in Georgia are operated by regulated MS4s. A Southeastern Stormwater Association (SESWA) survey completed in 2022 indicates the average stormwater utility fee in Georgia is approximately $54 per capita per year. A small number of local governments have raised stormwater fees to keep up with rising needs in recent years, and more are discussing increases, but little progress has been made to increase dedicated funding to stormwater infrastructure across Georgia.

In recent years, there have been an increasing amount of grant and low-interest loan opportunities to supplement these sources, primarily from federal and state government sources.

These include:

- Federal Government - American Rescue Plan Act Fund (ARPA), Infrastructure Investment and Jobs Act (IIJA)
- Georgia Environmental Finance Authority (GEFA) – Clean Water State Revolving Fund (CWSRF)
- Georgia Department of Natural Resources (GADNR) Environmental Protection Division (EPD) – Section 319 Nonpoint Source Implementation Grants, Regional Water Plan Seed Grant Funds, Georgia Outdoor Stewardship Program Grants
- GADNR Coastal Resources Division (CRD) – Coastal Incentive Grant Program
- Federal and Georgia Emergency Management Agencies (FEMA, GEMA)- Hazard Mitigation Assistance (HMA) Program Grants, Building Resilient Infrastructure and Communities (BRIC) Program Grants, Flood Mitigation Assistance (FMA) Grant Program, Pre–Disaster Mitigation (PDM) Grant
- Federal Highway Administration (FHWA) - Promoting Resilient Operations for Transformative, Efficient and Cost-saving Transportation (PROTECT) Grant Program
- United States Environmental Protection Agency (EPA) - Water Infrastructure Finance and Innovation Act (WIFIA) Program
- National Fish and Wildlife Foundation (NFWF)- National Coastal Resilience Fund

The City of Tybee Island, a coastal community in Chatham County, developed a stormwater master plan for its grey infrastructure in 2019 that was predominantly funded by a FEMA Pre–Disaster Mitigation (PDM) Grant. The master plan efforts included data collection for their first robust stormwater system inventory, hydrologic and hydraulic modeling to assess capacity, and provided a roadmap with estimated costs to address identified deficiencies. The City also secured funding from the NFWF's National Coastal Resilience Fund and the Georgia Department of Community Affairs (GDCA) in 2019 to develop their first natural infrastructure master plan,

providing recommendations for integrated green infrastructure solutions that could improve the ability to recover from more frequent storms and flooding caused by changing storm patterns and sea level rise. The two master plans work together to provide enhanced benefits through a hybrid infrastructure approach. In late 2023, the City received a second phase of funding from NFWF to move forward with design of solutions resulting from the natural infrastructure master plan.

Future Needs

Georgia's population is anticipated to grow by 2 million people in the next 20 years; increased development and impervious surfaces will generate more runoff further stressing our stormwater management infrastructure. The use of green infrastructure BMPs is increasing, which provides more water quality benefits, but the learning curve and resources required to properly inspect and maintain them can hinder a community's ability to keep up with their requirements. In addition, the rise of emerging contaminants that are not currently regulated, such as microplastics and per- and polyfluoroalkyl substances (PFAS), highlights the need for diligent source control in stormwater programs.

Regulations related to stormwater management have strengthened over the past decade, including requiring the use of green infrastructure to improve quality of stormwater runoff and promotion of nature-based solutions. The impending challenge is modernizing design storm guidance to account for the changing patterns and intensity of rainfall events. The current standard for rainfall intensity-duration-frequency (IDF), NOAA Atlas 14, was published in 2004 using 30 years of historical climate data from the late 20th century that is not reflective of current reality. There has been some progress, particularly in coastal Georgia, to update this guidance based on more recent storm data. The GADNR Coastal Resources Division (CRD) developed updated IDF curves based on more recent data for the 50-year,24-hour storm events expected to occur in the eleven coastal counties in Georgia (Vavrus and Notaro, 2020).

Preliminary data from the Environmental Protection Agency's 2023 Clean Watersheds Needs Survey estimates the total stormwater funding needed for Georgia over the next 20 years is $2.7 billion for traditional gray infrastructure like storm sewer pipes, $1.2 billion for green infrastructure, and $116 million for general stormwater management.

In general, communities lack the funding required to adequately maintain their stormwater conveyance systems. As a result, communities without a dedicated funding source must rely on general tax funds. In this case, community leaders may be forced to choose between stormwater programs and other community services (fire, police, transportation, etc.) when developing budgets. Unfortunately, in many cases, stormwater system upgrades do not make the final list of funded projects because of a lack of information on the subject or lack of urgency regarding the importance of these systems to community health and welfare. Analysis of available data provided by the ARC indicates there is an annual gap of over $620 million between stormwater infrastructure needs and funding in the fifteen-county Metro Atlanta area alone. In addition, an average of $40 per capita per year is spent in Metro Atlanta on stormwater infrastructure, much less than the $85 per capita need projected by the EPA.

Operations and Maintenance

The mix of government and private ownership of portions of the stormwater system makes

operation and maintenance even more challenging to ensure proper stormwater system maintenance. A limited survey of a mix of coastal and urban/suburban upland local governments indicated that most stormwater budgets are being spent on repairing or rehabilitating existing infrastructure.

Georgia's population is projected to increase almost 30 percent between 2022 and 2060, according to Georgia's Office of Planning and Budget. The additional stormwater infrastructure and increased impervious area associated with development to support this growth, as well as the changing storm event patterns, will result in an additional burden on local jurisdictions to maintain the stormwater infrastructure.

Public Safety

Many local governments struggle to proactively maintain stormwater pipes and structures due to limited funding and staffing resources. If these structures are not maintained properly and repaired or replaced when necessary, public safety can be significantly impacted by collapsed roads, sinkholes, flooding, and polluted drinking water sources. Public health can also be affected by degraded water quality and wildlife habitat. MS4-regulated local governments are required to develop inventories of their stormwater infrastructure, and some include condition assessment as part of their maintenance program, but smaller unregulated communities rarely take these proactive steps.

Flooding is a significant concern related to increased stormwater runoff. Unmanaged or poorly managed stormwater has significant costs that citizens, taxpayers, and businesses bear. Since 1980, 16,322 claims totaling $454 million have been paid through the National Flood Insurance Program (NFIP) for flood losses in Georgia. Of these claims, 1,315 have been paid since 2018, totaling $40 million. Approximately 30 percent of claims in Georgia have occurred outside of regulated floodplains, demonstrating the need for improved stormwater infrastructure capable of managing major storm events.

GADNR continues to help increase public awareness of flood hazards by providing current online digital Flood Insurance Rate Maps. In addition, 90% of the 655 communities in Georgia participate in the National Flood Insurance Program (NFIP). 58% of these NFIP communities also voluntarily participate in the Community Rating System (CRS), which requires going above and beyond the minimum standards to further protect from flood risks and provide lowered insurance rates for citizens of these communities.

Resilience

Georgia communities are vulnerable to many potential weather disasters, including hurricane impact, extreme rainfall events from both tropical and frontal storms, and drought. Georgia has experienced extreme weather events in recent history, including the metro Atlanta flooding in 2009 and a statewide drought in 2012, both of which demonstrated the vulnerability of its infrastructure, population, and economy. Infrastructure in Georgia's coastal communities is further threatened by potential sea level rise and the associated increases in flooding, storm surge, beach erosion, and tidal channel migration.

Trends indicate that hydrologic events will continue to test the capacity and effectiveness of

Georgia's stormwater infrastructure, the failure of which can cause additional surface water quality impairments and significant loss of life and property. More than 500,000 Georgia citizens live within FEMA's 100-year floodplain boundaries.

Georgia's 2019 Hazard Mitigation Strategy and its Flood Mitigation Assistance Program show the state is actively identifying its current and future hydrologic hazards. However, there is plenty of work left to address hydrologic vulnerability as local efforts to address current and future vulnerabilities are at various stages of implementation.

Innovation

The Georgia Stormwater Management Manual (the state stormwater design manual) was updated in 2016 to include guidance and design criteria for stormwater runoff reduction/infiltration, with the goal of decreasing runoff and allowing stormwater to infiltrate back into the ground through the use of green infrastructure practices. Building on this, the most recent Phase II MS4 permits include requirements for implementation of runoff reduction practices, and the next round of Phase I permits are expected to include these requirements as well. Currently, runoff reduction requirements are just starting to be implemented by those who are required to do so by their Phase II MS4 permit.

The first updates to the Coastal Supplement to the Georgia Stormwater Management Manual, originally developed in 2009, are underway and will provide recommendations for practitioners to consider future climate conditions in designs. This is a crucial step to mitigate the effects of more frequent, intense storms that burden Georgia's existing stormwater infrastructure.
The ARC's Metropolitan North Georgia Water Planning District (MNGWPD) completed an update of its Regional Water Plans in 2022. The Watershed Management Plan included the first stormwater quantity forecast in the almost 20-year history of the water planning process, recognizing the importance of measuring the gap between stormwater quantity management needs and the quantity currently being managed. This is a significant first step, but more data collection is needed to quantify that gap.

The planning community began to shift from viewing infrastructure as entirely separate entities (e.g., stormwater, water, wastewater) to planning using holistic solutions to address multiple aspects of infrastructure planning in recent years. For example, the MNGWPD Water Resources Management Plan recommends action items to improve stormwater quality, which are also given credit for addressing drinking water protection and stream quality.

One example of this innovative approach is Rodney Cook Sr. Park in Atlanta's Vine City neighborhood. This project, a collaboration between the City of Atlanta and the Trust for Public Land, showcases how engineering can improve community health and economic well-being. The project created a vibrant green space that can store over 10 million gallons of stormwater runoff, preventing flooding in an area previously inundated regularly during rainfall events. In addition, the stormwater wetland and other green infrastructure components remove pollutants from the runoff using nature-based solutions.

Recommendation to Raise the Grade

- CONDITION: Because streams and lakes throughout Georgia are used for fishing,

recreation, and drinking water, they must be protected from pollutants so that citizens recreating and consuming fish from them are not sickened or prevented from using them. Increased emphasis should be placed on educating the public about the need to protect the environment and the water resources of the state. This would include an emphasis on the importance of environmental regulations to protect the health and welfare of people.

- CAPACITY ANALYSIS: Population growth and development challenges underscore the need to manage stormwater infrastructure capacity. This need is exacerbated by frequent storms that are increasing in intensity, stressing the existing infrastructure. The State of Georgia should require that a capacity analysis be performed as part of the MS4 permitting process and that more guidance regarding changing storm patterns and intensity in stormwater infrastructure design be developed.
- STORMWATER PLANNING: Local governments should complete stormwater infrastructure master plans to properly quantify the funding needs to maintain and ensure their systems meet the needs of a growing population. Future efforts should consider socioeconomics factors in the design, planning, and implementation of new infrastructure and retrofit efforts.
- SUPPORTING STORMWATER INFRASTRUCTURE: We encourage more communities to develop dedicated funding sources for stormwater such as stormwater utilities. Additionally, these utilities and/or general fund budgeting should cover the full stormwater operation, maintenance and capital needs for the community and include regular automatic increases based on inflation and other economic factors.

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Transit: D+

Summary
Georgia's 93 transit systems remained steadfast during the COVID-19 pandemic but are under threat. Twenty-five percent of Georgia's FY2021 $1.4 billion transit spending was temporary federal relief. Georgians chose transit for only 54 million trips in 2021, still 25 percent below December 2019. Georgia's roads, airports, and passenger rail are all back to pre-COVID activity levels. Transit must compete on function and feasibility with cars to sustain Georgia's economic growth and relieve road congestion. But it hasn't been a fair fight. Transit funding is left mostly to local jurisdictions, compared to significant state support of road construction and operations. Local decision-makers have recognized the need for reliable and affordable transit, but recent attempts to secure necessary long-term funding have fallen short. Additionally, state decision-makers can harness the budget to chart a new financial and regulatory course where transit services get a level playing field to rethink and improve services in our new hybrid work reality.

Background
Between 2019 and 2023, the world underwent a once-in-a-century pandemic that resulted in a devastating impact on transportation and transit, as illustrated in Figure 1. While most transportation modes have recovered, as of July 2023, Georgia public transit ridership has recovered 75% of its pre-pandemic ridership. Georgia 2021 public transit service and ridership is summarized in Figure 2 The top thirteen transit agencies (of 93 total) represent 99 % of all trips taken on public transit. Most transit agencies throughout the state provide demand response for elderly and disabled citizens.

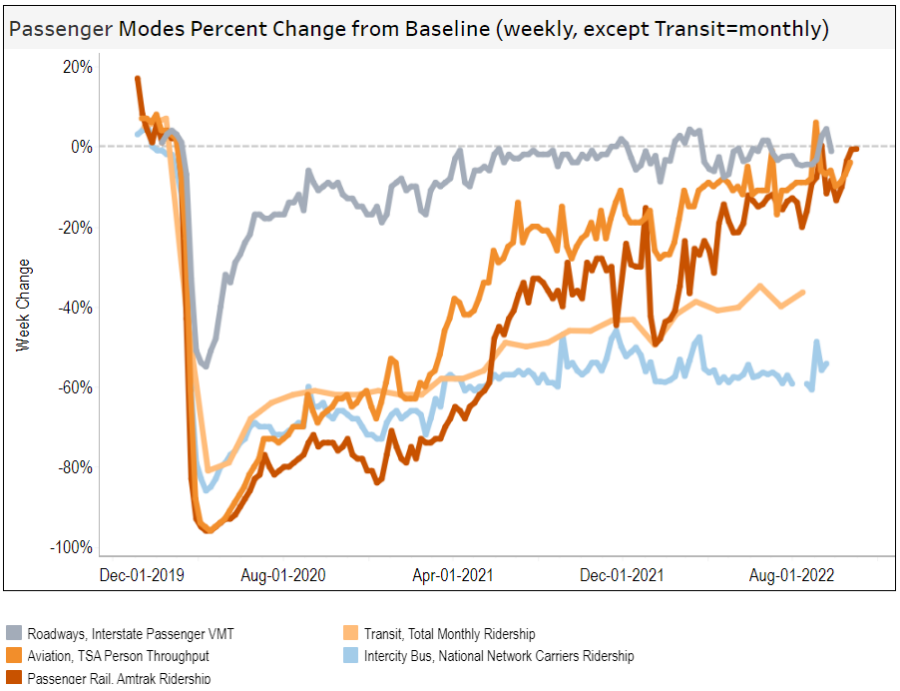

Figure 5 Covid-19 Transportation Impacts 2019 – 2022

2021 Georgia Transit Annual Passenger Trips

2021	2016	Agency	2021 Trips	2016 Trips
1	1	*Metropolitan Atlanta Rapid Transit Authority (MARTA)*	46,393,834	133,383,107
2	3	Chatham Area Transit Authority (CAT)	1,775,688	4,376,262
3	4	*Cobb County DOT*	1,334,845	2,921,517
4	2	University of Georgia Transit System	885,319	8,137,520
5	7	*Gwinnett County GCT*	829,167	1,496,448
6	6	Athens Transit System	631,657	1,515,424
7	9	Metra Transit System (Columbus, GA)	604,529	1,143,493
8	11	Augusta Richmond County Transit	530,209	794,501
9	5	*Atlanta-Region Transit Link Authority*	444,736	1,548,876
10	12	Albany Transit System (ATS)	431,260	689,285
11	10	Macon-Bibb County Transit Authority	360,563	892,352
12	-	Southwest Georgia RC	156,457	0
13	8	City of Rome Transit Department	98,913	1,164,297
-	13	*City of Atlanta (Atlanta Streetcar)*	0	686,722
Source: 2021 National Transit Database *Italicized Agencies located within Metro Atlanta*		**Total Trips**	**54,477,177**	**158,749,804**

2021 Georgia Transit Modes

Transit Agency	Commuter Bus	Paratransit	Heavy Rail	Bus	Streetcar	Van Pool	Ferry Boat	Totals
Rural	0	74	0	0	0	0	0	74
Urban	3	16	1	16	1	2	1	19
Totals	**3**	**90**	**1**	**16**	**1**	**2**	**1**	**93**

2021 Georgia Transit Ridership by Mode

Transit Agency	Commuter Bus	Paratransit	Heavy Rail	Bus	Streetcar	Van Pool	Ferry Boat	Totals
Rural	0	798,659	0	0	0	0	0	**798,659**
Urban	307,359	824,942	18,533,621	34,095,096	86,159	255,525	369,965	**54,471,667**
Total Trips	**307,359**	**1,623,601**	**18,533,621**	**34,095,096**	**86,159**	**255,525**	**369,965**	**55,271,326**
Metro ATL	307,359	516,177	18,533,621	29,305,623	86,159	253,643	0	**49,002,582**
Statewide	0	1,107,424	0	4,789,473	0	1,882	369,965	**6,268,744**
Total Trips	**307,359**	**1,623,601**	**18,533,621**	**34,095,096**	**86,159**	**255,525**	**369,965**	**55,271,326**

Figure 6 - 2021 Georgia Transit Ridership Data

Atlanta is the 10th most congested city in the US. There are currently 93 transit agencies operating in the state, and most of those agencies (74) provide on-demand/paratransit services to disabled or elderly riders, accounting for 1% of the statewide ridership. Whereas the Atlanta metropolitan area accounts for almost 90% of all transit trips statewide, with MARTA providing 95% of the region's service.

Funding

Funding for public transit in Georgia includes federal funds, state funds, local taxes (e.g., sales taxes, property taxes) and other revenues, such as fares, advertising, concessions, and parking. Local funding accounts for 47% of total public transit revenues. Approximately 89% of the reported local transit funding in Georgia is generated through various MARTA sales taxes in the Atlanta region. The remaining 11% includes various local funding streams, including property tax revenue and other local general funds. The state has primarily left transit funding to the local municipalities and agencies.

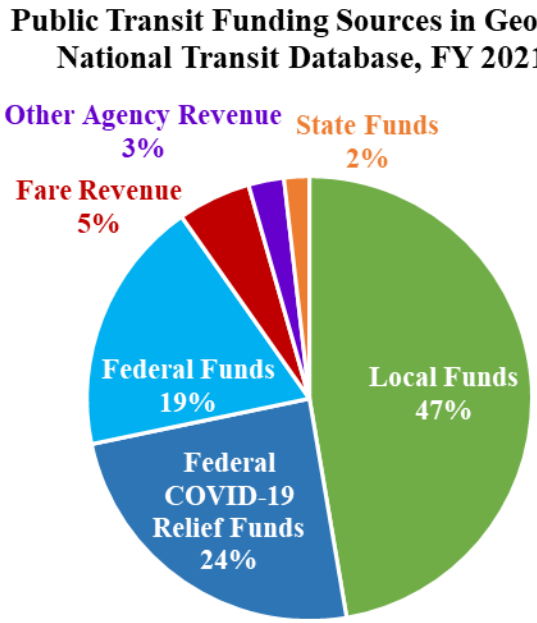

Figure 7 2021 Georgia Transit Funding Sources

Funding sources for public transit are also summarized in Table 1 for fiscal year (FY) 2021 in Georgia, which was $1.1 billion, including $984 million within the Atlanta region, $113 million outside the Atlanta region, and $43 million for rural transit providers. State funding accounts for less than 2% of total public transit funding in FY 2021. Many providers are using the remaining COVID-19 relief funds provided by Congress during the pandemic to address cost increases in the short-term, like GDOT did for roadway and bridges.

Table 1 FY 2021 Funding of Public Transit in Georgia

Funding Source	**FY 2021 ($ million)**
Federal	$211
Federal Temporary COVID-19 Relief	$278
State	$21
Local, Taxes and Fees by Transit Agencies	$539
Fare and Other Directly Generated Revenue	$91
Total	**$1,140**

The Statewide Transit Plan was developed to "improve statewide access and mobility through 2050". The plan listed 35 recommendations in three categories: Administrative Tools and Guidance, Transit Service Expansion, and Transit Service Enhancement. The plan estimated that the total cost to maintain existing services and implement the report's recommendations is $2.8 billion annually, an additional $1.7 billion beyond current annual funding levels.

Federal funds typically take the form of grants or formula funding for existing systems. In 2019 and 2020, Gwinnett County placed transit referendums before voters. The initiative failed by just a few thousand votes. Gwinnett incorporated feedback from these referenda and revised their

Transit Development Plan. Similarly, Cobb County developed a Transit Plan, and both intend to put them before voters in November 2024. Lastly, Metropolitan Atlanta Rapid Transit Authority (MARTA) has struggled in the implementation of the half-penny sales tax, dubbed More MARTA and approved by Atlanta voters in 2016. The More MARTA program has seen higher costs resulting in changes to the technologies and project prioritization, with fewer near-term projects. As a result, the Atlanta City Council moved to audit the More MARTA program.

Like transit agencies around the country, transit costs in Georgia are outpacing transit revenue. This industry-wide trend emerged prior to the pandemic and was accelerated by COVID-19-related operating and construction cost increases, supply chain shortages, global inflation, ridership decreases, and fare revenue decreases. The federal government stepped in to support Georgia's transit providers with $907 million in COVID-19 relief funds during the pandemic. Some providers have fully expended their COVID-19 relief funds, while others plan to continue to offset revenue impacts using remaining federal COVID-19 relief funds. As the remaining COVID-19 relief funds are expended, providers are seeking ways to transition to what many believe will be a "new normal" for the industry.

In November 2021, Congress passed a surface transportation reauthorization package as part of the larger Infrastructure Investment and Jobs Act (IIJA). This package authorized up to $108 billion for public transportation over a five-year period (federal FY 2022 – 2026), representing the single largest federal investment in transit in U.S. history. As a result, Georgia transit providers now receive approximately 30 % more annual federal formula funds for public transit compared to prior levels. In addition, many providers have been successful in securing discretionary grant funding, including competitive awards from the USDOT Rebuilding American Infrastructure with Sustainability and Equity (RAISE) grant program, Federal Transit Administration (FTA) Bus and Bus Facilities and Low-and No-Emission Vehicle grant programs, the USDOT Strengthening Mobility and Revolutionizing Transportation (SMART) grant program, and many more.

Georgia's primary source for state transportation funding, the motor fuel sales tax, is legislatively restricted and can only be used to fund roads and bridges. Georgia has historically allocated a little over $20 million per year in state general funds for transit. This annual support has been funded through the state general fund allocation process using a portion of the state's transportation revenues that are not legislatively restricted to roads and bridges (e.g., alternative fuel vehicle fees, highway impact fees for heavy vehicles, and hotel-motel fees). In the past few years, several major legislative actions have occurred with the potential to increase future state support for transit.

For example, Georgia House Bill (HB) 930 of 2018 established the Atlanta-Region Transit Link Authority (ATL) as a new umbrella organization for regional coordination of transit systems and funding. The bill also provided authorization for individual counties within the 13-county ATL district to levy a transit sales tax of up to 1% for up to 30 years. Georgia counties outside the ATL district currently do not have single-county authorization for a transit sales tax, and instead must partner with one or more neighboring counties to call for a multicounty transit sales tax.

Georgia HB105 of 2020 established a fee of $0.50 on for-hire ground transport trips and $0.25

on shared trips for taxis, ride-hailing services, and limousine services in Georgia. The new statewide fee was intended to fund transit projects within the state. The following year, HB511 of 2021 established nine trust funds, including the new Georgia Transit Trust Fund, which holds revenue from the newly created for-hire ground transportation fees. Revenue is appropriated annually to the fund and distributed by GDOT to transit providers for capital transit projects throughout the state. HB511 of 2021 also established the Georgia Transportation Trust Fund to hold revenue from fees on alternative fuel vehicles, highway impact fees for heavy vehicles, and hotel-motel fees. Revenue is appropriated annually to the fund and dedicated for use and expended by the GDOT commissioner of transportation for transportation purposes and transit projects. No more than 10% of the funds may be spent on transit projects.

In 2021, fare revenue accounted for 5.3% of total transit funding in Georgia. As a result of the pandemic, fare revenue dropped significantly across the country and has yet to fully recover to pre-pandemic levels. For example, MARTA's farebox recovery for 2021 was 10.7% compared to 28.6% in 2019 prior to the pandemic. Farebox recovery continues to steadily increase each year.

Figure 4 summarizes the funding sources for public transportation in Georgia in 2021. MARTA accounts for 81 % of total FY 2021 statewide transit funds, with $887.6 million in total funds reported to the National Transit Database (NTD). Other urban providers reported $95.9 million within the ATL region and $113.2 million outside of the ATL region. The remaining $43.0 million in revenue was reported by rural transit providers in the state.

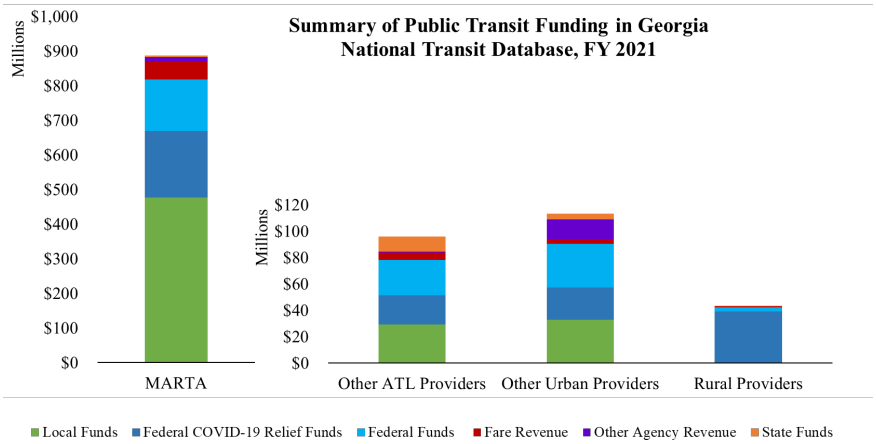

Figure 8: FY 2021 Summary of Public Transit Funding in Georgia

Future Needs and Capacity

According to the Georgia Statewide Transit Plan, the state population is expected to grow 136% to 15 million people by 2050. While there are 93 transit agencies in operation and close to 90% of people live within the service area of at least one of those systems, most of the systems provide on-demand transit to rural communities. More than 90% of the public transit trips in the state are within Metro Atlanta, with MARTA providing a disproportionately high number of those trips; however, approximately half of the total state population resides in the same 13-county area. Figure 5 highlights the transit coverage by county and provides the breakdown of service types.

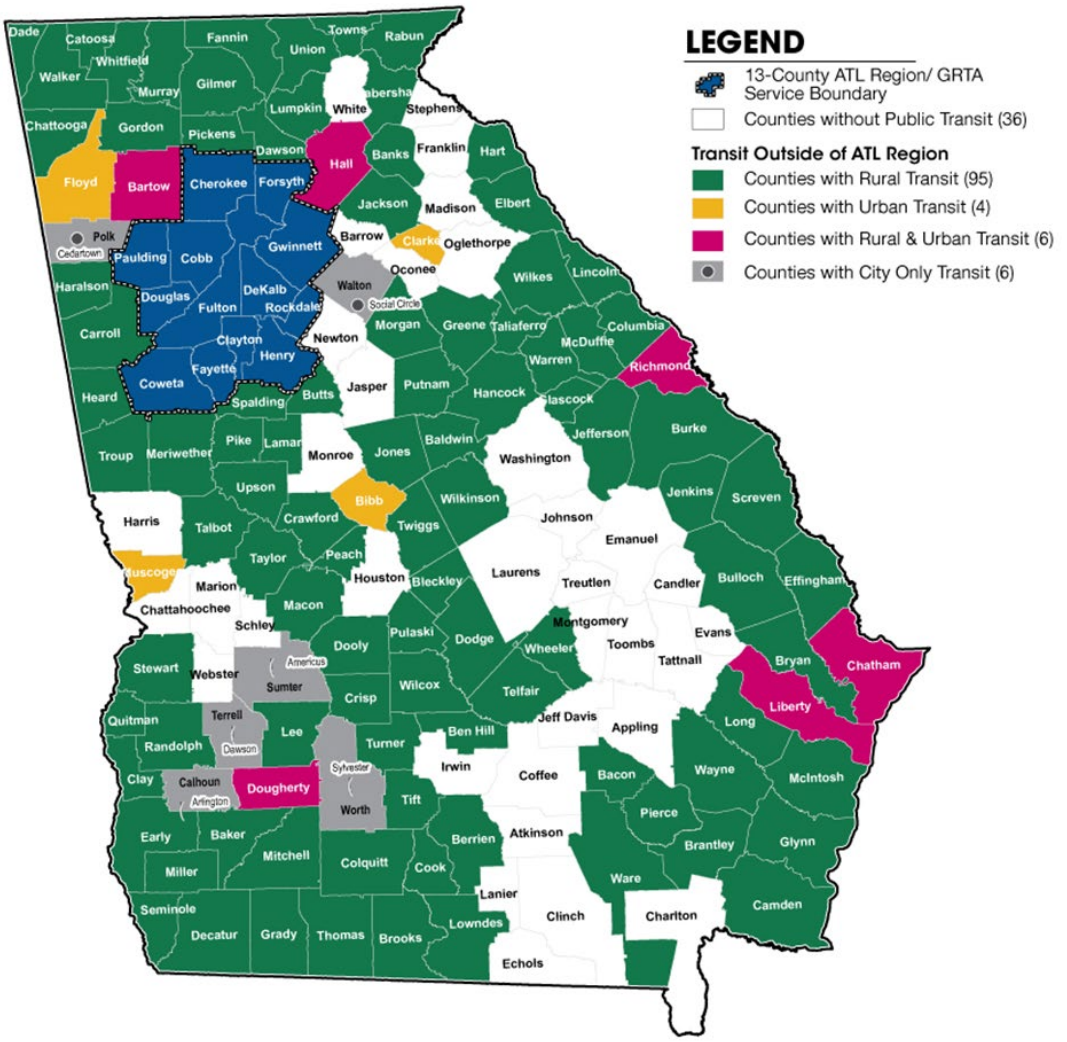

Figure 9 Statewide Transit Services, 2020

A review of the Centers for Disease Control and Prevention (CDC)'s Social Vulnerability Index (SVI) shows where potentially transit-dependent populations may reside throughout the state, as illustrated in Figure 6. The SVI considers socioeconomic status (i.e., poverty, unemployment, and high school education), household characteristics (i.e., age, disability, and Limited English Proficiency (LEP)), racial and ethnic minority status, and housing type and transportation (i.e., multiunit structures, no vehicle, group quarters).

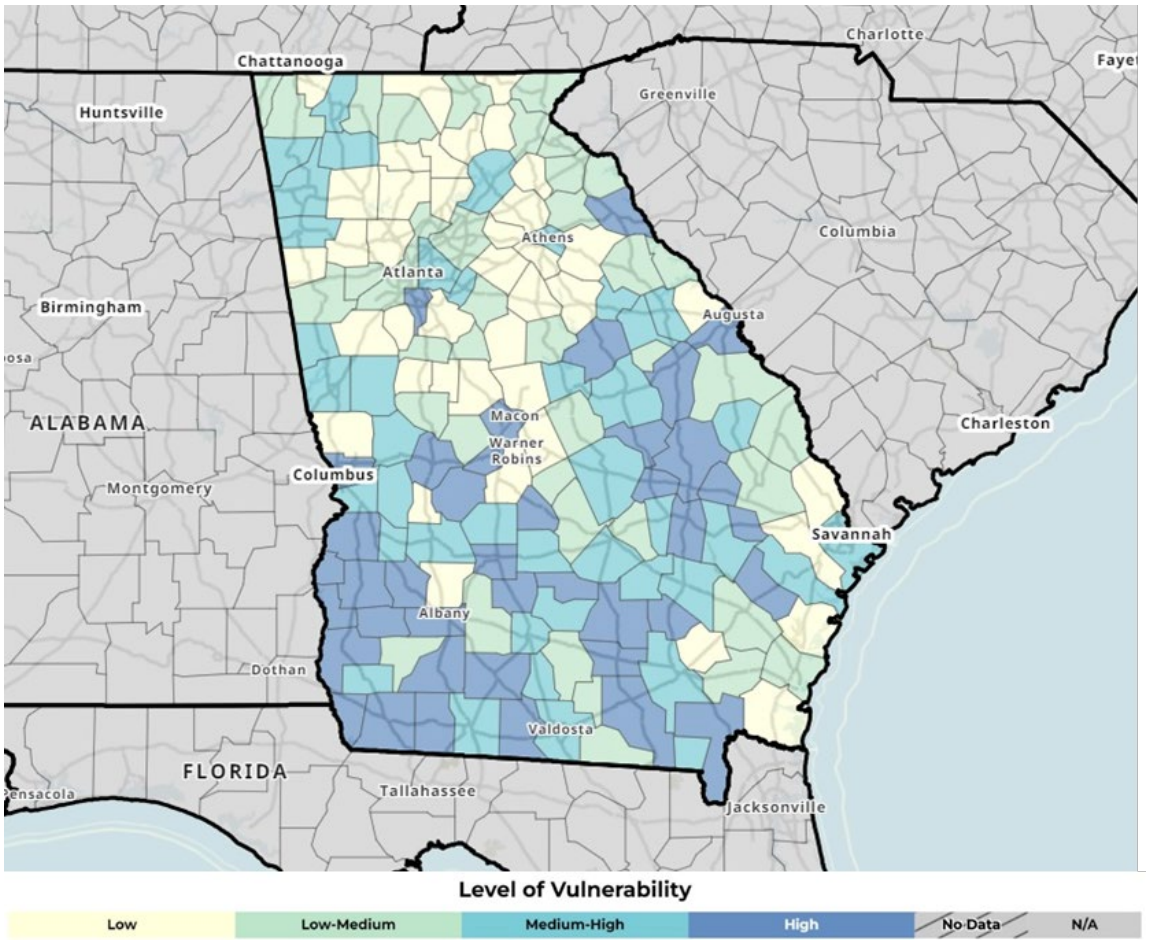

Figure 10 CDC Social Vulnerability Index Place and Health Statewide 2020

The map of Georgia counties shows that the core of Metro Atlanta often falls in the low-medium to medium-high vulnerability level; however, Clayton County stands out as an area in Metro Atlanta in the high vulnerability level. Looking outside of Metro Atlanta, and particularly into the central and southern counties of the state, numerous locations fall into the high vulnerability level. Many of these counties also lack transit service for their residents, which could mean that aging adults, people with disabilities, or people with mobility challenges have few choices for getting to doctors and other services on a regular basis.

The county-level data still lacks some of the granularity needed to understand variations within communities. The census tract map, See Figure 7) of the Metro Atlanta region shows that, even for counties where the overall level of vulnerability may be lower, such as Cobb and Forsyth Counties, portions of the counties tell a different story.

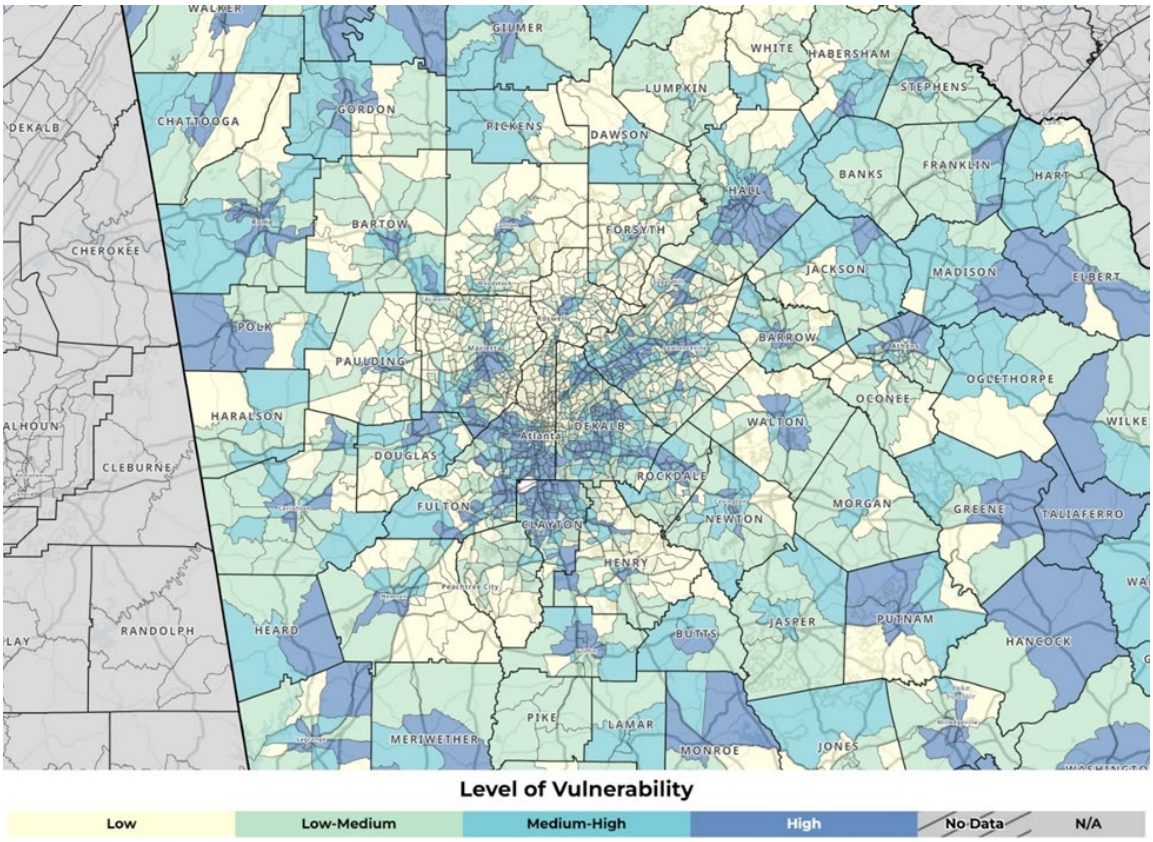

Figure 11 CDC Social Vulnerability Index Place and Health Metro Atlanta 2020

It also is important to note that just because a county has transit service does not mean that all residents and workers have adequate access to that transit service. Leveraging the AllTransit site to explore how well people can reasonably take transit to work, the City of Atlanta received a score of 8.0 (out of a possible 9.8), reflecting a very good combination of trips per week and number of jobs accessible by transit. On average, the City of Atlanta has nearly 4,000 transit trips per week available to an average block group, an average of 13 transit routes within ½ mile of households in a block group, and more than 280,000 jobs accessible within a 30-minute trip on average for a household. In the City, 11% of commuters use transit. When expanding out to the Atlanta-Sandy Springs-Roswell metro area, the score drops to 2.5, with only 730 trips and three transit routes within ½ mile of households and 62,000 jobs accessible in 30 minutes. Just over 3% commuters in this area use transit. The following map in Figure 8 shows the overall transit score resulting from factors such as connectivity, access to jobs, and frequency of service.

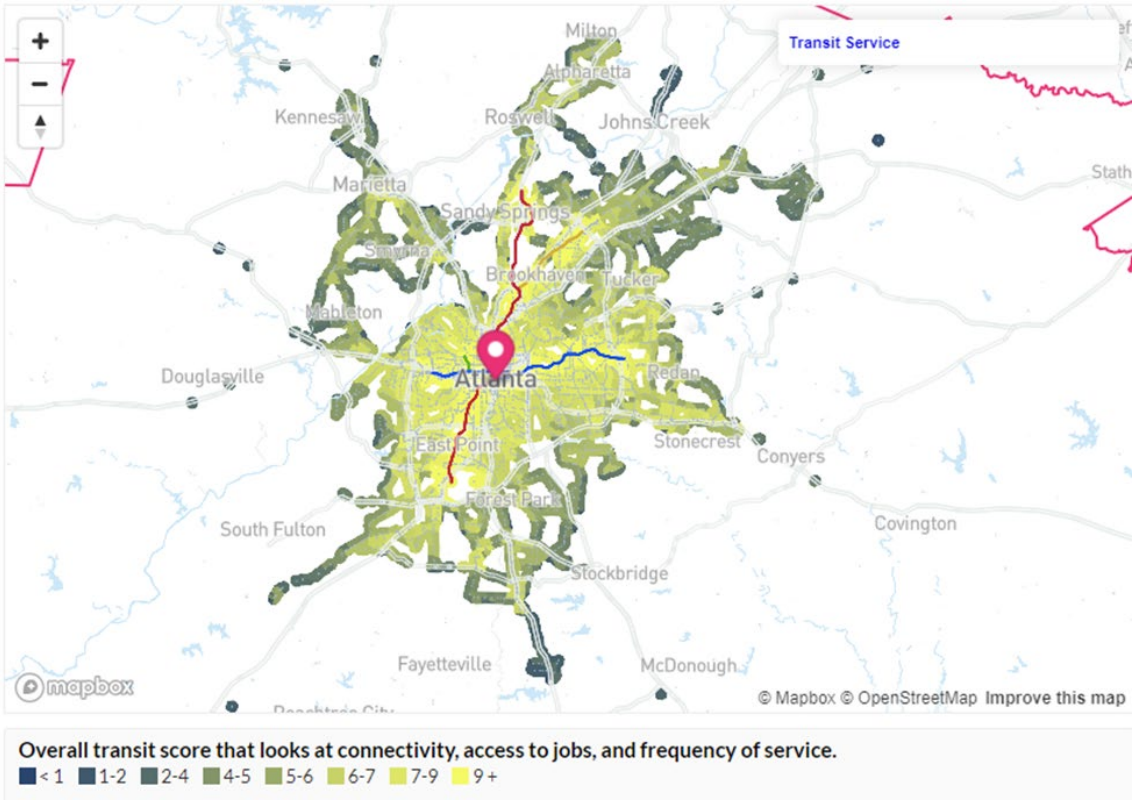

Figure 12 Metro Atlanta Transit Connectivity

Ultimately, the demand for transit currently far exceeds the capacity and reach of the systems that provide it. Many individuals may require transit to reach work and critical services daily, while others would consider transit if it was more convenient for them. As Georgia continues to grow to 15 million people and the current population continues to age, the transit systems supporting the growth need substantial investment to serve the communities of Georgia.

Condition / Operations and Maintenance

Operations and maintenance of the transit network in Georgia is divided between rural systems, which provide paratransit operations to the elderly and disabled, and urban transit systems, which provide regular bus, paratransit/demand response/vanpool, commuter bus, and/or rail service. Growing annual operational and maintenance needs for both rural public transit and urban systems were stated in the 2022 Georgia Statewide Transit Plan. For example, statewide, the documented urban transit forecasts total $351 million annually for operations and $303 million annually for maintenance/state of good repair (SGR).

Beginning in March 2020, the COVID-19 pandemic had a significant impact on transit providers in Georgia, from workforce needs to service impacts and ridership levels. Vehicle fleet maintenance is the second largest expense after labor costs. The roles with the highest vacancy rates include bus operators, bus mechanics, rail operators, and rail mechanics. Transit worker shortages impact ability to provide service and sufficient routine maintenance of the transit fleet.

While service levels and ridership have not yet rebounded to pre-pandemic levels, ridership for the 11 transit operators covered as part of the ATL's transit operator partner agencies increased

on each mode between 2021 and 2022, see Figure 9. Transit operators, such as ATL Xpress, are conducting return to ridership studies to evaluate the appropriate operations and service levels post-pandemic.

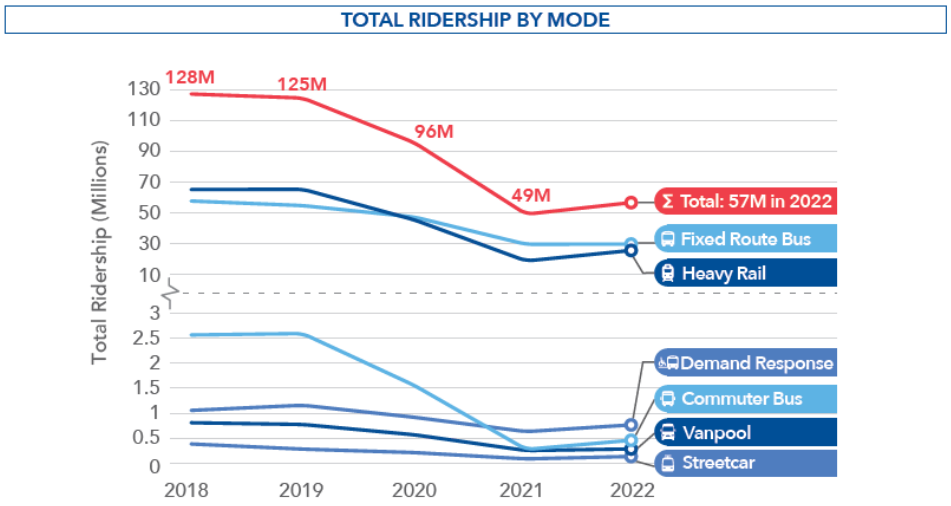

Figure 13 ATL Transit Link Ridership Analysis 2022

Across the Atlanta region, over a quarter of the commuter bus fleet exceeded its Useful Life Benchmark (ULB) in 2022. However, a vast majority of the demand response vehicles in the region are within their ULB. The fixed route bus fleet in the Atlanta region has no vehicles that exceed the useful life benchmark. However, in 2022, 12% of active revenue vehicles exceeded their ULB. This increase, largely driven by the commuter bus and heavy rail fleet, continues a trend that began last year, which demonstrates a need for sustained, annual capital investment to maintain fleets in a state of good repair. Thirty-six of MARTA's heavy rail fleet reached the end of their 40-year ULB in 2022. MARTA has plans for approximately 350 new rail cars to enter operation between 2024 and 2028 and are currently in procurement of a modern Communications Based Train Control (CBTC) system.

The Georgia Department of Transportation's (GDOT) Transit Asset Management (TAM) Plan has identified state-of-good-repair needs for transit vehicles and nonvehicle assets of all rural transit agencies across the state. Compared to TAMPs nationwide, GDOT subrecipient agencies have above average SGR. As reported in GDOT's TAMP, 12.4% of rolling stock meet or exceed their ULB, meaning they're eligible for replacement due to age and mileage. In comparison, the Federal Transit Administration (FTA) reports that 31% of buses and 37% of vans nationwide meet or exceed their ULB.

Public Safety

Most public transit agencies rely on local municipalities to provide security for employees and riders. MARTA Police Department (PD) consists of approximately 320 sworn officers, 50 Protective Specialists, and 57 civilian employees. MARTA PD was recognized by the American Public Transportation Association (APTA) with the 2023 Rail Security Gold Award for heavy rail stations for its outstanding security programs, specifically the Joint Bike Patrol Team partnership with the Atlanta Police Department. The Transportation Security Administration

(TSA) awarded MARTA the Gold Standard Award for its security program in 2022. MARTA continues to focus on improving the safety of both passengers and their employees. Crime on MARTA has been declining over the past five years. Part I Crimes between 2017 – 2019 were in the 420-452 range, but they dropped to 283 in 2020, 236 in 2021, and 195 in 2022.

Resilience

Interest in low- and no-emissions vehicles in Georgia has increased since the last report. MARTA, Chatham Area Transit (CATS), Macon-Bibb Transit Authority, ATL, and the University of Georgia operate battery electric buses. Further, additional FTA funding has been awarded to Augusta and Georgia State to increase the number of agencies and organizations operating battery electric vehicles. MARTA also continues to use compressed natural gas (CNG) propulsion systems and battery electric buses to provide some resiliency with different propulsion systems in the case of energy supply outages. ATL is completing a regional battery electric vehicle transition plan to include MARTA, ATL, Ride Gwinnett, CobbLinc, and other smaller regional providers. Other major transit operators, such as CATS in Savannah and MARTA, are also completing transition plans. While the number of battery electric transit vehicles is growing in Georgia, there are currently zero fuel cell buses in Georgia. Additionally, there is an opportunity to improve the support power and resiliency for all these systems, which may consider backup power strategies or running mixed fleets.

Innovation

Microtransit has grown as a mobility solution throughout the state. Microtransit is an on-demand service that utilizes smaller transit vehicles like cutaways or vans, with an app and dynamic scheduling. This type of service is adopting some of the concepts that consumers can find in Uber or Lyft services, but on a public transit app. MARTA, Ride Gwinnett, Hall County Transit, and the City of Valdosta have all completed pilots. Hall County Transit has continued that pilot into full service. Other transit operators, such as the Buckhead Area Transportation Management Association (TMA), also converted their shuttle service from the MARTA station into a microtransit service. Interest and deployment of microtransit services continues to grow, with many transit agencies having zones included in plans, and CAT was awarded zero-emission vehicles for future microtransit services as part of the 2023 Low- and No-Emission Vehicle (Low-No) Program grants. Autonomous vehicles are also being explored, with a connected autonomous vehicle corridor located in Peachtree Corners and the City of Chamblee and TMA of Cumberland running pilots. FTA awarded an Integrated Mobility Innovation grant to ATL for the ATL RIDES App, a program that would help coordinate all the different regional operators into one service platform. Phase 1 of the app will include trip planning. Lastly, MARTA continues to develop Breeze Mobile. Breeze Mobile 2.0 (mobile payment / ticketing app) was released in the second half of 2023, which added the availability of ATL Express, Ride Gwinnett, and CobbLinc services. Other Georgia transit systems continue to use Token Transit.

Solutions to Raise the Grade

Georgia's Statewide Transit Plan's thirty-five recommendations represent a variety of opportunities and strategies to enhance and expand all of Georgia's existing transit services, improving the quality of life and economic opportunities for all Georgians. The primary goal is to address the $1.7 billion additional annual funding need, recognizing the direct economic benefit of more than $6.8 billion, with more than $2.0 billion outside the Atlanta region.

Table 2 Recommended Additional Funding for Service Expansion

Recommended Category	Annual Cost to Implement
Administrative Tools & Guidance	$3.3 million
Service Expansion – Rural	$172.7 million
Service Expansion – Urban	$1 billion
Service Enhancement – Rural	$23.9 million
Service Enhancement – Urban	$491.6 million
Total	**$1.7 billion**

1. Establish a robust, sustainable, and reliable transit funding source. While HB 105 of 2020 is a good first step at establishing dedicated public transit funding, the revenue forecasts are insufficient to fund these needs established in GDOT's Statewide Transit Plan. The HB105 revenue forecast is illustrated in Table 3.
2. Reinstating the motor fuel tax exemption for public transit agencies. This would benefit all agencies, but rural agencies would likely see a larger benefit because fleets typically use ICE vehicles.

Table 3 Projected Excise Tax Revenue on For-Hire Ground Transportation

($ millions)	FY 2021	FY 2022	FY 2023	FY 2024	FY 2025
High	$45.0	$47.9	$50.6	$53.4	$56.4
Low	$24.1	$25.7	$27.1	$28.7	$30.2

Wastewater: C-

Summary
Georgia's 10.9 million residents are served by improving wastewater systems. Combined sewer systems made progress in reducing overflows after federal consent decrees. Statewide, daily wastewater flows were only 58 percent of the permitted maximum. But rural areas prove more challenging. Fifty-five percent of residents outside urban areas, or one-third of the state and 15 percent of its wastewater volume, rely on onsite septic sewer systems with limited government oversight. Overflows or spills, in many cases due to harmful infiltration/inflow events, were stuck at 1,000 annually despite increased repair work. Federal investments across two landmark laws in 2021 significantly improved wastewater funding levels, but only temporarily. At least 25 percent of utilities have not updated their rates since 2019 in the face of inflation. Many systems may not be recovering the cost of service. Moreover, extreme weather events demand more expensive, resilient infrastructure and stringent regulations mandate increasingly robust operations.

Background
Clean drinking water and excellent wastewater/sanitation infrastructure have contributed significantly to the standard of living and economy in our nation. Without adequate and properly maintained wastewater and sanitation infrastructure, cities cannot serve the existing population nor accommodate future growth and development. Failure to maintain and upgrade this infrastructure has consequences, including sewage overflows into receiving waters or homes and businesses. In addition to conveying wastewater to treatment facilities, the systems must treat wastewater to exceedingly high standards to avoid degradation of streams, rivers, lakes, and oceans.

Georgia has 498 municipal point source wastewater discharges, 185 municipal land application systems, and 3 systems with active combined sewer overflows. Septic systems account for approximately 15% of wastewater. Georgia's water and wastewater utilities have persevered through amazing challenges in the last half-decade. The industry has experienced double-digit escalation in the construction cost index due to inflation and supply chain limitations in key materials and equipment.

Currently, the wastewater industry is faced with both ongoing and new challenges, including:

- Additional wastewater treatment capacity to keep pace with Georgia's rapidly growing population and economy,
- A cohesive biosolids policy with funding initiatives from the State level to raise the importance of the sustainable disposal and potential reuse of sewage sludge,
- A determined effort to rehabilitate buried sewer infrastructure including trunk sewers and pumping stations,
- Emergency preparedness and resiliency, and
- Workforce challenges due to retirement and labor shortages.

Condition and Capacity
According to the latest 2021 population projections published by the Georgia Office of Planning

and Budget, the state population is expected to grow from 10.7 million in 2020 to 11.7 million in 2030, reaching over 14 million by 2060. The population growth is expected to occur near existing urban centers. While statistics show that more than one-third of Georgians do not have access to public sewers, densification and growth in urban areas will put pressure on capacity of existing sewer systems and drive sewer system expansion. Even though Georgia is a leader in water conservation, the increase in wastewater flows due to population and business growth is expected to outpace the expected reduction due to decreased per capita usage.

In Georgia in 2019, facilities were operating at approximately 58% of permitted monthly maximum average daily flow. While this implies adequate current capacity with some isolated exceptions, available capacity is uneven throughout the state. In specific areas, and as future flows increase, particularly in suburban and urban areas seeing significant population and industrial/commercial growth, existing treatment capacity will need to be increased. To maintain the same level of reserve capacity in the future, additional permitted discharge capacity of approximately 380 million gallons per day (mgd) or about 27% is needed. Georgia's growing population is mainly in separate sewer areas. The older combined systems, which handle stormwater and wastewater together, have been the focus of federal consent orders and much progress has been made in reducing the areas served by combined sewers and controlling overflows. Looking toward the future, increased wastewater flows are expected to flow to separate systems, which only handle wastewater, with combined sewer overflow systems serving reduced areas.

The water quantity resource assessments prepared by Georgia EPD for the 2023 regional water plans shows some specific challenges in receiving water flows and resulting ability to assimilate the capacity. This implies significantly increased capital and operating costs of treatment at these facilities in the metro area in the future.

Continued tightening of water quality standards, particularly for nutrients, will continue to drive the need for investment in treatment improvements. While some optimization opportunities remain, existing plants are generally performing at intended levels; existing treatment facilities do not have the capacity to accommodate significant changes in required discharge limitations.

Management of biosolids, a byproduct of wastewater treatment, is a significant area of need in Georgia. With industry changes in landfill disposal of high moisture content waste, many wastewater utilities are scrambling to alter their management approaches to ensure reliable outlets for the solids produced during treatment. Most of the existing treatment facilities in the state do not have the capacity to produce solids to the new standards for lower cost landfill disposal, leading many utilities to rethink their operational strategies. Changing biosolids management approaches will require significant investment by utilities.

Despite a focus on infiltration and inflow reduction measures at utilities across the state, the number of collection system spills reported to the state over the last five years has held relatively constant at approximately 1,000 per year statewide. This level of performance indicates that overall, while utilities are investing at a level to maintain current performance even as infrastructure ages, the improvement achieved by the current repair, rehabilitation and replacement efforts has plateaued.

Enforcement actions are another metric by which municipal utility performance can be judged. From Georgia EPD data from the last five years, the number of notices of violation, notices of noncompliance, and consent orders has held relatively constant at approximately 1,000 per year statewide.

Based on Georgia Department of Health and US Census estimates, 55% of the population of Georgia outside the metro district are served by septic systems. This means that more than one-third of all Georgians do not have access to public sewers and rely on septic systems. Septic systems are regulated by rules set by the Georgia Department of Public Health (GADPH) and administered by County Boards of Health, which are often understaffed and underfunded. Ensuring that septic systems are maintained is the responsibility of the individual owner. Despite the availability of educational material recommending periodic maintenance, much work remains to be done in encouraging regular pump out. Septic systems will remain a viable wastewater management option in rural Georgia into the foreseeable future, underscoring the importance of ensuring that they are designed, constructed and maintained properly. Water agencies must understand and include sufficient means and treatment capacity to support the disposal needs created by the maintenance of septic systems.

Operations and Maintenance; Funding and Future Needs

Over the past decade, communities have fallen behind performing the routine rehabilitation and improvements necessary to keep pace with deterioration of the infrastructure to reduce system failures and overflows into the natural waterways. This can be attributed to both the lack of funding and the workforce challenges. Utilities are actively trying to recruit a younger workforce to address the looming retirement of experienced operators.

The Georgia Municipal Association (GMA) indicates for capital projects between 2022-2026, that 25% of the overall capital needs - or about $4.6 billion - would be for water or sewer projects across the state. Most of the funding for wastewater infrastructure comes from sewer user fees. Sewer connection fees also pay for capital expenditures for new treatment capacity and conveyance infrastructure.

Another source of funding is the Clean Water State Revolving Fund (CWSRF), a federally funded loan program which supports wastewater and other clean water infrastructure projects. GEFA has funded more than 1,500 projects and provided more than $4 billion in loans for water, solid waste, and sewer improvements since 1985. The State of Georgia is required to match 20% of the sum provided through CWSRF loans. GEFA also offers low-interest loans for energy-efficiency and renewable energy projects at wastewater treatment facilities. The Bipartisan Infrastructure Law (BIL) is providing supplemental funding to the CWSRF program.

Utilities generate revenue from sewer rates charged on their water bills. In 2022, 349 agencies provided rate structure information to the Georgia Water & Wastewater Report (GEFA, UGA, and UNC EFC). The report showed that the median base charge for wastewater service was $17.08 per month. This is significantly lower than the 2014 monthly national average of $42 per the American Water Works Association, and at least 25% of utilities have not updated their rates since 2019 or before. The utilities that are currently not recovering their cost of services,

including inflationary increases, should actively pursue rate increases to cover O&M and capital costs in the future.

The report also showed that only 294 (84%) local government water or wastewater agencies in Georgia generate enough revenue to cover their operations and maintenance costs and account for future capital costs. Smaller systems serving fewer than 1,000 connections need to spread out those high operating costs over a smaller customer base. Twenty-five out of 214 of the utilities with an operating ratio (the ratio of operating revenue to operating expenses) of less than 1.0 serve more than 10,000 people, showing that larger utilities are better funded than smaller utilities.

Public Safety

Public safety has advanced with wastewater conveyance and treatment systems throughout Georgia over the past fifty years. Over the past decade, shortcomings relate to maintaining Georgia's wastewater systems at sustainable levels. This can be reflected with continued enforcement actions taken by Georgia EPD as well as reported spills. There remain two active federal wastewater consent decrees in Georgia: City of Atlanta and DeKalb County, both have an extended completion date of 2027. From a state regulatory perspective, the count of consent orders issued by Georgia EPD has stayed relatively flat for the past six years.

Similarly, the number of overflows or spills has remained relatively flat for the same reporting period, ranging from approximately 900 to 1,400 a year. The reported volume of spills has trended up over this time period; however, the accuracy of historical spill volume estimates makes it difficult to draw a firm conclusion.

More qualitatively, Georgia does still have occasional significant wastewater spills that make headlines for temporarily closing waterways to public use. Additional funding of regulatory state agencies and collaboration between the regulatory agencies and local jurisdictions as well as environmental organizations will facilitate adequate oversight to help protect public health and the environment.

Resilience

Wastewater treatment plants often are in flood-prone portions of the watershed that require design considerations as upgrades or new facilities are constructed. Extreme weather events stress the power supply for pump stations within systems and degrade older collection systems that are prone to rain-derived infiltration and inflow (RDII). Georgia has seen improvements in communities' installation of alternative power supply sources for critical components through permanent or temporary generators. Investments in treatment facilities continue to improve resiliency by design when upgrades or new facilities are required. An opportunity for improvement is rehabilitation of linear assets at a pace for proactive reduction in RDII. Georgia communities need additional resources and guidance for funding and maintaining wastewater pipelines at a sustainable rate to effectively reduce or maintain current levels of RDII within their wastewater systems.

Innovation

Innovation in the municipal wastewater sector has expanded beyond a technology-based approach (e.g., nutrient recovery). Utilities are now working to minimize their carbon footprint

while maximizing efficiencies– breaking down barriers between utilities, industrial sectors, and architects/engineers. A good example is the United Kingdom as they have implemented regulations around innovation.

Within the State of Georgia, there are several organizations and utilities leading the conversation. Most recently, Gwinnett County helped establish The Water Tower Institute (TWTI). A non-profit organization that collaborates with local and regional Universities and utilities "creating a thriving ecosystem of water innovation fueled by imagination, informed by research, and powered by pioneers." TWTI is a member of a nationwide workgroup led by the University of California, Berkeley and USEPA on advancing innovation through the National Pollution Elimination Discharge Permit System (NPDES) process. For example, a grant through the Community Project Funding process afforded TWTI the ability to create a state-of-the-art per- and poly-fluorinated alkyl substances (PFAS) laboratory for research involving the fate, transport, and removal of PFAS from wastewater and water reuse operations. TWTI's operator training program provides outreach and training opportunities for the next generation of operators with an emphasis on recruiting trainees from disadvantaged communities.

Another example is Clayton County Water Authority (CCWA) which has incorporated innovation as a component in its strategic master planning process. The intent is to "identify innovative projects during all workshops, and to promote innovation by adding an innovation metric to the project prioritization." To expand the discussion of innovation to the entire Authority, CCWA performed a self-assessment to determine how well the organization embraced the eight innovation disciplines of the Utility Innovation Framework (WRF 4642). Based on the results of that survey, CCWA built an Innovation Program that focuses on developing ideas from employees, rewards innovation, and supports a culture of innovation.

Solutions to Raise the Grade

- **Plan for Future Funding**: To improve system performance, municipalities need to improve their planning efforts for obtaining timely funding from traditional sources of financed loans and user revenue. Also, agencies must ensure that costs for new emerging contaminants (e.g., PFAS and microplastics) and the capacity required by development are fairly allocated to those users driving the development. Increased state and federal funding could also be obtained through a unified appeal, illustrating the capacity for collaboration among local, regional and state interests.
- **Advocate for Additional Resources and Guidance:** Georgia communities need additional resources and guidance for funding and maintaining wastewater pipelines at a sustainable rate to effectively reduce or maintain current levels of RDII within their wastewater systems.
- **Implement and Improve Asset Management Programs**: Utilities need to develop a comprehensive asset management program to make risk-based decisions on capital improvements, maintenance, and operations. The reduction of infiltration and inflow into the sanitary systems is a worthy goal that essentially "buys back" treatment capacity at the treatment plant.
- **Encourage Innovation:** Support technologies to improve energy efficiency and maximize on-site renewable capacities and continue to foster collaboration between utilities and technology providers through research and pilot studies.
- **Keep Up with Inspection Needs**: In support of more stringent surface water standards,

Georgia Environmental Protection Division (EPD) is expected to modify existing permits and future permits with more stringent requirements. The State of Georgia should increase staff to provide inspections.

- **Improve and Maintain Technical Skills**: Training courses on advanced technology and tools will be necessary to keep pace with stricter regulatory requirements, replace an aging workforce, and attract from a limited recruitment pool. Utilities should consider branding strategies to market to younger prospective workers. Position descriptions and qualifications should reflect the increasing technical complexities of the field and should provide greater flexibility for potential applicants.
- **Establish a Septic System Inspection and Maintenance Program**: Implement stricter state-level guidance for site selection, design and construction, and maintenance of septic systems while increasing enforcement and education. Provide regulatory support and planning for wastewater collection and centralized treatment to reduce the need of septic systems.
- **Evaluate Rate Structures**: In Georgia, most utilities are actively evaluating and modifying their rate structures every one to two years. It is recommended that utilities review their rates at least every two years to keep in pace with inflation and ensure rates cover the full life cycle cost of service for operation, maintenance and capital needs. Consider approving automatic adjustments to rates based on an inflation index.
- **Biosolids:** Georgia's bright economic development picture is very dependent on its communities having viable water and wastewater service available for its new industries. For this reason, we encourage the stakeholders that regulate the biosolids component of Georgia's public and private water and wastewater agencies including Georgia EPD, Georgia General Assembly, and, as of late, Georgia Department of Agriculture, develop a comprehensive, unified plan for disposal of biosolids in Georgia.

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