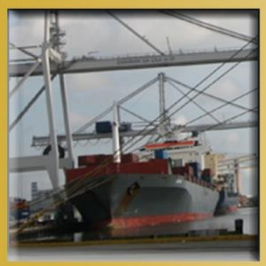
Georgia Department of Transportation
Office of Planning

Georgia Statewide Freight and Logistics Plan

Freight Improvement **Project Recommendations**



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1.0 Introduction

This report describes the freight improvement project recommendations developed as part of the Freight & Logistics Plan. This report represents the documentation of work conducted for Task 5 in the Plan.

Freight improvement projects discussed in this chapter were identified through stakeholder outreach, reviewing recent transportation plans, and needs analysis conducted as part of earlier tasks in this study. Key projects were then analyzed individually and grouped into packages. The packages were further analyzed using an economic impact tool and the results were used to develop a list of priority freight packages for the State of Georgia.

Projects described in this chapter cut across all modes and regions in Georgia. They were identified by a variety of public and private sector stakeholders.

This report is structured as follows:

Chapter 1 – Introduction. Describes the purpose and structure of this report.

Chapter 2 – Identifying Potential Freight Improvement Projects. This chapter describes the freight improvement projects that were considered across each of the freight modes: marine ports, rail, highway, and air cargo. Additionally, the source of improvement projects is discussed.

Chapter 3 – Project Evaluation. This chapter describes the individual project evaluation process applied to the projects identified in Chapter 2.

Chapter 4 – Grouping Priority Freight Projects into Packages. This chapter describes how projects were selected as priority freight projects, and how individual projects were grouped together into packages. The packaging process is most relevant for the highway mode.

Chapter 5 – Economic Benefits of Freight Packages. This chapter estimates the economic benefits of the freight packages identified in Chapter 4. Economic benefits were generated in terms of economic output and/or increased jobs and returns on investment are generated.

Chapter 6 – Summary Freight Recommendations. This chapter compiles the priority freight packages into a single framework and provides information on funding options for the freight program. It also discusses ITS and other operational programs that support the effectiveness of existing transportation infrastructure in increasing the safety and efficiency of goods movement in Georgia.

Chapter 7 – Highlights of Freight & Logistics Plan, Including Funding Options

2.0 Identifying Potential Freight Improvement Projects

Projects to consider in this plan came primarily from three sources:

- Outreach to the private sector – including surveys of the private sector and input from the Plan's Private Sector Advisory Committee;
- The Plan Development Committee which includes the GDOT Office of Planning and Office of Intermodal Programs, the Governor's Office, the Georgia Center for Innovation in Logistics; the Federal highway Administration (invited); and
- Previous freight-related reports conducted in Georgia including the Georgia Statewide Strategic Transportation Plan, the GDOT Statewide Transportation Plan, and Metropolitan Planning Organization Long Range Transportation Plans and Freight Plans (if available).

Projects considered for additional analysis are categorized by mode as follows:

- Port improvement projects;
- Rail improvement projects;
- Highway improvement projects which can be further sub-classified as long-haul corridors, interstate interchange improvements, controlled-access bypass facilities, smaller urban and urban freight highways, and safety projects; and
- Air Cargo improvement projects.

2.1 PORT IMPROVEMENT PROJECTS

The Port of Savannah is a critical facilitator of international trade. It provides access to global customers for companies based in Georgia. It also provides internationally produced goods to the shelves of stores across the State. Continued growth of the Georgia economy combined with continued growth in international trade has the potential to increase port traffic to over 16 million annual TEUs in 2050.

To most efficiently move these goods, the Savannah River will need to be deepened. This will allow the Port of Savannah to accommodate the increasingly larger cargo and vessel types calling the U.S. East Coast. The frequency of these larger ships is growing due to the completion of the Panama Canal's deepening and widening project.

Completion of the Savannah Harbor Expansion Project (SHEP) was mentioned by the Private Sector Advisory Committee as the most important freight-related project in Georgia and enjoys broad support from elected officials statewide.

Regardless of the status of SHEP, the Garden City terminal at the Port of Savannah is projected to experience continued growth and will reach capacity in the not-to-distant future. The states of Georgia and South Carolina are working together to develop a new port facility on the Savannah River just downstream in Jasper County, SC -- commonly called the Jasper Ocean Terminal -- to accommodate the continued container growth; this project is considered to be a longer-term marine port need in the Freight & Logistics Action Plan. More information available in Section 3 of this document.

2.2 RAIL IMPROVEMENT PROJECTS

Railroads are a key feature of Georgia's freight landscape. Atlanta is the hub for southeast rail operations for both Class I railroads in the eastern half of the U.S. – CSX and Norfolk Southern. For the Port of Savannah, rail is used to connect with shippers across the State. Atlanta metro is the top intermodal rail trading partner for the Port of Savannah shipping and receives 33% of the total intermodal rail containers through the port. Roughly half of the carload rail traveling through the port connects with Georgia destinations outside of Atlanta. Carload rail includes bulk commodities such as timber/wood products, broilers (frozen chickens), peanuts, cotton and kaolin. Increased economic activity in Georgia will drive additional demand for freight rail services. These demands will outstrip current capacity and require improvements in freight rail infrastructure to ensure that freight rail continues to be a cost-effective modal option for Georgia shippers.

Freight rail improvement projects were considered in three categories:

- Recent and Current Investments by Class I Railroads;
- Specific projects needed to address current deficiencies; and
- Conceptual projects considered as part of a longer-term rail program to capture future growth opportunities

Recent and Current Initiatives by Class I Railroads

Norfolk Southern's Crescent Corridor project is provides improved intermodal rail services between the Northeast, the Mid-Atlantic, and Southeast. Its phase I included development of new intermodal railyards in the Charlotte and Memphis regions. As part of Phase II of this program, increased intermodal rail travel speeds are expected for the rail line between Charlotte, Atlanta, and Birmingham. Phase III includes enhancements to the Austell intermodal rail yard immediately northwest of Atlanta.

Over the last decade, CSX has made significant improvements to its rail lines in Georgia, including over $1 billion of improvements in their Atlanta-Birmingham rail line and their north-south rail line that includes their Waycross classification yard and connections of Georgia with Florida and the Midwest. Adjacent to the Southeast region is a major forthcoming CSX initiative known at the National Gateway; it is a multi-stage rail construction project that will make improvements to improve double-stack abilities. Within Georgia, in 2015 CSX invested over $106.2 million on its network in the state.[1]

Current Deficiencies – Class I Railroads and Shortline Railroads

The industry standard railcar weight for bulk commodities such as grain, lumber, coal, and paper products, has trended in recent years from 263,000 pounds to 286,000 pounds (commonly referred to in the industry as "286K"). Many short line railroads in Georgia are not capable of handling 286K railcars. Railcar weight limits for Georgia's short line railroads are illustrated in Figure 2.1. Upgrading lightweight rail track to 286K is a key freight rail improvement project in this Plan.

Much of Georgia's rail infrastructure was originally built to accommodate rail cars with a height of 15 feet. With the general adoption of larger railcars such as tri-level auto carriers and double-stack intermodal cars, vertical height standard industry requirements have trended to upwards of 20 feet, and the defined height for fully unrestricted clearance was raised to 22' 6". A minimum height of 20' 8" can accommodate a pair of stacked domestic containers (each 9'6" high) and has become a defacto minimum standard for vertical clearance for main lines handling intermodal traffic.

Due to bridges and other obstructions, some rail lines in Georgia do not meet this requirement. Vertical clearances on CSXT, NS and many of the State's short line railroads are mapped in Figure 2.2. Increasing vertical height clearance to the 20' 8" minimum standard for vertical clearance is another freight rail improvement project in this Plan.

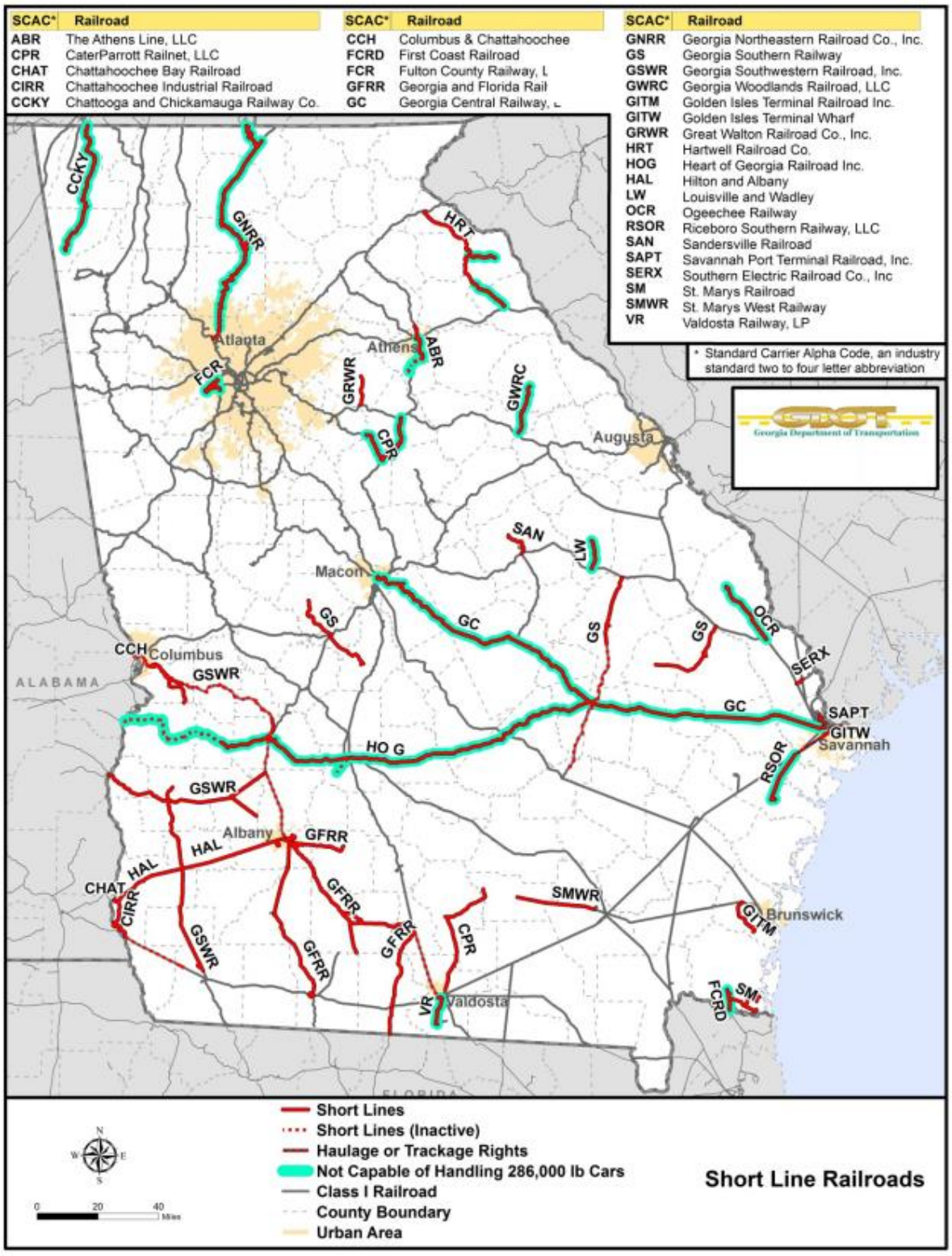
Approximately 95 percent of all mainline trackage, including Class I and short line railroad trackage, in Georgia are single-track. Class I routes have passing/sidings at regular intervals, which allow trains moving in opposite directions or at different rates of speed to pass one another. While this arrangement is effective for traffic volumes that have historically occurred over Georgia's main lines, as traffic increases and/or there is a greater mix of different types of trains, full double track becomes a consideration. As needed, double tracking key rail segments in the state is a freight rail improvement project recommended as part of this Plan.

[1] www.csx.com/index.cfm/about-us/state-information/georgia

In addition to the number of main line tracks, another important attribute affecting main line capacity is the type of traffic control system. Railroads in Georgia primarily make use of three different signal systems to control traffic movements on their systems. These are Manual, Automatic Block Signals (ABS), and Centralized Train Control (CTC). CTC systems permit the dispatcher to remotely manage train movements by controlling signal indications and train routing over a geographic jurisdiction such as a subdivision or terminal area. CTC is layered on top of an ABS system, which provides occupied block protection. Implementation of CTC leads to considerable capacity improvements, and is almost always taken as a first less costly step when traffic increases call for increased line capacity. The coverage of CTC systems will need to increase to manage increased volumes and increased double tracking across the state. This will increase the efficiency of rail operations in terms of average speeds and total travel times between origins and destinations.

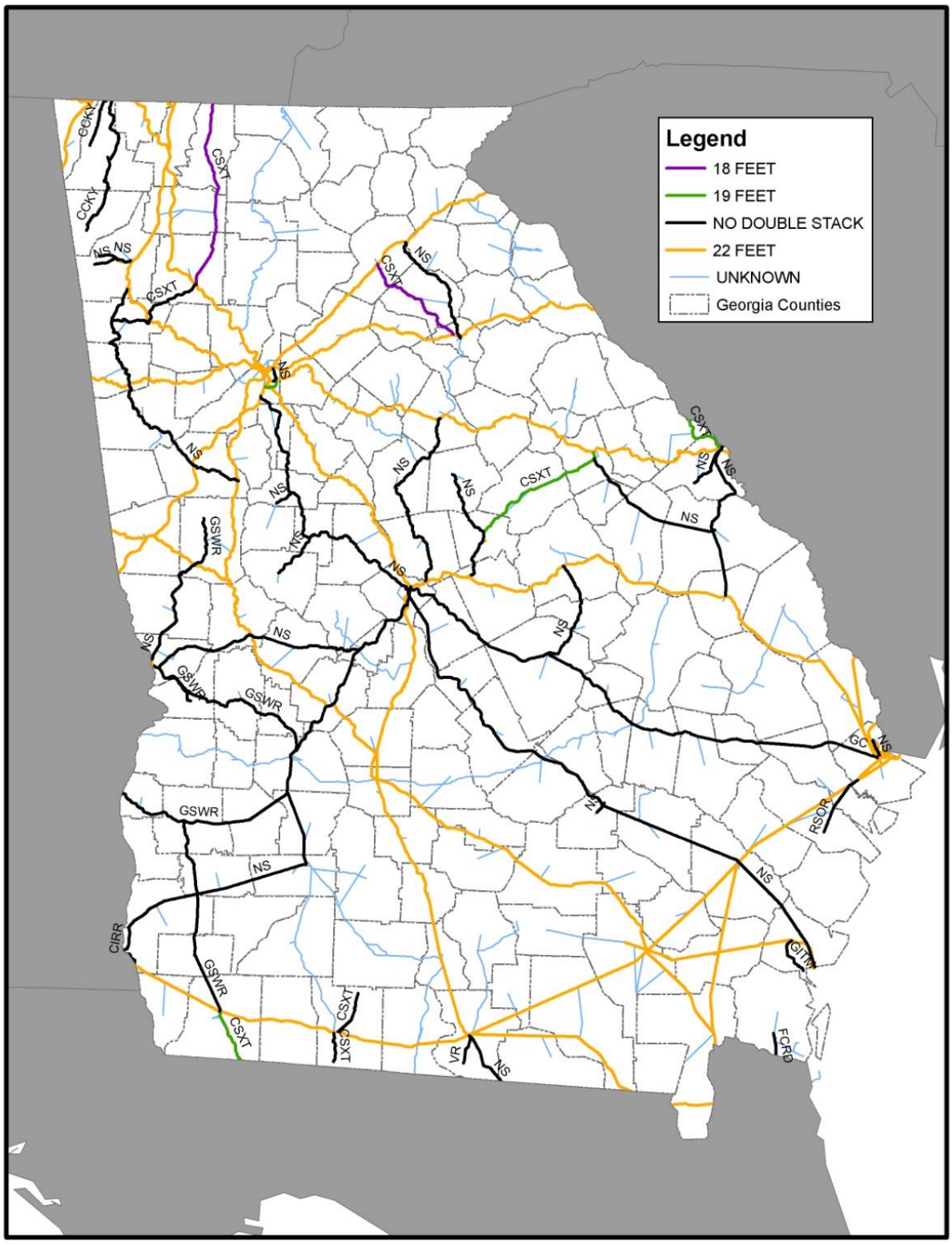
These rail improvements taken together represent a series of steps that would begin to address the rail system bottlenecks identified in this Plan. These bottlenecks are shown in Figure 2.3 with the rail track in red the priority rail track in need of improvements to accommodate future demand.

Figure 2.1 Rail Line Weight Limits – Shortline Railroads



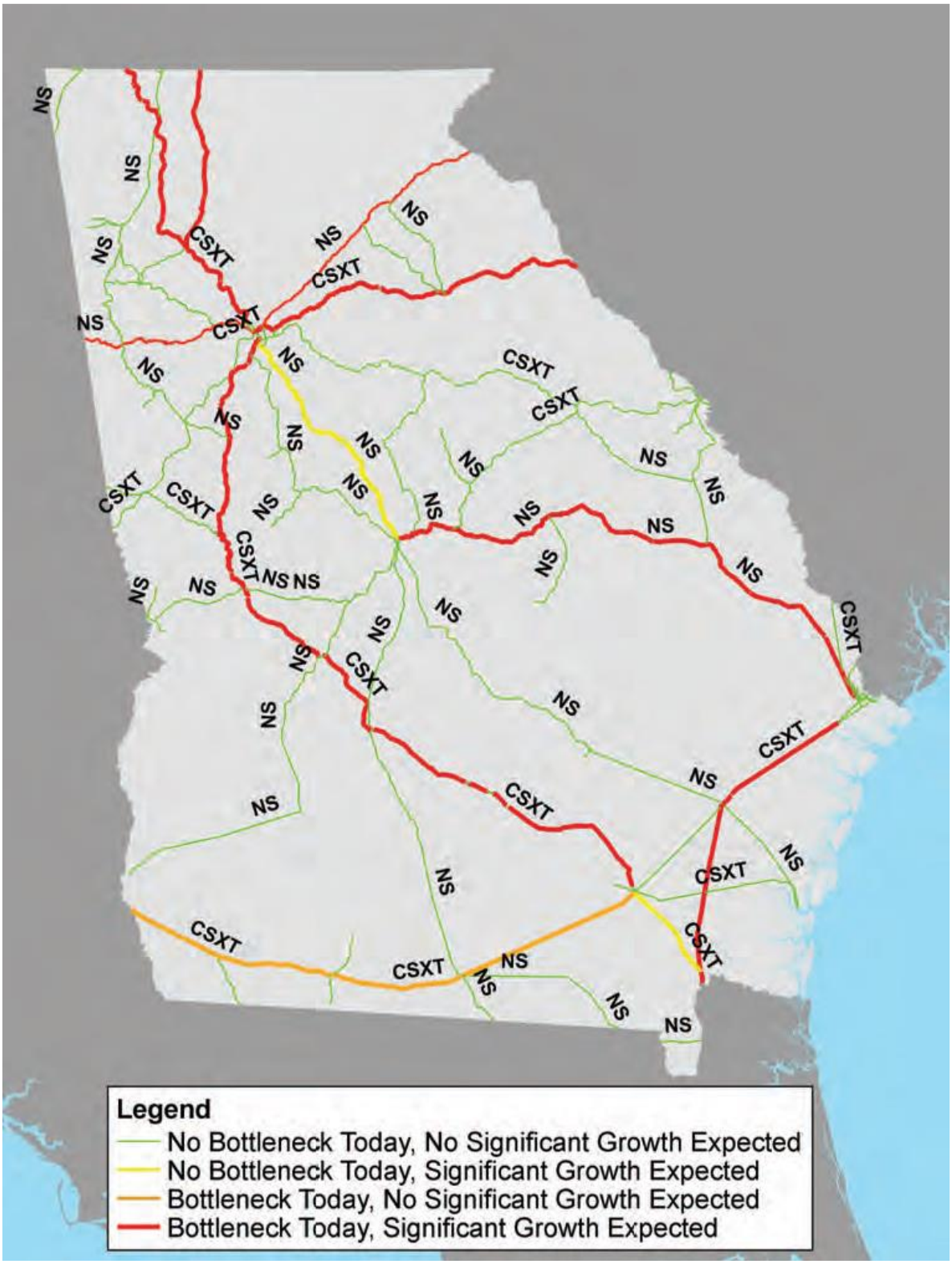
Source: www.dot.ga.gov/InvestSmart/Rail/Documents/StateRailPlan/2015GeorgiaStateRailPlan-1-26-16.pdf

Figure 2.2 Vertical Clearance Heights – Class I and Shortline Railroads



Source: Interviews with Class 1 railroads, American Shortline Railroad Association, Project team analysis.

Figure 2.3 Rail System Throughput Bottlenecks – Class I Railroads



Source: Interviews of Class 1 railroads, Project team analysis.

Long-Term Rail Program

Improving the deficiencies mentioned would be part of a long-term rail program to ensure that future growth can be captured by the Class I and shortline railroads. Determining specific projects out to the 2050 horizon year is outside of the normal planning process for Class I and shortline railroads and therefore individual projects over this period are not specified as part of this Plan. However, the American Association of Railroads ("AAR") developed the National Rail Freight Infrastructure Capacity and Investment Study (2007) which provides a sense of the magnitude of the infrastructure issues facing the railroads over the long-term.

The AAR study estimated that an investment of $148 billion would be needed nationally for freight rail infrastructure expansion between 2007 and 2035. An estimate of the costs to make these long range improvements in Georgia was developed by adjusting the AAR report timeline to a 2050 horizon year of the Freight & Logistics Action Plan and then factoring down the costs based on the amount of rail track in Georgia relative to the rest of the U.S. Putting a reasonable lower and upper bound on this process gives us an estimate of between $4 billion and $6 billion of rail capacity enhancements needed in Georgia by 2050 to accommodate future demand in the state.

These costs include the following improvements in the system:

- Line haul expansion;
- Major Bridges, Tunnels, and Clearance;
- Branch Line Upgrades;
- Intermodal Terminal Expansion;
- Carload Terminal Expansion; and
- Service Facilities.

The AAR report estimates that 70 percent of the total national costs are for line haul expansion and 14 percent of the national costs are for major bridges, tunnels and clearances. These two categories are likely the largest categories of freight rail improvements needed in Georgia over the long term as well.

2.3 HIGHWAY IMPROVEMENTS

Five types of highway improvement projects were identified as part of this Plan:

- Long-haul interstate corridors;
- Interstate interchanges;
- Urban bypasses;
- Smaller urban and rural freight corridors; and
- Highway safety projects.

Long-Haul Interstate Corridors

Due to the long distance nature of a large component of truck trips, long-haul interstate corridors in Georgia are particularly important for trucks and the overall movement of goods. Earlier analysis of the interstate system using the GDOT statewide travel demand model indicated that there will be significant long-haul bottleneck "segments" on the highway system in the year 2050 if no highway improvements are made to the system due to continued growth of truck and auto traffic volumes.

Long-haul interstates are considered to be the segments of the interstate between urban regions with the minimum number of lanes for the interstate. For example, the I-75 Atlanta-to-Tennessee long-haul corridor is the interstate segment between Atlanta and Chattanooga that has a total of six through lanes. The urban portion of the corridor in the Atlanta region that is more than six lanes is not part of the long-haul corridor. Similarly, the I-75 Atlanta-to-South Carolina long-haul corridor is the interstate segment between Atlanta and the Georgia-South Carolina state line that currently has a total of four lanes. The list of the long-haul corridors examined was:

- I-75 Atlanta-to-Tennessee
- I-85 Atlanta-to-South Carolina
- I-20 Atlanta-to-South Carolina
- I-75 Atlanta-to-Macon
- I-75 Macon-to-Florida
- I-16 Macon-to-Savannah
- I-85 Atlanta-to-Alabama
- I-20 Atlanta-to-Alabama
- I-95 South Carolina-to-Florida

NOTE: Georgia's Bottleneck Segments are part of "long haul" corridors analyzed later in this document; also see Table 6.2 of the study's Task 3 Truck Modal Profile.

Interstate Interchanges

Interstate interchanges are often the source of operational and capacity issues in the highway system. For trucks, traveling across interstate interchanges can be particularly problematic due to the increased time required to change speeds and operational issues created as large vehicles merge. Additionally, the longer average trip length of trucks results in the average truck trip encountering more interstate interchanges than other vehicles. Therefore, improving road geometry and bottleneck "hotspots" at interstate interchanges is beneficial to all vehicles, but particularly beneficial for truck mobility.

There are several well-known analyses of truck bottleneck "hot spots" referenced by freight practitioners that have been done over the past several years. Those unique to Georgia were discussed in section 6.3 of the Freight and Logistics Plan's Task 3 memo *Truck Modal Profile*. A listing of these nationally-ranked Georgia "hot spots" locations is repeated in Table 2.1 on the next page.

In addition, during the development of the Georgia Freight & Logistics Plan the I-16 @ I-75 interchange in Macon was cited by private sector stakeholders as particularly problematic; travel from I-75 southbound to I-16 eastbound *and* from I-16 westbound to I-75 northbound have operational issues. This interchange includes a single-lane, southbound left-hand exit to I-16 requiring significant lane changes for trucks and autos; this is important considering this interchange is used by many trucks daily to/from Port of Savannah and metro Atlanta. The interchange is also used by the many trucks traveling between the Port and growing warehouse/distribution activities south of Macon.

In the Savannah region, the I-95 interchanges at I-16 and State Route 21, as well as I-16 corridor between I-95 and I-516, were identified in GDOT's "Chatham County Interstate Needs Analysis & Prioritization Plan" (2008) as major issues for both trucks and autos, and are included in Table 2.1. The Savannah MPO Freight Plan (2015) also identifies these areas as *bottleneck locations*.

Table 2.1 Georgia's Major Bottleneck Hotspots

Location	GDOT Project (***Done*** and/or Proposed)
Atl., GA: I-285 @ I-85 (North metro ATL)	Proposed: Interchange reconstruction project in Atlanta MPO's **L**ong **R**ange **T**rans. **P**lan (LRTP). Proposed: new Collector-Distributor lanes on I-285 between SR 13/US 23 and I-85.
Atl., GA: I-285 @ I-75 (North metro ATL)	Proposed: Interchange reconstruction project in Atlanta MPO's LRTP. "Northwest Corridor" project under construction now adding corridor capacity along I-75 as far south as I-285.
Atl., GA: I-285 @ I-20 (East metro ATL)	***Done: new eastbound Collector-Distributor ("C-D") lanes added*** Proposed: Interchange reconstruction & westbound C-D lanes project…PE underway; ROW & CST in Atlanta MPO's LRTP & TIP
Atl., GA: I-75 @ I-85 (North metro ATL)	***Done: Mainline improvement & southbound C-D lane added (w/17th St. bridge project)***
Atl., GA: I-285 @ State Route 400	***Interchange Reconstruction: Construction underway***
Atl., GA: I-285 @ I-20 (West metro ATL)	Proposed: Interchange Reconstruction…Preliminary Engineering ("PE") now underway; ROW & Construction in Atlanta MPO's LRTP & TIP
Atl., GA: I-20 @ I-75/85 (Downtown ATL)	***Done: install southbound ramp meters @ Freedom Pkwy…also operations & lane restriping*** Proposed: GDOT Office of Planning's corridor-wide operational study underway.
Atl., GA: I-75 @ I-675	***Done: Southbound & northbound auxiliary lanes added in recent years: I-675 to Eagles Landing. Express-lanes opened early 2017--added corridor capacity between I-675 and SR 155***
Macon, GA: I-75 @ I-16	***Done: Construction underway for first phases; ROW acquisition underway on remaining.*** Proposed: Remaining construction phases in Macon MPO's LRTP & TIP
Savannah, GA: I-95 @ I-16	Proposed: Preliminary Engineering ("PE") now underway; ROW & Construction phases in Sav. MPO's LRTP & TIP
Savannah, GA: I-16 from I-95 to I-516	Proposed: **PE phase now underway**; ROW & Construction phases in Sav. MPO's LRTP & TIP
Macon, GA: I-75 @ I-475	***Done: Adjacent Hartley Bridge interchange reconstructed & I-75 mainline widened***
*Savannah, GA: I-95 @ State Route 21	***Done: I-95 NB shoulder/auxiliary lane added; interchange operational imprvmnt./"DDI" done*** Proposed: Interchange reconstruction in Savannah MPO's LRTP & Regional Freight Plan
Savannah, GA: I-16 @ State Route 307	Proposed: Interchange reconstruction in Savannah MPO's Regional Freight Plan

*Identified bottleneck per GDOT's *"Chatham County Interstate Needs Analysis & Prioritization Plan",2008*

While not identified on national-level bottleneck "hot-spot" lists, other projects are recommended that will improve local- and state-level bottlenecks:

Table 2.2 Other Georgia Bottleneck Hotspots and Associated Projects

Location	Freight Issue(s)	Proposed Project Type & Status
I-85 @ State Route 74 in Fairburn, Ga. (South metro Atlanta)	Capacity & operational needs; interchange provides access from I-85 to an expanded CSX Railroad Intermodal yard recently expanded[2]; State Route 74 is a US DOT-designated intermodal connector route (truck/rail facility GA32R).	**Recommended Project**: Interchange Reconstruction **Status:** Preliminary engineering underway. In Atlanta MPO's Long Range Transportation Plan (LRTP) and a recommended freight project in *South Fulton Co. Comprehensive Trans. Plan*[3].
I-285 @ I-75 (South metro Atlanta)	Improve operations on a major system-to-system interchange with very significant northbound I-75 to westbound I-285 truck movements (and the converse).	**Recommended Project**: Operations Improvement ("collector-distributor" ramps.) **Status:** In Atlanta MPO's LRTP & TIP.
I-75 @ Lake Park-Bellville Road (Exit 2 in Lake Park, Ga.)	Capacity & operational needs. Nearby 658,000ft.[2] Home Depot "rapid deployment" distribution center: 400 employees, 120 trucks/day, serves 150 stores in S.E.[4] Adjacent full-service truck stops nearby.	**Recommended Project**: Interchange Reconstruction **Status:** Preliminary Engineering underway; construction in Valdosta MPO's LRTP&TIP
I-16 @ State Route 307 (Savannah, Ga.)	This is the main interchange for trucks traveling to/from I-16 and main gate at the Port of Savannah.	**Recommended Project:** Interchange Operational Improvement **Status**: Prelim. Eng. underway. In *Chatham Co. Interstate Needs Analysis & Prioritization Plan*[5] and Savannah MPO's LRTP "Vision Plan".
State Route 6 "Truck Friendly" lanes (metro ATL)	State Route 6 is "last-mile" route between I-20 and existing Norfolk Southern intermodal yard (proposed for expansion under Norfolk Southern's "Crescent Corridor" initiative.)	**Recommended Project:** Add "Truck Friendly" improvements to corridor. **Status**: P.E. underway; ROW in Atlanta MPO's LRTP & TIP. Recommended in *State Route 6 Corridor Study*[6].
Jimmy Deloach Parkway Extens.: US 80 to I-16, and new interchange @ US 80	Connect existing Jimmy Deloach Parkway "last-mile" truck corridor to I-16 @ exit 152, with new interchange at US 80 and rail grade separation over the Ga. Central Railway (rail line connecting Cordele intermodal to Port of Savannah)	**Recommended Project:** New road and interchange for this State Freight Corridor. **Status**: Construction authorized FY 2018. State-designated Freight Corridor and freight project on the 2010 TIA regional project list.[7]

[2] www.dca.state.ga.us/dri/AppSummary.aspx?driid=2326

[3] www.fultoncountyga.gov/fts-t-planning

[4] www.georgia.org/news-room/governor-perdue-participates-in-board-cutting-for-lowndes-county-home-depot-distribution-center

[5] www.dot.ga.gov/BuildSmart/Studies/Documents/chatham_interstate_study/2-ChathamInterstatePlan.pdf#search=chatham%20interstate%20study

[6] http://comdev.cobbcountyga.gov/documents/SR6_Final-Rpt_1-8-08.pdf

[7] www.thempc.org/documents/Transportation/HB%20277/HB_277_project_CORE_MPO_submittal_Revised.pdf

State Route 17 and US 1	These are two existing north/south non-interstate corridors that will experience increasing truck volumes by the year 2050.	**Recommended Project:** Roadway widening of these designated State Freight Corridors. [State Route 17 and US 1 "work together" to provide non-interstate north-south freight movement; near Wrens, Georgia, significant truck volumes on US 1 exist on US 17 northwards to I-20 and Washington, Georgia.] **Status**: Recommended in TIA 2010 project lists[8] and GDOT State Trans. Improvement Program.[9]
State Route 72	A state-designated freight corridor; paired with State Route 316, it is east-west corridor from I-85 in metro ATL through Athens and into South Carolina.	**Recommended Project**: Corridor widening **Status:** Coordinated w/South Carolina DOT's adjacent State Route 72 widening project[10]. Construction authorized on portions.

Urban "Bypasses"

While 75 percent of the total freight tons in Georgia have an origin and/or a destination in the state, there are 25 percent of freight tons that are 'through trips' with both trip ends outside the state. For example, nearly 9,000 trucks per day travel through the state on I-95, almost 5,000 trucks per day travel through Georgia on I-75 and 6,000 trucks per day travel east-west through the state using I-85 and I-20. This "through" freight traffic contributes to congestion on both the highway and rail networks in Georgia. Investigating alternative paths that can be utilized for this traffic may support freight travel reliability and preserve existing infrastructure for freight traffic that is directly tied to economic activity in the State. This led to the consideration of testing the feasibility of potential "bypasses" around urban areas.

Additionally, the Private Sector Advisory Committee identified traveling around Atlanta as a major impediment to the free flow of freight. Based on this input several 'test' urban "bypass" scenarios were added to the evaluation list as shown in Figure 2.4. Ideas evaluated for preliminary feasibility include:

- A western Metro Atlanta "bypass" on new alignment connecting I-75 roughly 30 miles north and south of the current I-285;
- Improved connection from Macon-to-LaGrange plus four-laning remainder of US 27 north of LaGrange -- providing a "west Atlanta bypass route"; and
- A north metro Atlanta "bypass" on new alignment connecting I-75 and I-85 roughly 20-25 miles north of I-285.

[8]www.ga-tia.com/Images/FactSheets/CSRA-finalinvestmentlistreport.pdf

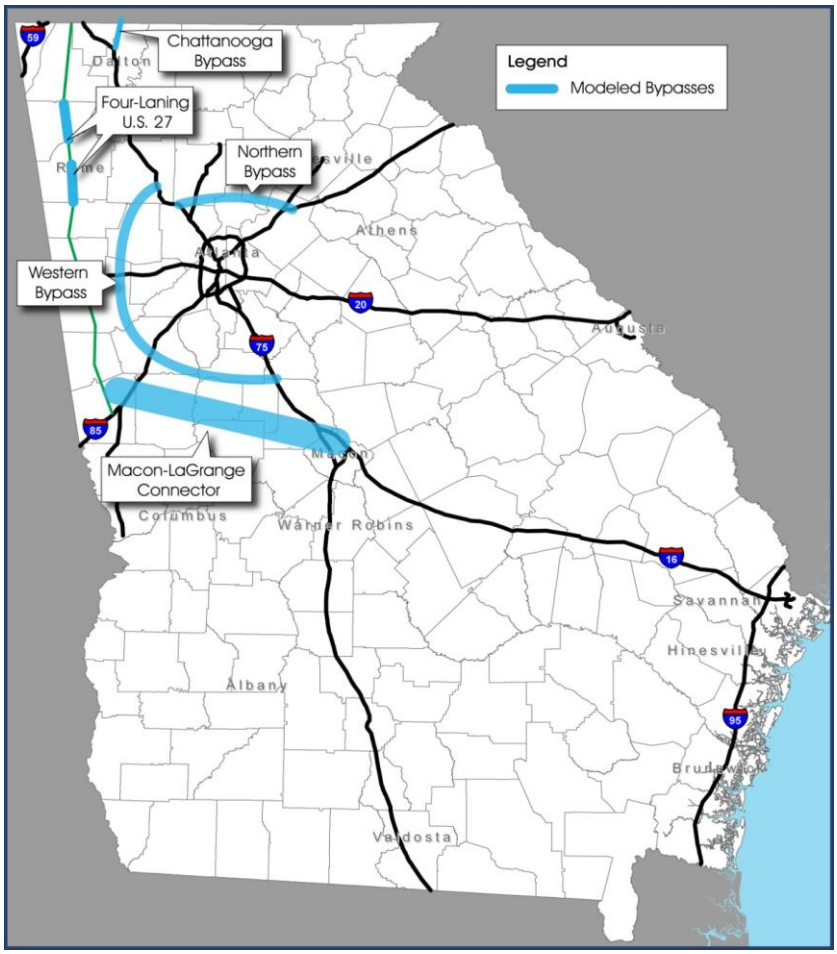
[9]www.dot.ga.gov/InvestSmart/Pages/STIP.aspx

[10]www.fhwa.dot.gov/environment/environmental_justice/case_studies/case10.cfm

Additionally, it was mentioned by the private sector that if highway bypasses are considered to be feasible, then rail bypasses may also be considered, because there was the question if additional right-of-way required would actually be minimal or significant.

A potential east "bypass" around Chattanooga was also analyzed; its genesis is in previous planning efforts in Tennessee, including Tennessee DOT's *I-75 Corridor Feasibility Study*[11] completed in late 2010 and the Chattanooga MPO's *Regional Freight Study*[12] done in July, 2011. Discussion of the proposal has continued in the Chattanooga region through mid-2014[13] and late 2015[14].

Figure 2.4 Alternative "Bypasses" Tested (Using Statewide Travel Demand Model)



[11] www.tdot.state.tn.us/i75

[12] www.chcrpa.org/TPO_reorganized/Plans_and_Programs/Multi-Intermodal_Land_Use_and_TransPlanning/Automobile-Freight_Planning/2010_Regional_Freight_Study.htm

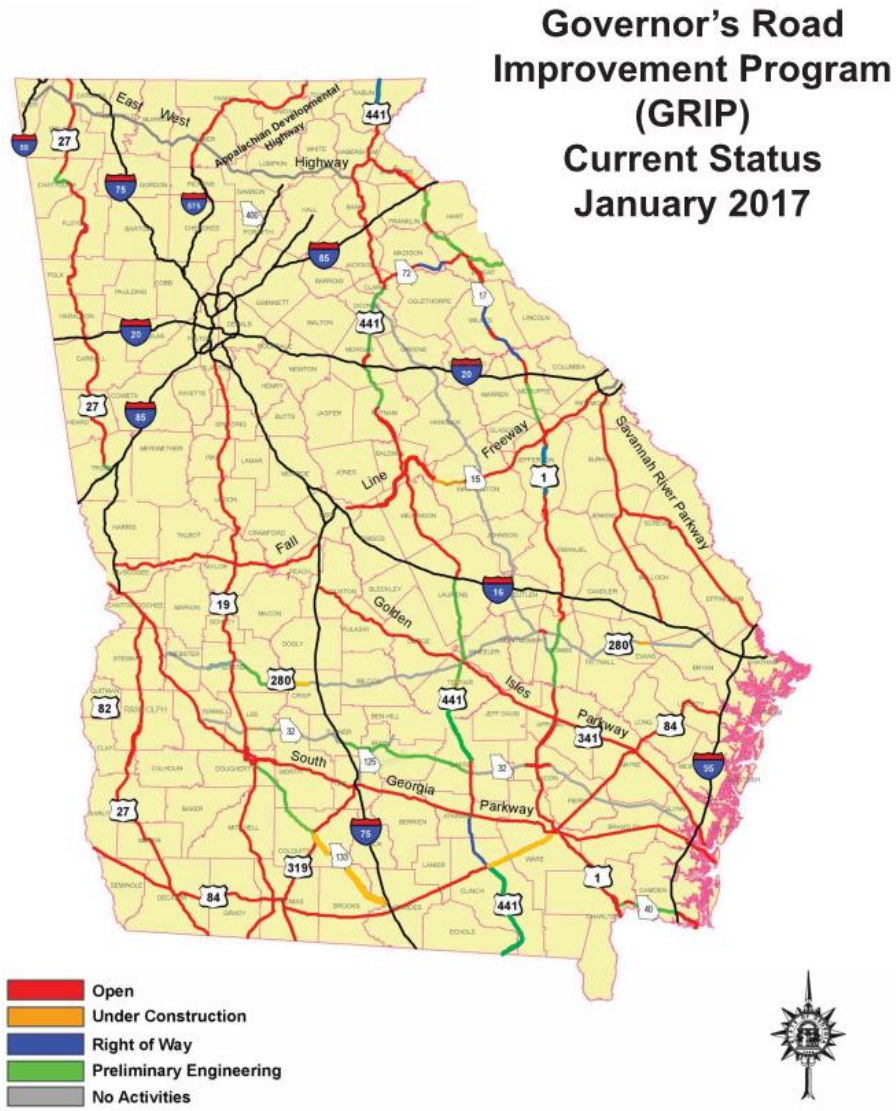
[13] www.timesfreepress.com/news/local/story/2014/jun/11/chattanooga-bypasshighway-encircling-metro-area/249523

[14] http://projects.timesfreepress.com/2015/12/trucks/day4.html

Smaller Urban and Rural Freight Corridors

Smaller urban and rural freight corridors are important to the State to ship goods between from lower density population locations to key freight consumption and production locations. They are also important for economic development.

To facilitate economic development the Governor's Road Improvement Program ("GRIP") was initiated by the state legislature in 1989 and includes 3,273 miles of roadway, typically outside large urbanized areas[15]. The review of the GRIP network and analysis of key corridors that were undertaken as part of this Plan indicated three GRIP corridor improvements are high-priority freight projects: US 84, State Route 133, and US 441.



[15] www.dot.ga.gov/BuildSmart/Programs/Pages/GRIP.aspx

US 84
This corridor currently has up to 2,000 trucks per day making it one of the highest truck volume non-interstate corridors and serving east-west corridor carrying freight traffic originating at the Ports of Brunswick and Savannah.

State Route 133
This route serves many freight-intensive facilities such as the recently-expanded Marine Corps Logistics Base in Albany which employs almost 2,800 civilians and provides worldwide, integrated logistics/supply chain and distribution management including the rebuilding/repair ground of combat and combat support equipment.[16] It is closely aligned with the Marine Corps base at Blount Island in Jacksonville, Florida which is the hub of the Marine Corps' prepositioning programs that provides Marine war fighters with the combat equipment and supplies. In combination, State Route 133, I-75 and I-10 are the main highways used to transport the military equipment to and from the Albany and Blount Island military bases.

This route also carries significant amounts of non-military goods produced in Albany needing access to I-75 for distribution to the large consumer populations in Florida and the I-10 corridor. Albany-based manufacturers include Miller-Coors Brewing Company (beer); Proctor & Gamble (paper towels & Charmin toilet tissue); Coats & Clark (textile-related fibers, yarns, and threads); and SASCO Chemical Company (one of two Georgia companies winning a 2014 "E" Award from US Department of Commerce in recognition of contributions to increasing American exports[17].)

On a regional scale, State Route 133 and four-laned US 82 serve freight traffic between I-185 (at its southern terminus in Columbus) and I-75 in Valdosta. These routes traverse the most agricultural-intensive area of the state, making State Route 133 a major "farm-to-market" highway facilitating the transport of raw food products to processing plants.

Data and analysis from an earlier study supports the need for improving State Route 133, especially from a truck-focused freight perspective. GDOT Office of Planning's *Southwest Georgia Interstate Study* (2009) developed a sub-regional travel demand model that found by the year 2040, truck vehicle-miles-traveled will be 31.4% of all vehicle-miles-traveled on that corridor -- even if no improvements are made.[18] The model also predicts by 2040 that all routes of the existing road system – with the exception SR 133 – will be able to handle

[16] www.militaryinstallations.dod.mil

[17] www.commerce.gov/news/press-releases/2014/05/28/us-secretary-commerce-penny-pritzker-honors-65-companies-export-succe

[18] Table 4.4.16.1 of study final report: www.dot.ga.gov/BuildSmart/Studies/Documents/SWGA/FinalReport-compressed.pdf

anticipated traffic growth and continue to efficiently support highway travel.[19] Findings were supported by attendees at multiple rounds of the study's stakeholder and public meetings, where multiple comments were received in support of widening SR 133.

US 441

The third GRIP corridor is four-laning U.S. 441 between I-85 and I-16, which provides alternative access between Central Georgia and I-85 as well as supporting shippers in Central Georgia to connect to markets on the I-85 corridor in the Carolinas/Mid-Atlantic/Northeast.

This corridor is a primary route for truck freight moving between the Port of Savannah and the new Caterpillar assembly plant[20] in Athens, Georgia – a city through which US 441 passes. US 441 also provides an alternative, more direct route for freight moving from the Port to new warehouse/distribution/manufacturing businesses clustering along the I-85 corridor in northeast Atlanta, such as:

- Amazon 600,000 square foot fulfillment center with 500+ full time jobs[21],
- Systemax $15 million distribution center with 400 jobs[22],
- Bed, Bath & Beyond's $50 million e-fulfillment center with up to 900 jobs[23],
- Ollies' $14.6 million distribution center with 175 jobs[24],
- Toyota Industries $350 million manufacturing plant with 320 jobs[25],
- Williams Sonoma's 1 million square foot distribution center[26], and
- Dollar General's 1 million square foot distribution center with 500 jobs[27].

Highway Safety Projects

Analysis was conducted of truck-involved crashes, identifying head-on collisions involving trucks as the most severe vehicle crashes. Most occurred on highways in smaller urban and rural areas with relatively high truck volumes and no median barrier between opposing traffic flows. Improving median barriers at strategic locations is one possible consideration on those freight corridors.

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[19] S.W. Georgia Interstate study's tech memo (Page 76)
www.dot.ga.gov/BuildSmart/Studies/Documents/SWGA/FutureConditions/Final%20Future%20Conditions.pdf

[20] http://onlineathens.com/local-news/2012-02-25/caterpillars-jobs-come-price

[21] https://gov.georgia.gov/press-releases/2016-06-22/deal-amazon-create-more-500-jobs-jackson-county

[22] www.georgia.org/news-room/systemax-creates-400-jobs-in-jackson-county-georgia

[23] www.georgia.org/news-room/bed-bath-beyond-inc-to-create-up-to-900-jobs-in-jackson-county

[24] www.georgia.org/news-room/deal-ollies-create-approximately-175-jobs-commerce

[25] gov.georgia.gov/press-releases/2012-01-31/toyota-industries-creates-320-jobs-jackson-county

[26] www.gainesvilletimes.com/section/6/article/115165

[27] gov.georgia.gov/press-releases/2016-05-09/deal-dollar-general-create-more-500-jobs

2.4 AIR CARGO PROJECTS

Air cargo projects were identified via stakeholder outreach at Georgia's top air cargo-handling airports: Hartsfield-Jackson in Atlanta, Southwest Georgia Regional in Albany, and Savannah/Hilton Head. The major identified air cargo needs include:

- Additional air cargo warehousing at Hartsfield-Jackson airport, and
- Lengthening the runway at Southwest Georgia airport.

3.0 Project Evaluation

A range of analysis tools and estimation techniques were utilized to determine the traffic impacts of projects identified for the Freight & Logistics Plan. Table 3.1 lists the tools used for each project category.

Table 3.1 Methodology for Evaluating Individual Projects

Project Category	Methodology or Tool Used to Evaluate Individual Projects
Marine Port Projects	Recent reports
Rail Projects – *Crescent Corridor*	Previous analysis
Rail Projects – Other improvements	Top-down estimate using previous reports
Highway Projects – Add capacity to long-haul interstates	Georgia DOT statewide travel demand model
Highway Projects – Improve interstate interchanges	"Off-model" analytical technique
Highway Projects – Develop urban "bypasses"	Georgia DOT statewide travel demand model
Highway Projects – Add capacity to rural freight corridors	Georgia DOT statewide travel demand model
Highway Projects – Develop safety projects	"Off-model" analytical technique
Air Cargo Projects	Qualitative descriptions from discussions with airport staff

This chapter is structured to describe the analysis of projects in each of the categories listed in Table 3.1. The sections of this chapter are:

- Section 3.1 – Marine Port Improvements
- Section 3.2 – Rail Improvement Projects
- Section 3.3. – Highway Projects Analyzed Using State Travel Demand Model
- Section 3.4 – Highway Projects Analyzed Using Off-Model Techniques
- Section 3.5 – Air Cargo Improvements

3.1 MARINE PORT IMPROVEMENTS

Several port-related projects are considered: 1) Port of Savannah's Harbor Expansion and Mega-Rail project and 2) new Jasper Ocean Terminal.

Savannah Harbor Expansion Project (Deepening)

The U.S. Army Corp of Engineers' Savannah Harbor Expansion Project (SHEP) will deepen the Savannah harbor and the associated shipping channel from an authorized depth of 42 feet to 47 feet. This deepening will allow larger, more efficient container vessels to use the East Coast's second-busiest container harbor with fewer weight and tidal restrictions. Inner harbor work will also include constructing three bend wideners and two meeting areas, and enlarging the Kings Island Turning Basin at the Garden City Terminal.[28]

Most recently, the Corps estimate to deepen the harbor has increased. It is now $973 million (38% above the Corps' 2014 estimate), however the cost savings to shippers and consumers have also increased from $174 million/year to $282 million/year – an improvement of 62% over the next 50 years, representing a corresponding improvement of the cost-benefit from 5.5 to 7.3, respectively[29].

Port of Savannah's "Mega-Rail" Project

This is a $128 million "Mega-Rail"[30] project, funded partly by a $44 million U.S.DOT FASTLANE grant administered by MARAD. With construction beginning in 2018 and completion in 2020, its goal is:

- On-port CSX and Norfolk-Southern rail expansion that positions the Port of Savannah to rapidly increase service to arc of inland markets (Atlanta, Memphis, St. Louis, Chicago and Ohio Valley);
- Increases the number of truck lanes at Gate 8 from eight to 16, which will give the Garden City terminal a total of 54 truck lanes; and
- Doubles rail lift capacity at the Garden City terminal to 1 million containers/year, facilitating shift of up to 100,000 freight truckloads/year from road to rail.[31]

Jasper Ocean Terminal Development

With the execution of a bi-state development agreement signed by the governors of Georgia and South Carolina in 2008, the new Jasper Ocean Terminal port

[28] www.sas.usace.army.mil/Missions/Civil-Works/Savannah-Harbor-Expansion

[29] www.joc.com/port-news/us-ports/port-savannah/savannah-deepening-cost-timeline-and-bco-benefits-expand_20170407.html

[30] www.gaports.com/About/StateofthePort/MegaRailInlandTerminalUpdate.aspx

[31] www.sav-cdn.com/news/2017-11-13/georgia-ports-board-approves-mason-mega-rail-project

proposal officially became a joint venture between the states. When complete, it will be the nation's largest terminal build-out, with a capacity for 7 million TEU's. For comparison purposes, the current largest terminal is L.A. and Long Beach which handle over 6.5 TEU's/year spread over 14 container terminals, while about 2 million go through the Port of Charleston and 3 million through the Port of Savannah.[32]

One of the primary motivations for a new port is future capacity limitation at existing Port of Savannah due to continued, rapid growth. An estimate released in November 2015 predicts the existing terminals at the Ports of Savannah and South Carolina Port Authority's terminals could approach their capacity limits as early as the year 2025.[33]

Work on developing a new Jasper port terminal has been steady over the years. One major report released in March 2011 was "An Update on the Jasper Ocean Terminal" authored by the Georgia Ports Authority and the South Carolina Ports Authority. It estimates $9 Billion in tax revenue would accrue to Georgia and South Carolina from the development of a new port on the Savannah River in Jasper County, South Carolina based on the assumption that taxes and jobs would scale with port volume. It also assumed that higher container density and efficient operations would lead to increased utilization of existing port facilities.

Construction of Phase 1 of a new Jasper terminal (infrastructure including roads, bridges and utilities) is also estimated to translate into 900 direct and indirect jobs.[34]

In January 2015 the Joint Project Office completed a capacity study concluding that the Savannah River is capable of supporting both the current Georgia Ports Authority's Garden City Terminal as well as the proposed new Jasper terminal.[35] November 2015 was when the Georgia and South Carolina Ports Authorities formally signed the joint venture agreement allowing the Joint Project Office -- established in 2008 and comprised of representatives of both states -- to initiate the required permitting process applications with the U.S. Army Corps of Engineers; later that month the first federal permit application for the proposed port was filed with the Corps.[36]

The cost estimate to construct the facility on its 1,500 acre site is $4.5 billion[37] as of May 2016, which was also the month that $10 million had been spend so far

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[32] www.jaspersuntimes.com/news/2016-05-04/developing-port-will-%E2%80%98transform%E2%80%99-jasper

[33] www.jaspersuntimes.com/news/2015-11-17/new-joint-agreement-kick-starts-jasper-port

[34] http://dc.statelibrary.sc.gov/handle/10827/9691

[35] http://savannahnow.com/exchange/2015-01-26/engineers-river-can-support-two-ports

[36] www.islandpacket.com/news/business/article46961765.html

[37] www.jaspersuntimes.com/news/2016-05-04/developing-port-will-%E2%80%98transform%E2%80%99-jasper

(shared between Georgia and South Carolina) for preliminary planning and permit work.

As of mid-2017, the proposed project is entering a second where an environmental impact study, public hearings and a final record-of-decision are being completed. Estimated cost of this work is $100 million, with the bulk of total project expenses to occur during the construction phase beginning in the next decade.[38] There is an expected four-year timeline between the required research beginning soon and the submission of the required environmental impact study.[39] Timing for completing all required environmental studies and receiving permits from the U.S. Corps of Engineers is estimated to take up to eight years.[40] Information on the environmental impact study is available at www.jasperoceanterminaleis.com.

The first phase of the new terminal, to be built on the South Carolina side of the Savannah River about 10 miles upriver from the Savannah Harbor, could have two berths with a 55-foot depth that can handle ships carrying as many as 20,000 cargo boxes – about 6,000 more than the ports in Charleston and Savannah can accommodate. The terminal could have a rail system accessed by CSX on a northern route and Norfolk Southern on a southern route, and a road system accommodating up to 7,500 trucks per day.[41]

In support of the development of the Jasper Ocean Terminal, GDOT and SCDOT (South Carolina Department of Transportation) have teamed up to improve the US 17 crossing of the Back. This river crossing connects the states of Georgia and South Carolina and offers the most efficient route between the Jasper Ocean Terminal with the Port of Savannah and rest of the state of Georgia. This new project will build a second bridge crossing the Back River, as well as a short widening to the existing road between the river and the Talmadge Bridge, to create a 4-lane connection between the two states. These improvement projects were formally adopted by the Savannah MPO at their August, 2017 meeting[42].

[38] www.postandcourier.com/20160502/160509861/south-carolina-governor-nikki-haley-urges-funding-for-jasper-port-project

[39] www.jaspersuntimes.com/news/2016-05-04/developing-port-will-%E2%80%98transform%E2%80%99-jasper

[40] http://savannahnow.com/news/2014-05-23/savannah-river-can-apparently-handle-new-port

[41] www.postandcourier.com/20160502/160509861/south-carolina-governor-nikki-haley-urges-funding-for-jasper-port-project

[42] www.thempc.org/docs/lit/CoreMpo/Latest/FY2018-2021TIPAmend.pdf

3.2 RAIL IMPROVEMENT PROJECTS

The rail-related improvement projects analyzed as part of this plan include one specific project -- Norfolk Southern' s *Crescent Corridor* -- and a generalized set of improvements needed to accommodate future freight rail demand in the state. This section describes how the benefits of each improvement were estimated.

Crescent Corridor

The Crescent Corridor consists of a series of rail tracks that extend as far northeast as New York and New Jersey, though the mid-Atlantic with the southern termini in Memphis and New Orleans (Figure 3.1). According to a Norfolk Southern presentation at the Atlanta Regional Commission, improvements include 300 miles of new passing track; double-track by full development; new or expanded terminals in 11 markets; and $2.5 billion in new investments through full corridor development. When complete, it will be one of the nation's most direct intermodal rail routes from Northeast and Southern U.S.

In Georgia, the Crescent Corridor improvements include enhancements to the rail track connecting Atlanta to the South Carolina state border and improvements to the rail track connecting Atlanta to Birmingham parallel to I-20. The Phase 1 improvements in Georgia include line haul capacity improvements which would result in increased train speeds in the corridor. The full build-out of the Crescent Corridor would occur in Phases 2 and 3. In Georgia, the full build-out would include improvements to track capacity and railyard enhancements resulting in trains travelling at close to 55 miles per hour. The cost for all the rail improvements in Georgia is estimated to total $84.3 million.

To estimate the amount of traffic generated by this improved service, two key data sources were utilized. Global Insight TRANSEARCH database was used to determine mode split by commodity and trucking shipment data was used to define 88 market lanes. This identified that the southeast-to-northeast market is dominated by truck traffic. Figure 3.2 shows 15 percent of the long-haul traffic in these trade lanes goes by rail, which is much lower than rail share for other lanes.

Improvements to this corridor could allow a higher percentage of the freight in this corridor to shift to rail allowing for significant potential savings in terms of logistics costs, travel time savings, safety improvements, fuel savings, emissions savings, and pavement wear and tear. Based on a Norfolk Southern presentation to Atlanta Regional Commission (June 2010), the estimated total monetized public benefits from these improvements were estimated at $2 billion annually.

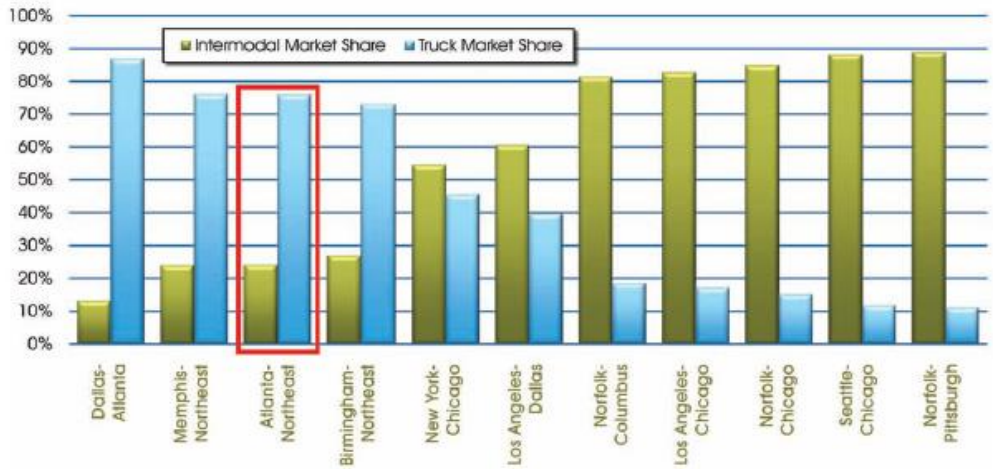
The development of new intermodal terminals is also considered to be a significant economic benefit to the region. An economic impact analysis of the Crescent Corridor was conducted for six proposed new terminals and estimated that the cumulative economic impact by the year 2030 was $40 billion

representing a 16:1 return on investment relative to the $2.5 billion[43] in initial investment in the Crescent Corridor. It should be noted that none of the six new terminals included in this analysis were located in Georgia as reflected in Figure 3.1; therefore, the economic benefits for Georgia could be somewhat reduced. However, future expansion at the existing Austell intermodal railyard (northwest metro Atlanta) is included in overall Crescent Corridor initiative.[44]

Figure 3.1 Norfolk Southern *Crescent Corridor*

Source: Norfolk Southern presentation to GDOT Board

Figure 3.2 Mode Share for Select Trade Lanes



Source: Norfolk Southern presentation to Atlanta Regional Commission (June 2010)

[43] www.nscorp.com/content/nscorp/en/ship-with-norfolk-southern/shipping-options/corridors/crescent-corridor.html

[44] www.dot.ga.gov/InvestSmart/Rail/Documents/StateRailPlan/2015GeorgiaStateRailPlan-1-26-16.pdf

General Rail Improvements Needed in Georgia

As mentioned in Chapter 2, improving general rail deficiencies should be part of a long-term rail program to ensure that future growth in freight movement can be captured by rail. This section will expand on that discussion. As previously noted, specific rail improvement projects out to the 2050 horizon year are outside of the normal planning process for railroads; consequently these projects were not addressed as part of this Plan.

As previously discussed, existing literature developed by the railroads can provide estimates of the benefits of investments in freight rail. The AAR National Rail Freight Infrastructure Capacity and Investment Study (2007) estimated a national investment of $148 billion needed for freight rail infrastructure expansion by 2035. As discussed in Chapter 2, prorating these costs to the horizon year 2050 timeline of the Freight & Logistics Action Plan and state of Georgia yields an estimated $4 - $6 billion of rail capacity enhancements needed in Georgia.

These costs include the following recommended improvements:

- Line haul expansion;
- Major Bridges, Tunnels, and Vertical Clearance;
- Branch Line Upgrades;
- Intermodal Terminal Expansion; and
- Carload Terminal Expansion.

Methodology used in AAR study to estimate rail capacity and investment:

- Divided continental U.S. Class I railroad network into primary corridors;
- Established current corridor volume in freight and passenger trains per day for each primary corridor, based on STB Carload Waybill data;
- Estimated current corridor capacity (trains/day) for each corridor;
- Compared current corridor volume to current corridor capacity;
- Estimated future corridor volume in trains per day, using U.S. DOT's Freight Analysis Framework forecasts of rail freight demand by 2035 by type of commodity and by origin and destination locations of shipments moving within U.S. and through international land and port gateways;
- Compared future corridor volume to current corridor capacity;
- Determined additional capacity needed to accommodate future train volumes at an acceptable level of service reliability;
- Identified rail line and signal control system improvements required to provide the additional capacity; and

- Estimated costs of the improvements.

The AAR study estimated the need for expansion of Class I railroad carload terminals, intermodal yards, and railroad-owned international gateway facilities by analyzing the projected increases in the number of railcars and intermodal units (containers and truck trailers) handled at major facilities and comparing them to current handling capacity. Expansion costs were estimated using unit costs per railcar or intermodal container, or estimated using recent and comparable terminal expansion project costs. Estimates of the cost of expanding service and support facilities such as fueling stations were provided by the railroads based on the anticipated changes in the number and type of trains.

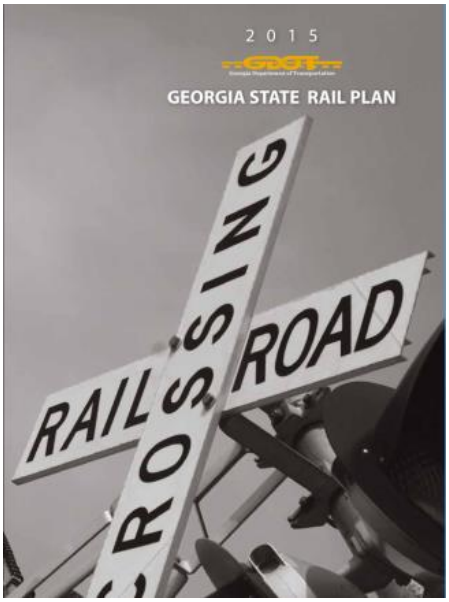
Finally, the AAR study estimated the capacity and investment requirements for secondary mainlines, branch lines, and short line and regional railroads by updating information from a prior study of short line system investment needs commissioned by the American Short Line and Regional Railroad Association.

To estimate the benefits associated with these improvements, the AASHTO Freight Rail Bottom Line Report (2003) was utilized by the Georgia Statewide Freight and Logistics Plan. The report suggests that an additional investment of $53 billion to upgrade from a constrained investment scenario to a base case scenario yields $173 billion in reduced highway needs and reduced shipper costs. These benefits can be translated into a return on investment in generalized rail improvements of roughly 3.3.

State Rail Plan Update[45]

Completed in 2015 and approved by the Federal Railroad Administration in early 2016, this detailed rail modal plan provides the guide for freight and passenger rail investments in Georgia.

Initial tasks to formally update this document will commence in late FY 2018



[45] http://www.dot.ga.gov/IS/Rail/StateRailPlan

3.3 HIGHWAY PROJECTS ANALYZED -- USING THE GEORGIA STATEWIDE TRAVEL DEMAND MODEL

The Georgia statewide travel demand model was used to evaluate projects that added mainline highway capacity. These projects included testing scenarios of adding capacity to long-haul interstate corridors, new limited access urban bypass routes, and improving capacity on smaller urban and rural freight corridors. Existing and added capacity for each of these projects is shown below in Table 3.2. The map of "bypasses" was previously shown in Figure 2.4.

The full list of GRIP corridors is shown in Figure 3.3. The most freight-intensive corridors from this list were selected based on a combination of truck volumes and feedback from outreach efforts. The four-laning enhancements considered as part of this plan were on the following highway segments:

- US 84 between US 1 and US 441;
- State Route 133 between Albany and Valdosta;
- Portions of US 280;
- US 441 between I-16 and I-85; and
- Final section of the Fall Line Freeway

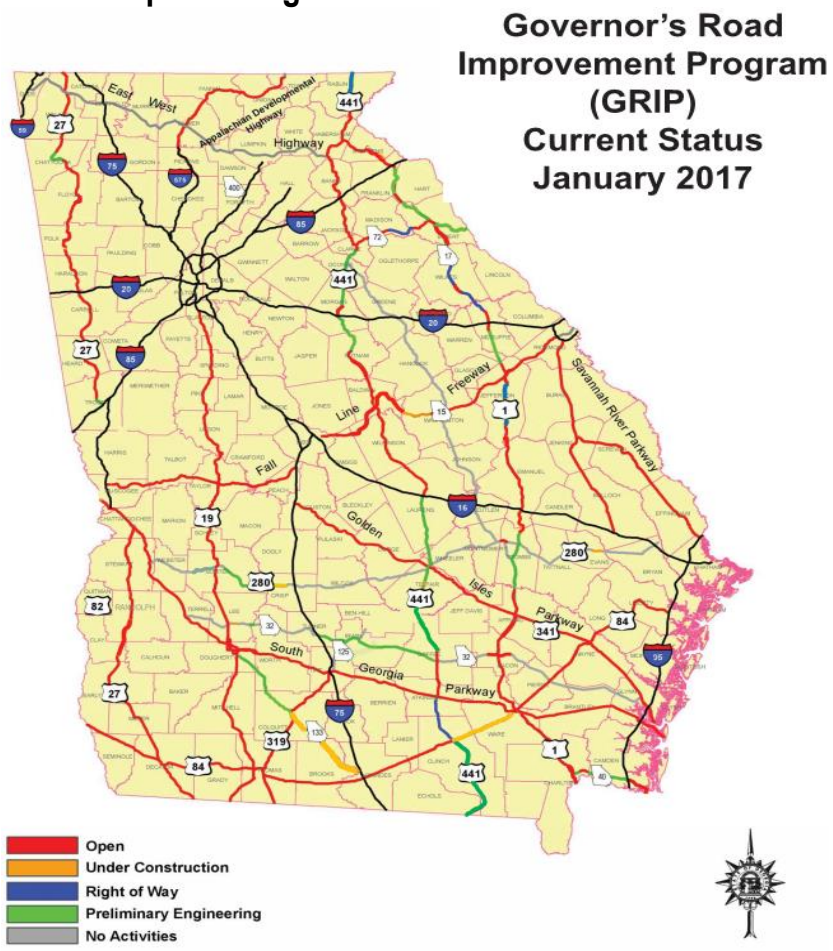
Table 3.2 Capacity-Expansion Projects Tested in the Travel Model

		Total Number of Through Lanes		
Type	**Project Name**	**Existing**	**Added**	**Total**
Long Haul	I-75 Atlanta-to-Chattanooga	6	2	8
Long Haul	I-75 Atlanta-to-Macon	6	2	8
Long Haul	I-85 Atlanta-to-S.C. Line	4	2	6
Long Haul	I-85 Atlanta-to-AL. Line	4	2	6
Long Haul	I-75 Macon-to-FL. Line	6	2	8
Long Haul	I-16 Macon-to-Savannah	4	2	6
Long Haul	I-20 Atlanta-to-AL. Line	4	2	6
Long Haul	I-20 Atlanta-to-S.C. Line	4	2	6
Long Haul	I-95 (entire stretch)	6	2	8
Smaller Urban and Rural Freight	US 84	2,4	2	4
Smaller Urban and Rural Freight	State Route 133	2	2	4
Smaller Urban and Rural Freight	US 280	2,4	2	4
Smaller Urban and Rural Freight	US 441 from I-16 to I-85	2,4	2	4

Type	Project Name	Total Number of Through Lanes		
		Existing	Added	Total
Smaller Urban and Rural Freight	Fall Line Freeway	2	2	4
Bypass	Western Atlanta metro "Bypass"	0		
Bypass	Macon-to-LaGrange improvement[46] plus remainder of US 27 four-laning north of LaGrange	2,2	0-or-1,2	2-or3,4
Bypass	Chattanooga "Bypass"	0	6	6
Bypass	Northern Atlanta Bypass	0	4	4

Note: As GRIP-designated corridors, only portions of the highways were four-laned.

Figure 3.3 Map of Georgia GRIP Corridors



Source: www.dot.ga.gov/BS/Programs/GRIP ("status map")

[46] See the *Macon-to-LaGrange Subtask* of GDOT Planning's "*Connect Central Georgia Study*"

Growth Scenarios

The projects were run under two growth scenarios: a medium and a high truck growth scenario. The medium truck growth scenario assumed the truck growth rate to be 2.0 percent annually through the year 2050. This two percent growth rate is consistent with the TRANSEARCH freight flow forecast utilized in earlier sections of this Plan. Under the medium truck growth scenario, the container growth at the Port of Savannah was capped based on the capacity of its Garden City Terminal.

For the high truck growth scenario, the annual truck growth rates were increased to four percent. This growth seems rapid, but is consistent with growth of metro Atlanta in the 1980s and 1990s. The unconstrained growth rate for containers at the Port of Savannah was incorporated into the high truck growth scenario. This equates to container growth rate at 4.5 percent per year through 2050.

Model Run Features

Relevant output variables from the model were *vehicle miles traveled* (VMT) and *vehicle hours traveled* (VHT) between the base year 2020 and the horizon year 2050. Changes in VMT and VHT for 2020 and 2050 between build and no build options were used to derive benefits for each of the alternatives. To estimate total changes over the time period of concern, estimates of the changes in VMT and VHT were generated for each year between 2020 and 2050.

Statewide travel demand model forecast years are 2020, 2040, and 2060. To develop 2020 model results, the change in VMT and VHT for 2020 between the no build and build scenarios could be used directly. To develop 2050 traffic impact estimates, the model results for 2040 and 2060 were generated and straight-line interpolation was used such that the midpoint of these two values was used as the estimate for 2050. This was done for both the build and the no build scenarios. The change in VMT and VHT could then be calculated for both 2020 and 2050. Straight-line interpolation was then used to estimate the change in VMT and VHT for years in between 2020 and 2050. All projects were assumed to be open for traffic in 2020 for purposes of this analysis.

The long-haul interstate corridor capacity enhancements were run in the model as a bundle to best identify the system-wide benefits of long-haul capacity improvements. For these model runs, the traffic impacts of the improvements were primarily based on the traffic impacts that occurred on the corridor. Traffic impacts that did not occur on the interstate corridors were allocated to corridors based on their individual improvements of VHT and VMT. The accuracy of this process was confirmed by also running I-85 from Atlanta to South Carolina individually and comparing it to the bundle results. The traffic impact results were similar for both methods.

Each bypass route and smaller urban and rural freight improvement was run as a separate project.

Travel Demand Model Results

Table 3.3 shows the changes in vehicle miles of travel (VMT) and vehicles hours of travel (VHT) for both autos and trucks by the year 2050 for the medium growth scenario for each of the capacity enhancement alternatives. Table 3.4 shows the changes in VMT and VHT for the high growth scenario. **Tables discuss the traffic impact for each of the alternatives, but cannot be used by itself to evaluate the overall performance of a project.**

As expected, the reductions in VMT and VHT were greater for a high growth scenario relative to the medium growth scenario. This is largely due to more delay that can be reduced through the freight improvement projects.

Table 3.3 Results of Changes in VHT and VMT: *Medium-Growth Scenario*

Improvement Type	Project	Change by Year 2050			
		Auto		Truck	
		VMT	VHT	VMT	VHT
Long Haul	I-75 Atlanta-Chattanooga	138,809	-86,285	58,563	-6,789
Long Haul	I-75 Atlanta-Macon	61,354	-46,779	27,976	-4,915
Long Haul	I-85 Atlanta-SC Line	127,392	-144,707	36,616	-11,134
Long Haul	I-85 Atlanta-AL Line	83,349	-89,444	11,202	-8,776
Long Haul	I-75 Macon-FL Line	122,791	-46,559	43,720	-7,322
Long Haul	I-16 Macon-Savannah	14,143	-5,901	-595	-1,610
Long Haul	I-20 Atlanta-AL Line	99,162	-108,319	16,339	-5,750
Long Haul	I-20 Atlanta-SC Line	140,369	-141,514	22,206	-9,371
Long Haul	I-95 (entire stretch)	174,359	-66,016	42,514	-11,189
Long Haul	All Interstate Long Haul Projects	961,728	-735,523	258,540	-66,857
Smaller Urban and Rural Freight	US 84	-232,014	-8,766	-37,844	-1,704
Smaller Urban and Rural Freight	State Route 133	-494,953	-17,999	-83,416	-3,429
Smaller Urban and Rural Freight	US 280	-158,859	-4,932	-41,269	-1,424
Smaller Urban and Rural Freight	US 441 from I-16 to I-85	-140,784	-12,271	-24,569	-2,344
Smaller Urban and Rural Freight	Fall Line Freeway	55,042	-4,417	27,681	-120
Bypass	Western Bypass	2,317,908	-166,586	267,142	-25,894
Bypass	Macon-to-LaGrange improvement plus remainder of US 27 four-laning north of LaGrange	-950,862	-71,530	-317,624	-14,465
Bypass	I-75 Bypass Around Chattanooga	-443,894	-25,708	-62,488	-3,806
Bypass	Northern Bypass	1,917,686	-362,302	45,506	-11,855

Table 3.4 Results of Changes in VHT and VMT: *High-Growth Scenario*

		Change by Year 2050			
		Auto		Truck	
Type	Project	VMT	VHT	VMT	VHT
Long Haul	I-75 Atlanta-Chattanooga	116,314	-55,122	311,383	-10,316
Long Haul	I-75 Atlanta-Macon	53,404	-35,970	208,170	-10,316
Long Haul	I-85 Atlanta-SC Line	124,972	-158,939	159,777	-43,880
Long Haul	I-85 Atlanta-AL Line	82,661	-98,067	108,695	-27,928
Long Haul	I-75 Macon-FL Line	122,396	-42,940	367,355	-14,695
Long Haul	I-16 Macon-Savannah	56,716	-18,312	133,671	-27,841
Long Haul	I-20 Atlanta-AL Line	106,704	-100,828	64,154	-21,463
Long Haul	I-20 Atlanta-SC Line	113,921	-179,602	148,519	-28,649
Long Haul	I-95 (entire stretch)	73,910	-106,015	143,125	-66,188
Long Haul	All Interstate Long Haul Projects	850,997	-795,795	1,644,849	-251,275
Smaller Urban and Rural Freight	US 84	454,274	-13,382	194,823	-6,054
Smaller Urban and Rural Freight	State Route 133	156,906	-27,477	377,828	-12,181
Smaller Urban and Rural Freight	US 280	95,751	-7,529	412,498	-5,060
Smaller Urban and Rural Freight	US 441 from I-16 to I-85	361,939	-18,732	255,090	-8,326
Smaller Urban and Rural Freight	Fall Line Freeway	554,749	-104,656	368,918	-348
Bypass	Western Bypass	2,051,030	-180,237	1,699,576	-97,319
Bypass	Macon-to-LaGrange improvement plus remainder of the US 27 four-laning north of LaGrange	-724,081	-109,197	-907,286	-51,389
Bypass	I-75 "Bypass" Around Chattanooga	-345,474	-30,561	-227,556	-18,919
Bypass	Northern Bypass	1,711,610	-433,260	204,014	-24,635

Estimation of User Benefits

The first step in developing benefit-cost ratios is generating an estimate of the benefits from implementing each project. Factors considered for benefit calculations is a reduction in several cost factors associated with owning and operating a vehicle. These cost factors are:

- Travel time costs;
- Travel time reliability costs;

- Safety costs;
- Vehicle operating costs;
- Emissions costs; and
- Pavement damage costs.

Travel Time Costs

Travel time savings is the monetized benefit of less time spent traveling on the roads. Travel time savings is calculated for three trip types: trucks, business travel and commuter travel. The calculation of travel time savings is based on estimating the opportunity cost to the road-user of an alternative use of time. Opportunity cost is a function of trip purpose, wage rates, and amount of time saved.

Reduction in daily freight transportation cost is valued as the product of freight transportation cost per hour and the daily change in travel time or delay. Transportation cost per hour of $58.57 is utilized for truck travel for this study[47].

For personal auto travel, travel time savings is valued as the product of hourly wages and changes in VHT. Average wage rate for Georgia reported by the Bureau of Labor Statistics (BLS) is employed for this analysis.

For business related auto travels, annual value of travel time savings is equivalent to value of daily travel time saving annualized over 260 working days. Daily value of travel time savings is estimated as the product of traveler's hourly wage and daily travel time savings. Average hourly wage of $49.15 associated with management level positions in Georgia, as reported by the Bureau of Labor Statistics (BLS) is utilized for this analysis.

$$\Delta V_t^{Business} = W_t^{Business} \; x \; \Delta VHT^{Business}{}_t \; x \; 260$$

Where,

ΔVHT_t = Change in daily travel time

$W_t^{Buisness}$ = Average wage rate in Georgia, reported by the Bureau of Labor Statistics

$\Delta V_t^{Business}$ = Annual monetized value of business related travel time savings

For commuters, the value of travel time savings is computed similar to the method used for estimating benefits for business travelers. The only difference

[47] Levinson et al (2005), Value of Time for Commercial Vehicle Operators in Minnesota.

stems from the application of wage rate. For commuters, statewide average hourly wage of $10.23, reported by the Bureau of Labor Statistics is used.

$$\Delta V_t^{Commute} = W_t^{Commute} \; x \; \Delta VHT^{Commute}{}_t \; x \; 260$$

Where,

$\Delta V_t^{Commute}$ = Monetized value of commute related travel time savings

$W_t^{Commute}$ = Average hourly wage in Georgia (from Bureau of Labor Statistics)

$\Delta VHT^{Commute}{}_t$ = Daily change in commute related vehicle-hours traveled

Travel Time Reliability Costs

Travel time reliability is used to represent the amount of variability in travel times in the highway system. The Georgia Regional Transportation Authority's Metro Atlanta Performance Measures report was used to generate travel time reliability savings. Estimates of the non-recurrent incident rate at 30 percent and average buffer time index of 32 percent for the Atlanta metropolitan region; this generated travel time reliability of 9.6 percent of travel time.[48]

Safety Costs

Frequency of accidents and value of accidents are the two factors used to estimate safety costs. Reductions in overall crash rates and crash severity result in savings to industries and households. Savings in the loss or disability of workers, damage to property, and insurance rates are some ways in which crash reductions are expected to lower the overall costs of doing business of the region's firms and increase the disposable income for commuters.

For trucks, changes in safety costs between each build alternative are calculated using the estimated changes in VMT, accident rates and dollar values of accidents. Value of accidents reported by the Georgia Department of Transportation (GDOT) and analysis of crash date reported provided accident rates utilized for this analysis (Table 3.5).

[48] www2.gahighwaysafety.org/shsp/grtamapreport211.pdf

Table 3.5 Value of Accident and Accidents Rates by Severity

		Accident Rate Per Million VMT	
Accident by Severity	**Value ($)**	**Auto**	**Truck**
Fatal	5,800,000	0.012	0.031
Injury	333,500	0.688	0.628
Property Damage	4,400	1.915	1.908

Source: GDOT Crash Data and Project Team analysis.

Estimation of safety costs for personal travel is similar to that used for freight transportation. For personal vehicles, benefit annualization varies by trip purpose: business and commute related personal travels are annualized over 260 working days, while nonwork related is annualized over 365 days.

Vehicle Operating Costs

Changes in vehicle operating costs (VOC) are estimated as a product of fixed cost per mile and changes in vehicle-miles traveled. Change in vehicle operating costs is estimated separately for fuel and non-fuel and summed (Table 3.6).

Due to unpredictable gas prices, many benefit estimation models leave the fuel price constant in forecast years. This analysis follows the same practice and allowed future price to be set at the current average economic price of $4 and projecting growth with the Bureau of Labor Statistics' Consumer Price Index.

Non-fuel VOC comprises the wearing-out of expendable items on the vehicle. A constant wear-out rate is a reasonable assumption given data limitations and the unpredictability of future wear-out rates. In view of this, a per mile cost on non-fuel operating costs for both truck and personal vehicle from Barnes and Langworthy (2003), updated to current dollars are employed for this analysis.

Table 3.6 Vehicle Operating Costs Inputs

Vehicle Type	**Fuel Cost Per Gallon ($)[49]**	**Fuel Consumption Per Mile**	**Non-fuel Cost Per Mile[50]**
Auto	4	19.12[51]	0.15
Truck	4	6.5[52]	0.30

Source: US Environmental Protection Agency, Barnes and Langworthy and project team analysis.

[49] Average market price less Federal and State taxes.

[50] Barnes and Langworthy (2003), updated to current year dollars.

[51] "Emission Facts: Average Annual Emissions and Fuel Consumption Cars and Light Trucks." EPA420-F-00-013, April 2000 (Average data for passenger cars and auto are used for the analysis.)

[52] Barnes and Langworthy (2003). *[Used midpoint of 5.8 to 7.2 mpg for the analysis.]*

Change in the fuel component of vehicle-operating cost for truck travel is expressed below:

$$\Delta VOC_t^{fuel} = FC \; x \; FE^{Truck} \; x \; \Delta VMT^{Truck}{}_t \; x \; 365$$

Where:

$\Delta VOC^{fuel}{}_t$ = Change in annual fuel cost component of vehicle-operating costs

FC = Fuel cost per gallon (less taxes/subsidies)

FE = Fuel consumption per mile

ΔVMT_t = Daily change in vehicle-miles traveled

Annual change in non-fuel costs of freight transportation is estimated as:

$$\Delta VOC_t^{Non-fuel} = NFC \; x \; \Delta VMT_t^{Truck} \; x \; 365$$

Where *NFC* = non-fuel cost per mile for trucks

Thus, total change in vehicle-operating costs for freight transportation can be expressed as:

$$\Delta VOC_t^{TR} = \Delta VOC_t^{Fuel} + \Delta VOC_t^{Non-fuel}$$

For person auto operating costs, assuming 260 working days a year, fuel and non-fuel vehicle-operating costs for yearly-passenger travel (auto) can be expressed as follows:

$$\Delta VOC_t^{fuel} = FC \; x \; FE \; x \; \Delta VMT^{Auto}{}_t \; x \; 260$$

$$\Delta VOC_t^{Non-fuel} = NFC \; x \; \Delta VMT_t^{Auto} \; x \; 260$$

Hence, annual changes in vehicle-operating costs were expressed as follows:

$$\Delta VOC_t^{Auto} = \Delta VOC_t^{fuel} + \Delta VOC_t^{Non-fuel}$$

Emissions Costs

Air pollutant emissions include carbon monoxide (CO), nitrogen oxides (NOx), volatile organic compounds (VOC), particulate matters (PM), and oxides of Sulfur (SOx). These emissions react with other pollutants in the atmosphere, especially NOx and VOC, to form Ozone. VOC, SOx, and NOx, also react to form particulates. These pollutants cause damage to human health and can damage property as well. Some of the mobile source pollutants of concern are diesel particulate matter (PM) and volatile organic compounds (VOCs).

For truck emission savings, change in emissions costs is estimated as the product of emission cost per mile and change in vehicle-miles traveled. Emission cost per mile is the sum of per-miles costs of individual pollutants. Per-mile cost of individual pollutants can is estimated as cost per emission type multiplied by emission per mile (Table 3.7).

Table 3.7 Emission Cost Inputs

Emission Type	Cost By Emission Type ($/ton)[53]	Grams of Emissions Per Mile[54]	
		Auto	Truck
NOx	3	0.911	0.0036
Sox	16,000	0.0077	0.022
PM	16,800	0.0179	0.41
CO_2	21.4[55]	411.1	1345.4
VOC	1,700	0.23	0.23

Source: Tiger III from U.S. DOT, MOVES Model Inputs, Executive Order 12866.

The emission costs are computed for freight transportation and total personal travel separately and then summed together. The equations that govern these calculations are:

$$\Delta EC_t = \Delta VMT_t^{TR} \; x \sum_{i=1}^{n} (EC_i \; x \; EP_i) \; x \; 365$$

Where

ΔEC_t = Annual change in emission cost per mile

ΔVMT_t^{TR} = Change in vehicle-miles between build and no-build scenarios

EC = Emission cost of emission type

EP = Emission per mile

For personal auto travel, the emission costs is

$$\Delta EC_t = \Delta VMT_t^{Auto} \; x \sum_{i=1}^{n} (EC_i \; x \; EP_i) \; x \; D$$

Where,

ΔVMT_t^{TR} = Change in vehicle-miles between build and no-build scenarios

D = number of working days: commute and business trips (260 days) and nonwork trips (365 days)

Pavement Damage Costs

Pavement damage is proportional to the weight of wheel axles that utilize the roadway. Therefore, trucks cause much more pavement damage per mile than autos. The Federal Highway Administration's Highway Cost Allocation Study

[53] Costs of pollutants from US DOT Tiger III Cost Standards. www.dot.gov/tiger/application-resources.html#BCAG

[54] Source of emission factors from MOVES Model standard factors for the US, retained by Cambridge Systematics.

[55] Cost of CO_2 is from social cost of carbon for regulatory impact analysis under Executive Order 12866: www.epa.gov/OMS/climate/regulations/scc-tsd.pdf

estimates a pavement maintenance price of $0.01 per automobile VMT, and $0.031 per 40,000 pound truck VMT.[56]

Construction and Operations & Maintenance Costs

The cost to develop a roadway includes capital and operation and maintenance costs. The relevant costs for this Plan are construction costs and incremental operation and maintenance costs. Project baselines assume commencing operation in 2020, with a 30-year life span.

Table 3.8 provides development costs for all of the capacity enhancement highway projects.

Table 3.8 Construction and Operation and Maintenance Cost by Projects
Millions of Dollars

Type	Project	Capital Cost	Annual OM Cost	Total OM Cost	Total Project Cost
Long Haul	I-75 Atlanta-Chattanooga	$ 2,700	$ 19	$ 570	$ 3,270
Long Haul	I-75 Atlanta-Macon	$ 1,086	$ 17	$ 510	$ 1,596
Long Haul	I-85 Atlanta-SC Line	$ 1,157	$ 15	$ 450	$ 1,607
Long Haul	I-85 Atlanta-AL Line	$ 1,177	$ 13	$ 390	$ 1,567
Long Haul	I-75 Macon-FL Line	$ 1,000	$ 28	$ 840	$ 1,840
Long Haul	I-16 Macon-Savannah	$ 1,900	$ 54	$ 1,620	$ 3,520
Long Haul	I-20 Atlanta-AL Line	$ 800	$ 10	$ 300	$ 1,100
Long Haul	I-20 Atlanta-SC Line	$ 2,945	$ 23	$ 690	$ 3,635
Long Haul	I-95 (entire stretch)	$ 1,620	$ 18	$ 540	$ 2,160
Long Haul	All Interstate "Long Haul"	$ 14,385	$ 211	$ 6,330	$ 20,715
Smaller Urban and Rural Freight	US 84	$ 55	$ 2	$ 60	$ 115
Smaller Urban and Rural Freight	State Route 133	$ 278	$ 10	$ 300	$ 578
Smaller Urban and Rural Freight	US 280	$ 996	$ 16	$ 480	$ 1,476
Smaller Urban and Rural Freight	US 441 from I-16 to I-85	$ 189	$ 4	$ 120	$ 309
Smaller Urban and Rural Frt.	Fall Line Freeway	(under construction)			

[56] www.fhwa.dot.gov/policy/otps/costallocation.htm.

Type	Project	Capital Cost	Annual OM Cost	Total OM Cost	Total Project Cost
"Bypass"	Western "Bypass"	$ 3,135	$ 35	$ 1,050	$ 4,185
"Bypass"	Macon-to-LaGrange improvement plus remainder of the US 27 four-laning north of LaGrange	$ 483	$ 12	$ 360	$ 843
"Bypass"	I-75 Bypass Around Chattanooga	$ 800	$ 13	$ 390	$ 1,190
"Bypass"	Northern Bypass	$ 2,663	$ 13	$ 390	$ 3,053

Source: GDOT TPRO, GDOT Costing Tool, GDOT GRIP Program Factsheets.

Discount Rate

Discount rate measures the cost of a dollar in the future relative to a dollar available in the current time. The opportunity cost is valued at 2.9 percent for this Plan. The annual benefit and costs associated with the projects are discounted at 2.9 percent to present dollars.

Benefit-Costs Analysis

Since VHT and VMT values are available for the years 2020 and 2050, benefits are determined for these two years separately, the benefits for intermediate years are then determined using linear interpolation. The benefits for the 30 years are then accrued by determining the net present value (NPV) for year 2020. The formula to generate this value is provided in the following information.

$$NPV = P\left(\frac{1-(1+r)^{-(n-1)}}{r}\right)$$

Where P = benefit of year 2020, r = discount rate (2.9%), and n = number of years between 2020 and 2050 (30 years)

The NPV generated will be in 2020 dollar terms, and therefore need to be brought back to 2011, or real present value terms, using this formula:

$$NPV_{2011} = NPV_{2020}\left(\frac{1}{(1+r)^{n-1}}\right)$$

Where r = discount rate (2.9%) and n = # of years to 2020

A ratio of the present value of benefits to the present value of costs is the benefit-cost ratio (BCR). The BCR can be calculated by dividing the NPV with total project cost for each project. Table 3.9 shows the results of the BCA calculation for the medium truck scenario and Table 3.10 shows the results for the high truck scenario.

Note: B/C ratios for alternatives are negative due to the increased vehicle operating costs outweighing the congestion and safety benefits for the added roadway segment.

Table 3.9 B/C Analysis for Capacity Expansion Projects
Medium-Growth Scenario

Type	Project	Benefit (2011) – Millions	Capital Cost – Millions	Total OM Cost – Millions	B/C
Long Haul	I-85 Atlanta-SC Line	$ 2,913	$ 1,157	$ 457	2.12
Long Haul	I-20 Atlanta-AL Line	$ 1,651	$ 800	$ 287	1.71
Long Haul	I-85 Atlanta-AL Line	$ 2,060	$ 1,177	$ 382	1.43
Long Haul	I-75 Atlanta-Macon	$ 1,977	$ 1,086	$ 508	1.35
Long Haul	I-20 Atlanta-SC Line	$ 3,305	$ 2,945	$ 685	0.89
Long Haul	I-95 (entire stretch)	$ 1,779	$ 1,620	$ 536	0.77
Long Haul	I-75 Macon-FL Line	$ 1,174	$ 1,000	$ 833	0.34
Long Haul	I-75 Atlanta-Chattanooga	$ 1,409	$ 2,700	$ 555	0.32
Long Haul	I-16 Macon-Savannah	$ 978	$ 1,900	$ 1,619	-0.33
Smaller Urban & Rural Freight	US 84	$ 657	$ 55	$ 66	10.75
Smaller Urban & Rural Freight	State Route 133	$ 1,648	$ 278	$ 289	4.89
Smaller Urban & Rural Freight	US 441 from I-16 to I-85	$ 537	$ 189	$ 134	2.13
Smaller Urban & Rural Freight	US 280	$ 19	$ 996	$ 489	-0.47
Smaller Urban & Rural Freight	Fall Line Freeway		(under construction)		
Bypass	Macon-to-LaGrange improvement plus remainder of US 27 four-laning	$ 4,459	$ 483	$ 361	8.48
Bypass	I-75 Bypass Around Chattanooga	$ 3,506	$ 800	$ 394	3.89
Bypass	Northern Bypass	$ 2,821	$ 2,663	$ 385	0.91
Bypass	Western Bypass	$ 2,897	$ 3,135	$ 1,057	0.59

Table 3.10 B/C Analysis for Capacity Expansion Projects
High Growth Scenario

Type	Project	Benefit (2011) – Millions	Capital Cost – Millions	Total OM Cost – Millions	B/C
Long Haul	I-85 Atlanta-SC Line	$12,011	$1,157	$457	9.99
Long Haul	I-20 Atlanta-AL Line	$5,166	$800	$287	6.1
Long Haul	I-85 Atlanta-AL Line	$6,599	$1,177	$382	5.28
Long Haul	I-75 Atlanta-Macon	$1,998	$1,086	$508	1.37
Long Haul	I-20 Atlanta-SC Line	$6,915	$2,945	$685	2.12
Long Haul	I-95 (entire stretch)	$16,955	$1,620	$536	10.14
Long Haul	I-75 Macon-FL Line	$3,690	$1,000	$833	2.86
Long Haul	I-75 Atlanta-Chattanooga	$3,234	$2,700	$555	0.99
Long Haul	I-16 Macon-Savannah	$4,569	$1,900	$1,619	1.55
Smaller Urban & Rural Freight	US 84	($726)	$55	$66	-14.4
Smaller Urban & Rural Freight	State Route 133	($248)	$278	$289	-1.93
Smaller Urban & Rural Freight	US 441 from I-16 to I-85	($742)	$189	$134	-4.63
Smaller Urban & Rural Freight	US 280	$98	$996	$489	-0.39
Smaller Urban & Rural Freight	Fall Line Freeway	(under construction)			
Bypass	Macon-to-LaGrange improvement plus remainder of US 27 four-laning north of LaGrange	$12,879	$483	$361	25.92
Bypass	I-75 Bypass Around Chattanooga	$8,863	$800	$394	10.59
Bypass	Northern Bypass	$6,288	$2,663	$385	2.22
Bypass	Western Bypass	$10,283	$3,135	$1,057	2.94

3.4 HIGHWAY PROJECTS ANALYZED -- USING OFF-MODEL ANALYSIS

This section discusses the projects that could not be analyzed using the statewide travel demand model. A range of off-model techniques was used to estimate the traffic impacts of these projects. Benefits were then calculated for these alternatives using the same methodology as for the projects that were modeled. Highway projects that were analyzed using off-model techniques were interstate interchange improvement projects, a truck-friendly lane alternative on State Route 6 in Atlanta, and safety-related projects.

Interchange Improvements

Select interchange improvements were analyzed using off-model techniques that expanded upon existing data and previous interstate interchange analysis. For each interstate interchange analyzed, current congestion levels were estimated based on current truck and auto volumes combined with vehicle speed data provided in the ATRI Freight Performance Measurement database. The amount of delay reduction at each interchange was estimated based on a sample of previous simulation runs conducted at similar interstate interchanges.

The changes in delay under build and no build conditions were used to generate benefits in a similar fashion as for the modeled projects. The benefits were then combined with estimated costs to determine B/C ratios for each project.

Table 3.11 B/C Analysis Results of Select Interchange Improvement Projects

	2020 Change		2050 Change					
Project	Auto VHT	Truck VHT	Auto VHT	Truck VHT	Benefit (2011) – Millions	Capital Cost – Millions	Total OM Cost – Millions	B/C
Atlanta, GA: I-285 at I-85 (North metro)	-11,988	-2,396	-29,098	-5,815	$1,955	$200	$120	9.18
Atlanta, GA: I-75 at I-285 (North metro)	-8,016	-1,774	-19,457	-4,306	$1,411	$200	$120	6.46
Atlanta, GA: I-20 at I-285 (West metro)	-4,015	-1,331	-9,746	-3,230	$ 974	$382	$229	1.95
Atlanta, GA: I-20 at I-285 (East metro)	-3,890	-840	-9,441	-2,040	$672	$109	$65	5.57
Macon, GA: I-16 at I-75		*See*	*footnote*					7.58[57]
Savannah, GA: I-95 at I-16	-154	-53	-373	-129	$ 39	$73	$44	-0.07
Atlanta, GA: I-285 at I-85	-1,106	-364	-2,685	-884	$ 267	$240	$144	0.51

[57] Source: GDOT TIGER 2011 funding application submitted to US DOT

Project	2020 Change		2050 Change		Benefit (2011) – Millions	Capital Cost – Millions	Total OM Cost – Millions	B/C
	Auto VHT	Truck VHT	Auto VHT	Truck VHT				
(South metro)								
Atlanta, GA: I-75 at I-285 (South metro)	-1,756	-493	-4,262	-1,196	$ 372	$240	$144	0.95
Savannah, GA: I-95 at State Route 21	-128	-47	-310	-113	$ 34	$ 73	$ 44	-0.14

State Route 6 "Truck-Friendly" Lanes

Roadway access to and from intermodal rail yards is critical to ensure reliability of goods movements for the supply chain. In the Atlanta region, most intermodal yards are closely located to interstates, and therefore interstate improvement solutions can help address access issues to/from these intermodal yards. One exception is Norfolk Sothern's Whitaker Yard intermodal terminal near Austell, which connects to I-20 using State Route 6. Because this intermodal terminal receives up to 1,000 trucks per day in peak season[58], this road experiences high truck volumes mixed with significant volumes of auto traffic from commuters to/from the suburban city of Austell. This corridor has already been officially designated by US DOT as an Intermodal Connector.

A freight-focused project has been identified to improve traffic operations on State Route 6. More specifically, the project is known as the State Route 6 "Truck Friendly" truck lanes which propose these elements to support truck movements[59]:

- Widen existing shoulders to accommodate a "Truck Friendly" Lane;
- Maintain existing bridge widths;
- Improvements to key intersections ;
- Reduce truck stops and eliminate dilemma zones[60];
- ITS Integration with Intermodal Facility (travel times);
- Increase overhead signage along the corridor; and
- Identify rollover crashes exiting facility onto State Route 6/US 278.

These listed benefits do not easily lend themselves to quantification using a benefit-cost ratio. However, based on the current and future unacceptable level of service for traffic conditions on State Route 6, and the presence of Georgia's

[58] http://comdev.cobbcountyga.gov/documents/SR6_Final-Rpt_1-8-08.pdf

[59] www.atlantaregional.com/File%20Library/Transportation/Freight/tp_freight_sr6trucklanes_041411.pdf

[60] http://safety.fhwa.dot.gov/intersection/resources/techsum/fhwasa09008

busiest intermodal yard[61] immediately adjacent to the route (which is planned to expand as part of the Crescent Corridor[62]), the improvement of State Route 6 is a significant recommended freight improvement project.

Highway Safety Improvements

Across the median crashes are generally high in severity and can easily occur on long stretches of highways where there are minimal physical barriers between the two directions of travel. In such cases, installation of median barriers may be one safety improvement to consider in support of crash severity reduction.

To quantify the benefit of improving median barriers, the methodology outlined in *Median Treatment Study on Washington State Highways* is used.[63] The benefit of the median barrier will be the reduced societal costs of crashes. Safety values from GDOT are used to quantify the cost of crashes by severity category.

The savings in cost is calculated by assuming that the severity of post-installation crashes will be reduced from fatal to injury crashes. While WSDOT study breaks down cost by different injury categories, for our purposes only one injury and fatality cost is used; savings from several injury to light injury costs are not accounted for and estimate of safety savings is likely a conservative one.

The next step is to determine the number of crashes that run across the roadway. For this, the GDOT crash database years from 2005 to 2008 are used, and crashes under first harmful event of "colliding with motor vehicle in motion in other roadway" are counted. It is found that there are 1,334 property-damage-only crashes, 618 injury crashes, and 27 fatal crashes. Of the 618 injury crashes, there are 35 severe injury crashes and 583 injury crashes. Safety savings were calculated from the 27 fatal crashes; the annual benefit resulting from the reduced crash costs is $35,898,875.

The average cost of installing and maintaining each of the three median barrier types is shown in Table 3.12.

Table 3.12 Costs for Median Barrier Improvements (source: GDOT)

Type of Barrier	Construction Costs (Per Mile)	Annual Maintenance Costs ($/per Mile)
Cable Barrier	73,920	1,880
Guardrail	79,200	270
Concrete Barrier	1,056,000	43

[61] See Table 3.1 of Georgia Statewide Freight & Logistics Plan's *Rail Modal Profile* document at: www.dot.ga.gov/InvestSmart/Freight/Documents/Plan/RailModal-Task3.pdf

[62] www.nscorp.com/content/nscorp/en/shipping-options/corridors/crescent-corridor.html

[63] www.wsdot.wa.gov/research/reports/fullreports/516.1.pdf

The next step is to identify the highway sections where installing the barriers will have the most significant impact. GDOT's Roadway Classification file is used to act as a general guide to determine the mileage of highways. The criteria used (adopted from *Median Treatment Study on Washington State Highways*) to determine sections of highway that are recommended to install barriers:

- AADT > 5,000 vehicles
- Median width < 50 ft.
- Speed limit > 45 mph
- Roadways with no median or with only curb median

This generated 2,740 miles of roadway in Georgia. (This value is a general estimation because RC file has missing data and criteria used are approximate; field verification needed to determine sections of highways eligible for barrier installation, in event that a more detailed B/C analysis is performed --using formula from WSDOT study):

$$BC\ Ratio = \frac{(Benefits * 13.59)[present\ worth\ factor]}{cost_I + cost_M\ * 13.59\ [present\ worth\ factor]}$$

Table 3.13 B/C Estimation for Median Barrier Installation (source: GDOT)

	Average Construction Costs ($/per mile)	Annual Maintenance Costs ($/per mile)	Construction Cost ($ millions)	Maintenance Cost ($ millions)	B/C
Cable Barrier	73,920	2,371	202	6.5	1.72
Guardrail	79,200	340	217	0.9	2.18
Concrete Barrier	1,056,000	54	2,893	0.1	0.17

3.5 AIR CARGO IMPROVEMENTS

Add Warehouse Capacity at Hartsfield-Jackson Atlanta Airport

To accommodate future air cargo growth, the Atlanta airport has identified the need for more warehouse space allowing additional short-term storage of goods between flight arrivals/departures and truck arrivals/departures. As air cargo volumes continue to increase, more of these types of facilities will be needed. The cost was estimated at $10-$15 million based on discussions with airport staff. The latest update to the airport master plan discussed in February 2017 identifies additional air cargo capacity as a short-term priority, with 1 million square feet being added and work completing in the year 2021.[64]

Extend Southwest Georgia (Albany) Airport Runway

Recommended in the Southwest Georgia Airport Masterplan, the estimated cost for the runway extension is almost $5 million. Benefits cannot be easily quantified until changes in air cargo volumes materialize, however, extending the runway can improve current operations and serve as a business retention/recruitment vehicle for southwest Georgia. As of 2016, the airport is looking at an extension of 500 feet.[65]

[64] https://aircargoworld.com/allposts/atlanta-airport-adding-1-million-square-feet-of-warehouse-space

[65] http://democratherald.com/business/albany-airport-looks-at-jet-fuel-to-drive-expansion/article_ecdbd4c6-425a-5740-9d25-eb08a85da62d.html

4.0 Freight "Packages"

The previous chapter described the analysis of several projects using the statewide model and off-model techniques. This chapter identifies which of those projects will become priority freight projects based on this analysis along with feedback from our stakeholder group and technical analysis conducted for the modal profiles.

After identifying priority freight projects, they are grouped into packages to develop project sets that are complementary and will benefit freight flow patterns.

4.1 IDENTIFYING PRIORITY FREIGHT PROJECTS

Table 4.1 provides a list of the alternatives analyzed in this Plan along with whether or not the project became a priority freight project and the rationale for its designation. Projects that are marked as priority are then grouped into modal and geographic packages in the next section. These packages were analyzed for benefit/cost, but to give light of their priority, the summary of qualitative considerations were referenced in the comments column in Table 4.1.

Benefit/cost is only one factor to consider regarding the importance of a project and needs to be taken into context; according to US DOT:

> *"Cost-benefit analysis is a framework for considering a range of benefits and costs in monetary terms. A variety of analytical tools are available to assist in quantifying and monetizing the various benefits and impacts of transportation and land development policies. Since some impacts are difficult to monetize, the results of cost-benefit analysis are rarely the sole factor in determining whether a project or policy is worthwhile."*[66]

Table 4.1 Identification of Select Priority Freight Projects

Project Category	Location/Project	B/C Ratio (or other benefit)	Immediate Priority?	Comments
Port	Savannah Harbor Expansion Project	7.3[67]	Y	High B/C and return-on-investment. High priority from stakeholder input
Port	Savannah: Develop the Jasper Ocean Terminal	$9 billion in tax receipts[68]	N	High return-on-investment; needed in long-term. Bi-state development/coordination.

[66] www.fhwa.dot.gov/planning/processes/tools/toolbox/methodologies/costbenefit_overview.cfm

[67] www.joc.com/port-news/us-ports/port-savannah/savannah-deepening-cost-timeline-and-bco-benefits-expand_20170407.html

[68] http://dc.statelibrary.sc.gov/handle/10827/9691

Project Category	Location/Project	B/C Ratio (or other benefit)	Immediate Priority?	Comments
Rail	Statewide: Systemwide rail improvements	3.30	Y	High Freight B/C ratio. Need to accommodate future rail growth
Highway – Long Haul	I-85 Atlanta-to-S.C. widening	1.81	Y	High Freight B/C ratio. High truck volumes.
Highway – Long Haul	I-20 Atlanta-to-AL. widening	1.52	Y	High Freight B/C ratio. High truck volumes. Matches Alabama DOT's I-20 widening project across the state line.[69]
Highway – Long Haul	I-85 Atlanta-to-AL. widening	1.32	Y	High Freight B/C ratio. High truck volumes
Highway – Long Haul	I-75 Atlanta-to-Macon widening	1.24	Y	High Freight B/C ratio. High truck volumes
Highway – Long Haul	I-20 Atlanta-to-S.C. widening	0.91	N	Modest B/C ratio. Existing capacity sufficient over the long-term
Highway – Long Haul	I-95 (entire state) widening	0.83	N	Modest B/C ratio. Existing capacity sufficient over the long-term
Highway – Long Haul	I-75 Macon-to-FL. widening	0.64	N	Modest B/C ratio. Existing capacity sufficient over the long-term
Highway – Long Haul	I-75 Atlanta-to-TN. widening	0.43	N	Low B/C ratio. Existing capacity sufficient over the long-term.
Highway – Long Haul	I-16 Macon-to-Savannah widening	0.28	N	Low B/C ratio. Existing capacity sufficient over the long-term.
Highway- Smaller Urban and Rural Freight	US 84 widening	0.63	Y	Modest B/C. Important truck route: Connectivity to/from Sav. Port to I-75. Significant east-west truck volumes. GRIP.
Highway- Smaller Urban and Rural Freight	State Route 133 widening	0.63	Y	Modest B/C. Important truck route: Improved connectivity for Marine Corps Logistics Base & manufacturers in Albany, plus agricultural products of S.W. Georgia, to I-75 and points south. GRIP route.
Highway - Smaller Urban and Rural Freight	Central Georgia: US 441 widening	0.62	Y	Modest B/C. Important truck route: Regional Connectivity & alternative north-south route around metro ATL. GRIP route.
Highway - Smaller Urban and Rural Freight	Central Georgia: US 280 widening	0.01	N	Low B/C ratio. GRIP route.
Highway - Smaller Urban and Rural Freight	Central Georgia: 'Fall Line Freeway'	-	Y	GRIP route. (*Under construction*)
Highway – Bypass	Macon-to-LaGrange improvement plus four-laning remainder of US 27 north of LaGrange, GA	5.29	N	High B/C ratio (note: *benefits accrue per implementation timeframe in Table 6.2*). Alternative north-south route around west metro Atlanta.
Highway – Bypass	I-75 "Bypass" north Georgia & metro Chattanooga, TN.	2.94	N	High B/C ratio. Proposal initiated and led by Tennessee MPO & transportation plans.
Highway – Bypass	North Metro Atlanta Bypass: new alignment/roadway	0.93	N	Modest Freight B/C ratio; autos received most benefits.

[69] www.annistonstar.com/news/article_3b3a9b86-fe57-11e3-a06e-0019bb2963f4.html

Project Category	Location/Project	B/C Ratio (or other benefit)	Immediate Priority?	Comments
Highway – Bypass	West Metro Atlanta Bypass: new alignment/roadway	0.69	N	Lower B/C ratio than [Macon-to-LaGrange improvement plus completion of US 27].
Highway – Interchange	Atlanta, GA: I-285 at I-85 (North) reconstruction	6.11	Y	High B/C ratio. Key truck interchange and nationally-identified (ATRI/FHWA) bottleneck.
Highway – Interchange	Atlanta, GA: I-285 at I-75 (North) reconstruction	4.41	Y	High B/C ratio. Key truck interchange and nationally-identified (ATRI/FHWA) bottleneck.
Highway – Interchange	Atlanta, GA: I-285 at I-20 (West) reconstruction	1.59	Y	High B/C ratio. Key truck interchange and nationally-identified (ATRI/FHWA) bottleneck.
Highway – Interchange	Atlanta, GA: I-285 at I-20 (East) reconstruction	3.85	Y	High B/C ratio. Key truck interchange and nationally-identified (ATRI/FHWA) bottleneck.
Highway – Interchange	Atlanta, GA: I-285 at I-85 (South) reconstruction	0.04	N	Low Freight B/C ratio. Not identified as a major bottleneck at state or national level.
Highway – Interchange	Atlanta, GA: I-285 at I-75 (South) reconstruction	0.33	N	Relatively Low Freight B/C ratio for a reconstruction, but operations project feasible.
Highway – Interchange	Atlanta, GA: I-285 at State Route 400 interchange reconstruction	n/a	Y	Nationally-identified (FHWA) bottleneck. Georgia Freight & Logistics Plan's *Task 3 Truck Modal Profile* (Appx. B) Truck GPS data revealed significant truck delays at this location ["through" truck traffic to/from State Route 400 not allowed 'inside' I-285 per Georgia Code 40-6-51[70]: they must use interchange to go from one route to other.]
Highway – Interchange	Macon, GA: I-75 at I-16 interchange reconstruction	7.58[71]	Y	Stakeholder feedback: important interchange to state and Macon region. Nationally-identified (ATRI/FHWA) bottleneck.
Highway – Interchange	Savannah, GA: I-95 at I-16 interchange reconstruction	11.0[72]	Y	Nationally-identified (ATRI/FHWA) bottleneck. Important freight connector for Savannah Port; included in Savannah MPO's LRTP and TIP, as well as the GDOT Office of Planning's "Chatham County Interstate Needs Analysis study".
Highway – Interchange	Savannah, GA: I-95 at State Route 21 interchange reconstruction	0.29	Y	Recommended in Savannah MPO's LRTP and GDOT "Chatham County Interstate Needs Analysis study". Important freight interstate interchange for Port of Savannah.
Highway – Operational	Atlanta: GA: State Route 6 (State Route 6) "Truck Friendly" Lanes	tbd	Y	In Atlanta MPO's LRTP TIP, and State Route 6 Corridor Study[73]. Vital "last-mile" connection from I-20 to NS rail intermodal terminal. Designated intermodal connector

[70] http://dps.georgia.gov/sites/dps.georgia.gov/files/related_files/site_page/07%20-%20Trucks%20Using%20Multi-Lane%20Highways.pdf

[71] GDOT's funding application submitted to US DOT for TIGER 2011 funds

[72] GDOT's funding application submitted to US DOT for INFRA 2018 funds

[73] http://comdev.cobbcountyga.gov/documents/SR6_Final-Rpt_1-8-08.pdf

Project Category	Location/Project	B/C Ratio (or other benefit)	Immediate Priority?	Comments
				("truck/rail facility GA55R and GA56R").
Highway – Operational	Savannah, GA: Grange Road improvement	1.8[74]	Y	High B/C ratio. Improved last-mile connection between 100% state-funded Jimmy Deloach Parkway Extension (now under construction providing direct truck access to/from port & I-95) and port's new "Mason Gate"[75] truck access point on Grange Road. Grange Road also US DOT-designated Intermodal Connector ("port terminal, Facility ID no. GA33P"). Project details in F&L Plan's Task 3 Marine Profile.
Highway – Operational	Savannah, GA: Brampton Road	tbd	Y	New last-mile route directly connecting port's truck gate #8 (on Brampton) to I-516. Brampton Road is a US DOT-designated Intermodal Connector ("port terminal, Facility ID no. GA24P").
Highway – Operational	Various: Improve Median Barriers	tbd	tbd	Low cost safety improvement alternative
Highway – Operational	Metro Atlanta: Expand the TRIP Program[76]	11.0[77]	Y	Reduces incident/crash clearance times, focused on those involving large trucks. *(See program details later in this document)*
Air Cargo	Hartsfield-Jackson Atlanta airport: Additional warehouse facilities	Additional cargo storage	Y	Stakeholders said priority air cargo for Atlanta airport. New building C of South Cargo Complex now under construction (est. finish Nov. 2015) will complete South Cargo Facility on South Loop Road and be same size, appearance and function as three existing facilities; have 128,566 square feet; include landside improvements of truck staging; and relocate airfield access gate.[78]
Air Cargo	Albany, GA airport: Extend runway	Add'l. air cargo aircraft capabilities	Y	Stakeholder feedback indicates a priority air cargo project. Airport has UPS sort facility.

4.2 GROUPING HIGHWAY PROJECTS INTO PACKAGES

Highway projects were grouped into packages based on geographic location along priority highway corridors in the state. The most significant freight flows in

[74] GDOT's funding application submitted to US DOT for TIGER 2014 funds

[75] www.gaports.com/Departments/Engineering/Projects/tabid/563/bidid/136/Default.aspx

[76] www.timetaskforce.com/time-initiatives/trip

[77] http://ops.fhwa.dot.gov/eto_tim_pse/preparedness/tim/knowledgebase/resources/doc_details.cfm?document_id=38&from=search

[78] www.atlanta-airport.com/Airport/Construction

the state based on truck tonnage and key freight facilities can be ranked into the following seven corridor categories:

1. Savannah-to-Atlanta Corridor
2. Atlanta-to-Tennessee Corridor
3. Atlanta-to-South Carolina Corridor
4. Macon-to-Florida Corridor
5. Atlanta-to-Alabama Corridor
6. Through Freight Corridors
7. Smaller Urban and Rural Freight Corridors

Figure 4.1 below shows the first five of these corridors. A map of the smaller urban and rural freight corridors is shown in Figure 4.2 below; it shows the recommended projects in each of the corridors.

Table 4.2 Recommended Projects Included in Each of the Highway Corridor "Packages"

Corridor	Recommended Projects Included
Savannah-to-Atlanta	I-75 capacity from Atlanta to Macon; I-75@I-16 interchange in Macon, Savannah interchanges I-95@I-16 and I-95@ State Route 21; and "last mile" Port of Savannah connector projects -- Grange Road and Brampton Road. *(Note: I-16 widening from I-95 to I-516 also recommended; analysis of its freight importance completed in Savannah MPO Freight Plan,ca.2015)*
Atlanta-to-Chattanooga	Metro Atlanta interchange: I-75@I-285 North
Atlanta-to-South Carolina	I-85 capacity from Atlanta metro to S.C., and metro Atlanta interchanges of I-285@I-85 North and I-285@I-20 East
Macon-to-Florida	No additional capacity-adding projects recommended
Atlanta-Alabama	I-20 capacity between Atlanta metro and Alabama; I-85 capacity between metro Atlanta & Alabama; and metro Atlanta interchange I-285@I-20 West
'Through' Freight Corridors	Chattanooga "Bypass", Macon-to-LaGrange improvement plus completion of US 27 four-laning north of LaGrange
Smaller Urban and Rural Freight Corridors	Completion of four-laning US 84, US 441, and State Route 133 GRIP routes. Consider safety improvements off the interstate system

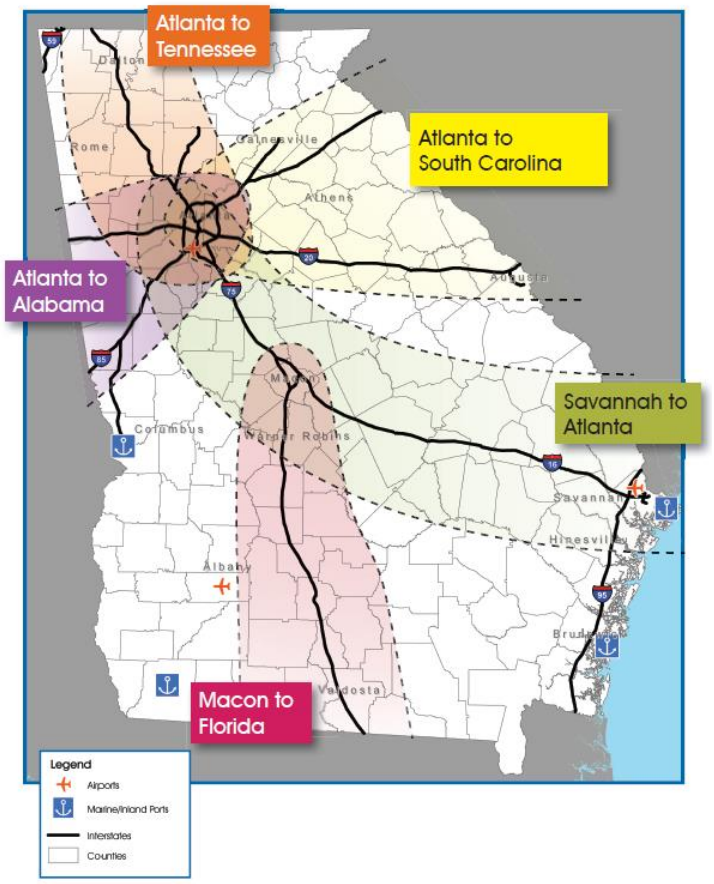


Figure 4.1 Significant Highway Corridors

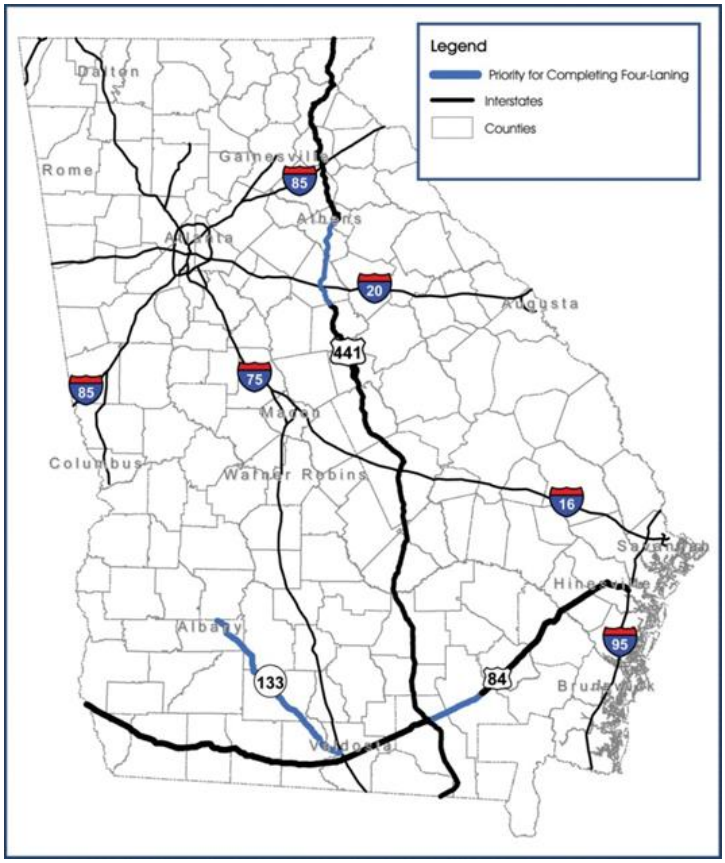


Figure 4.2 Smaller Urban and Rural Freight Corridors

5.0 Economic Impact Analysis

5.1 Overview of Methodology

The tool used to model the economic impact of highway improvement projects and to calculate the return on investment is the REMI Transight Macroeconomic Simulation Model. The fundamental structure of the REMI model incorporates detailed inter-industry transactions of intermediate goods in the production process, and interrelated final demand feedbacks that captures the dynamic relationship between income and spending. The REMI model is appropriate for analyzing the regional economic impacts of the investment packages because the model accounts for how relationships between prices, costs of doing business, and demographic variables interact with other important economic variables such as employment, gross regional product, and personal income to influence economic performance.

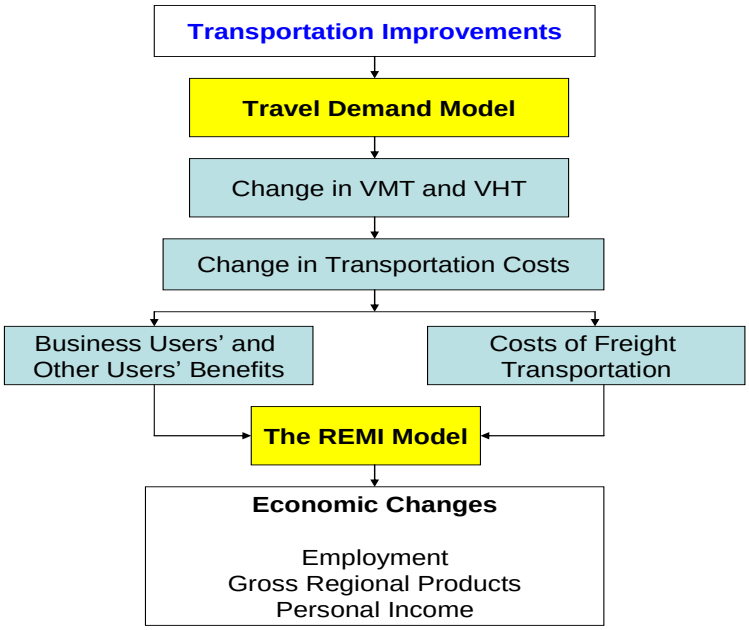
To estimate the economic impact of the investments, travel efficiency gains are mapped to households and businesses, depending on the beneficiary. Travel efficiency gains arising from personal travels (commute and non-work related trips) are disaggregated into explicit (out-of-pocket) and implicit gains (savings). Explicit gains associated with safety, vehicle operating costs and travel time are mapped to households. In accordance with U.S. Department of Transportation guidelines, only half of the travel time gains are mapped to households. These gains serve as input into REMI as changes in consumer spending in order to estimate total impact due to households.

Similarly, travel efficiency gains arising from business related trips (trucks and business related auto trips) are mapped to industry. The gains or savings mapped to industry are further distributed across various industries in Georgia based on each industry's dependency on transportation usage. Each industry's dependency on transportation usage is equivalent to its transport cost relative to output, and it is estimated as the product of transportation cost per dollar of output and the industry's output. For this study, transportation cost per dollar of output provided by the Transportation Satellite Accounts (TSA) in conjunction with output provided by REMI are utilized to estimate the relative cost of transportation across industry. Industry related savings serve as input into REMI as changes in business cost. The resulting total impacts are expressed as changes in employment, gross state product (GSP), and personal income.

Economic impact is measured as changes in economic activity in a given region, arising from a project or a change in policy. It can be expressed in various economic variables including sales (output), employment, and personal income (earnings). Reduction in transportation cost and improved connectivity to domestic and international markets arising from roadway capacity expansion

increases output of firms (especially export oriented manufacturing industries) and increases demand for key factors of production including labor, materials, equipment, and supporting downstream activities which are supplied by other local and non-local firms. This chain of activities leads to local economic contraction through increased employment, personal income, and business profits. Generally, total assessment of economic impacts comprises estimation of three impact types, namely direct, indirect and induced. The relationship between the Travel demand model, REMI and the various input and output variables are shown in Figure 5.1.

Figure 5.1 Analytical Framework for Benefit-Cost and Total Economic Impact Analyses for Proposed Corridor Investments



Direct Impacts

Direct impacts associated with roadway capacity improvement are the direct effects of changes in output (sales) or production cost, and spending in key economic industries including wholesale and retail trades, manufacturing, and transportation and logistics. For instance, the direct effect of improved roadway to a manufacturing firm is the reduction in crew and inventory costs.

To estimate the economic impact of the proposed study, the user benefits are disaggregated into explicit and implicit benefits. The explicit benefits are mapped to the beneficiaries. This implies that explicit benefits accruing to commute and non-work related personal travels are mapped to households, while those associated with truck and business related personal travels (changes vehicle operating costs, safety cost, and travel time) are mapped to industry.

Explicit cost mapped to industry is further distributed across industry based on each industry's transportation usage, determined by transport cost relative to output. This is estimated as the product of transportation cost per dollar of output and the industry's output. For this study, transportation cost per dollar of output provided by the Transportation Satellite Accounts (TSA) in conjunction with 2009 output for Georgia provided by REMI are utilized to estimate the relative cost of transportation across industry. The equation below provides the basis for distributing the explicit benefits across industry. Each industry's share of benefit represents change in cost of doing business (or production cost).

$$\Delta V_i = \Delta V^{Total} \; x \; \frac{C_i Q_i}{\sum_{i}^{n} C_n Q_n}$$

Where,

ΔV_i = Cost change associated with industry "i"

ΔV^{Total} = Industry cost change (aggregate)

Ci = Transportation cost per dollar of output, reported by the Transportation Satellite Account

Q_i = Output of industry "$\boldsymbol{i}$" (2009 output reported by REMI)

The explicit cost savings across industry serves as input into as a reduction in production cost for economic simulation and estimation of economic impacts.

Similarly, changes in explicit benefits associated with personal travels (except business) are mapped to households. These changes are entered in REMI as changes in consumer spending for simulation and estimating economic impacts.

Indirect and Induced Impacts

As business sale increases, demand for key input materials also increases in tandem, and vice versa. Therefore, the indirect impact associated with increased business sale (output) is estimated or referred to as increase in demand (purchases) for key input materials by local firms who are the direct suppliers to these businesses. For example, increased construction activities increase the demand (purchases) for steel, concrete, timber, fuel etc. Consequently, spending on factors of production stimulate expansion of businesses downstream of the production chain. Accordingly, changes in output, employment, and income arising from these expansions are considered to be indirect impacts.

Direct and indirect impacts are the sources of induced impacts, and it normally constitutes the largest portion of total impacts. Changes in output, employment, and income, stemming from household consumption of goods and services are induced impacts. Similar to indirect impacts, increase or decrease in personal consumption also lead to increase or decrease in business sales (output). This chain of activities also translates into changes in employment, and income.

Output from REMI simulation provides total economic (direct, indirect and induced) impact associated with the project.

5.2 SUMMARY OF RESULTS FOR HIGHWAY CORRIDOR "PACKAGES"

Economic impacts in terms of job growth and Gross State Product (GSP) growth for each package of projects are shown in Table 5.1. In addition, return-on-investment ("ROI") is calculated as the ratio between total long term economic benefit and total cost, with total returns calculated at the time of implementation in Table 6.2.

Table 5.1 Summary of Economic Impact Analysis Results

Corridor	Projects Included	Cost ($Millions)	Increase in GSP ($Millions)	Increase in Employment (Annual)	ROI
Savannah-to-Atlanta	I-75 capacity metro Atlanta-Macon; reconstruct I-75@I-16 in Macon; improve I-95@I-16 and I-95@State Route 21 in Savannah; and improve "last mile" connectors at Port of Savannah--Grange and Brampton Roads. *(Note: I-16 widening from I-95 to I-516 also recommended; its **separate** detailed analysis of freight importance done via Savannah MPO Freight Plan, ca. 2015)*	$1,950	$9,100	2,426	4.7
Atlanta-to-Chattanooga	Metro Atlanta interchange I-75@I-285 North	$200	$90	39	0.4
Atlanta-to-South Carolina	I-85 capacity metro Atlanta-S.C. , Atlanta interchange I-85@I-285 North	$1,400	$7,200	1,901	7.3
Macon-to-Florida	No major capacity-adding highway improvement projects recommended	n/a	n/a	n/a	n/a
Atlanta-Alabama	I-20 capacity between Atlanta metro and Alabama; I-85 capacity between Atlanta and Alabama; and west metro Atlanta interchange I-20@I-285	$ 2,000	$9,800	2,443	4.0
Chatt. "Bypass"	Chattanooga east "Bypass" ***(interest led by Tennessee DOT & Chatt. MPO studies)***	$800	$6,400	1,681	10.7
Macon-to-LaGrange impvt. and US 27	Macon-to-LaGrange improvement plus four-laning remainder of US 27 north of LaGrange	$ 480	$11,300	2,738	18.0[79]
Smaller Urban and Rural Freight Corridors	Four-laning all of US 84 and SR 133, and portions of US 441	$522	2,180	508	4.2

[79] *Benefits accrue as per the recommended implementation timeframe shown in Table 6.2.*

6.0 Summary of Freight Recommendations

By investing road, rail, airport and marine improvements, new rail terminals and line haul capacity, improved Interstate interchanges, limited access bypasses, and high volume rural freight corridors, the State could generate over $77 billion in additional economic output and thousands of new jobs. Table 6.1 lists the project categories for each mode along with costs and benefits.

These benefits include the economic benefits that will accrue from the two large port improvement projects: deepening the Savannah Harbor and building a new port in Jasper. The Savannah Harbor Expansion Project General Reevaluation Report has estimated that the harbor deepening will result in substantial transportation cost savings. A Jasper Ocean Terminal would support additional tax revenue and over one million jobs to Georgia and South Carolina when the facility is operating.[80]

Table 6.1 Summary of Recommended Improvements

Mode	Projects and Project Categories Included	Cost ($Millions)	Increase in GSP (*$Millions*) or Other Benefits
Port	Deepen Savannah Harbor	550	$2.8 billion trans. cost savings[81]
	Develop Jasper Port	4,000[82]	$9 billion add'l. tax receipts in Georgia & South Carolina[67]
Rail	Pursue Crescent Corridor initiative Improvements to other terminals and mainlines	4,000 to 6,000	13,200 to 19,800
Highways	Add capacity to select long-haul corridors Improve congested interstate interchanges Develop key bypass routes Improve key smaller urban &rural freight corridors Improve "last-mile" connectors: Savannah (Grange Road & Brampton Road) & Atl. (S.R. 6) Highway Safety Improvements	9,542	52,480
Air Cargo	Add warehouse capacity at Atlanta airport Lengthen airport runway at Albany airport	15 to 20	Add'l. air cargo capabilities (*data not available*)
TOTAL		**18,017 to 20,112**	**65,680 to 72,280**

[80] "*An update on the Jasper Ocean Terminal*" (March '11) http://dc.statelibrary.sc.gov/handle/10827/9691

[81] Does not include benefits from marine port improvements

[82] www.wtoc.com/story/27944500/georgia-south-carolina-port-officials-discuss-progress-of-jasper-county-ocean-terminal

6.1 FUNDING FREIGHT IMPROVEMENT PROJECTS

There are a variety of potential sources for each of the freight modes:

- Nationally, several port-related projects have been funded by the Harbor Maintenance Trust Fund. However, appropriations from this fund have been limited to fund the full range of national port needs. Therefore, major harbor deepening projects such as the Savannah harbor deepening have more often been funded through general funds at Federal and state levels; Georgia has committed a portion of the funds required for deepening the harbor, while the remainder of these funds is expected to be provided by the Federal government based on the national need.
- The majority of freight railroad projects are funded by the private sector. There may be the potential for future Federal grant related sources to be targeted towards freight rail as well, particularly as improvements are made to accommodate passenger rail service on freight rail lines.
- Highway projects that benefit freight are eligible for the same funds as other highway program projects. They often require a financial plan that includes a variety of funding sources. Many states utilize a mix of state motor fuel taxes, sales taxes, parking and tourist-based fees, license tag fees, registration fees, tolls, and public-private partnerships to fund highway projects.
- Air cargo projects are also paid for through a combination of Federal, state, and local funding. Development of on-airport warehouse building facilities are typically paid for by the airport operators (e.g., the City of Atlanta for the Atlanta airport) and then reimbursed through rental contracts over time. Runway extensions, such as the one needed in Albany, are funded through a combination of FAA and local funding. However, outside sources of funding are also possible, and can accelerate projects that are considered to be critical.

6.2 FREIGHT & LOGISTICS ACTION PLAN'S RECOMMENDED IMPLEMENTATION TIMELINE

Based on feedback from the private sector, information from previous studies, and the return-on-investment analysis discussed earlier in this report, a proposed timeline for the major Freight & Logistics Plan (not including such projects as those listed in Table 2.2) is shown in Table 6.2 on the next page.

***Note**: while not shown on next page, I-16 widening in Savannah from I-95 to I-516 is also a recommended project in this Freight & Logistics Plan. Detailed analysis of its freight importance was completed by Savannah MPO's Freight Plan (completed Dec. 2015); Savannah MPO amended project into their Long Range Transportation Plan and TIP on March 9, 2016.*[83]

[83] www.thempc.org/docs/lit/corempo/plans/tip/2016/mar/amendment.pdf

Table 6.2 Freight & Logistics Action Plan: Recommended Timeline for Major Projects

		2012-2020	2021-2030	2031-2040	2041-2050
Marine Port Improvements	Deepen Savannah Harbor	●			
	Develop Jasper Port		●		
Rail Improvements	Line Haul Expansion	●	●	●	●
	Intermodal and Carload Terminal Expansion	●	●	●	●
	Increase Weight Limits and Vertical Clearances	●	●		
Interstate Interchange Improvements	I-285 @ I-75 North		●		
	I-285 @ I-85 North	●			
	I-285 @ I-20 West	●			
	I-285 @ I-20 East		●		
	I-75 @ I-16 in Macon	●			
	I-95 @ I-16 in Savannah	●			
	I-95 @ SR 21 in Savannah	●			
Long-Haul Highway Corridor Improvements	I-85 between Atlanta Metro and South Carolina	●	●		
	I-75 between Atlanta Metro and Macon metro			●	
	I-85 between Atlanta Metro and Alabama				●
	I-20 between Atlanta Metro and Alabama				●
Highway Bypasses	Chattanooga Metro Bypass		●		
	Macon-LaGrange – U.S. 27			●	
Rural and Smaller Urban Highway Corridor Improvements	Complete 4-laning U.S. 84	●			
	4-laning SR 133 from Albany to Valdosta		●		
	4-laning U.S. 441 fro I-85 to I-16		●		
	Safety Improvements	●			
Air Cargo Improvements	Additional Air Cargo Warehouse at Atlanta Airport	●			
	Extend Runway at Southwest Georgia Airport in Albany	●			

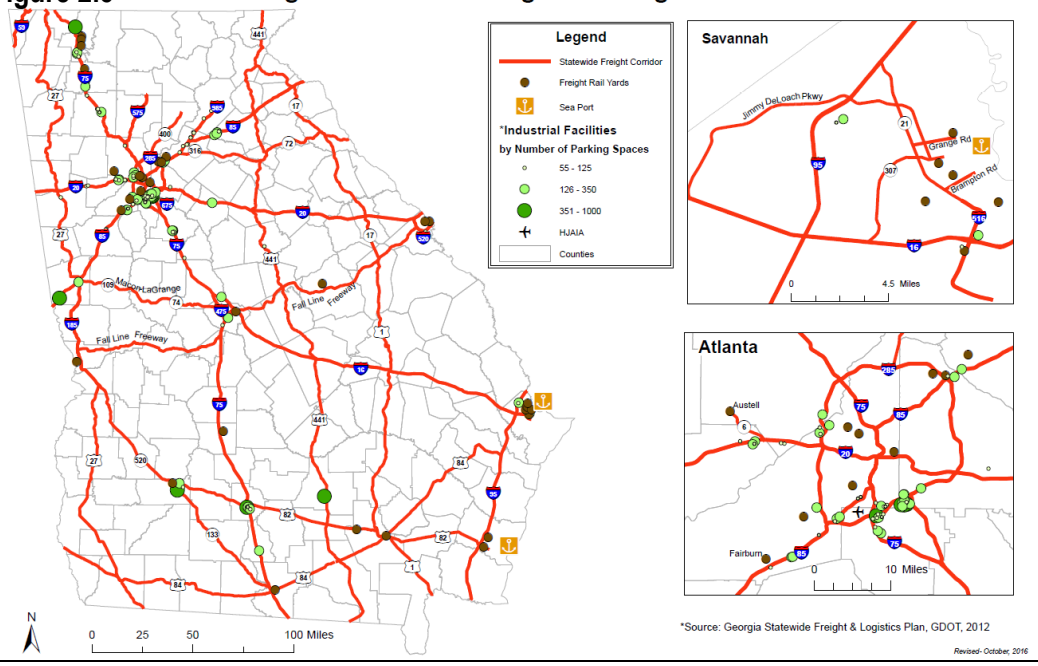
6.3 FREIGHT CORRIDORS: STATE & METRO ATLANTA

Statewide Freight Corridors

Since initial adoption of the Georgia Statewide Freight and Logistics Plan in February 2012, the State Transportation Board approved another key state freight policy in August 2013.[84] Known as Georgia's Statewide Freight Corridors, this policy was grounded in findings from the State Freight & Logistics Plan and represents a cohesive and complete map of Georgia's priority roads for freight movements. Amended by the State Transportation Board in October 2016 to add State Routes 316 and 400, its corridors represent interstates, key freight-intensive GRIP (rural four-lane) routes, and "last-mile" connector roads to major significant freight activity centers such as an intermodal rail terminal in metro Atlanta and the Port of Savannah.

The Georgia Statewide Freight Corridors policy is grounded in Georgia House Bill 202 approved by the Legislature in their 2013 session and signed by the Governor on April 18, 2013. Effective July 1, 2013, it makes routes on a Georgia Statewide Freight Corridor exempt from Georgia's congressional balancing law related to transportation dollars spent on those corridors.

Figure 2.5 **Georgia's Statewide Designated Freight Corridors**



[84] http://saportareport.com/georgias-latticework-of-roads-to-benefit-from-gdots-new-freight-designation

The corridors are vital to the state's freight and logistics industries: they represent approximately 15% of the roadways operated by GDOT, yet provide for efficient north-south, east-west and 'last-mile' access for moving cargo and goods. Figure 2.5 shows they are some of the highest truck percentage routes that also connect most of the state's major industrial facilities and freight rail yards.

Metro Atlanta: Strategic Truck Route Master Plan ("ASTRoMaP")

Just as the Georgia Statewide Freight Corridor identified the longer-haul state-level freight routes, region-level freight routes in metro Atlanta were the focus of the Atlanta Regional Commission (ARC) who identified the north/south and east/west *non-interstate* routes that primarily handle most of the truck-based freight movement in metro Atlanta.

Specifically, ARC designated regional truck route network with associated policies and guidelines. Known as the **A**tlanta **Str**ategic Truck Route **Ma**ster **P**lan ("ASTRoMaP"), it was adopted by ARC in June, 2009 and is shown in the figure below. Additional information is at: www.atlantaregional.com/transportation/freight.

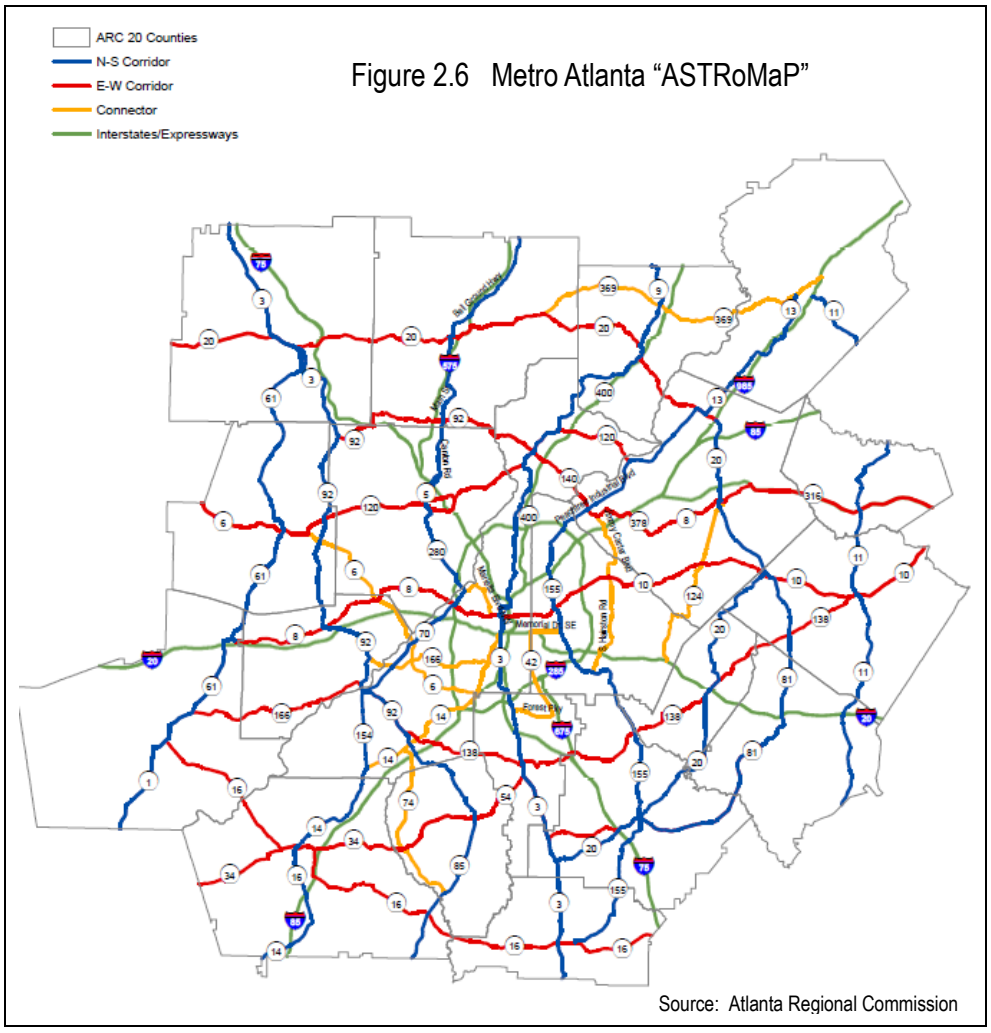


Figure 2.6 Metro Atlanta "ASTRoMaP"

Metro Atlanta: GDOT & ARC *Freight Operations & Safety Program*

Relatively recently, GDOT and ARC partnered on the creation and funding of a metro Atlanta Freight Improvement Program whose goal is to "enhance -- as quickly and efficiently as possible -- the <Atlanta> regional freight transportation network that serves the regional economy." The program proposes to fund short-term freight projects on the ASTRoMaP network – projects which typically have significant cost/benefit ratios and are typified by a smaller-scale that can be designed and delivered in a timely manner.[85]

6.4 Operational Improvement Strategies

Metro Atlanta : Intelligent Tranportation Systems (ITS)

GDOT's Intelligent Transportation Systems (ITS) is also a significant component of maintaining safe and efficient traffic operations of interstates in metro Atlanta. This is important for this region – an area of Georgia that the State Freight & Logistics Plan identified as a major freight-intensive area of the state and vital to its economy.

This system monitors traffic flow via automatic sensors and cameras, and provides real-time travel information to all drivers. Information alerting drivers of incidents ahead and delays anticipated is dispatched in many ways: a dedicated toll-free phone number to reach a live operator 24/7; changeable message signs ("CMS") throughout the state; an internet website operated by GDOT (www.511ga.org); phone apps, and via broadcast media.

The system is also served with a fleet of GDOT Highway Emergency Response Operators "**HERO**s" (www.511ga.org/static/hero-faqs.html) who are coordinated with local emergency service responders (police, fire and state patrol.)

One of the newest components of the ITS system in Atlanta is the I-285 'variable speed limit' policy which was approved[86] in late 2012. Focused on the section of I-285 north of I-20, the project uses *existing* detection systems to monitor the flow of traffic and harmonize speeds to increase throughput *and* reduce crashes by raising the default speed limit to 65 mph from 55 mph and vice versa, when appropriate. In addition to being a major commuter route, the affected section of I-285 is a high truck volume corridor, so the initiative's objective to smooth traffic flow and reduce crashes/incidents should directly benefit for freight-moving trucks on that corridor. Additional information on the project is available on the GDOT website at: www.dot.ga.gov/DriveSmart/SafetyOperation/Pages/VSL.aspx.

[85] www.atlantaregional.com/File%20Library/Transportation/Freight/Tp_PLN2040FreightOps_091412.pdf

[86] http://georgia.gov/blog/2012-09-26/electronic-speed-limit-signs-approved

Metro Atlanta: Regional Traffic Operations Program ("RTOP")

One key operations initiative is GDOT's RTOP program -- a multi-jurisdictional signal timing program that improves traffic flow and reduces vehicle emissions through improved and coordinated corridor signal timing.[87]

The difference between this effort and a normal signal timing operations is that GDOT provides additional signal timing personnel focused solely on metro Atlanta's busiest arterial roadways. Because corridors cross city and county boundaries, this GDOT program works with local governments to make signal timing seamless. Detailed performance data is available at: www.dot.ga.gov/DS/SafetyOperation/TrafficSignals.

Metro Atlanta: Downtown Connector Operational Improvements

The Downtown 'Connector' in Atlanta, which is the four-mile stretch of interstate where I-75 and I-85 are co-routed through the heart of the city, can be a significant freight bottleneck with regards to the movement of delivery trucks. In an effort to reduce congestion at this location in a cost effective way, operational improvements were recently made to the Connector. In 2003, GDOT re-striped and extended a divider wall to add ramp storage and reduce weaving at three exit ramps. It was then in 2005 that GDOT installed four southbound entrance ramp meters -- at the existing interchanges with Spring Street, Ellis Street, Freedom Parkway, and Edgewood Avenue, yielding significant improvements to traffic flow on the Connector. In fact, GDOT estimates the ramp meters saved a weekly average of 17.3 percent in fuel and 22.4 percent times during the four-hour afternoon traffic peak period. In addition, between 2004 and 2005 the number of severe congestion hours was reduced by 37.7 percent.[88]

Metro Atlanta: Traffic Incident Management Enhancement ("TIME")

TIME is a metro Atlanta-focused taskforce of first-responders and transportation agencies who developed and sustain a regional incident management program to facilitate coordination of safe and fast roadway clearance that lessens the impact on emergency responders and motorists. It constantly seeks ways to improve inter-agency coordination and cooperation; create opportunities for multi-agency training to promote teamwork; and serve as a platform to develop common operational strategies and a better understand other agencies' roles and responsibilities.

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[87] www.dot.ga.gov/DriveSmart/SafetyOperation/Documents/TrafficOperations/ConceptofOperations.pdf

[88] www.cedengineering.com/upload/Traffic%20Bottlenecks%20Operational%20Improvements.pdf

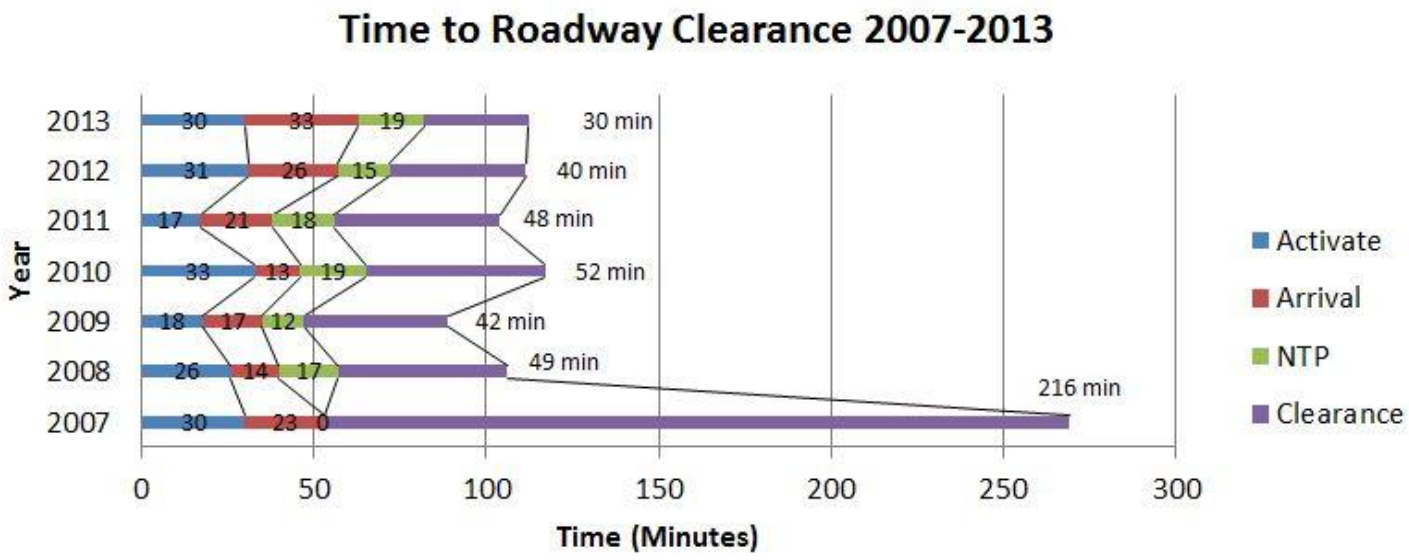
In addition to GDOT, the TIME taskforce currently has over 90 member organizations including the Federal Highway Administration; the Georgia Department of Motor Vehicle safety; emergency responders from cities and counties in metro Atlanta (police, fire, etc.); and towing companies.[89] Additional info is available on the web at www.timetaskforce.com.

Metro Atlanta: Towing and Recovery Incentive Program ("TRIP")

One major initiative of the previously-mentioned TIME task force was creation of TRIP in 2007. TRIP is a quick-clearance program that provides a financial incentive/bonus for heavy-duty recovery/wrecker companies to remove large truck-involved crashes from affected travel lanes within 90 minutes. Prior to this program, clearance of large truck crashes could often take several hours causing significant travel delay.

TRIP operates on I-285 (Atlanta's perimeter freeway with very significant truck volumes) and all radial interstates (I-20, I-75 and I-85) inside the perimeter plus the State Route freeways of GA-400 and GA-166. TRIP also operates up to 10 miles outside of I-285 on the significant truck corridors of I-20, I-75 and I-85. Expanding this program to cover a larger portion of metro Atlanta will extend the geographic scope of these benefits.

In its first full year, this program very effectively reduced crash clearance time for those involving large trucks by two-thirds.[90] The continued success of this program is evident as shown below:



Source: www.timetaskforce.com/index.php/time-initiatives

[89] www.gampo.org/docs/6-28-13_work_session/08-GDOT_Traffic_Operations-Michael_Roberson.pptx

[90] www.timetaskforce.com/index.php/time-initiatives

Metro Savannah: Traffic Operations and ITS

Since its creation for the 1996 Atlanta Summer Olympics (several venues were in Savannah), GDOT's ITS system still has significant presence in Savannah. This system continues to benefit the Savannah region – a region with the 4th-busiest container port in the nation and a major catalyst for the regional economy.

This is a region of significant truck traffic on its interstates and many state and local routes due to the presence of the Port of Savannah. In Savannah, ITS hardware installed along those interstates includes CMS to alert drivers of incidents or major advisories. As a coastal city, the GDOT ITS system also provides hurricane evacuation information via GDOT's traveler information website[91] as well as overview information on how hurricane evacuations are coordinated.[92]

While GDOT continues working closely with Savannah, Chatham County and adjacent municipalities for traffic operations related issues[93], the Savannah MPO has recently embarked on a feasibility study with the partner agencies for a countywide ITS and Traffic Control Center Strategic Plan[94].

Metro Macon: Intelligent Tranportation Systems (ITS)

CMS was recently installed north of the I-16/I-75 interchange and connected to GDOT's statewide ITS system. This interchange is vital to the movement of freight between the port and metro Atlanta, and is a major reconstruction project recommended in this plan. The CMS provides information on traffic incidents at this interchange so drivers can make alternate route choices.

It joins existing ITS components in Macon[95], especially along I-475 which is the main interstate 'bypass' around Macon for I-75 truck traffic heading between metro Alanta (and points north) to/from the southern portions of Georgia, I-10, and the large consumer population in Florida.

Statewide: Intelligent Tranportation Systems (ITS) & "Smart" Signals

On interstates outside metro Atlanta, probe technology blends road sensor data with data points from GPS-enabled vehicles provide traffic speeds and identification/response to incidents. Additional information for metro Atlanta,

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[91] www.511ga.org/mobile/?action=view_static_content&template_id=hurricanes&trail=main_menu

[92] www.dot.ga.gov/DS/Emergency/Hurricane

[93] http://savannahnow.com/news/2016-02-14/plans-slowly-emerge-savannah-area-traffic

[94] www.thempc.org/Dept/Atms

[95] www.itsga.org/Member%20News/GDOT%20Macon%20Cameras.pdf

including the ITS strategic plan and ITS architecture status report, is available at: www.atlantaregional.com/transportation/roads--highways/intelligent-transportation-system or www.consystec.com/texas/web/atlanta/atlantaintro.htm.

In addition to ITS, in 2016 GDOT announced deployment of state-of-the-art "smart" signals at 1,000 intersections throughout the state. This initiative was part of a statewide upgrade which converts traffic lights in Georgia to un up-to-the-second traffic signal controller technology. The new software provides significant improvements to how GDOT and local agencies can operate their signal systems. The 1,000th intersection completion was achieved in July 2016 and marked the beginning of the final goal of deploying "smart" signals at approximately 9,000 intersections in metro Atlanta including Gwinnett County, Cartersville, Thomaston and Athens-Clarke County – all of which are expected to be complete by 2018.[96]

Statewide: Truck *PrePass* program

Since 2007, Georgia is an active participant of the multi-state PrePass program which is an automatic vehicle identification (AVI) system enabling participating transponder-equipped trucks to be pre-screened and "bypass" Georgia's interstate route weigh stations – of which there are 19 in total[97] -- as well those of participating states along the interstate corridor. Not stopping at the multitude of weigh stations means trucks can stay in the travel lanes at highway speed -- eliminating the need to enter each weight station add cumulative delay to their trip. By 2015, cumulative estimates of benefits include 2,010,212 hours saved (5 minutes saved per screening bypass), 9,649,019 gallons of fuel saved (0.4 gallons per pull-in), and $198,402,902 operational cost savings.[98]

Statewide: 'Virtual' Mainline Weigh-In-Motion ("WIM") Scales program

GDOT have very recently installed a new WIM system primarily on its rural highway interstates, less than one mile upstream from the 19 existing weight stations. The system is expected to reduce crash frequency and severity as well as improve operational efficiency of the interstate. Its freight benefits include expediting the movement of weight compliant trucks past weight stations (pointed out in the map below) who will no longer be required to divert through the weigh stations.

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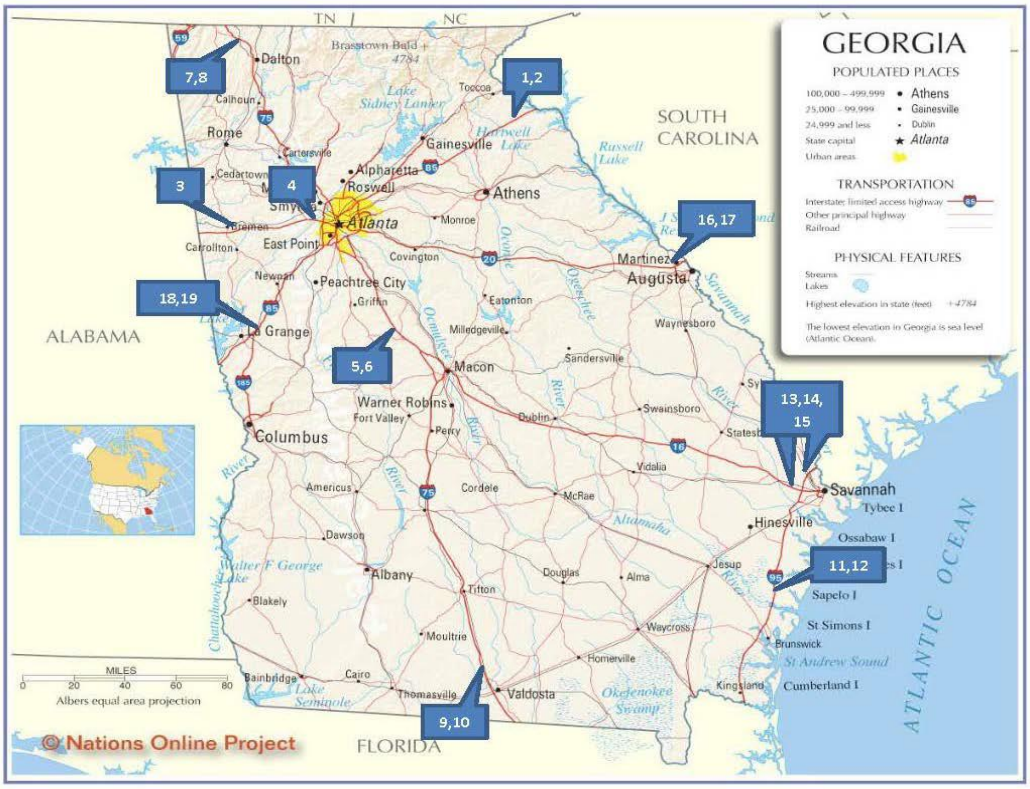
[96] www.dot.ga.gov/PartnerSmart/Public/PressReleases/Georgia%20DOT%E2%80%99s%20Signal%20Software%20Update%20to%20Make%20Traffic%20Smart-8-25-16.pdf

[97] www.prepass.com/aboutus/Pages/AboutUs.aspx

[98] www.helpinc.us/wp-content/uploads/Georgia-Fact-Sheet_3Q_2015.pdf



The current weigh station system requires trucks to exit the interstate mainline and enter weigh stations causing delays ranging from a few minutes to extended queue times for trucks waiting to be weighed. These delays can lead to countless hours of productivity loss for truckers and longer trip times.

Technology is a vital part of the project, which includes a "virtual" component allowing data to be collected electronically and immediately transmitted to the adjacent weigh station and Georgia Highway Patrol Officers in their vehicles for enforcement purposes. Using the mainline WIM scales; cameras; over-height detection; power/internet connection; signage (including driver indications signage) and traffic data classifier, the system also collects data for later use by stakeholders such the Georgia Department of Public Safety and Federal Highway Administration, as well as various GDOT Offices (Office of Materials; Office of Transportation Data; Traffic Management Center; and the Office of Planning.)

Project construction started in 2015 at the truck weigh stations in Carroll County (I-20 westbound), Troup County (I-85 northbound and southbound), Douglas County (I-20 eastbound) and Catoosa County (I-75 northbound and southbound). Construction of the remaining weigh station sites completed the end of 2016.[99]

[99] www.worldhighways.com/categories/traffic-focus-highway-management/news/ird-wins-georgia-state-weigh-in-motion-deal

Statewide: Web-based Posted Bridge information

Posted bridges carry restrictions on truck travel by limiting the maximum weight that a bridge is designed to carry by type of truck. GDOT requires trucks that contain loads over the posted weight limit to take an alternate route. For truck drivers, this may require planning the route in advance to avoid posted bridges. This task is made easier with GDOT's web-based system that allows drivers to find out the latest information on posted bridges by going to this website: http://gdottruckrouteservices.dot.ga.gov. General information is also available here: www.dot.ga.gov/PartnerSmart/permits/Pages/postedBridges.aspx.

Statewide: Roadside Assistance and Maintenance Program

Starting in 2017, Georgia's interstates featured a new incident response program for non-metro Atlanta interstates (excluding I-24 and I-59)[100]. Known as Coordinated Highway Assistance and Maintenance Program (CHAMP), GDOT started this initiative funded by proceeds of the Georgia Transportation Funding Act[101] (100% state funds).

Unlike the previously-mentioned HERO program in metro Atlanta which assigns each vehicle to patrol six miles of roadway, CHAMP feature 32 vehicles patrolling 16 different routes ranging from 30 to 50 miles in length, for 16 hours every day[102].

CHAMP assistance will help stranded motorists and may be available to assist emergency responders working traffic incidents, as well as conduct basic maintenance such as removing tire debris from roads, clearing clogged roadway drains, picking up major litter, and cutting back tree branches.[103]

[100] www.dot.ga.gov/AboutGeorgia/Board/Presentations/CHAMP-1-8-17.pdf

[101] http://commuting.blog.ajc.com/2016/04/06/hero-roadside-assistance-program-to-expand-statewide

[102] www.macon.com/news/local/article69787342.html

[103] www.macon.com/news/local/article127305534.html

Statewide: Truck Volumes Considered During Project Development and Pavement Design

Design Traffic

In order to proactively design improvements with trucks in mind, GDOT definitely accounts for the impact of growing truck volumes in road projects under development through its Plan Development Process (PDP). Specifically, truck volumes resulting from the PDP's process yield detailed future-year traffic forecasts (sometimes referred to as "design traffic" volumes) used by GDOT engineers to inform their pavement designs, bridge designs, traffic analyses, and design and construction plans. Guidance on development of this design traffic, as specified in GDOT's Design Traffic Forecasting Manual[104], specifically accounts for truck volumes during a project's design process.

Specifically, when a project is under design, truck volumes are considered in its early preliminary engineering phase when projects are required to have collected current-year vehicle classification count data (separate car and truck volumes). This data is required on the project mainline, on all state routes in the project's area, and on any adjacent road with an expected high volume of trucks (i.e. near ports, truck stops, industrial parks, warehouse/distribution centers, weigh stations, etc.), and on all ramps in the project area. These classification count data are collected in accordance with FHWA's 13 vehicle classification categories and are reported in the design traffic forecasts as 'single unit' truck percentages (Classes 4 through 7), and multi-unit or combination truck percentages (Classes 8 through 13), for both daily- and peak-hour volume conditions.

As that current-year data is ready to be forecasted to a future year, locally-adopted current and future land use plans are consulted and identification is made of potential truck-related facilities in the project area; these steps help guide predictions for the future rate of truck volume increases. Additionally, the Georgia Statewide Freight Plan includes outputs of the statewide travel demand model analysis; it provides another planning-level tool to help engineers identify the location and scale that major routes are expected to experience increasing volumes of trucks in the future.

All this information helps engineers take into account current- and future-year truck volumes in their pavement designs, bridge designs, traffic analyses, and design and construction plans, such that the most cost-effective designs are developed that take into account increasing truck volumes around the state.

[104] www.dot.ga.gov/PS/DesignManuals/DesignGuides

Specialized Pavement Design -- example

One example is "whitetopping[105]" -- a paving technology where Portland Cement Concrete (PCC) overlays on asphalt are used on heavily traveled roadways to reduce deterioration and maintenance. This technique was studied in GDOT's Central Georgia study:

> "*Most interstate highways in Georgia are paved with Portland Cement Concrete while the majority of the other highways have asphaltic concrete pavement. Within the last few years, concrete overlays on existing asphalt pavements have been used on roadways surrounding the Port of Savannah. Concrete overlaid on asphalt pavement is commonly referred to as whitetopping; variations include:*
>
> - *Conventional whitetopping – a concrete overlay, usually of a thickness of four inches or more, placed directly on top of asphalt pavement.*
> - *Concrete inlay – a concrete overlay placed in a trench milled out of a thick asphalt pavement.*
> - *Ultra-thin whitetopping (UTW) – a concrete overly, usually less than four inches thick placed on an asphalt surface that is prepared to enhance the bond between concrete and asphalt.*
>
> *Whitetopping an existing asphalt pavement provides many benefits including superior service, long life, low maintenance, low life-cycle cost, improved safety, and environmental benefits. Whitetopping is traditionally used to repair the rutting of asphalt pavement caused by trucks stopping and starting. The flexibility of asphalt allows forces exerted by trucks to produce rutting on the roadway. The adjacent aerial photo shows an intersection that was reconstructed with PCC.*
>
> *The GDOT District 5 has several key intersections that carry a large volume of heavy trucks to and from the Port of Savannah. District 5 maintenance crews rehabilitated these asphalt intersections approximately every four months due to the extreme rutting, shoving, and cracking caused by heavy trucks. Four years ago District 5 whitetopped these key intersections and to date they have not deteriorated or needed maintenance attention. Whitetopped intersections have a service life much longer than typical asphalt intersections. Generally, whitetopped intersections will have a service life of 8-12 years, depending on the truck volumes, the sub-base design, and the thickness of the PCC. The asphalt overlays exhibit a more rapid loss of serviceability in comparison to concrete whitetopping and whitetopping key intersections is a proven way to reduce maintenance."*[106]

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[105] www.fhwa.dot.gov/pavement/concrete/pubs/07025/07025.pdf

[106] GDOT's "Central Georgia Corridor Study" www.dot.ga.gov/BuildSmart/Studies/Documents/CentralGeorgia/HPC%206%20Phase%202%20Report.pdf

7.0 Highlights of the Georgia Statewide Freight & Logistics Plan, Including Financial Plan

Over the course of the development of the Georgia Statewide Freight & Logistics Plan, several themes were identified and reinforced in regards to the importance of goods movement in Georgia. These themes can be used to guide future policy and funding discussions regarding the Freight & Logistics Action Plan. It can also be used to guide the incorporation of freight and logistics into future work conducted by GDOT, the Georgia Department of Economic Development, and other key state agencies. These highlights include:

- Georgia has world-class freight infrastructure that is critical to its economic competitiveness. This infrastructure was developed through several decades of investment by both the public and private sectors.

  Investing $18-$20 billion towards strategic freight projects by the year 2050 could generate $65 billion in additional economic output and new jobs.

  Completion of the Savannah Harbor Expansion Project is the state's top freight priority. Its importance to Georgia's economic competitiveness was reinforced both through technical analysis conducted by the U.S. Army Corps of Engineers and several rounds of input from the private sector as part of the Statewide Freight & Logistics Plan development.

- The vast majority of goods moved in Georgia are carried by truck. Interstate highway mobility is a critical for the state's trucking industry.

  Adding capacity to I-85 between the Atlanta metro region and the South Carolina border is the greatest need of Georgia long-haul corridors.

- Freight rail is funded and operated by the private sector, but the efficiency of its operation has a tremendous impact on the competitiveness of shippers in Georgia. Improvements to rail track and terminals are needed to continue effective movement of goods by this mode.

- Air cargo smaller amounts, yield high-value, time-sensitive goods, so adequate access to air cargo facilities should be maintained.

- Funding the project recommendations of a state Freight & Logistics Plan is being delivered by new state and federal sources. GDOT remains committed to focus on delivering these strategic freight investments in a timely and efficient manner.

Funding Strategy: Utilize State Funds, especially Georgia *Transportation Funding Act ("TFA")* funds

With state legislative passage and subsequent signature by the Governor in mid-2015, GDOT initiated the *Transportation Funding Act* – TFA -- to provide much-needed funding to repair, improve and expand the state's transportation network through routine and capital improvement projects. **This new TFA funding is providing an estimated $830 million to $1 billion in new annual revenues offered GDOT the opportunity to address critical infrastructure needs in routine and capital maintenance.**[107]

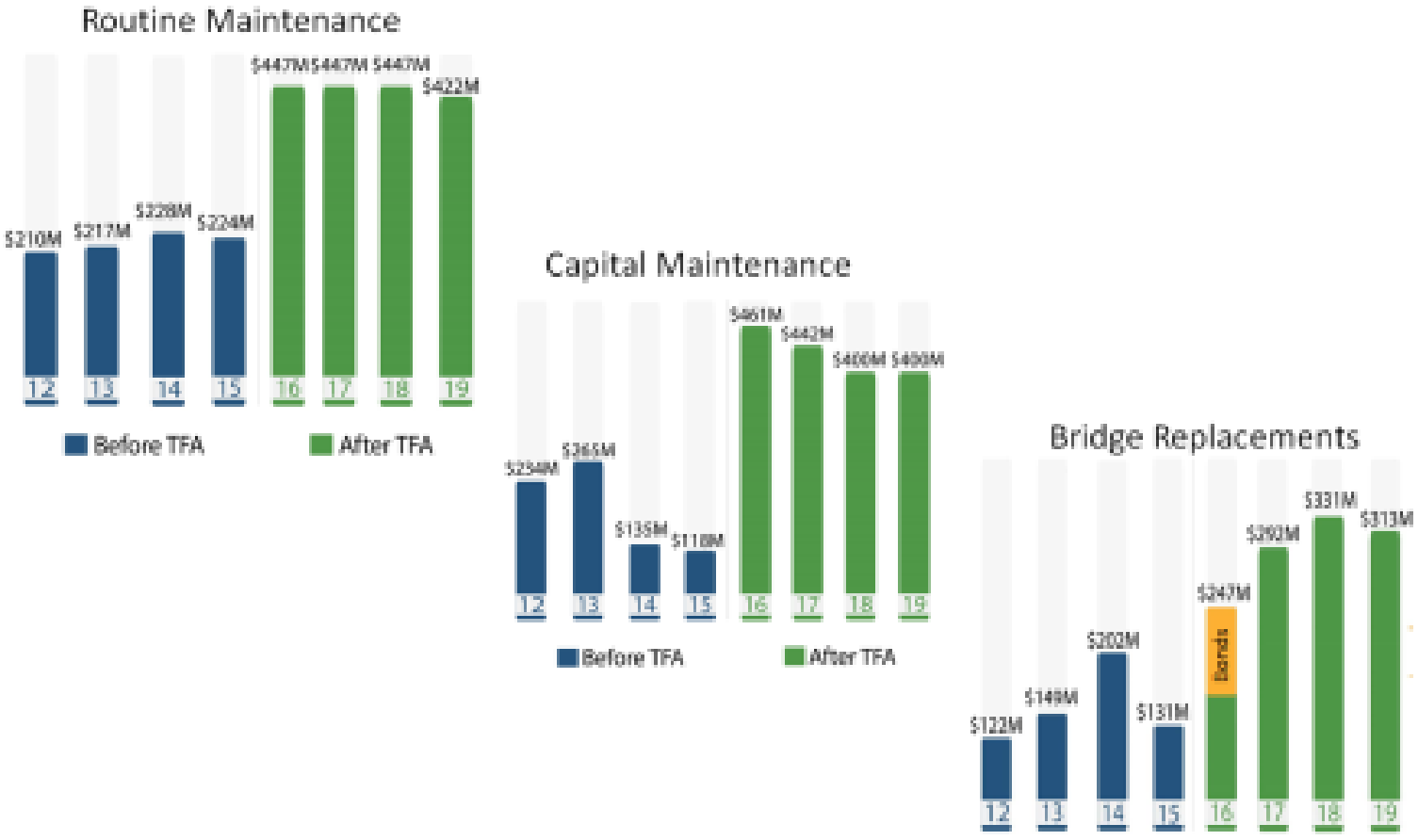
Source: www.dot.ga.gov/InvestSmart/TransportationFundingAct/Documents/Factsheet/MMIP-Infographic.pdf

[107] www.dot.ga.gov/InvestSmart/TransportationFundingAct/Documents/General/WhatIsTFA.pdf

Among the very many projects and maintenance improvements being funded with TFA proceeds include **11 new megaprojects** designed to enhance mobility and safety, fuel economic growth and support goods movement, and improve Georgian's quality of life with improved travel times and trip reliability. Known as the Major Mobility Investment Program (MMIP), they are discussed in more detail in subsequent pages.

From a maintenance perspective, TFA funds are a vital. Historically, GDOT resurfaced six to seven percent of the system annually, translating to a 15-year resurfacing cycle. This is compared to the year 2014 when two percent of the system was budgeted to be resurfaced, which translates to a 50 year resurfacing cycle. Going forward, without TFA funds GDOT anticipated resurfacing one percent of the system annually, putting major road resurfacing on a 100-year cycle.[108]

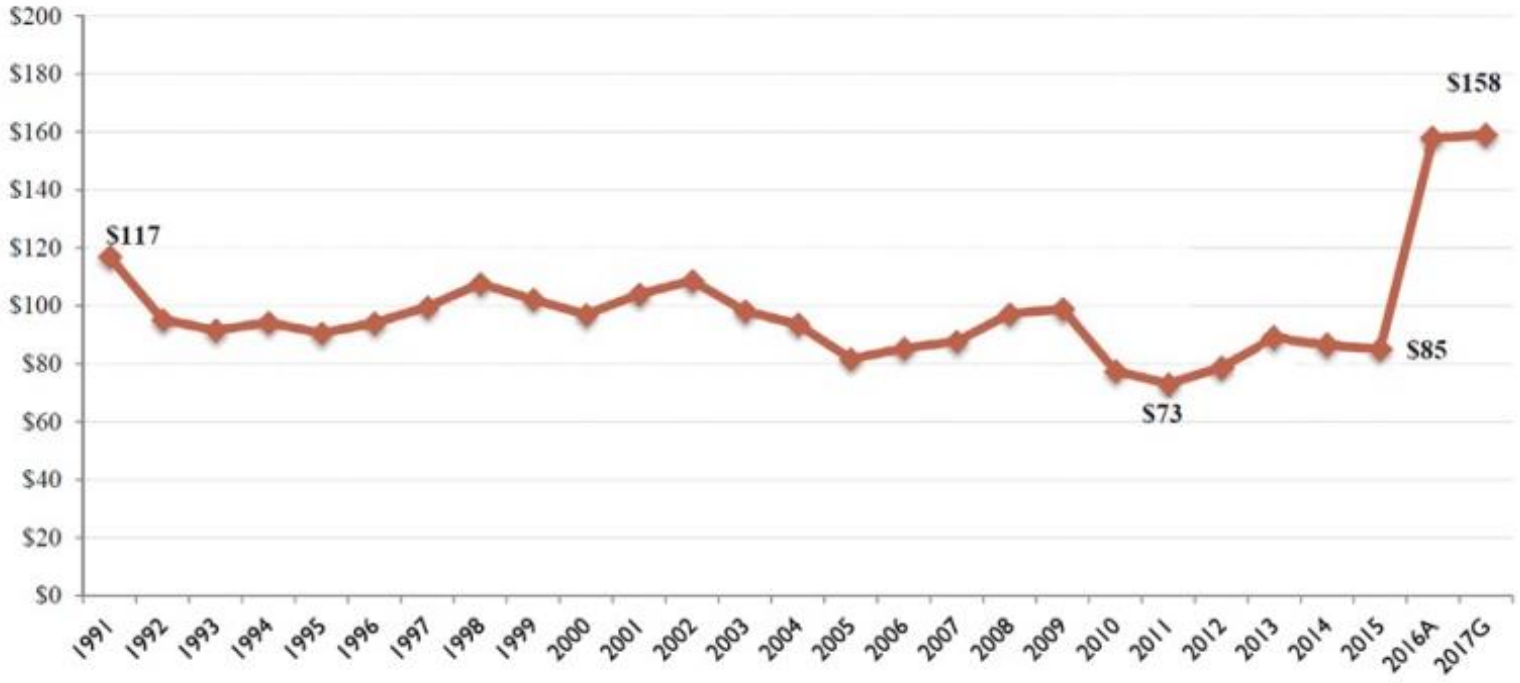
With TFA funds the transportation maintenance investment is increasing throughout the state. This is especially when looking at the trend from FY 2012 through FY 2019:



[108] www.dot.ga.gov/InvestSmart/TransportationFundingAct/Documents/General/WhatIsTFA.pdf

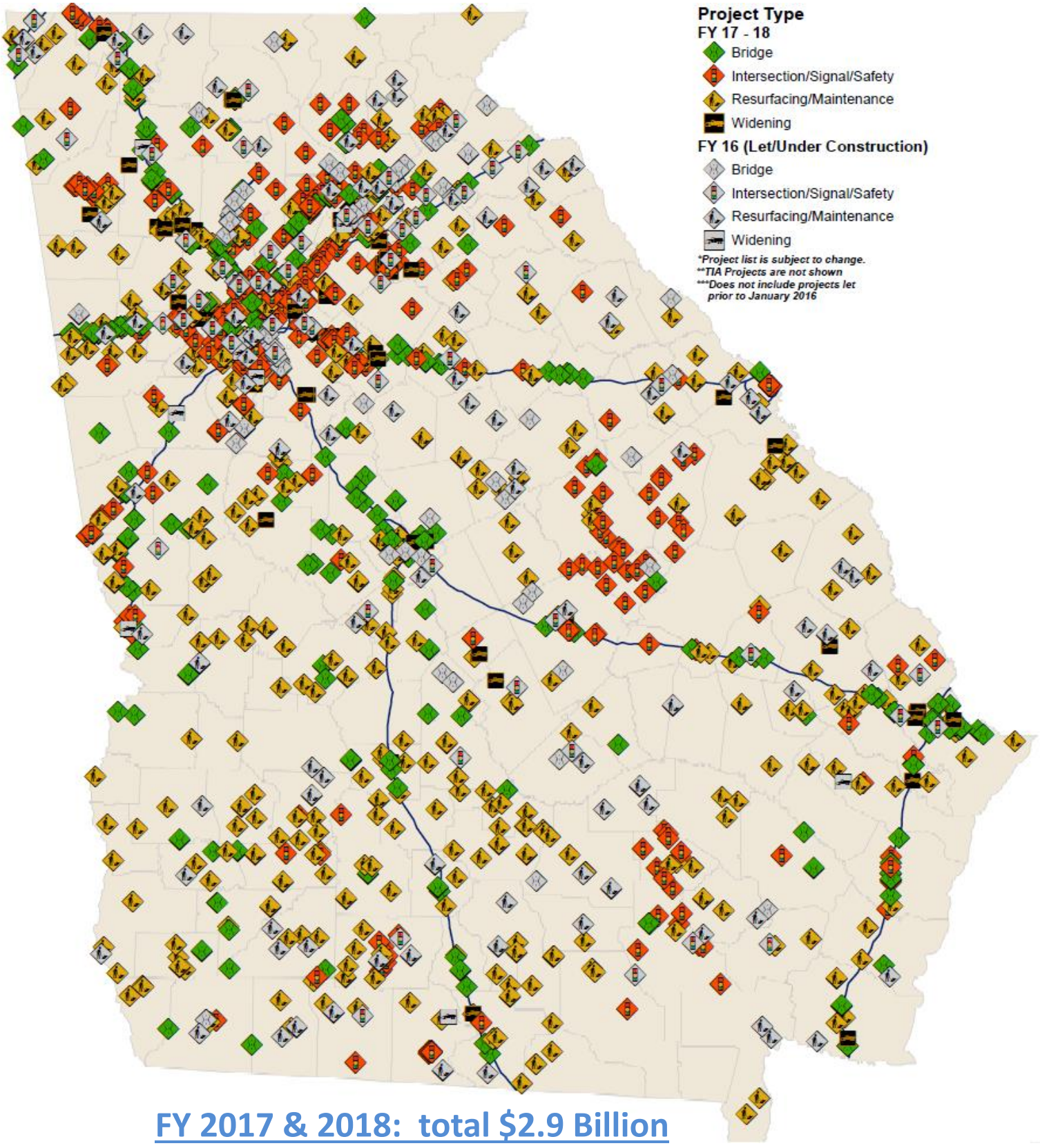
In addition, when analyzed on a per-capital basis, even with Georgia's increasing population, actual spending has increased:

Georgia Per Capita Transportation Spending



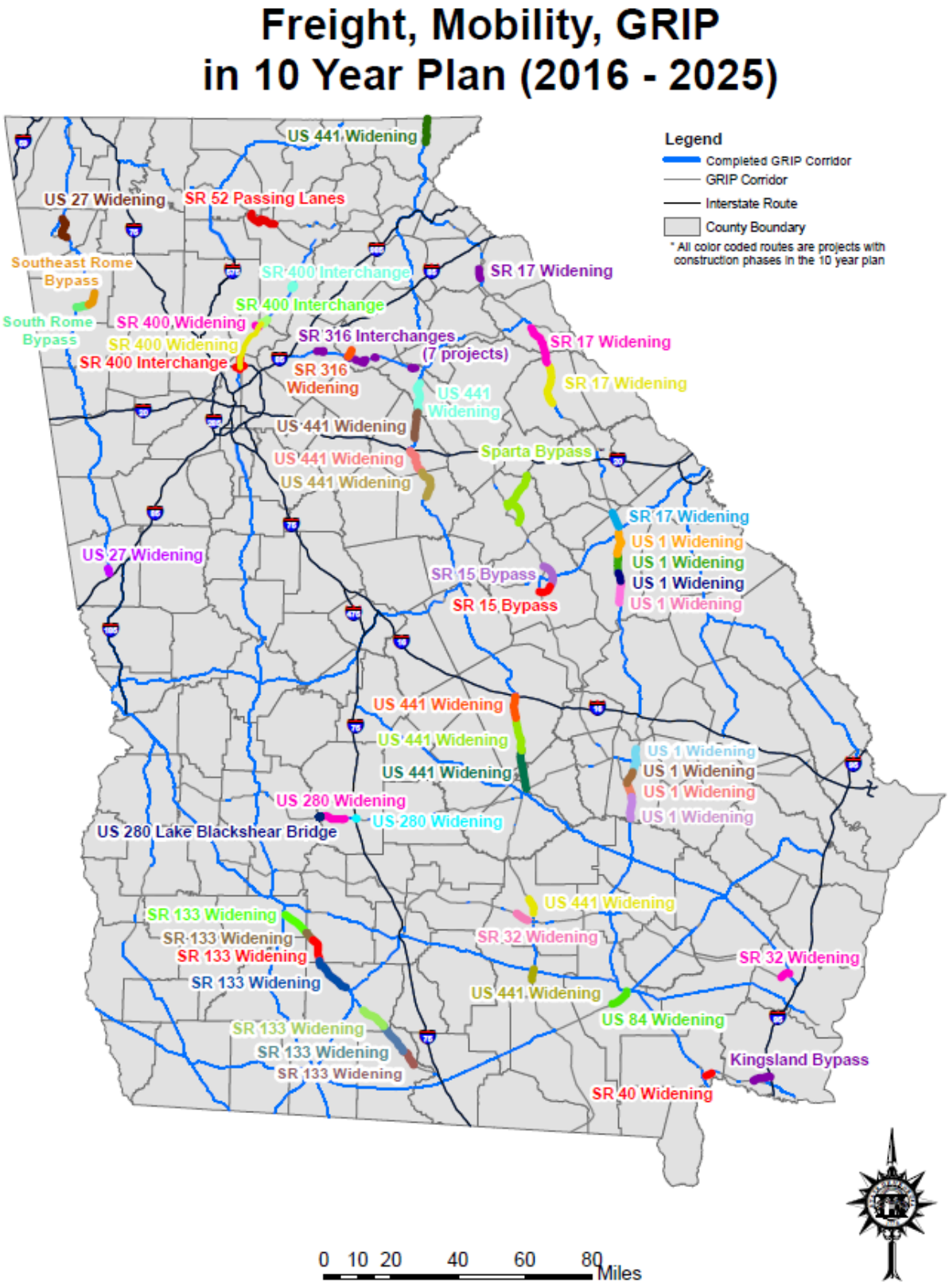
Source: Dr. Carolyn Bourdeaux, Georgia State Univ. "*A Briefing On Georgia's Budget: The Big Picture*" 1-18-17

In addition, state funds are delivering proejcts all around the state:



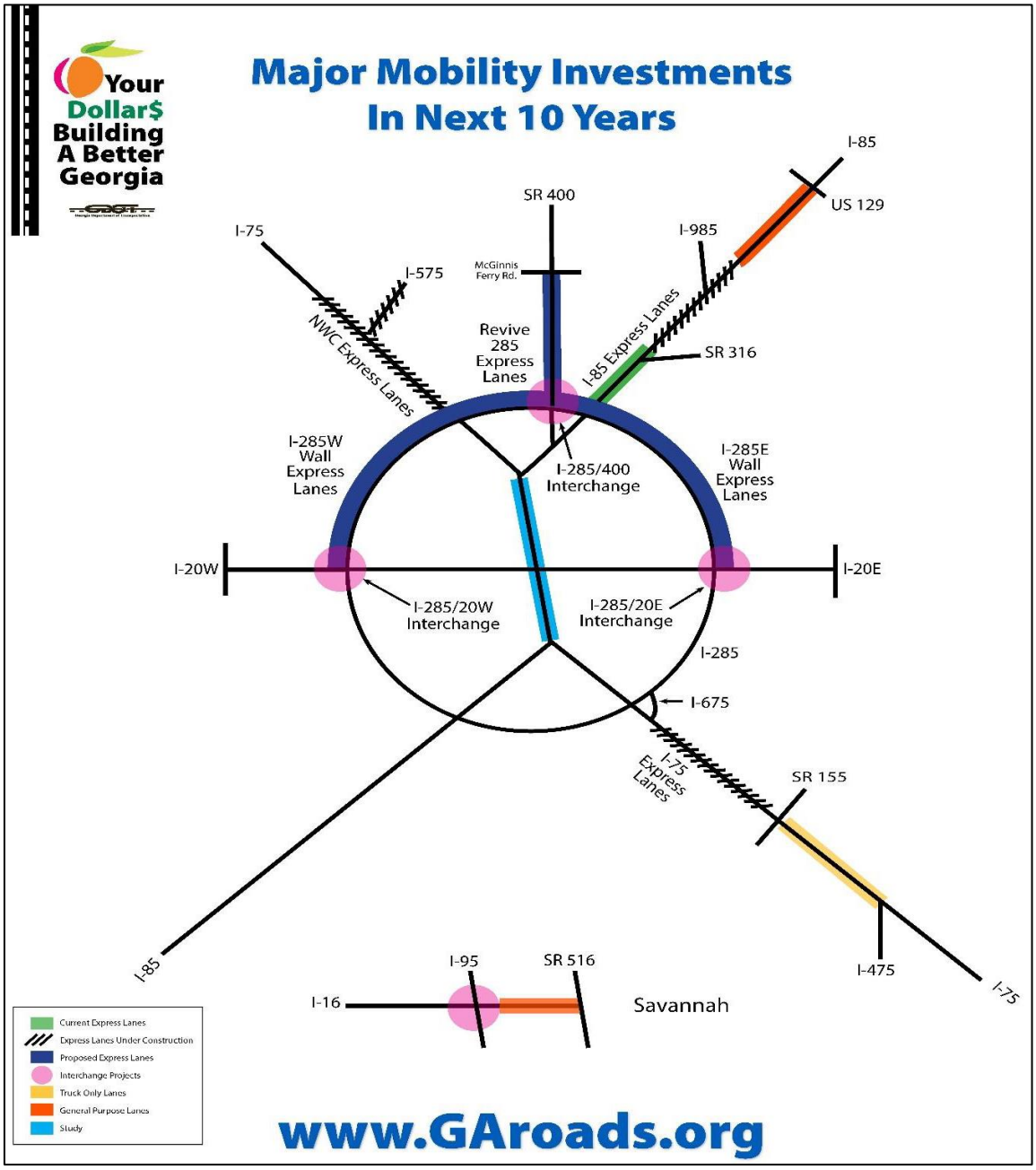
FY 2017 & 2018: total $2.9 Billion

Many of the State's current, committted and proposed major road investments are recommended in the State Freight & Logistics Plan:

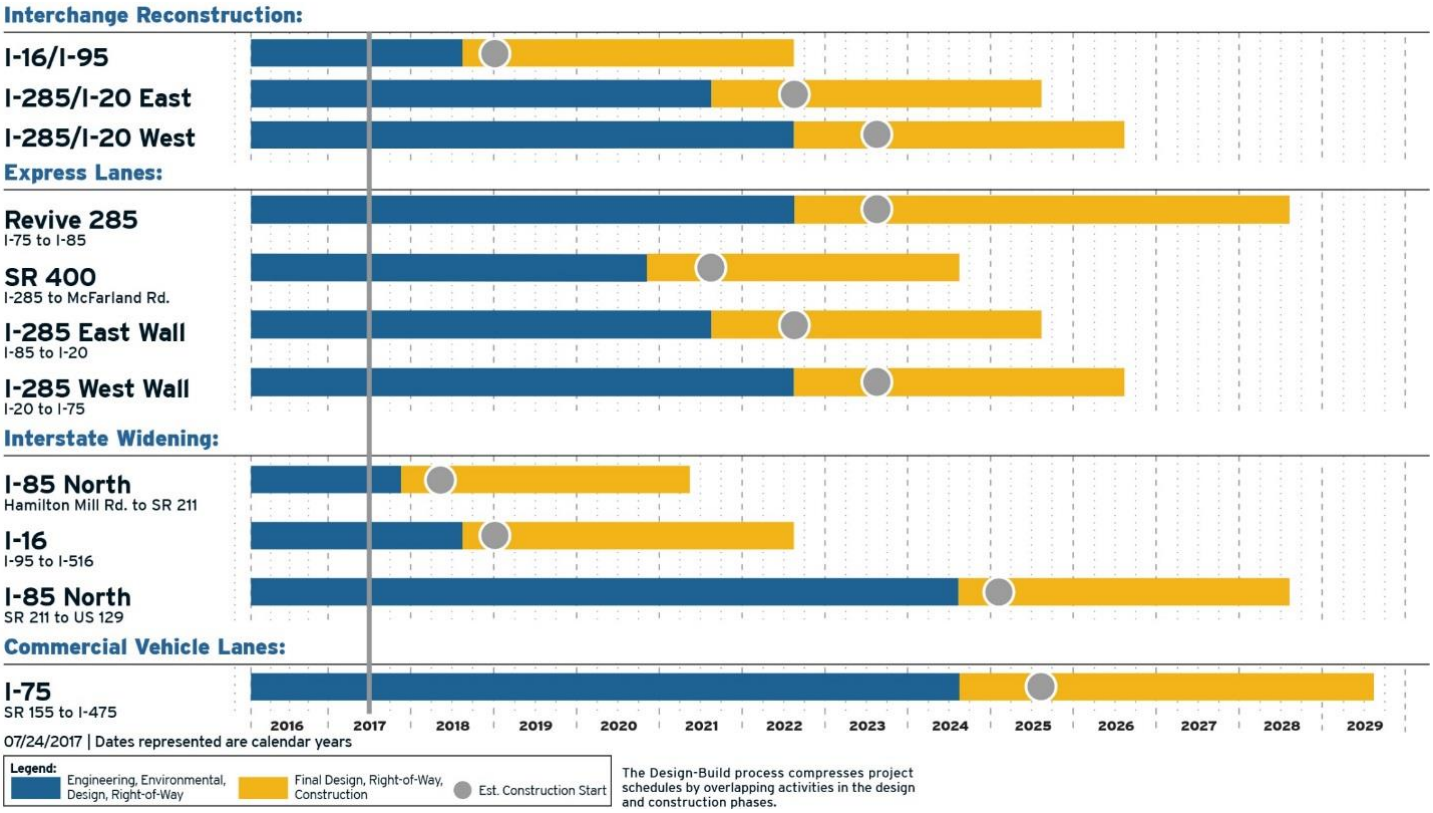


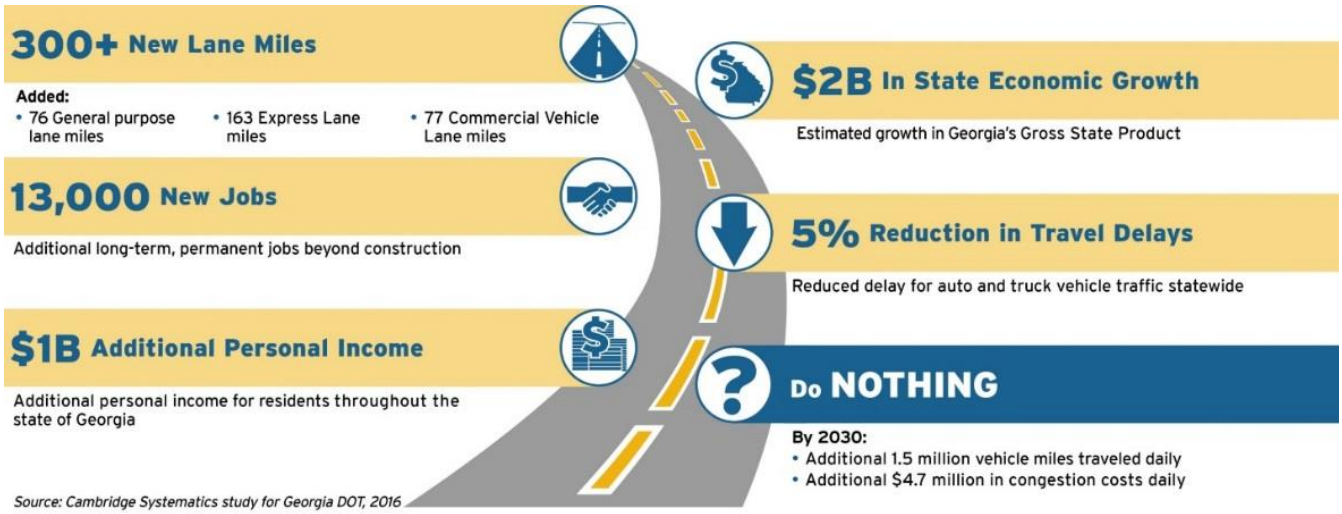
Major Mobility Investment Program (MMIP)

GDOT is advancing its ***Major Mobility Investment*** Program across the state in an effort to yield a significant reduction in congestion along key freight and passenger corridors. Once the projects are completed, they will lead to a 5% reduction in delay and travel time-savings in the year 2030, as compared to doing nothing and allowing traffic congestion to increase. The initial 11 mobility projects (shown below) rely on state and federal funding dedicated by law to improving roads and bridges. Together, they will add more than 316 new lane miles in Georgia's metro areas. The projects will also create additional capacity; improve the movement of freight; provide operational improvements and efficiencies; enhance safety; and decrease travel times.



Major Mobility Investment Program (MMIP) – Proposed Schedule





Funding Strategy: Utilize Federal Funding "'Tools"

Using traditional existing fund sources in the most strategic manner is always important. Consequently, several years ago Georgia sought U.S. DOT approval to utilize the section 1116 freight funding-match flexibility offered by the federal MAP-21 legislation to assist delivery of freight projects in its FHWA-approved MAP-21 compliant state freight plan.

At that time, MAP-21 section 1116 allowed projects listed in US DOT-approved State Freight Plans to pursue a Federal share payable up to 95% (on Interstate System) and up to 90% on non-Interstate facilities[109], compared to the typical maximum 80% Federal share for both types of facilities.

Even though there was no new/additional formula or discretionary Federal funds made available, GDOT monitored this provision to consider how this funding "tool" could support delivery of recommendations in its MAP-21 compliant, FHWA-approved plan. GDOT received formal US DOT approval in July 2015 to utilize that 'enhanced funding match' provision for multiple projects listed in the State Freight & Logistics Plan:

- Complete the US 84 corridor widening,
- Complete the Jimmy Deloach Parkway Extension new alignment,
- Reconstruct the interchange of I-285 @ State Route 400,
- Reconstruct the interchange of I-95 @ I-16 in Savannah,
- Reconstruct the interchange of I-95 @ SR 21,
- Improve Grange Road,
- Complete the US 27 corridor widening,
- Complete the US 1 corridor widening,
- Complete the SR 17 corridor widening, and
- Implement "Truck Friendly" improvements on State Route 6.

While the passage of the Federal FAST Act, the 'enhanced funding provision' was rescinded. However, prior to FAST Act GDOT successfully utilized the FHWA approval of the enhanced match provision to successfully deliver two of major those State Freight Plan-recommended projects:

- Complete the US 84 corridor widening,
- Complete the Jimmy Deloach Parkway Extension new alignment

[109] www.fhwa.dot.gov/map21/guidance/guidesec1116.cfm

Funding Strategy: Apply for Discretionary Federal Funds

TIGER Grants Program
The Transportation Investment Generating Economic Recovery (TIGER) grant program provides funding for State DOTs to invest in road, rail, transit and port projects that promise to achieve national goals or objectives. Since 2009, Congress has dedicated nearly $4.6 billion for seven rounds of TIGER to fund projects that have a significant impact on the Nation, a region or a metropolitan area.

The eligibility requirements of TIGER allow State and local sponsors to obtain funding for multi-modal or multi-jurisdictional projects that may be more difficult to support through traditional DOT funding programs. TIGER funds are eligible to support freight projects in Georgia for projects such as port and freight rail projects, for example, which play a critical role in the State's ability to move freight, but may not qualify for typical sources of Federal transportation funds.

INFRA Grants Program
The Infrastructure for Rebuilding America (INFRA) program announced in 2017 was a modification of the existing FASTLANE grant program; which was the first federal source of dedicated freight funding. The INFRA grant program provides dedicated freight funding for projects that address critical issues facing our nation's highways and bridges.

A focus of the INFRA program is to award project funds to construction-ready projects that are utilizing innovative delivery, funding, processes, and approaches to significantly reduce the timeline for completing transportation projects, and increasing accountability for the projects that are built.

Funding Strategy: Utilize Federal Funding Programs

National Highway Freight Program

The National Highway Freight Program (NHFP) is a program that is supported by the Highway Trust Fund (HTF) and is funded at an average of $1.2 billion per year and distributed to states by using a formula, based on the proportion of total designated primary highway freight system (PHFS) mileage in the State to the total mileage of the PHFS in all States. The purpose of the NHFP is to improve efficient movement of freight on the National Highway Freight Network (NHFN) and support several goals, including:

- Investing in infrastructure and operational improvements that strengthen economic competitiveness, reduce congestion, reduce the cost of freight transportation, improve reliability, and increase productivity;
- Improving the safety, security, efficiency, and resiliency of freight transportation in rural and urban areas;
- Improving the state of good repair of the NHFN;
- Using innovation and advanced technology to improve NHFN safety, efficiency, and reliability;
- Improving the efficiency and productivity of the NHFN;
- Improving State flexibility to support multi-state corridor planning and address highway freight connectivity; and
- Reducing the environmental impacts of freight movement on the NHFN.

NHFP funds may be used in Georgia on any component of the NHFN. The Federal share for NHFP funds is governed by 23 U.S.C. 120 and is generally 80 percent. The Federal share for projects on the Interstate system (except projects that add lanes that are not high-occupancy-vehicle or auxiliary lanes) is 90 percent. For projects that add single occupancy vehicle capacity, that portion of the project that increases single occupancy vehicle capacity will revert to the 80 percent Federal share participation level. 23 U.S.C. 120. The Federal share for projects that are located on toll roads, and subject to the provisions of 23 U.S.C. 129, is limited to 80 percent.

Nationally Significant Freight and Highway Projects

The Nationally Significant Freight and Highway Projects (NSFHP) established a nationally significant freight and highway projects program to provide financial assistance for projects of national or regional significance. The goals of the program are to:

- Improve the safety, efficiency, and reliability of the movement of freight and people;
- Generate national or regional economic benefits and an increase in the global economic competitiveness of the United States;
- Reduce highway congestion and bottlenecks;
- Improve connectivity between modes of freight transportation;

- Enhance the resiliency of critical highway infrastructure and help protect the environment;
- Improve roadways vital to national energy security; and
- Address the impact of population growth on the movement of people and freight.

National Highway Performance Program

The National Highway Performance Program (NHPP) guides activities related to the condition and performance of the National Highway System (NHS) and provides funding for the construction of new facilities on the NHS. It ensures that investments of federal-aid funds in highway construction are directed to support progress toward the achievement of performance targets established in a state's asset management plan for the NHS. The Fast Act continues all prior NHPP eligibilities, and added four new eligible categories:

- Installation of vehicle-to-infrastructure communication equipment [23 U.S.C. 119(d)(2)(L)];
- Reconstruction, resurfacing, restoration, rehabilitation, or preservation of a bridge on a non-NHS Federal-aid highway (if Interstate System and NHS Bridge Condition provision requirements are satisfied) [23 U.S.C. 119(i)];
- A project to reduce the risk of failure of critical NHS infrastructure (defined to mean a facility, the incapacity or failure of which would have a debilitating impact in certain specified areas) [23 U.S.C. 119(j)(3)]; and
- At a state's request, the U.S. DOT may use the state's STBG funding to pay the subsidy and administrative costs for TIFIA credit assistance for an eligible NHPP project or group of projects [23 U.S.C. 119(h)].

Surface Transportation Program

The Surface Transportation Program (STP) provides flexible funding for: projects on any Federal-Aid highway, bridges on public roads, bridge and tunnel inspection, and inspector training. Eligible freight projects also include bridge clearance increases to accommodate double-stack freight trains, capital costs of advanced truck stop electrification systems, freight transfer yards, and truck parking facilities.

Highway Safety Improvement Program

The Highway Safety Improvement Program (HSIP) is a Federal-aid program with the purpose of achieving a significant reduction in traffic fatalities and serious injuries on all public roads, including non-State-owned roads and roads on tribal land. The HSIP requires a data-driven, strategic approach to improving highway safety on all public roads with a focus on performance.

The HSIP consists of three main components, the Strategic Highway Safety Plan (SHSP), State HSIP or program of highway safety improvement projects and the Railway-Highway Crossing Program (RHCP), In addition, some states also have a High Risk Rural Roads (HRRR) program if they had increasing fatality rate on rural roads.

Railroad Rehabilitation and Improvement Financing Program

The Federal Railroad Administration's (FRA) Railroad Rehabilitation and Improvement Financing (RRIF) Program seeks to support railroads in improving or modernizing intermodal and rail equipment and for updating or developing new facilities. The U.S. DOT is anticipating that this program will help to improve railroad connections between port facilities and the landside transportation network.

Transportation Infrastructure Finance and Innovation Act

The Transportation Infrastructure Finance and Innovation Act (TIFIA) provides federal credit assistance in the form of direct loans, loan guarantees, and standby lines of credit to finance surface transportation projects of national and regional significance. The goal of TIFIA financing is to leverage federal resources and stimulate private capital investment in transportation infrastructure by providing credit assistance in the form of direct loans, loan guarantees, and standby lines of credit to projects of national or regional significance. TIFIA financing is available for large-scale public or private transportation projects. The program is aimed at large projects with a minimum value of approximately $50 million. The maximum TIFIA-financed portion is 33 percent and is administered by the USDOT's TIFIA Joint Program Office.

Congestion Mitigation and Air Quality Program

The Congestion Mitigation and Air Quality (CMAQ) Program provides a flexible funding source to state and local governments for transportation projects and programs to help meet the requirements of the Clean Air Act. CMAQ money supports transportation projects that reduce mobile source emissions in areas designated by the U.S. Environmental Protection Agency (EPA) as nonattainment or maintenance of national ambient air quality standards. Eligible activities include those related to rail intermodal freight transportation improvements. To be eligible for funding, the project must reduce emissions of criteria pollutants for which the area is in non-attainment. CMAQ funding is administered jointly by the FHWA and FTA and is allocated among the states based on the severity of their air quality status.

Funding Strategy: Strategic Use of (freight-specific) Federal Formula Funds

National Highway Freight Program (NHFP) : With the passage of the federal FAST ACT, the MAP-21 Section 1116 'enhanced match' provision was replaced by a National Highway Freight Program (NHFP) that provides freight-specific funds for improvements specified in federally-approved state freight plans. NHFP funds are available to state via formula. In Georgia the figures are as follows:

- FY 16: **$36,048,979*** source: www.fhwa.dot.gov/legsregs/directives/notices/n4510802/n4510802_t1.cfm
- FY 17: **$36,048,979*** source: www.fhwa.dot.gov/legsregs/directives/notices/n4510807/n4510807_t1.cfm
- FY 18: **$39,137,660*** source: www.fhwa.dot.gov/legsregs/directives/notices/n4510819/n4510819_t1.cfm
- FY 19: **$44,241,929** (estimate)* source: www.fhwa.dot.gov/fastact/estfy20162020apports.pdf
- FY 20: **$49,157,698** (estimate)* source: www.fhwa.dot.gov/fastact/estfy20162020apports.pdf
- FY 21: **$48,591,911** (estimate)** source: https://www.fhwa.dot.gov/fastact/fy2021comp.pdf?revised
- FY 22: **$43,884,167** (estimate)***

** NHFP Funding Amount calculated based on annual increase of 11.1 percent. The figures are before post-apportionment penalties, set asides, and sequestration.*

***FY 2022 NHFP estimate based on FY 2021 funding level.

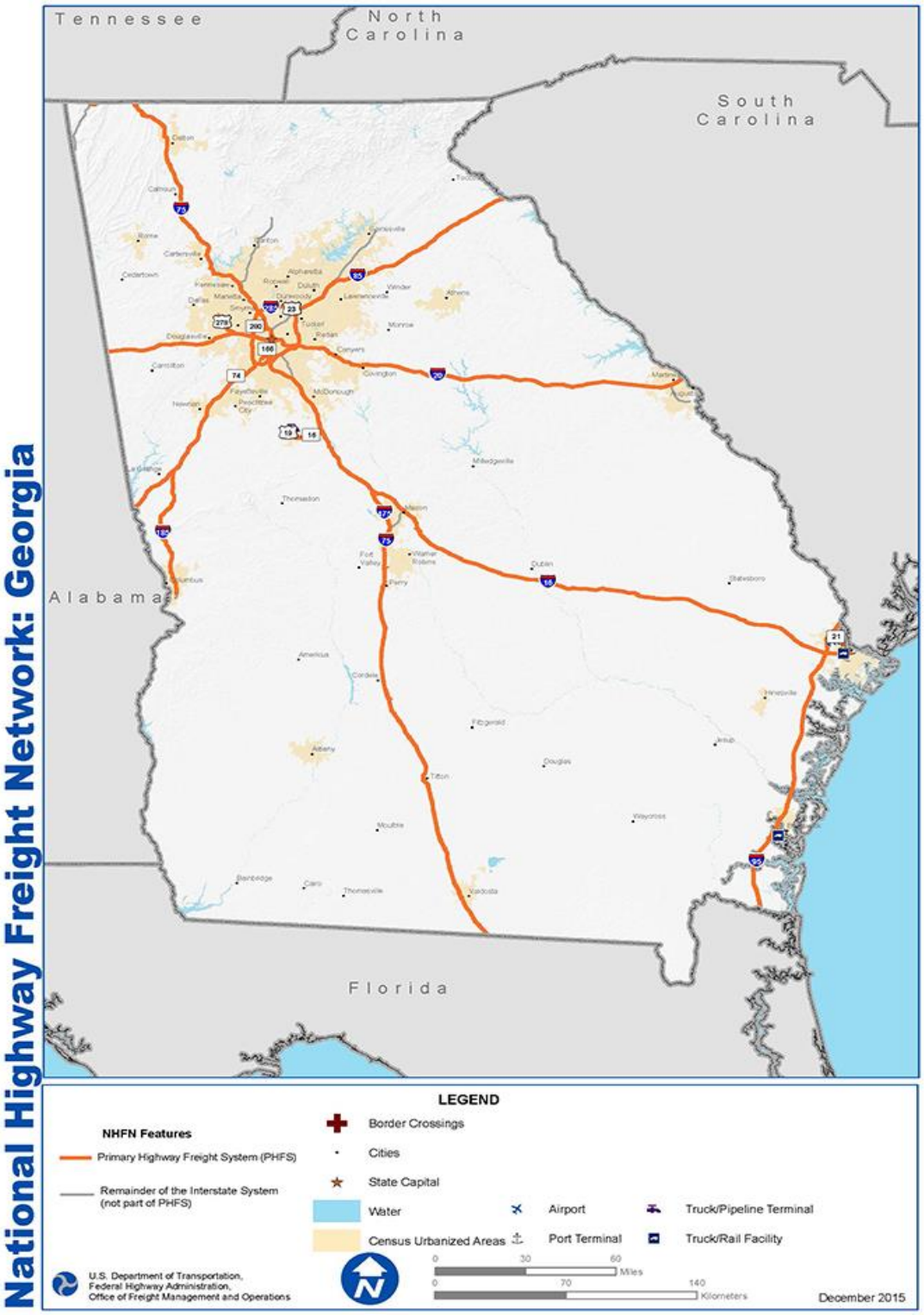
"Generally, NHFP funds must contribute to the efficient movement of freight on the NHFN and be identified in a freight investment plan included in the State's freight plan (required in FY 2018 and beyond). [23 U.S.C. 167 (i)(5)(A)] In addition, a State may use not more than 10% of its total NHFP apportionment each year for freight intermodal or freight rail projects. [23 U.S.C. 167 (i)(5)(B)] Eligible uses of program funds are as follows:

- *Development phase activities, including planning, feasibility analysis, revenue forecasting, environmental review, preliminary engineering and design work, and other preconstruction activities.*
- *Construction, reconstruction, rehabilitation, acquisition of real property (including land relating to the project and improvements to land), construction contingencies, acquisition of equipment, and operational improvements directly relating to improving system performance.*
- *Intelligent transportation systems and other technology to improve the flow of freight, including intelligent freight transportation systems.*
- *Efforts to reduce the environmental impacts of freight movement.*
- *Environmental and community mitigation for freight movement.*
- *Railway-highway grade separation.*
- *Geometric improvements to interchanges and ramps.*
- *Truck-only lanes.*

- *Climbing and runaway truck lanes.*
- *Adding or widening of shoulders.*
- *Truck parking facilities eligible for funding under section 1401 (Jason's Law) of MAP-21.*
- *Real-time traffic, truck parking, roadway condition, and multimodal transportation information systems.*
- *Electronic screening and credentialing systems for vehicles, including weigh-in-motion truck inspection technologies.*
- *Traffic signal optimization, including synchronized and adaptive signals.*
- *Work zone management and information systems.*
- *Highway ramp metering.*
- *Electronic cargo and border security technologies that improve truck freight movement.*
- *Intelligent transportation systems that would increase truck freight efficiencies inside the boundaries of intermodal facilities.*
- *Additional road capacity to address highway freight bottlenecks.*
- *Physical separation of passenger vehicles from commercial motor freight.*
- *Enhancement of the resiliency of critical highway infrastructure, including highway infrastructure that supports national energy security, to improve the flow of freight.*
- *A highway or bridge project, other than a project described above, to improve the flow of freight on the NHFN.*
- *Any other surface transportation project to improve the flow of freight into and out of an eligible intermodal freight facility. [23 U.S.C. 167(i)(5)(C)]*
- *Diesel retrofit or alternative fuel projects under the Congestion Mitigation and Air Quality Improvement program (CMAQ) for class 8 vehicles.*
- *Conducting analyses and data collection related to the NHFP, developing and updating freight performance targets to carry out section 167 of title 23, and reporting to the Administrator to comply with the freight performance target under section 150 of title 23. [23 U.S.C. 167(i)(6)]"* [110]

[110] Source: www.fhwa.dot.gov/fastact/factsheets/nhfpfs.cfm

Projects proposed to be funded with NHFP funds are limited to those located on the Federally-designated National Highway Freight Network ("NHFN") within the state:



Source: https://ops.fhwa.dot.gov/freight/infrastructure/ismt/state_maps/states/georgia.htm

Detailed map of the National Highway Freight System (NHFN) in Georgia:

Below are Georgia's candidate projects located on the National Highway Freight Network (NHFN):

CANDIDATE FREIGHT PROJECTS FY 2018 - FY 2022

TYPE	MAP ID	PI	PROJECT NAME	PE	ROW	CST & UTL
Interchange Reconstruction	A	0007386	I-75 @ CR 274/Lake Park - Bellville Rd Phase II – Exit 2	AUTHORIZED	AUTHORIZED	$17.63M STATE
	B	0012758	I-16 @ I-95 Interchange Reconstruction	AUTHORIZED	$2.6M FEDERAL	$144.4M FEDERAL
	C	0008613	I-16 @ CR 310/Old River Rd	AUTHORIZED		$9.32M STATE
	D	0007842	I-85 @ SR 138/Jonesboro Road DDI	AUTHORIZED	$9.99M FEDERAL	FY 2022-2029
	E	0008358	I-516 @ CS 1503/Derenne Avenue	$1.63M FEDERAL	$6.4M FEDERAL	LONG RANGE
	F	0010297	I-75 @ SR 31 Phase II	AUTHORIZED	AUTHORIZED	$22.29M FEDERAL
	G	0010298	I-75 @ SR 133 Phase II	$2M STATE	FY 2022-2029	FY 2022-2029
	H	0013104	I-85 @ CR 5640/McGinnis Ferry	AUTHORIZED	$4M LOCAL	$13.3M FEDERAL
	I	713300-	I-285 @ Bouldercrest Rd	AUTHORIZED	$20.18M FEDERAL	$46.16M FEDERAL
	J	0012698	I-85 @ SR 324	AUTHORIZED	AUTHORIZED	$12.38M FEDERAL
	K	0013546	I-285 @ SR 400; Inc CD Lanes & Abernathy Rd Interchange	AUTHORIZED	AUTHORIZED	$569.2M FEDERAL/ STATE/ LOCAL
	L	0013142	I-285 WB @ SR 6 Diverging Diamond Interchange	AUTHORIZED		$7.77M FEDERAL

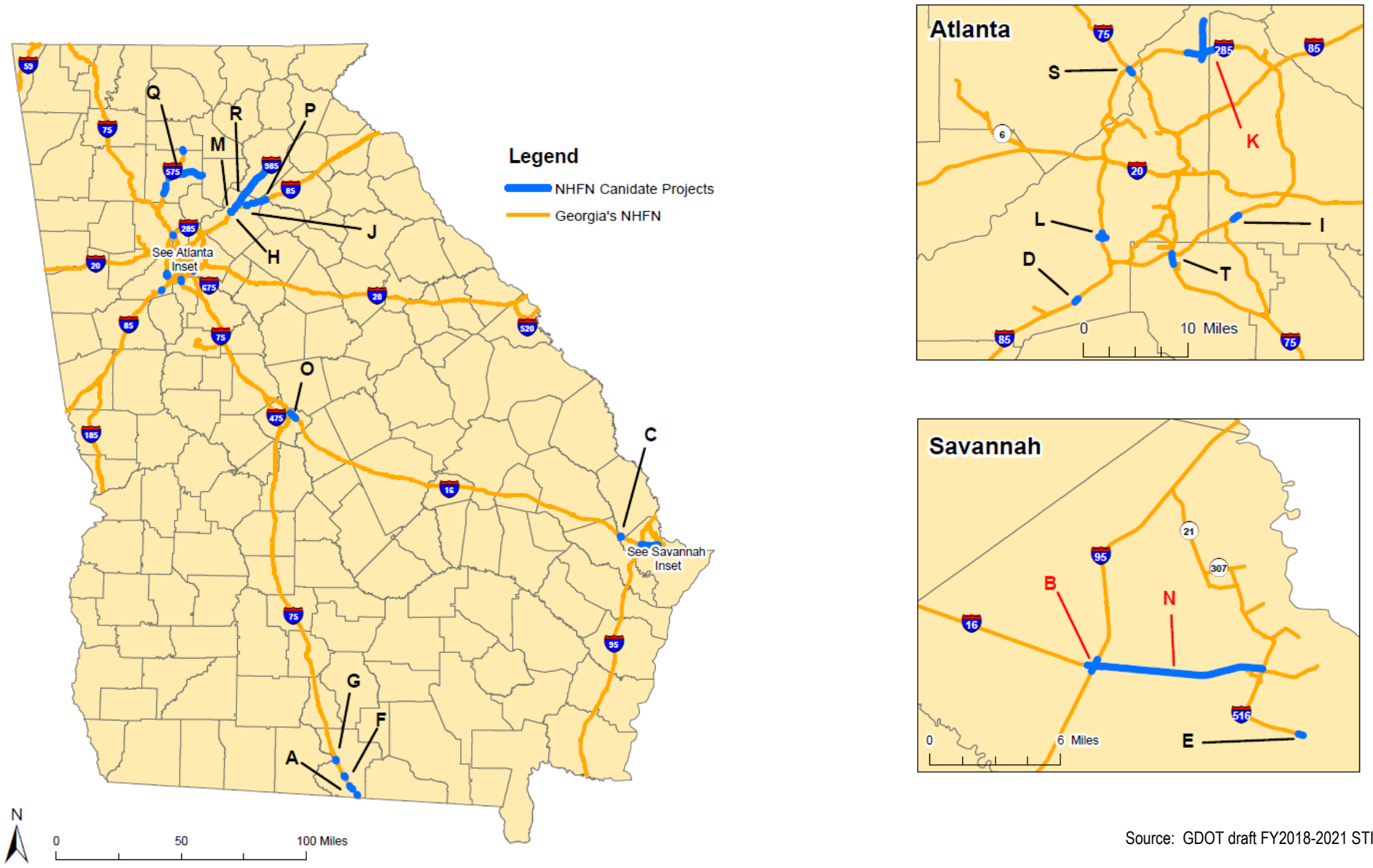
Source: GDOT draft FY2018-2021 STIP

CANDIDATE FREIGHT PROJECTS FY 2018 - FY 2022 (cont.)

TYPE	MAP ID	PI	PROJECT NAME	PE	ROW	CST & UTL
Widening	M	0014130	I-985 From I-85/Gwinnett To SR 53/Hall	$5M STATE		FY 2022-2029
	N	0012757	I-16 From I-95 To I-516	AUTHORIZED	$3.5M	FY 2022-2029
	O	0012701	I-16 WB From I-75 to Walnut Creek – Phase V			$97.81M FEDERAL
	P	110610-	I-85 From N Of CR 134/Hamilton Mill Road To N Of SR 211	AUTHORIZED		$105.1M FED/STATE
ITS	Q	0015765	I-575 From CS 698/Ridgewalk Pkwy/Cherokee To SR 372/Pickens	$0.03M STATE		$2.1M STATE
	R	0015766	I-985 From I-85/Gwinnett To N Of SR 365/Hall	$0.03M STATE		$1.7M STATE
Ramp	S	0015051	I-75 @ CR 2025/Akers Mill Rd New Express Lane Access Ramps	AUTHORIZED		$5.15M LOCAL
	T	713210-	I-75 NB CD System From SR 331 To I-285	AUTHORIZED	AUTHORIZED	$49.43M FEDERAL

Source: GDOT draft FY2018-2021 STIP

Location of the candidate projects eligible for NHFP funding:



Source: GDOT draft FY2018-2021 STIP

Consistent with its use of the FY 2016 and 2017 NHFP apportionments, GDOT proposes to apply its FY 2018, 2019, 2020 and 2022 NHFP funds to the I-285 @ SR 400 interchange reconstruction project. This design-build project is listed in Atlanta MPO's Long Range Transportation Plan and Transportation Improvement Program (TIP) as GDOT PI# 0013546. Its scope includes addition of collector-distributor lanes and other operational interchange modifications to more efficiently move traffic and trucks through this very congested portion of Atlanta's I-285 "Perimeter" bypass. (I-285 is vital to trucks because 'through' trucks are not allowed inside the I-285 'perimeter'; they are required to use I-285 to bypass the core of metro Atlanta.[111]) This project has broad local and state support; in fact, the adjacent Perimeter Community Improvement District (a private, self-taxing district) committed $10 million to the project[112]. Besides appearing on ATRI's annual list of nationally-ranked interchange bottlenecks, the I-285 @ SR 400 project is also one of the GDOT freight projects approved by FHWA to pursue 'enhanced funding match' provision previously available under MAP-21 Section 1116.

In FY 2021, GDOT proposes to apply its NHFP apportionment to the remainder to the I-16 @ I-75 interchange reconstruction Phase V (Map ID# 'O'). This project is listed in the Macon MPO's Long Range Transportation Plan and Transportation Improvement Program (TIP). The I-16/I-75 Interchange reconstruction project will improve the safety of the corridor by widening and reconstructing I-75 from Hardeman Avenue to Pierce Avenue and I-16 from I-75 to Walnut Creek within the City of Macon. The project will improve each of the interstate highways by constructing wider shoulders, concrete barriers and, in most locations, additional lanes I-16 @ I-75 interchange reconstruction Phase V is part of the National Highway Freight Network (NHFN) and eligible for NHFP funds, as seen in the table and map above (Map ID# 'O'). Please see the following table for a Summary of GDOT's proposed use of NHFP funds.

In FY 2022, if the I-285 @ SR 400 project does not require the totality of that fiscal year's NHFP funds, GDOT proposes to apply the remainder to the I-16 widening from I-95 to I-516 project in Savannah (PI# 0012757). The I-16 from I-95 to I-516 project is listed in the Savannah MPO's Long Range Transportation Plan and Transportation Improvement Program (TIP) and it experiences heavy truck volumes related to Port of Savannah freight movement. This project is eligible for NHFP funds and it is depicted on the map above (Map ID# 'N') and the "Candidate Freight Table" above as well.

[111] https://dps.georgia.gov/sites/dps.georgia.gov/files/related_files/site_page/07%20-%20Trucks%20Using%20Multi-Lane%20Highways.pdf

[112] http://perimetercid.org/projects

Summary of GDOT's proposed use of NHFP funds

Fiscal Year	GDOT Project ID Number and Description	Annual NHFP Funding Apportionment †	Federal NHFP Amount	State Funds Match Amount ‡	Total NHFP + State Match Programmed	Project Phase
2016	PI# 0000784: I-285 @ SR 400 Reconstruction Including C-D Lanes from Roswell Rd to Ashford Dunwoody Rd	$37,687,596*	$5,397,818	$1,349,454	$6,747,272	Right-Of-Way
	PI# 0013546: I-285 @ SR 400 Reconstruction Including C-D Lanes & Abernathy Road Interchange		$31,536,000	$7,884,000	$39,420,000	Construction
2017	" " "	$36,048,979*	$35,100,034	$8,775,009	$43,875,043	Construction
2018	" " "	$39,137,660*	$38,511,177	$9,627,794	$48,138,971	Construction
2019	" " "	$44,241,929*	$39,380,396	$9,845,099	$49,225,495	Construction
2020	" " "	$49,157,698*	$40,323,538	$10,080,884	$50,404,422	Construction
2021	PI# 0012701: I-16 WB from I-75 to Walnut Creek - Phase V	$48,592,911**	$47,920,621	$11,980,155	$59,900,776	Construction
2022	PI# 0013546: I-285 @ SR 400 Reconstruction Including C-D Lanes & Abernathy Road Interchange	$43,884,167***	$16,356,720	$4,089,180	$20,445,900	Construction
	PI# 0012757: I-16 from I-95 to I-516		$27,527,447	$6,881,862	$34,409,309	Construction

† Figures are before post-apportionment penalties, set asides, & sequestration. ‡ Please reference total state funding estimates from draft FY18-21 STIP (page 7-5)

* Source: www.fhwa.dot.gov/fastact/estfy20162020apports.pdf

** Source: https://www.fhwa.dot.gov/fastact/fy2021comp.pdf?revised

***FY 2022 estimate based on FY 2021 funding level.