

**2040 Statewide Transportation Plan /
2015 Statewide Strategic Transportation Plan:
Economic Impact of Investment Scenarios**
Technical Memorandum 6

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Georgia Department of Transportation

prepared by

Cambridge Systematics, Inc.

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1.0 Economic Impact of Alternative Investment Scenarios

The economic impacts of three investment scenarios were estimated as part of the 2040 SWTP/2015 SSTP investment tradeoff analysis. These scenarios included a Traditional Revenue Scenario (pre-Transportation Funding Act of 2015) which was constrained to \$44 billion over the plan horizon and a New Transportation Revenue Scenario (post-Transportation Funding Act of 2015) which was constrained to \$65 billion over the plan horizon. Both of these investment scenarios were aligned with an SSTP investment philosophy, with funding levels by investment program maximized to available revenue. Both of these scenarios were compared to the third, Current Spending Scenario, which was used as a baseline for comparison; this scenario carried forward the same funding allocations by investment program as applied today.

The spending by investment program reflected in each scenario is provided in Table 1.1 below.

Table 1.1 Spending by Investment Program

Investment Program	Current Spending Scenario	SWTP/SSTP Update Scenario 1: Traditional Revenue Scenario (SSTP Policy Emphasis)	SWTP/SSTP Update Scenario 2: New Revenue Scenario (SSTP Policy Emphasis)
	\$ / year (% Budget)	\$ / year (% Budget)	\$ / year (% Budget)
Safety	\$144M (9%)	\$160M (9%)	\$230M (9%)
Existing Pavement	\$277M (17%)	Interstate: \$280M (16%) Other NHS: \$230M (13%) Other FAS/GDOT: \$220M (13%)	Interstate: \$280M (11%) Other NHS: \$270M (10%) Other FAS/GDOT: \$520M (20%)
Existing Bridge	\$236M (14%)	\$235M (13%)	\$235M (9%)
Roadway Capacity	\$740M (45%)	\$340M (19%)	\$660M (25%)
Operations	\$78M (5%)	\$100M (6%)	\$145M (6%)
Transit Expansion	\$121M (7%)	\$160M (9%)	\$205M (8%)
Bicycle/Pedestrian	\$33M (2%)	\$35M (2%)	\$50M (2%)
Total Spending	\$1629 M/yr (\$42B)	\$1760 M/yr (\$44B)	\$2595 M/yr (\$65B)

The economic impact analysis was conducted on each of the three investment scenarios using four of the six investment programs – roadway capacity, roadway preservation, transit, and bicycle and pedestrian (bike/ped). The following summarizes the approach and findings of the economic impact analysis.

1.1 ECONOMIC IMPACT RESULTING FROM CAPACITY IMPROVEMENTS

Economic impacts of capacity improvements are driven by changes in total transportation costs for residents and businesses. Transportation cost changes arise from changes in travel time costs and vehicle operating costs. These direct changes are referred to as user benefits. Table 1.2 displays the estimated total user benefits arising from capacity spending for each of the investment scenarios in the year 2040. Delay savings capture the value of travel time savings arising from increased capacity and decreased congestion. Vehicle operating costs savings capture the value of fuel and non-fuel (i.e., tires and other maintenance) savings.

Table 1.2 Estimated Monetary Value of Travel Efficiency Gains Accruing to Highway Users due to Capacity Investments in the State of Georgia
2040

Scenario	Road Capacity Funding Level	User Benefits (in Millions of 2014\$)		
		Average Annual Delay Savings (1)	Average Annual Vehicle Operating Cost Savings (2)	Total Average Transportation Cost Savings (1) + (2)
Current Spending Scenario	\$740M	\$35.2	\$47.0	\$82.2
Traditional Revenue Scenario	\$340M	\$39.0	\$62.0	\$101.0
New Revenue Scenario	\$660M	\$48.1	\$62.0	\$110.1

The transportation cost savings are allocated across industry sectors and households and used as input into GDOT’s Regional Economic Model Inc. (REMI) economic simulation model. The model estimates the total economic impact arising from lower transportation costs. Table 1.3 presents the results for the plan

horizon year of 2040. These are changes to 2040 baseline economic projections¹ developed as part of the 2040 SWTP/2015 SSTP; as such, they represent a “snapshot” of economic impact in the year 2040. Table 1.3 also presents the cumulative impact across the 2016-2040 plan period.

Total employment reflects total new, permanent jobs. Gross State Product (GSP) measures the overall size of the state’s economy.

¹ See summary Table 1.9 for baseline economic projections developed as part of 2040 SWTP / 2015 SSTP.

Table 1.3 Estimated Economic Impact Attributable to Capacity Improvements in the State of Georgia

Scenario	Road Capacity Funding Level	Impact in 2040			Cumulative Impact over the Plan Horizon (2016-2040)		
		Employment (Permanent Jobs)	Gross State Product (in Millions of 2014\$)	Personal Income (in Millions of 2014\$)	Employment (Average Annual Permanent Jobs)	Gross State Product (in Millions of 2014\$)	Personal Income (in Millions of 2014\$)
Current Spending Scenario	\$740M	355	\$45	\$24	954	\$2,883	\$1,888
Traditional Revenue Scenario	\$340M	436	\$54	\$29	1,172	\$3,539	\$2,320
New Revenue Scenario	\$660M	476	\$59	\$32	1,277	\$3,860	\$2,527

1.2 ECONOMIC IMPACT OF ROADWAY PRESERVATION SPENDING IN THE STATE OF GEORGIA

Pavement condition can affect highway users in several ways. Pavement roughness affects not only riding quality, but also fuel consumption, tire wear, maintenance and repair costs, and in the end, the life of the vehicle. It can also affect road users' travel time and safety. This analysis estimates the additional vehicle operating costs (VOC) related to business travel (i.e., auto and truck trips) due to deteriorating pavement in the state of Georgia and their impact in the state economy based on the three investment scenarios.

The average per-mile costs of fuel consumption, repair and maintenance, and tire wear for passenger cars are estimated based on the American Automobile Association (AAA) figures for three size categories of sedans (i.e., small, medium and large sedans), four wheel-drive sport utility vehicles (SUV) and minivans (see Table 1.4).

Table 1.4 Vehicle Operating Costs for Passenger Cars (cents/mile) nationwide
2014

Operating Cost	Small Sedan	Medium Sedan	Large Sedan	4WD Sport Utility Vehicle	Minivan	Average (in 2014\$)	% of Total
Fuel Consumption	9.18	10.87	13.58	14.6	13.65	12.38	66%
Repair and Maintenance	4.68	5.20	5.46	5.65	5.19	5.24	28%
Tire Wear	0.68	1.11	1.15	1.38	0.84	1.03	6%
Total	14.54	17.18	20.19	21.63	19.68	18.64	100%

Source: American Automobile Association (AAA). *Your Driving Costs, 2015 Edition*.

The REMI model is used to estimate the economic impact associated with the increased VOC due to deteriorating pavement conditions in the State of Georgia. This included estimating the total economic impacts for residents and businesses and overall economic growth/reduction in terms of jobs, income and GSP. The results are presented in Table 1.5 and Table 1.6

Table 1.5 Additional Vehicle Operating Costs Accruing to Highway Users due to Deteriorating Pavement Conditions in the State of Georgia 2040

Scenario	Total Pavement Funding Level	Baseline Vehicle Operating Costs in 2040	Changes in User (2014\$)		
			Private Automobile Business Travelers (1)	Commercial Vehicles (2)	Total Vehicle Operating Costs (1) + (2)
Current Spending Scenario	\$277M	\$503,500,346	\$26,028,413	\$477,471,933	\$503,500,346
Traditional Revenue Scenario	\$730M	\$150,488,519	\$18,217,617	\$334,794,211	\$353,011,827
New Revenue Scenario	\$1,070M	\$100,727,900	\$20,414,874	\$382,357,573	\$402,722,466

Table 1.6 presents economic impacts in the year 2040 (as changes to 2040 baseline economic projections developed as part of the 2040 SWTP/2015 SSTP) and the cumulative economic impact over the plan horizon, across each scenario.

Table 1.6 Estimated Economic Impact Attributable to Pavement Spending in the State of Georgia

Scenario	Total Pavement Funding Level	Impact in 2040			Cumulative Impact over the Plan Horizon (2016-2040)		
		Employment (Permanent Jobs)	Gross State Product (in Millions of 2014\$)	Personal Income (in Millions of 2014\$)	Employment (Average Annual Permanent Jobs)	Gross State Product (in Millions of 2014\$)	Personal Income (in Millions of 2014\$)
Current Spending Scenario	\$277M	-2,181	-\$270	-\$145	-9,300	-\$26,474	-\$16,693
Traditional Revenue Scenario	\$730M	1,529	\$189	\$102	6,779	\$19,400	\$12,176
New Revenue Scenario	\$1,070M	1,743	\$216	\$116	7,400	\$21,135	\$13,290

1.3 ECONOMIC IMPACTS ARISING FROM SPENDING ON NON-ROADWAY MODES

The non-roadway modes included in the analysis are transit and bike and pedestrian. For these non-highway modes, a benchmark approach is used. A review of recent relevant national studies on the economic impact of transit and bike/ped investments was conducted. From these studies, a ratio of impact per \$1 million in spending was developed and shown in Table 1.7.

Table 1.7 Benchmark Measures of Economic Impact of Transit and Bike/Ped per \$1 Million in Spending

Metric	Transit	Bike/Ped ²
Gross State Product	\$1.1 million	\$0.6 million
Income	\$0.4 million	\$0.3 million
Jobs	8	6

The economic impact of transit and bike/ped spending in Georgia is estimated by applying these benchmark measures to the proposed level of spending in each investment scenario (Table 1.8). Results are shown for 2040 and represent changes from 2040 baseline economic projections and, cumulatively, across the plan horizon (2016-2040).

² Impacts derived from national research associated primarily with stand-alone bicycle/pedestrian projects which were not associated with a corresponding roadway upgrade.

Table 1.8 Estimated Economic Impact of Transit and Bike/Ped Spending in Georgia

	Multimodal Funding Level	Impact in 2040			Cumulative Impact over the Plan Horizon (2016-2040)		
	Transit	Gross State Product (millions \$2014)	Income (millions \$2014)	Jobs	Gross State Product (millions \$2014)	Income (millions \$2014)	Jobs
Current Spending Scenario	\$121M	\$133	\$48	968	\$3,325	\$1,200	968
Traditional Revenue Scenario	\$160M	\$176	\$64	1,280	\$4,400	\$1,600	1280
New Revenue Scenario	\$205M	\$226	\$82	1,640	\$5,650	\$2,050	1640

	Multimodal Funding Level	Impact in 2040			Cumulative Impact over the Plan Horizon (2016-2040)		
	Bike/Pedestrian	Gross State Product (millions \$2014)	Income (millions \$2014)	Jobs	Gross State Product (millions \$2014)	Income (millions \$2014)	Jobs
Current Spending Scenario	\$33M	\$21	\$11	\$198	\$21	\$11	\$198
Traditional Revenue Scenario	\$35M	\$22	\$12	\$210	\$22	\$12	\$210
New Revenue Scenario	\$50M	\$32	\$17	\$300	\$32	\$17	\$300

1.4 SUMMARY

Table 1.9 presents a summary of the total estimated economic impacts of GDOT roadway capacity, pavement, and multimodal spending relative to the 2040 baseline forecast and cumulative over the plan horizon. Table 1.10 presents the expected annual savings/losses accruing to individual Georgia licensed drivers under the alternative investment scenarios.

Georgia's economy is projected to expand by an average annual rate of 2.3% through 2040³. As summarized below, under a Current Spending Scenario, Georgia will see negative economic impacts across all three economic metrics over the plan horizon; i.e., jobs, GSP, and personal income will not grow as fast as projections indicate. Further, increased transportation cost resulting from this investment scenario is estimated to represent, on average, an additional *expenditure* of nearly \$185 per Georgia licensed driver per year. In contrast, increased transportation spending under the Traditional Revenue Scenario with an SSTP investment focus are expected to yield \$145 in cost savings per year per Georgia licensed driver due to reduced congestion and better pavement quality. **Under the New Revenue Scenario with an SSTP Investment Focus, economic growth across all three key metrics is accelerated. Additionally, each Georgia licensed driver is anticipated to save nearly \$160 per year due to reduced congestion-related delays and improved pavement conditions.**

³ REMI economic projections conducted for 2040 SWTP/2015 SSTP

Table 1.9 Total Estimated Economic Impact of Alternative Investment Scenarios

	2040 Baseline ⁴	Impact in 2040			Cumulative Impact over the Plan Horizon (2016-2040)		
		Current Spending Scenario	Traditional Revenue Scenario	New Revenue Scenario	Current Spending Scenario	Traditional Revenue Scenario	New Revenue Scenario
Annual Employment	7.732 million	-648	3,545	5,037	-7,179	9,440	10,618
Gross State Product (in Millions of 2014\$)	\$845,752.75	-\$71.32	\$441.79	\$532.69	-\$20,245	\$27,361	\$30,677
Personal Income (in Millions of 2014\$)	\$644,320.68	-\$61.75	\$206.98	\$246.67	-\$13,594	\$16,108	\$17,884

⁴ REMI economic projections conducted for 2040 SWTP/2015 SSTP

Table 1.10 Estimated Annual Savings/Losses Accruing to Georgia Licensed Drivers under Alternative Investment Scenarios

	*Total Savings Resulting from Capacity Improvements over the Plan Horizon (2016-2040)	**Total Cost Resulting from Pavement Condition over the Plan Horizon (2016-2040)	Net Cost	Change in Transportation Cost (relative to the Current Spending Scenario)		Average Annual Change in Transportation Cost (relative to the Current Spending Scenario)	***Average Annual GA Licensed Drivers over the Plan Horizon	Annual Changes in Transportation Cost per Licensed Driver in GA
	(a)	(b)	(b) - (a)			(c)	(d)	(c)/(d)
	(in Millions of 2014\$)	(in Millions of 2014\$)	(in Millions of 2014\$)	(in Millions of 2014\$)		(in Millions of 2014\$)		(in 2014\$)
Current Spending Scenario	\$2,055	\$38,026	\$35,971	\$35,971 Losses		\$1,438.83	7,853,390	\$183 Losses
Traditional Revenue Scenario	\$2,525	\$10,245	\$7,720	-\$28,251 Savings		-\$1,130.03	7,853,390	-\$144 Savings
New Revenue Scenario	\$2,753	\$7,703	\$4,950	-\$31,020 Savings		-\$1,240.81	7,853,390	-\$158 Savings

Notes: *Total savings represent the monetary value of reduced delays and vehicle operating costs accruing to highway users from roadway capacity investments; **Total costs represent additional vehicle operating costs accruing to highway users due to poor pavement conditions; ***The historical average annual growth rate of licensed drivers in the state of Georgia, estimated based on historical data provided by the FHWA Highway Statistics Series 2009, 2010, 2011, 2012 and 2013, was used to project and estimate the average annual number of licensed drivers in the state over the plan horizon.