PRACTICAL STRATEGIES

FOR INCREASING MOBILITY IN ATLANTA

Reason

PART OF THE GALVIN PROJECT TO END CONGESTION

BY BARUCH FEIGENBAUM

Policy Study 422
August 2013

Acknowledgement

This policy study is the independent work product of Reason Foundation, a nonprofit, tax-exempt research institute headquartered in Los Angeles. This study is part of the Galvin Project to End Congestion, a project producing the solutions that will end traffic congestion as a regular part of life. To learn more about the Galvin Project, visit www.reason.org/areas/topic/mobility-project

Reason Foundation

Reason Foundation's mission is to advance a free society by developing, applying and promoting libertarian principles, including individual liberty, free markets and the rule of law. We use journalism and public policy research to influence the frameworks and actions of policymakers, journalists and opinion leaders.

Reason Foundation's nonpartisan public policy research promotes choice, competition and a dynamic market economy as the foundation for human dignity and progress. Reason produces rigorous, peer-reviewed research and directly engages the policy process, seeking strategies that emphasize cooperation, flexibility, local knowledge and results. Through practical and innovative approaches to complex problems, Reason seeks to change the way people think about issues, and promote policies that allow and encourage individuals and voluntary institutions to flourish.

Reason Foundation is a tax-exempt research and education organization as defined under IRS code 501(c)(3). Reason Foundation is supported by voluntary contributions from individuals, foundations and corporations. The views are those of the author, not necessarily those of Reason Foundation or its trustees.

Reason Foundation

Practical Strategies for Increasing Mobility in Atlanta

By Baruch Feigenbaum

Executive Summary

Metropolitan Atlanta's transportation system has reached a critical juncture. Its highway and transit systems have failed to keep pace with population growth and changing travel patterns, and the result is congestion and a lack of mobility.

As the Texas Transportation Institute has pointed out, Atlanta's average annual delay per auto commuter increased by 231 percent from 1982–2010, leading drivers to waste more than 142 hours in traffic and burn more than 63 million excess gallons of gasoline.

Meanwhile, a study from Brookings Institution has noted that only 37 percent of metro Atlanta residents have access to transit, and that only 3.6 percent of jobs in the metro area are transit-accessible.

Taken together, these problems have significant economic implications for Atlanta. For one thing, congestion and a lack of mobility reduce the effective size of the metropolitan area's labor market, since people are able to reach fewer jobs within a reasonable time. That reduces productivity and economic output, and damages Atlanta's competitiveness. It also shrinks people's circles of opportunity, limiting their possibilities in entertainment, recreation and social life.

This transportation plan aims to end traffic congestion as a regular part of life in metropolitan Atlanta and to dramatically increase the mobility of its residents. In trying to accomplish this, the plan does not focus solely on improving specific corridors or encouraging specific transportation modes. Rather, it prioritizes the development of a comprehensive highway and transit *network* for the entire region, outlines the practical strategies that can deliver such a network, and then identifies the projects that could make it a reality. Crucially, this plan also proposes an approach to funding its recommendations that requires *no new tax revenue*.

A Managed Lanes Network for Atlanta's Freeways

In the short run, simply adding lane-miles to the freeway network can ease traffic bottlenecks and reduce congestion. But simple capacity expansion is only a temporary solution. First, it is difficult (and expensive) to keep up with a metropolitan area's growth. Second, capacity expansion tends to induce additional demand for road space by encouraging drivers to satisfy previously unmet travel goals. Therefore, while this plan does propose 14 projects to add general-purpose lane capacity on Atlanta's freeways, capacity expansion of this sort does not play a major part in its strategy to reduce congestion and increase mobility.

Instead, this plan adopts a smarter approach, making the vast majority of new freeway lanes subject to dynamic pricing. While access to these *Managed Lanes* is free of charge for buses and vanpools, other drivers have to pay a variable toll to use them. That toll varies according to traffic conditions, which helps manage demand and keep traffic in the new lanes flowing smoothly at all times (as well as producing a new revenue stream). By arranging these Managed Lanes as a network across metropolitan Atlanta, consistent travel times can be guaranteed for transit users, carpoolers, and anyone willing to pay the requisite toll.

Establishing a Managed Lane network is already a major part of Atlanta's transportation infrastructure agenda. Accordingly, this plan updates HNTB Corporation's 2010 *Atlanta Regional Managed Lanes System Final Report* for the Georgia Department of Transportation (GDOT), taking into account which components of the network have already been built, are under construction, or are soon to break ground.

There are differences between the HNTB report and this plan, however. One key change is that this plan proposes using pylon barriers—not concrete ones—to separate Managed Lanes from the rest of the freeway. This has several advantages: first, they do not damage vehicles that need to cross the barrier in an emergency; second, they are less costly to install. This change, coupled with the effect of the recession and lower material costs in Georgia, allows this plan to revise the projected cost of the Managed Lane network down by 30 percent.

In addition, this plan only allows buses and vanpools toll-free access to the new, grade-separated Managed Lanes, whereas the HNTB report assumed toll-free access for cars carrying three or more people. This change will slightly increase the percentage of the network's costs that can be covered through toll revenue. On the other hand, due to lower vehicle-miles traveled growth rates and other factors, this plan counts on a somewhat smaller private sector contribution to the cost of the network (50, rather than 55, percent).

A map of the proposed Managed Lanes network, which unlike the HNTB report includes a north-south tunnel connecting I-675 and SR 400 and a new east—west bypass north of metropolitan Atlanta, can be seen on page 42. The total cost of the network, including the reconstruction of 19 associated freeway interchanges, is estimated at $16.5 billion over 30 years, with $7.5 billion of that coming from the private sector.

Creating an Arterial Highway Network

One area where this plan goes far beyond the Atlanta Regional Commission's existing long-range plan is in its proposals for a significantly upgraded arterial highway network to support Atlanta's over-burdened freeways. Such a network is essential in a low density, post-World War II metropolitan area like Atlanta, in which the central business district accounts for a tiny percentage of jobs and suburb-to-suburb commuting is the dominant pattern of travel.

As things stand, however, Atlanta lacks the effective grid of major arterial highways that in other Sunbelt metro areas provide the critical backbone of the transportation network. In fact, Atlanta's arterial system was never adequately developed and is today one of the least effective major metropolitan area networks in the country. This coupled with the fact that Atlanta's freeway system is predominantly radial in nature—that is, designed to feed traffic to and from the central business district—imposes a serious constraint on mobility.

Therefore, this plan proposes the use of grade separation, access management, intelligent transportation systems and strategic capacity expansion to upgrade 11 existing arterials into a network of *major primary arterials* that offer an alternative to the existing freeway network, at an estimated cost of $2.6 billion over 30 years. A map of the proposed network can be seen on page 51.

One feature of the proposed major primary arterial network worth noting is that the five new grade-separated interchanges on SR 141 would be *managed* underpasses or overpasses. Drivers would pay a small, variable toll to use the underpass and avoid waiting at the intersection; transit vehicles and some carpoolers would be able to use them for free. As with Managed Lanes, tolling these underpasses creates a revenue stream and allows demand to be managed so as to establish more-consistent and -reliable travel times.

How Will These Highway Improvements Be Funded?

In total, the highway and intelligent transportation systems aspects of this Atlanta plan, combined with similar plans for the rest of the state, will cost an estimated $29.9 billion over 30 years. Dedicating *all* of Georgia's gas tax revenue to transportation, removing gas tax exemptions and enacting a modest fee on electric vehicles will cover more than 85% of the total cost. The specific components of this package include the following:

- Shift the remaining quarter of the revenue from the 4 percent statewide gasoline sales tax from the general fund to transportation uses. This shift will generate $5.8 billion over 30 years.
- Dedicate the revenue from all special purpose local option sales taxes paid on gasoline to transportation. This change will generate $18.6 billion over 30 years.

- Eliminate all gas-tax exemptions for state vehicles. For state vehicles alone this will raise $1 billion over 30 years.

The additional revenues needed for the highway and intelligent transportation system proposals contained in this plan will come from the use of public-private partnerships to build Managed Lanes (generating $7.6 billion over 30 years), and all-electronic-tolling on Managed Lanes and Managed Arterials (generating $2.9 billion over 30 years). TIFIA loans will help finance a portion of the public resources, while Private Activity Bonds will help finance a portion of the private resources.

Establishing an Effective Transit Network

Just as metropolitan Atlanta lacks a grid of major arterial highways, so too it lacks a comprehensive grid network for transit users. The MARTA heavy-rail network, which resembles a plus sign, is far too core-focused to be useful to many commuters in a decentralized metropolitan area like Atlanta. Significantly expanding it, moreover, is an unaffordably expensive proposition—and most likely a losing one too, given that only one station on the *existing* network has a surrounding population density high enough to justify heavy rail service. Meanwhile, the metropolitan area's bus network is split between five different transit operators and displays little integration with MARTA rail service, inadequate route co-operation, differing fare structures, and patchy geographic coverage.

This plan proposes that rather than waste time pursuing additional rail lines, policy makers should refocus MARTA on maintaining and improving its existing network, and then invest in the construction of cost-effective bus lines. This should take two main forms. First, this plan recommends adding 120 new local bus routes in the 13-county Atlanta region. Second, this plan recommends adding at least 20 new bus rapid transit (BRT) and express bus lines and identifies the most promising corridors for such bus service (as shown on page 15).

In many respects, BRT is a low-cost alternative to heavy or light rail. Express bus, similarly, is a low-cost alternative to commuter rail. As a result, expanded express bus and BRT service would complement MARTA rail to create a far more effective transit grid network than currently exists.

Furthermore, expanding BRT and express bus creates an opportunity to take advantage of this plan's highway and intelligent transportation systems proposals. First, buses can use Managed Lanes free of charge. The guaranteed service levels and reliable travel times such lanes offer will be a considerable benefit to transit users. Second, this plan's arterial highway proposals include the use of transit-signal priority systems, queue jumps, and grade-separated underpasses and overpasses—all of which get transit vehicles through intersections faster, making transit travel times shorter and more reliable.

This plan also proposes three operational reforms to improve transit service in metropolitan Atlanta. First, in an effort to reduce costs *and* improve service, transit agencies should consider introducing contracting and competitive bidding across all their transit operations. Second, agencies should implement distance-based and time-of-day pricing. If structured correctly, this would increase ridership and revenue while also supporting more demand-responsive service provision. To offset potentially higher fares on some routes at some times, transit agencies should also consider offering vouchers to some low-income riders.

Finally, Atlanta policy makers should consider establishing a mobility management center (modeled on Denver's) to coordinate different agencies' services and technologies and ensure that they function together as an effective network. In the absence of a functioning free market in metropolitan transit, some entity needs to play this role.

How Will an Expanded Transit Network be Funded?

This plan recommends that metropolitan Atlanta's counties maintain their transit funding at current levels, and that this be supplemented with annual match grants totaling $66.6 million from the state government, which will help them to fund the expansion of local bus, express bus and bus rapid transit networks. This is accomplished without the need for any additional tax revenue by shifting funds from other departmental budgets to transit, where it will deliver more bang-for-the-buck.

Specifically, this plan recommends moving responsibility for funding transit from GDOT—where it will always play second fiddle to highways—to the Department of Community Affairs (DCA). DCA's transit program should then be given an annual budget of $120 million—enough to cover new match funding for bus network expansion, and the establishment of the mobility management center. It is beyond the scope of this research to determine exactly where in existing state budgets this funding should come from, but with an overall budget of $16 billion and recent revenue growth, the state should not find it difficult to redirect $120 million annually to supplement transit. Many agencies have seen large increases in state funding, or are expecting them between FY 2013 and FY 2015. Diverting parts of these increases to support transit service would in many instances represent a much better use of taxpayer resources.

Lastly, this plan encourages local governments and/or transit agencies to consider using value capture—likely through tax increment financing—to generate additional funding for bus rapid transit lines. This should raise at least $500 million over 30 years. Value capture could also be used to support MARTA rail, in combination with the existing MARTA special sales tax and, where necessary, grant anticipation notes.

Conclusion

The proposals contained in this plan would give metropolitan Atlanta the comprehensive highway and transit networks it needs without requiring any new tax revenue. The plan would strengthen the user-pay/user-benefit principle on Atlanta's roads, leverage significant private funds to deliver vital infrastructure, *and* give transit-dependent Atlantans faster, more extensive and more reliable service. This plan would reduce congestion and increase mobility, with all the economic and social benefits that entails.

Needless to say, this is a long-range plan. Delivering the projects proposed here could take as long as 30 years. But the time for decisive action is now; the sooner Georgia's policy makers get started on implementing this plan's recommendations, the better metropolitan life will be for all Atlantans.

Table of Contents

Figures

Tables

Part 1

Introduction

Metropolitan Atlanta's transportation system is at a critical juncture. The current system is inadequate. Both the highway and the transit systems feature partially built networks with limited options and no alternate routes. Atlanta also lacks a comprehensive transportation plan that all the region's political leaders accept. Further, as a result of the gas tax's declining purchasing power and the redirection of state monies away from transportation, funding is limited. And the first two factors make a solution to the funding problem that much more challenging. Inaction, however, is not improving Atlanta's transportation problems.

According to the *2012 Annual Urban Mobility Report* from the Texas Transportation Institute, it currently takes 23 percent longer to go somewhere during rush hour than to make the same trip by automobile outside of rush hour.[1] In 1982, it only took 8 percent longer to travel during rush hour. From 1982 to 2010, the annual delay per auto commuter grew from 13 hours to 43 hours, a stunning 231 percent increase. Freeway vehicle-miles traveled increased from 14.3 million miles to a record 49.5 million miles. And in 2010 commuters wasted more than 142 million hours in traffic and burned more than 63 million excess gallons of gasoline.[2]

Future prospects are not encouraging. These increases in delays occurred despite the Great Recession and despite a 10 percent unemployment rate in the Atlanta metro area during 2009 and 2010. When economic growth returns, delays will worsen. In 2030, delays are forecasted to be double those of 2013.[3]

Delays have serious economic costs beyond wasted time. The current level of congestion imposes significant costs on individuals, businesses and the regional economy. The *Urban Mobility Report* estimates that the 51 hours Atlanta commuters spend stuck in traffic each year amount to a cost of $1,120 per commuter of travel delay and excess fuel consumed for a total cost of $2.5 billion to metro Atlantans.[4] Since Atlanta is a logistics crossroads, traffic creates substantial freight delays. The total cost for trucks for 2010 totaled $775 million.[5]

Another major problem with mobility in Atlanta lies in its transit system. Transit users face a multitude of different agencies, some of which have different rules and fares. While progress has been made in transit-agency coordination, the transit network is mostly a collection of local city, county or two-county networks with poor connections. Cost cutting has eliminated buses for transit-dependent riders, and no transit agency, including the Metropolitan Atlanta Regional

Transit Authority (MARTA) and the state-run Georgia Regional Transportation Authority (GRTA), has a sustainable revenue stream.

Business leaders and transportation policy makers are concerned about mobility in the region. Both state and local plans establish transportation goals and direct federal, state and local money to specific projects.

A. Existing Transportation Plans in the Atlanta Region

The Atlanta region is governed by two major transportation plans:

- The Atlanta Regional Commission's (ARC) PLAN 2040 (ARC is the federally designated metropolitan planning organization [MPO] in the Atlanta region); and
- The Georgia Department of Transportation's (GDOT) 2010–2030 Statewide Strategic Transportation Plan.

PLAN 2040 "serves as both the regional transportation plan and regional comprehensive plan defining both transportation and land use policy and investment strategies to address regional needs across multiple planning emphasis areas," according to the ARC.[6] The plan consists of transportation, land use, environmental, economic, housing and human-services components.

In the plan, the ARC modeled three different transportation scenarios: ultra sprawl, concentrated growth and local policy.[7] The ultra sprawl scenario examined conditions if all of the region's growth occurred in rural areas, while the concentrated growth scenario examined conditions if all of the region's growth occurred inside the perimeter (defined by the I-285 beltway) and around transit stations. The local policy scenario balanced the ultra sprawl and concentrated growth scenarios.

After analyzing the three scenarios, the ARC eliminated the ultra sprawl scenario because travel distances and infrastructure construction costs would be "unsustainably longer." It also eliminated the constrained growth scenario because it would lead to "severe localized congestion and the highest congestion costs of any scenario." The constrained growth scenario also documented that land-use changes, no matter how severe, cannot improve transportation congestion on their own. The ARC chose to proceed with the local policy scenario, which is a middle ground between the constrained growth and the ultra sprawl scenarios with development patterns clustered around regional centers and somewhat higher densities in the rest of the metro area.

While the ARC had good reasons for choosing the middle road, there are two concerns about this policy. First, the challenge with "sprawl" is the increased infrastructure costs associated with lower density if residents do not pay the full costs. And while the local policy scenario reduces "sprawl," it does not eliminate it. Nevertheless, creating a system where infrastructure users pay by the mile is a better solution than creating arbitrary boundaries for development. The other problems

commonly associated with sprawl, such as farmland loss, limited access to water, and pollution, are exaggerated and can be managed through other programs.

Second, a component of the ARC's strategy—the Livable Centers Initiative (LCI)—may decrease both transit use and employment if implemented incorrectly. LCI encourages dense, mixed-use development in both the central city and the suburbs. It is more realistic than other schemes, which concentrate all development in the region's core. But LCIs and other transit-oriented developments (TODs) may harm low-income individuals. This is because incentivizing development in specific areas may induce high-income individuals to relocate to those areas but also force out low-income individuals either through demolition of their homes or through unaffordable increases in property taxes. These low-income individuals, who are often transit-dependent, may be forced to relocate to areas far from transit.

Such a scenario simply moves people around; it does not improve land use. The new high-income residential development is often significantly less dense than the lower-income housing it replaced. The high-income individuals use transit less than the low-income residents they displaced, and transit use decreases. Since the low-income, transit-dependent riders have lost access to transit, some former residents may no longer be able to access their jobs, thereby increasing unemployment and reducing economic activity. This outcome is not the intent of TODs, but TODs can in certain circumstances do more harm than good.

On a statewide basis, GDOT is implementing the 2010–2030 Statewide Strategic Transportation Plan, which covers both state and local projects. GDOT's plans are focused on improving mobility in three major areas:

1. **Statewide freight and logistics.** The plan seeks to invest $15 billion over the next 20 years in limited-access highways, rail capacity improvements, regional improvements and bottleneck removal.
2. **People mobility in metro Atlanta.** The plan adds a network of Managed Lanes in the Atlanta metro area.
3. **People mobility in the rest of the state.** The plan adds capacity on arterials and freeways for congestion relief and to improve safety.

Cities, counties, transit agencies and other state transportation entities have transportation plans that the MPO or GDOT examines. If these plans are feasible and have a realistic chance of receiving funds, they are incorporated into the MPO's long-range plan (PLAN 2040), its shorter-term metro area Transportation Improvement Program (TIP) and/or GDOT's State Transportation Improvement Program (STIP). Many different agencies/governments have transportation plans. Gwinnett County's has plans for new roads and bus service. In the Atlanta region, the State Road and Tollway Authority in cooperation with GDOT has plans for new toll lanes. GRTA has plans for enhanced regional bus service. MARTA has plans for expanded rail and bus service. The ARC and GDOT study these plans and either incorporate them into the long-range transportation plan—and when funding becomes available the TIP/STIP—or discard them.[8]

Since this report focuses on metro Atlanta, the following section more closely examines the funding in PLAN 2040. The plan breaks funding into three main categories: system modernization, demand management and system expansion.[9] Tables 1 and 2, below, display both the funding totals and percentages for each level of government and transportation category.

Table 1: PLAN 2040 Funding for Major Program Areas in Millions of 2012 Dollars

Project Types	Federal	State	Local	Private	Totals
System Modernization					
Transit	3,297	355	19,184		22,836
Roadway/Bridge Preservation	8,884	5,189	2,333		16,406
System Optimization and Safety	1,504	231	1,819		3,554
Demand Management					
Bicycle and Pedestrian	911	6	666		1,583
Other Programs/Initiatives	468	11	94		573
System Expansion					
Managed Lanes Expansion	994	1,181		3,177	5,353
Transit Expansion	999	305	2,035	150	3,490
Roadway Expansion	4,670	1,047	1,456		7,173
Totals	21,727	8,325	27,588	3,327	60,967

Source: Atlanta Regional Commission, PLAN 2040

Table 2: PLAN 2040 Percentage Share of Funds

Project Types	Federal	State	Local	Private	Overall Share of Total
System Modernization					
Transit	14.4	1.6	84		37.5
Roadway/Bridge Preservation	54.1	31.6	14.2		26.9
System Optimization and Safety	42.3	6.5	51.2		5.8
Demand Management					
Bicycle and Pedestrian	57.5	0.4	42.1		2.6
Other Programs/Initiatives	81.7	1.9	16.4		0.9
System Expansion					
Managed Lanes Expansion	18.6	22.1		59.3	8.8
Transit Expansion	28.6	8.7	58.3	4.3	5.7
Roadway Expansion	65.1	14.6	20.3		11.8
Total % of Funding per Governmental Level	35.6	14.6	45.3	5.5	100

Source: Author's calculations based on PLAN 2040

PLAN 2040's $61 billion price (in 2012 dollars) is fiscally constrained and meets all federal and state guidelines, but its impact on congestion reduction will be minimal. And the plan is only feasible assuming federal transportation funding continues at its current level, which may be unsustainable.

PLAN 2040 has many positive aspects. It spends more than 70 percent of its funds on crucial maintenance, operation and efficiency improvements to current infrastructure (system modernization). These projects include road resurfacing, bus replacement and Intelligent Transportation Systems (ITS) signal timing and maintenance. System expansion, which totals 26 percent of spending, includes expanding Managed Lanes, general roadways and transit. Of this amount, PLAN 2040 spends about 45 percent on projects that expand highways, about 33 percent on projects that expand both highways and transit, and about 22 percent on projects that expand transit.

PLAN 2040 also has several negatives. It is based on the ARC's Concept 3 transit vision that tries to be all things to all people. First, Concept 3's $16 billion cost is not fiscally constrained.[10] Second, its cost estimates are on the low side. For example, Concept 3 estimated that the full Atlanta BeltLine loop would cost $840 million. A later ARC report, however, estimated the cost of two small sections of it at more than $600 million.[11]

Third, the report recommends extensive commuter-rail extensions without realistic cost forecasts. The rail tracks in Atlanta are owned by two freight operators: Norfolk-Southern and CSX. Freight-rail companies typically give priority to their trains over passenger-rail operators. For commuter rail to be viable, a passenger-train operator would have to pay to lease the tracks and develop a track sharing joint-scheduling operation with the owners. Today, many of the current single-tracked lines have little room for additional trains. Many of these single-track sections would have to be double tracked, which would require using eminent domain to purchase highly valued land. Additionally, some of these track sections are deficient for passenger rail and would have to be rebuilt. None of these costs—leasing, rebuilding or double-tracking—are included in Concept 3.

Fourth, while metro Atlanta needs to expand its bus operations, some of the proposals are not realistic. For example, the suburban bus routes from Acworth to Peachtree Corners, from Canton to Gwinnett Place Mall, and from Marietta to Lawrenceville on local unimproved arterial roads are each estimated to take almost two hours during rush hour.[12] Concept 3 did not include any ridership projections. It is doubtful these buses would secure significant ridership.

Finally, while PLAN 2040 is a good start, it does not do nearly enough to relieve congestion or improve mobility.

B. A Different Approach

This report takes a different approach to solving Atlanta's transportation challenges. Many long-range plans written by both state DOTs and MPOs are corridor-focused: they emphasize making specific improvements to specific roads. This Reason Foundation transportation plan takes a different approach by prioritizing the development of a highway and transit network and then selecting the individual projects needed to build that network. This plan does not achieve radically different results; most of the projects outlined here are also in PLAN 2040. By focusing on the

county, region and state and not on one specific road or transit line, however, our plan adds projects necessary to create a comprehensive network.

The Reason Foundation plan also addresses the biggest problem of any transportation plan: funding. It dedicates transportation revenue to transportation purposes and frees up significant additional funding. Additionally, it provides a roadmap with specific steps that detail how Georgia can better spend its resources by leveraging public funds with private funding sources to maximize the benefits of public fund expenditures.

Finally, this transportation plan builds on Reason's previous report on mobility in Atlanta— *Reducing Congestion in Atlanta: A Bold New Approach to Increasing Mobility* by Robert W. Poole, Jr.— by including updated projected costs, a greater focus on transit and specific implementation details.

C. The Interrelated Nature of Highways and Transit

Traditionally, more liberal groups have favored constructing mostly transit facilities while more conservative groups have favored building highways. Major metro areas such as Atlanta need both, which requires a comprehensive road strategy and a comprehensive transit strategy. While highways and transit have been pitted against each other, the two can complement each other. New Managed Lanes on freeways provide a guaranteed travel time to carpoolers, vanpoolers, bus riders and express bus/bus rapid transit (BRT) riders, as well as solo commuters. Bus pullouts and turn lanes shared with cars on arterial roads allow buses to use traffic-signal prioritization to avoid waiting at intersections. These features give buses shorter travel times and more reliable schedules. Better bus service can also reduce travel times for cars on the existing road if it attracts some drivers out of their cars. Traffic-signal synchronization can decrease travel times for both transit customers and drivers. And proper maintenance of the MARTA heavy-rail system is critical to keeping the system in good working order and eliminating more expensive maintenance over the long-term.

Highway and transit groups need to work together to solve the region's transportation problems. Highway proponents need to consider that continually widening highways without adjusting pricing has limited effectiveness. Transit proponents need to consider that for the cost of building two or three rail-transit lines, Atlanta could build a comprehensive, region-wide BRT network.

Plan 2.0's detailed recommendations include:

- **A comprehensive highway and arterial network.** This network would have a Managed Lane network on freeways; a primary arterial network, with major corridors converted to Managed Arterials; and other, targeted expansions (e.g., missing links or roads needed to complete a roadway network).

- **A comprehensive transit network.** Existing MARTA heavy-rail service, enhanced local bus service, express buses and BRT would operate in a network.

The lack of a quality transportation system is a major problem in metro Atlanta. The ARC's Plan 2040 is a good start, but aspects of the local option growth plan, the Livable Centers Initiative and especially the Concept 3 transit plans do not represent the best options for metro Atlanta. This Reason Foundation transportation plan can help solve Atlanta's congestion and mobility problems by employing a regional instead of a corridor focus. Further, this plan has a realistic funding source and works to integrate highways and transit.

Part 2

A Lack of Mobility

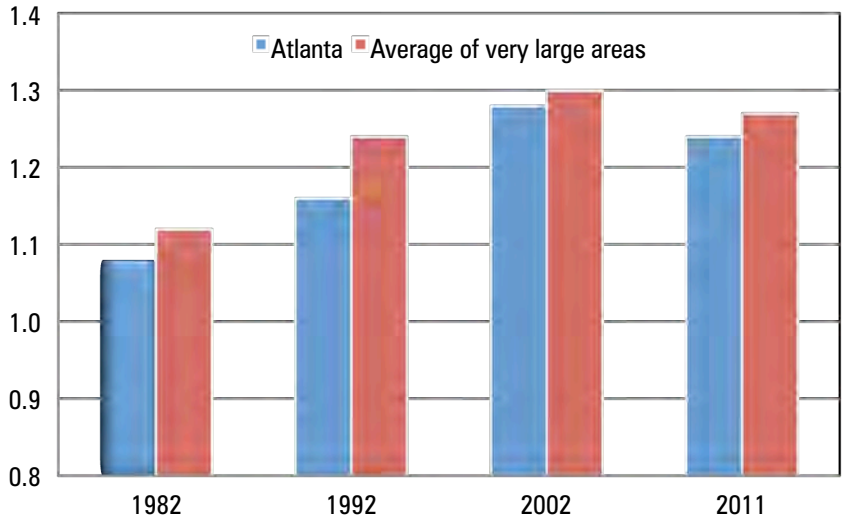
Despite the economic recession and stabilizing vehicle-miles traveled, most metro Atlanta highways remain very congested. This occurs in Atlanta for three main reasons. First, the expansion/reconstruction of freeways and arterial roads has not kept pace with growth. Second, politics has prevented road construction in needed areas and required it in unneeded areas. Third, some cities do not consider elimination of congestion a priority. But while congestion is often a sign of an economically successful metro area, the failure to tackle it can significantly harm the metro area's economic prosperity going forward.

Moreover, despite increased interest in transit, metro Atlanta transit service continues to be a patchwork of systems that fails to form a connected network. This occurs for two reasons. First, metro Atlanta has weak transit service that offers fewer routes today than ten years ago. Second, politics has prevented transit expansion in needed areas and required it in unneeded areas. Third, by waiting for more expensive rail lines, many policy makers are forgoing the more immediate construction of cost-effective bus lines. While transit will never be used by a majority of metro Atlanta residents, a lack of cost-effective transit limits economic prosperity.

A. Major Congestion

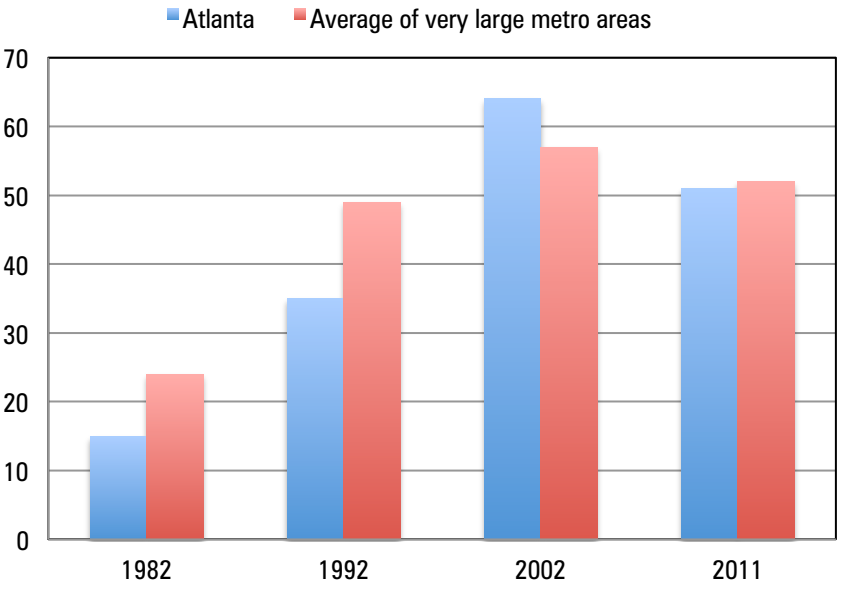
Traffic congestion was not always a major problem for Atlanta. During the 1970s and 1980s, despite substantial growth, Atlanta's congestion was modest for a very large metro area (one with more than three million people), as indicated in Figures 1 and 2, below. While Atlanta's travel-time index was significantly less than the national average in 1982 and 1992, it exceeded the national average in 2002 and 2011. And while the delay per peak traveler decreased between 2002 and 2011, the delay was much higher in 2011 than in 1982 or 1992. The biggest problem is that Atlanta's population has grown much faster than its highway system has grown. Also, as the metro area's population has dispersed and residents' travel patterns have changed, Atlanta has not updated its road network to serve these new travel patterns.

Figure 1: Growth in Atlanta's Travel-Time Index



Source: Graph composed from data in the Texas Transportation Institute's 2012 Annual Urban Mobility Report

Figure 2: Growth in Atlanta's Delay per Peak Traveler (Hours of Delay)



Source: Graph composed from data in the Texas Transportation Institute's 2012 Annual Urban Mobility Report

Congestion is at its worst during the peak weekday travel periods typically defined as from six to 10 o'clock in the morning and from three to seven o'clock in the evening. Some days, morning rush hour can linger beyond 10 o'clock, and evening rush hour can begin at two and last until eight. While work-to-home trips often make up fewer than 50 percent of peak-period trips, they are the focus of most commuting studies since these trips must be made during rush hour.[13] Table 3 shows how Atlanta residents made their work trips in 1990, 2000 and 2010.

Table 3: Work-Trip Distribution in 1990, 2000 and 2010

Travel Mode	1990 Share (%)	2000 Share (%)	2010 Share (%)	Mean 2010 Travel Time (in minutes)
Drive Alone	78.0	77.0	77.6	28.8
Carpool	12.7	13.6	10.3	33.5
Public Transit	4.6	3.5	3.4	51.8
Bicycle	0.1	0.1	0.2	N/A
Walk	1.5	1.3	1.3	N/A
Work at Home	2.2	3.5	5.8	N/A

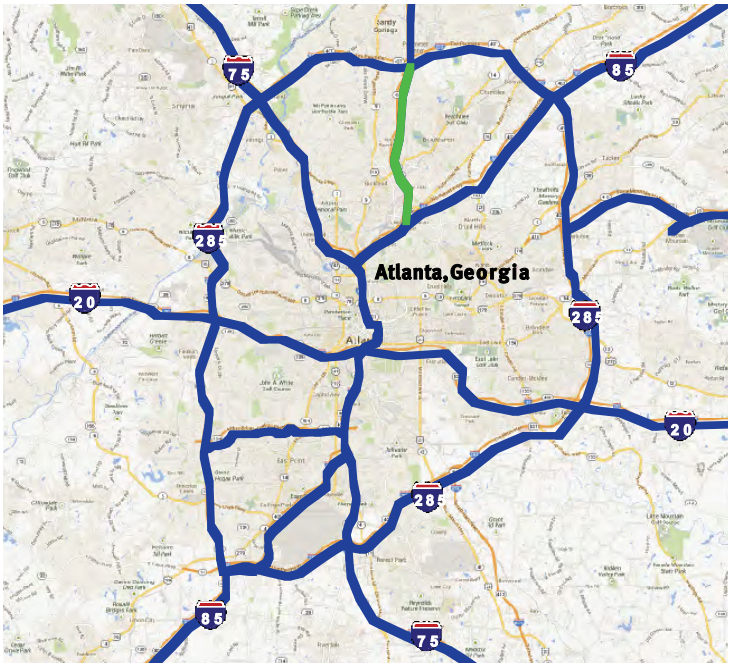
Source: American FactFinder Community Survey, United States Census Bureau

Auto travel continues to dominate: almost 90 percent of workers commute by car.[14] Despite congestion, driving typically provides the fastest trip. Further, because of the automobile-oriented growth in cities such as Atlanta, the central business district accounts for a tiny percentage of jobs. Instead, suburb-to-suburb commuting continues to be the dominant pattern. Atlanta's transportation system is designed more for the Atlanta of 1960, however, than the Atlanta of 2020. Moreover, the city's long-range transportation plans do little to support 21st century commuting patterns, as both the freeway and rail-transit systems are predominantly radial in nature—that is, designed to transport commuters to and from the traditional central business district.

Some 1,500 freeway-miles have been added to the urban area since 1970, with I-285 providing the only suburb-to-suburb connections. Further, Atlanta lacks a grid of major arterial highways, which in other Sunbelt metro areas provides the critical backbone of the transportation network. In other words, Atlanta is one of the least core-oriented urban areas in the world with one of the most core-oriented transportation systems.[15]

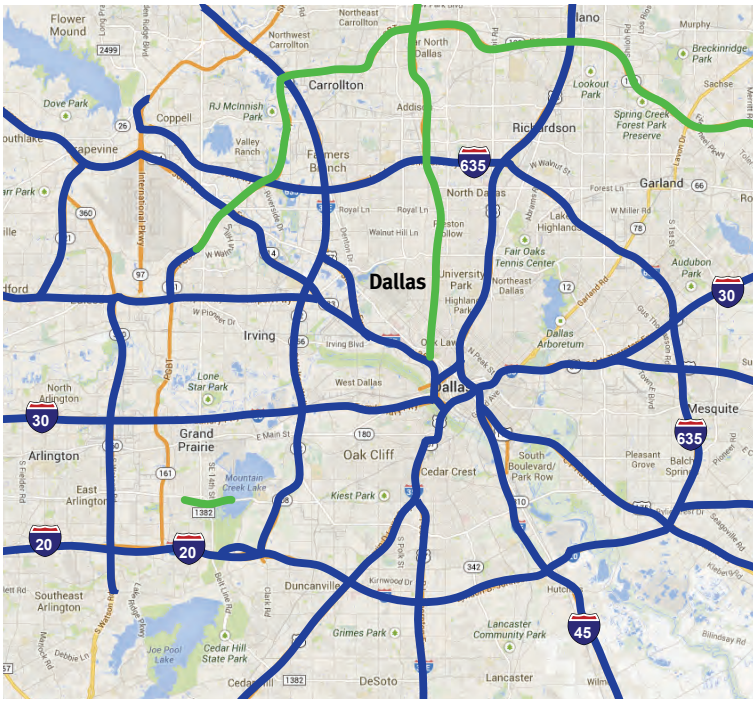
Figures 3, 4 and 5 compare Atlanta's freeway system with those of other post-World War II metro areas. These metro areas have better suburb-to-suburb connectivity due to a more extensive freeway network and a more complete grid of arterials.

Figure 3: Atlanta



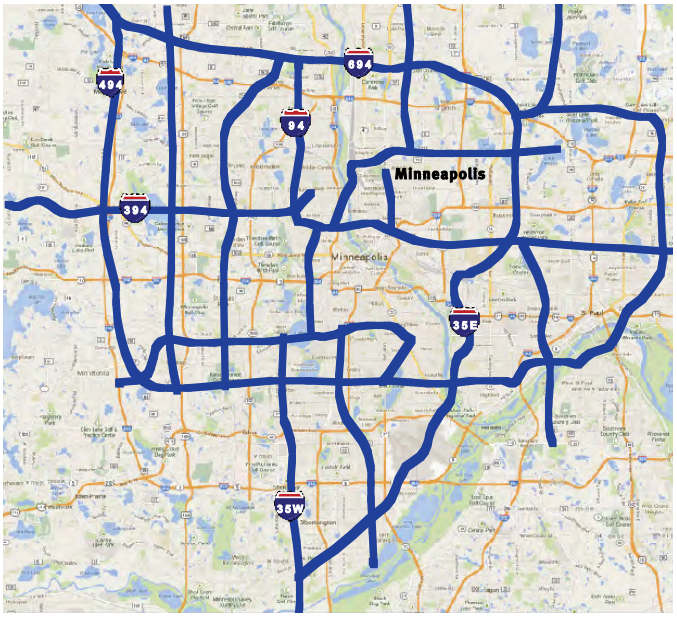
Source: Google Maps

Figure 4: Dallas



Source: Google Maps

Figure 5: Minneapolis



Source: Google Maps

Table 4, below, compares metro Atlanta's freeway and arterial systems with those of other similar post-World War II metro areas. This table displays the metro population, the lane-miles and vehicle-miles traveled (VMT) on both the freeway and arterial networks, and the VMT per lane-miles.

Table 4: Comparative Data on Freeways and Arterials, 2011

Urban Area	Population (1,000s)	Freeway VMT	Freeway Lane Miles	Freeway VMT/Lane Miles	Arterial VMT	Arterial Lane Miles	Arterial VMT/ Lane Miles
Atlanta	4,304	46,779	2,545	18.38	43,220	7,666	5.64
Dallas	5,198	63,405	3,705	17.11	45,170	9,516	4.75
Denver	2,307	20,091	1,293	15.53	21,969	3,767	5.83
Houston	4,056	54,833	3,309	16.57	39,587	7,907	5.01
Minneapolis	2,730	28,250	1,729	16.34	23,978	5,342	4.48
Phoenix	3,632	30,171	1,594	18.93	36,085	7,288	4.95
Miami	5,391	39,439	2,191	18.00	52,328	7,573	7.04

Source: Calculated from data in the Texas Transportation Institute's 2012 Annual Urban Mobility Report

Of the cities studied, Atlanta has the second-heaviest intensity of freeway use and the third-highest intensity of arterial use, as measured by daily freeway vehicle-miles traveled per lane-mile and daily arterial-miles traveled per lane-mile, respectively. While Atlanta has many wide (12-to-15 lane) freeways, they are easily overburdened because of a lack of a comprehensive network. Dallas

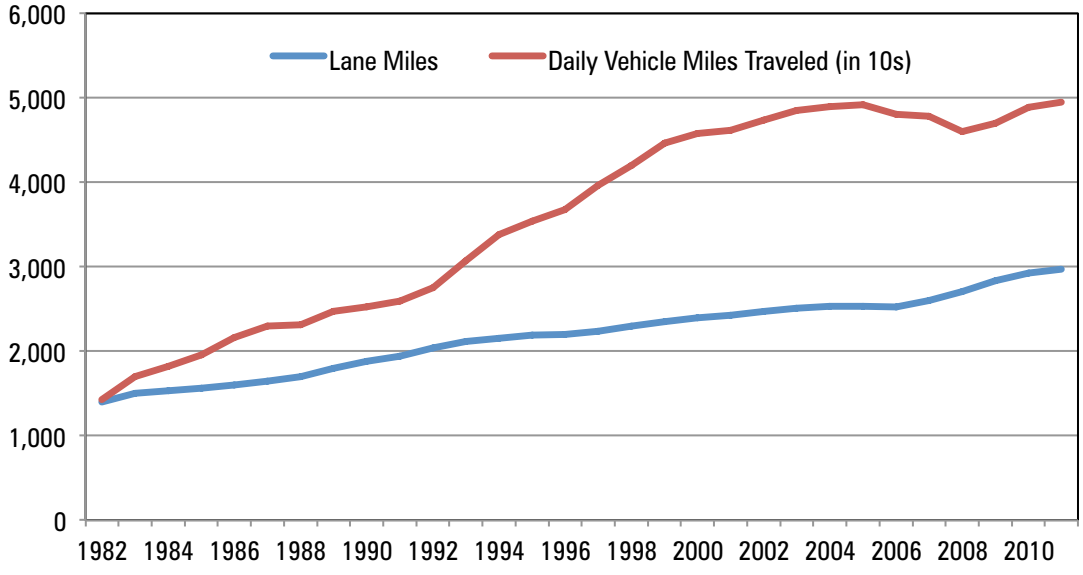
and Minneapolis, with four freeways in each direction, have developed a grid network of freeways. Their freeways are narrower, but since there are more of them, they move traffic far more effectively.

Atlanta's weak arterial network has always been a negative, but because most significant travel between 1970 and 2000 occurred on the freeways, it was not a major problem. Since major Interstate capacity expansion stopped in 2000, however, much of the new traffic has shifted to arterials. In addition to being narrow many Atlanta arterial highways are winding, unimproved two-lane country roads. These characteristics increase congestion and create numerous safety problems. A comprehensive arterial network would include at least three major arterials in each direction. Most importantly, the freeway and arterial networks would complement each other by providing a seamless network of high-quality roads.

Considering that Atlanta is less dense than any of the other metro areas in Table 4, it should have the highest VMT per capita on both freeways and arterial highways.[16] It does not, however, which shows that Atlanta's freeway system is somewhat underdeveloped and that its arterial system is substantially underdeveloped.

Figure 6, below, shows that even from 1988 through 1998, freeway expansion in Atlanta was far less than the growth in traffic volume. VMT in the seven-county core area of metro Atlanta increased by 59.6 percent. Meanwhile, the capacity of freeways, arterial highways and collectors in those counties increased by only 16.2 percent.[17]

Figure 6: Freeway Lane Miles vs. Daily Vehicle Miles Traveled



Source: Graph composed from data in the Texas Transportation Institute's 2012 Annual Urban Mobility Report

The obvious implication of this is that metro Atlanta needs a better freeway and arterial network. Its current network is clearly underdeveloped.

B. Insufficient Transit

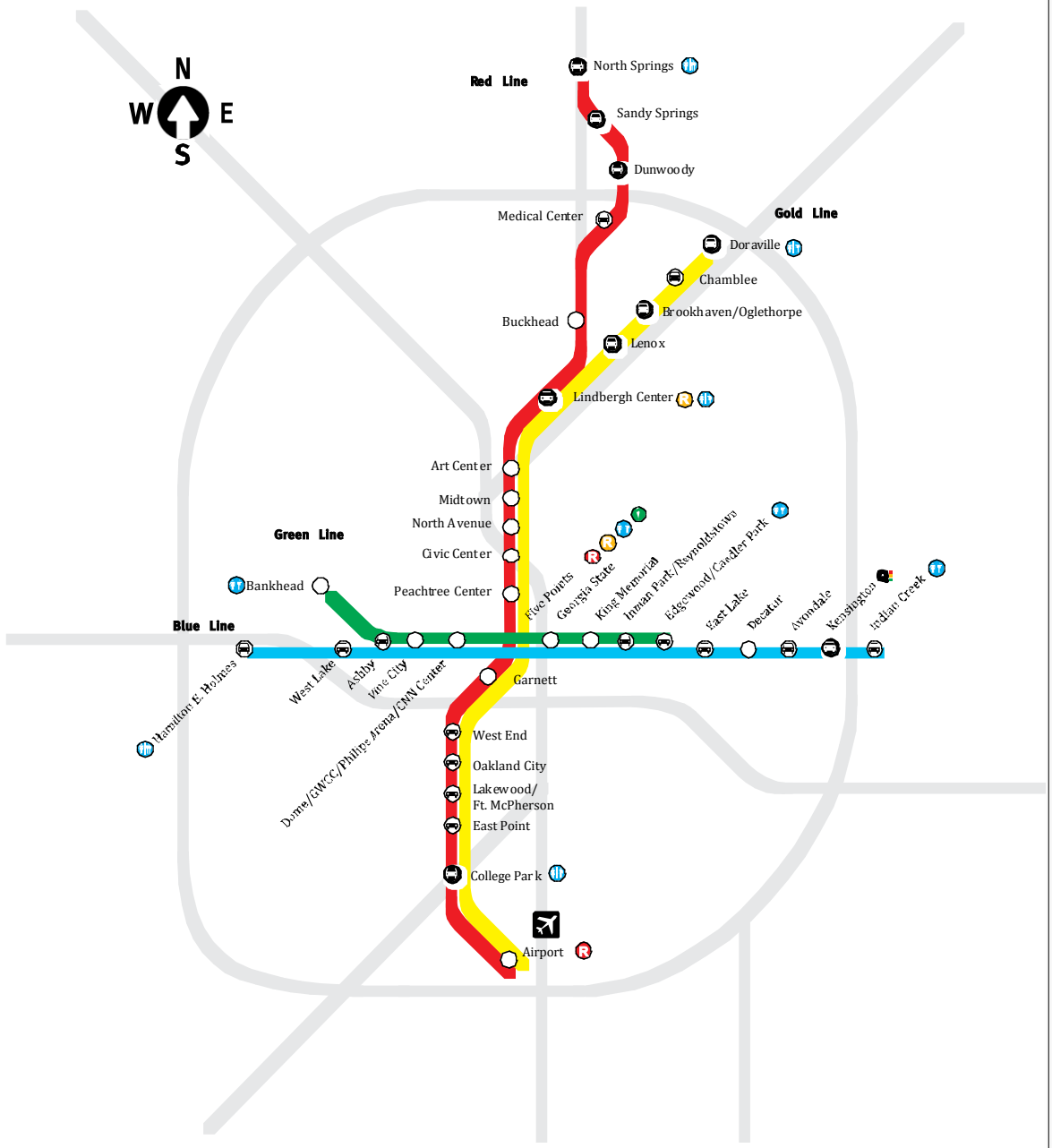
Atlanta's transit network needs major improvements. A Brookings Institution study noted that only 37 percent of metro Atlanta residents have access to transit,[18] and only 3.6 percent of jobs in the metro area are accessible by transit within 45 minutes.

The percentage of people who commute by transit has declined despite new transit systems in Cobb and Gwinnett Counties and the GRTA Xpress regional bus system.[19] Several factors play a part in this decline. First, low land prices and few geographical barriers have combined to make Atlanta the least dense major metro area in the world.[20] Creating successful transit in such areas is challenging. Second, declining MARTA service levels play a minor part in Fulton and DeKalb Counties. The biggest factor, however, is that the current system fails to provide a transit network in all counties, especially areas outside the perimeter, that can transport a large number of people from point A to point B.

Atlanta's transit network is only partially developed and is poorly coordinated. The MARTA heavy-rail service, which only operates in the city of Atlanta and in DeKalb and Fulton Counties, resembles a plus sign, as Figure 7, below, demonstrates. Thirty-four of the 38 rail stations and more than 95 percent of the track mileage are inside the I-285 perimeter.[21] And because of the high operating costs, headways—the time between when one train arrives at the station and the next train arrives at the station—are long. Worse, the lack of a robust transit network makes using MARTA heavy rail unrealistic for most residents. Cobb, Gwinnett and Clayton Counties have repeatedly opposed expanding MARTA in the past. While these counties are now interested in rail service, most of MARTA's expansion plans have focused on increasing service inside the perimeter.

Metro Atlanta has a patchwork of bus systems. MARTA offers mostly local bus service in Fulton and DeKalb Counties. Long headways and the design of the bus network to feed the rail system diminish its usefulness, though. Cherokee, Cobb and Gwinnett Counties operate small bus networks that cover less than 50 percent of the county. Cobb and Gwinnett Counties and GRTA operate Xpress buses that provide good service between residential communities and business districts. Metro Atlanta bus-service maps are included in Appendix F.

Figure 7: Map of MARTA Heavy-Rail Network



Source: MARTA Map of Rail Stations

Metro Atlanta needs a better transit network, but it also needs a realistic way to accomplish that goal. It needs a comprehensive transit system with multiple routes that can have independent operators, but which also includes a mobility-management center to better coordinate the operators. Atlanta needs to keep its rail system in a state of good repair. And it needs to expand its network through more local buses with shorter headways, more express buses and BRT service, and a better-integrated route network.

C. Costs of Congestion and Reduced Mobility to Atlanta's Economy

There are many different ways to measure the costs of congestion. Congestion affects both automobiles and transit vehicles—specifically, congestion can increase bus travel times and reduce reliability, making transit significantly less appealing. The Texas Transportation Institute (TTI) estimates direct congestion costs of approximately $121 billion nationwide.[22] However, this only accounts for the direct costs. The U.S. Department of Transportation estimates indirect congestion costs of $38 billion in annual costs due to productivity losses, another $38 billion due to unreliability, $3.8 billion due to cargo delay and $12.6 billion in safety and environmental costs. Combining both the direct and indirect costs, totals more than $200 billion ($213.4 billion) in congestion costs annually.[23]

In 2001, the National Cooperative Highway Research Program (NCHRP) funded the first study examining the cost of congestion to regional businesses.[24] The results show that congestion interferes with just-in-time delivery systems, thereby increasing inventory costs. It reduces the availability of skilled workers and raises the payroll costs needed to attract such workers. It also shrinks the market area for local firms' products and services, and it reduces the range of job opportunities for workers.

The NCHRP research team used Chicago and Philadelphia to gather data with which to do some modeling. On the logistics effects, they estimated that a 10 percent reduction in congestion would save businesses $1,274 million per year in Chicago and $312 million a year in Philadelphia, in 2013 dollars. Shipping costs account for much of these savings. Since most people receive packages by mail, UPS or FedEx, these savings are passed on to the general public. In addition, the labor-market effects were estimated at $455 million in Chicago and $260 million in Philadelphia in 2013 dollars. Sluggish commutes, which lead to lower job growth, are responsible for most of the labor-market effects. This leads to fewer jobs and higher unemployment in cities with the worst congestion.

Most people will not spend more than a particular amount of time each day on the journey to work. As congestion increases, the number of miles they can travel within this amount of time decreases. Imagine a person's home in the center and a range of employers, some five miles away, some 10 miles away and some 20 miles away. When congestion is low or zero, commuters can reach every point on the 20 mile-away circle, but in a highly congested region like Atlanta, some people can only reach the points on the 10-mile circle. Others may be able to reach only points on the five-mile circle. According to basic geometry, the area of a 20-mile radius circle is four times that of a 10-mile radius circle. If work possibilities are randomly distributed across the landscape, the 20-mile circle will include four times as many job opportunities as the 10-mile circle. And the same applies in reverse for an employer. It will have four times as many potential employees within a 20-mile circle as a 10-mile circle.

In a large and diverse metro area, economic productivity depends on matching up skilled employees with employers who can make the best use of their abilities. When Remy Prud'homme

and Chang-Woon Lee studied this question using data on travel times and labor productivity for French cities, they reached several conclusions.[25] They found a robust relationship between the effective labor-market size (the size of the available circle, as defined by acceptable travel time) and the productivity of that city. Specifically, when the effective labor-market size increased by 10 percent, productivity (and hence economic output) increased by 1.8 percent.

A previous Atlanta congestion study, *Blueprint 2030*, applied the Prud'homme and Lee analysis to Atlanta. It found that a scenario that prevented the travel time index from getting worse between 2004 and 2030 would lead to a 2.4 percent total increase in gross personal income in the Atlanta area. A scenario that *reduced* congestion by 50 percent from current levels would increase personal income by 3.5 percent. Those numbers translate into increases of $2,450 to $3,560 per person in 2030.[26] Based on a 2030 population of seven million, stabilizing or reducing congestion would equate to $17 billion to $25 billion for the region as a whole in 2013 dollars.

Congestion costs is a major issue in trucking. And understanding the total congestion costs can be challenging. While TTI counts truck congestion, the truck time value reflects only the hourly operating cost of trucks, not the value of trucking services to shippers. According to GDOT's 2008 *Truck Only Lanes Study*, trucks carry approximately 93 percent of the freight that is transported in or through the Atlanta area.[27] Also, according to ARC projections, commercial vehicle traffic is expected to increase by 40 percent over the next 25 years. Atlanta, the trucking crossroads of the South, plays a major role in America's sophisticated logistics system. Truck congestion affects more than time; congestion wreaks havoc on the reliability of truck pick-up and delivery schedules, a substantial cost that is not included in the *Urban Mobility Report* figures.

Congestion harms metro Atlanta residents in other ways. With the roads gridlocked, emergency vehicles may be seriously delayed, meaning the paramedics may not arrive in time to save a life. Congestion shrinks people's circles of opportunity, limiting their possibilities in entertainment, recreation and social life. With congestion, people may avoid restaurants and theaters that take too much time to reach. Online dating services report that many participants are unwilling to be matched up with people who live more than 20 miles away, because congestion simply makes it too much of a hassle to try to develop a relationship.[28]

Finally, congestion decreases Atlanta's economic competitiveness. North Georgia is home to 14 Fortune 500 companies, including Home Depot, United Parcel Service, Coca-Cola, Delta Air Lines, Southern, Genuine Parts, First Data, Sun Trust Banks, AGCO, Coca-Cola Enterprises, Newell Rubbermaid, Mohawk Industries, NCR and Rock-Tenn. Atlanta has 10 Fortune 500 companies in its city limits—the third most in the country. There are also several large, privately owned companies, including Georgia Pacific. Efficiently moving goods and services is essential to these companies. Moody's cites Atlanta's overburdened surface transportation infrastructure as the area's biggest weakness.[29]

North Georgia competes with other Sunbelt metros as a place to live, work and do business. Direct competitors such as Dallas, Houston and South Florida have invested in improving their

transportation systems. Several have explicit goals to reduce the travel time index. Metro areas in Texas were spurred to act when Dell announced it would no longer expand its facilities in Austin due to unacceptable traffic congestion. Other regional competitors, including Charlotte, Nashville and Tampa, have developed detailed frameworks for improving their transportation systems and reducing congestion.

To sum up, major congestion and limited mobility caused by an inadequate road and transit network are significant problems in metro Atlanta, and their economic and social costs are often understated. Congestion can harm citizens' social life *and* limit economic growth. Fortune 500 companies that choose to expand outside of Atlanta often cite traffic congestion as the primary reason. In other words, Atlanta's current lack of mobility harms people's social and economic opportunities.

Part 3

Congestion in Atlanta: Its Sources and Potential Solutions

There are two primary types of congestion. This chapter details strategies for reducing both. Further, it explains how eliminating bottlenecks, adding priced and non-priced lanes, creating a redundant arterial network, using dynamic traffic management and creating a comprehensive transit network can reduce congestion and increase mobility in metro Atlanta.

A. Sources of Congestion

At the most basic level, traffic congestion results from, say, 100 vehicles trying to use road space designed for 40. There are two different kinds of congestion: nonrecurrent and recurrent. These two different kinds of congestion require different solutions.

1. Nonrecurrent Congestion

Nonrecurrent congestion, which makes up 50 percent of Atlanta's total congestion, has many causes, including mostly unpredictable events (breakdowns and crashes), partially predictable events (weather) and very predictable events (construction work zones).[30] Since incident-related congestion occurs randomly and is unknown in advance to most people, it adds unreliability to trips. The rubbernecking resulting from a fender-bender may add 30 minutes to a 45-minute trip. When these incidents occur frequently, commuters often add extra "buffer time" to their trips. This buffer time is not included in standard measures of congestion, but is nevertheless part of its true cost.

Fortunately, Georgia has been ahead of the curve in solving nonrecurrent congestion. Nonrecurrent congestion, which results from accidents and breakdowns can be lessened by detecting, responding to and clearing up accidents. Georgia's Highway Emergency Response Operators (HERO) program is designed for these types of crashes and breakdowns.[31] HERO trucks deliver a jumpstart, tire change, coolant or telephone use. The HERO program also oversees Georgia's Towing and Recovery Incentive Program (TRIP), which requires tow truck operators to clear accidents and significantly improve traffic flow within 90 minutes of being called.

Traffic congestion from weather events can be addressed by early warnings and road closures as necessary. GDOT posts winter weather warnings on its NaviGAtor system. It could augment the program by suggesting alternate routes where available and by quickly closing local roads that cannot be rapidly treated. Since the Atlanta metro area averages two to four inches of snow per year and one significant ice storm, winter weather is responsible for less congestion in Atlanta than the 5 to 6 percent of total delays it accounts for nationwide.[32]

Traffic congestion from construction can be managed by providing early warnings and alternate routes and by limiting disruptions and closures to off-peak hours. GDOT has made great progress in improving traffic flow in work zones. The agency also limits major construction work to nights and weekends and limits the amount of time multiple lanes can be closed.

Table 5 shows the average national delay from both recurrent and nonrecurrent congestion. It is modified from its original version in a recent National Cooperative Highway Research Program report.[33]

Table 5: Recurrent and Nonrecurrent Congestion

Source of Delay	Contribution Toward Total Delay
Poor signal timing	5%
Demand greater than capacity	37%
Recurrent Total	**42%**
Special events	0%*
Crashes	36%
Work zones	9%
Breakdowns	7%
Weather	6%
Nonrecurrent Total	**58%**

*As a result of rounding

Source: National Cooperative Highway Research Program

2. Recurrent Congestion

Recurrent congestion is the rush hour overloading of the roadways. While costly and annoying, this type of congestion is predictable.

Recurrent congestion results from a disparity between supply and demand. Because of the severe congestion on Atlanta's freeways, the region's recurring congestion (demand exceeding capacity) is relatively high from a national perspective. Fixing the problem will require a blend of methods. First, Atlanta needs capacity improvements. Both Atlanta's Interstate and arterial systems are underdeveloped. While Atlanta has some of the widest freeways in the country, the overall network is limited to two major north-south freeways that merge into one inside the perimeter and one major east-west freeway. There are additional freeways, but many of these are only partially built.

Parts of the Stone Mountain freeway and a second north-south freeway were never completed because of neighborhood opposition.

Additionally, Atlanta has one of the least developed arterial networks in the country. Most Atlanta Interstates have, at most, one arterial alternative. When this arterial highway becomes congested due to excess demand, there is no good alternative. Some routes have no alternatives at all. North of the city of Atlanta from between where I-285 connects Smyrna and Doraville and where SR 20 connects Cartersville and Buford, there is not a single arterial highway that travels continuously from I-75 to I-85 that can serve as an alternative for congested conditions on I-285. This is a distance of more than 30 miles with no alternative roads.

B. Potential Solutions to Congestion

Reducing congestion and increasing mobility in Atlanta will require bottleneck elimination, capacity expansion, network expansion, dynamic traffic management systems and a better transit network. Each of these concepts is outlined below.

1. Freeway Bottleneck Elimination

A bottleneck is a source of traffic congestion at a major interchange or major intersection resulting from a poorly designed road, sharp curve or mistimed traffic lights. Freeway bottlenecks occur where the number of lanes suddenly decreases and traffic has to squeeze into the remaining lanes, or where on- and off-ramps are too close together, resulting in excessive weaving as cars cross each other's paths getting on and off the freeway in too short a distance. GDOT prioritizes fixing these bottlenecks. Projects are planned at the I-285/SR 400 interchange, the I-285/I-20W interchange, the I-285/I-85N interchange and the I-285/I-20E interchange. Other major bottlenecks also need to be addressed.

Several years ago, transportation consultancy firm Cambridge Systematics examined the worst bottlenecks in the United States.[34] Five of those 25, or 20 percent, were in metro Atlanta.

Table 6: Metro Atlanta Freeway Bottlenecks Ranked in Top 25

Interchange	National Rank, All Vehicle Bottlenecks	National Rank, All Truck Bottlenecks	National Rank, Trucks, Long-Distance Trips
I-75N and I-85N	6	15	22
I-285 and I-85N	10	2	7
I-285 and I-75N	17	7	13
I-20 and I-285W	Not in Top 25	11	18
I-20 and Fulton St	Not in Top 25	20	Not in Top 25

Source: Cambridge Systematics

The cost of fixing these freeway bottlenecks at interchanges is significant. Fixing the GA 400/I-285 interchange alone is estimated to cost $500 million.[35] Table 7 lists the estimated costs of other recently improved major freeway interchanges around the country.

Table 7: Recent Interchange Reconstruction Projects

Interchange	Project Description	Costs	Lane-Miles Added	Construction Dates
San Francisco SR 92/I-880	Replace two cloverleaf ramps with direct-access ramps	$245 million	0	10/07–10/11
Washington, D.C. I-495/I-95S	Rebuild interchange ramps, including express lanes	$676 million	0	10/03–07/07
Houston I-610/I-10W	Reconstruction of interchange and bridges	$262.5 million	0	10/04–01/10
South Florida I-595 between I-75 and I-95	Build three new lanes, rebuild bridges, rebuild entry/exit ramps	$1.2 billion	41 miles	02/10–06/14

Source California, Florida, Texas and Virginia Departments of Transportation

2. Adding General and Managed-Lane Capacity

Given the limitations on Atlanta's freeway system, it would be easier to start with a clean sheet of paper and design a state-of-the-art roadway and transit system for the entire urbanized area. However, this approach is clearly not feasible. Augmenting and improving existing systems is the only practical way forward.

Dr. David Hartgen, professor emeritus of transportation studies at the University of North Carolina, Charlotte, worked with transportation modelers at the metropolitan planning organizations of 32 urban areas, including Atlanta, to estimate how many lane-miles would have to be added to each region's roadway system to eliminate the most severe congestion by 2030. This exercise was run on the Atlanta Regional Commission's traffic assignment model. The ARC modelers found that a total of 2,613 lane-miles of all types (freeway, arterial, collector and other) would need to be added.[36]

Capacity improvements alone will not solve the problem, though. The Downtown Connector was continually widened in the 1980s and 1990s from six lanes in the 1970s to between 12 and 15 lanes, depending on the area, by the mid-90s. While the continual widening helped solve the problem at the time, as soon as GDOT ran out of room to widen, congestion reappeared. This phenomenon of highways becoming congested soon after they are widened is called "induced demand" and occurs for two reasons. First, most metro areas are growing; while a highway may have sufficient capacity for current residents, it does not have room for growth. Most large-scale roadway expansions provide congestion relief in the short term and medium term (depending on how fast the region grows), but become congested again in the long term.

Second, residents often have unmet travel goals. If congestion is severe, consumers may choose to eat at home instead of at a restaurant or to watch an Atlanta Braves game at home instead of in person. When congestion is reduced, more commuters will make these trips. Infrastructure improvements that induce residents to travel farther are good from an economic development perspective, but they undermine congestion relief. This paper does suggest several unpriced capacity-expansion projects, but they make up a small part of the new capacity.

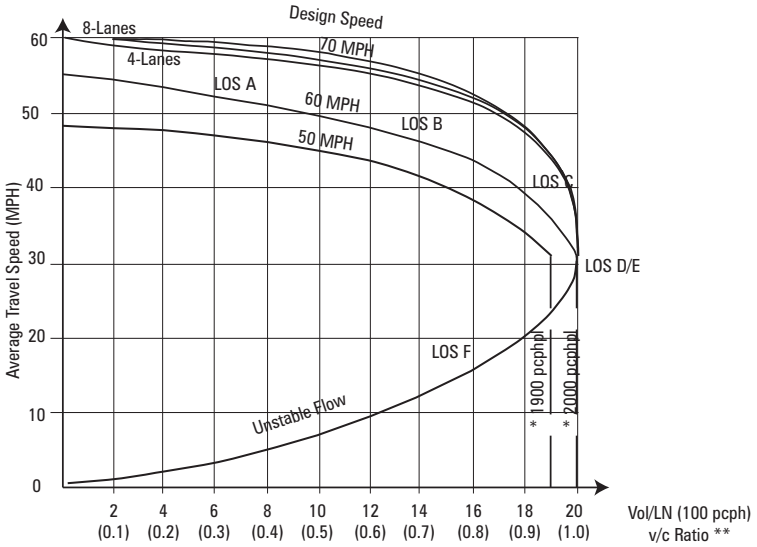
Adding more lanes is not realistic for other reasons. Large-scale construction projects are politically challenging because they require the acquisition of significant rights of way via eminent domain proceedings that displace significant numbers of businesses and residences. Additionally, the costs of such undertakings are high, likely exceeding the available funding.

A smarter approach to dealing with roadway congestion is to make targeted capacity increases and use dynamic pricing to control traffic flow on the new capacity. Lanes that use dynamic pricing are typically referred to as "Managed Lanes," which are optional, variable-toll highway lanes that transit vehicles can use for free and that cars can pay a small toll to use. Atlanta features dynamic pricing on the I-85 Managed Lane between Chamblee Tucker Road and Old Peachtree Road,[37] and it keeps traffic flowing, even during the busiest peak periods. Managed Lanes benefit motorists by giving them an alternative to sitting in traffic when punctuality is vital.

Using what is called a "speed/flow curve," traffic engineers explain why freeway lanes get congested and how pricing keeps them free-flowing.[38] Figure 8 shows such a curve, with traffic speed on the vertical axis and traffic volume on the horizontal axis. At the top left, when traffic volume is low, speeds are high and consistent. Engineers refer to this type of flow as Level of Service (LOS) A. As volume gets higher and cars get somewhat closer together, speeds decline somewhat, resulting in traffic at LOS B—still flowing fairly well. Moving to the right, as volume continues to increase, speed declines, reaching the maximum rate of flow that each lane can handle with minimal congestion, designated as LOS C. At that point, if more vehicles enter the lane, speed decreases but throughput still increases, producing LOS D. If even more vehicles try to enter, speed declines further, and flow volume is only minimally increased, resulting in LOS E. Once LOS E is reached, if more vehicles enter, the flow degenerates into stop-and-go traffic. The result is both low speed *and* low volume, called LOS F. Under LOS F conditions, the freeway's ability to move traffic is hampered at precisely the time it is needed most. Once a freeway gets into severe LOS F, it sometimes takes an hour or more for it to recover.

Dynamic pricing limits the number of vehicles entering the lane so as to keep traffic flowing at a specified level of service (perhaps C or D during peak periods). Traffic engineers describe this condition as maintaining traffic at the "sweet spot" represented by the upper-right portion of the speed/flow curve.

Figure 8: Traffic Throughput versus Speed



* capacity
** v/c ratio based on 2000 pcphpi valid only for -60 and 70-MPH design speeds

Such pricing was pioneered on the SR 91 Express Lanes in California in 1995. During the busiest peak periods, two priced lanes handle 49 percent of the peak-direction throughput on this six-lane freeway, even though they represent only 33 percent of the *physical* lane capacity.[39] Thus, priced Managed Lanes operating at LOS C during rush hour have about 50 percent more *functional* capacity (throughput) than the highly congested LOS F general-purpose lanes alongside. The SR 91 Express Lanes have remained free-flowing 24 hours a day for the past 18 years, thanks to dynamic pricing.

Atlanta is not the only city with Managed Lanes. Dallas, Denver, Houston, Los Angeles, Miami, Minneapolis, Salt Lake City, San Diego, the San Francisco Bay Area, Seattle and the Virginia suburbs of Washington, D.C., have all built Managed Lanes over the last 15 years.

Notably, dynamically priced Managed Lanes also offer major benefits to transit, enabling express-bus service to operate significantly faster and far more reliably than when it operates in congested high-occupancy vehicle (HOV) lanes. This makes express-bus service a more competitive alternative to car travel.[40] These Managed Lanes not only benefit transit-dependent commuters, but may also induce some choice riders, to try transit. Dependent riders are transit users who do not have any alternate mode available to them to reach their destination. Choice riders are transit users who can choose alternate modes to reach their destinations, yet for certain purposes prefer to use transit.[41] In the HOV lanes, congestion can make commuting by transit as slow as commuting by car. Given identical travel times between transit and single-occupant commuting, most choice riders will choose to drive their own vehicles. Managed Lanes change the equation by providing a consistent, reliable trip. New Managed Lanes in other metro areas have increased transit ridership.

Buses are not the only transit vehicles that benefit from Managed Lanes. Vanpools, carpools and casual carpools also benefit. More information is available on vanpools, carpools, and casual carpools in Chapter 6.

Atlanta's Managed Lane Network

Planning has been underway on the Atlanta Managed Lanes network for almost 10 years. The Atlanta 2030 Mobility Plan called for adding 688 lane-miles to its existing network to create a HOV network with 1,200 lane-miles.[42] This approach had two problems. First, HOV-network performance was never optimized. In simple terms, Atlanta's HOV lanes have suffered from the "Goldilocks" problem. Some HOV lanes are "too hot." During rush hour, HOV lanes on the I-75/I-85 Downtown Connector carry far more traffic than originally intended. As a result, HOV-lane cars move at approximately the same speed as cars in the general-purpose lanes. This situation does not incentivize commuters to carpool or ride the bus. Other HOV lanes are "too cold." These lanes on I-75, I-85 and I-20 inside the perimeter carry far fewer cars than they were designed for. Traffic flows smoothly in the HOV lanes but encounters major delays in the general-purpose lanes.

The problem with traditional high-occupancy vehicle lanes is that to be efficient the corridors they serve need to have an exact number of carpoolers. There are no corridors in Atlanta that currently meet these conditions. Second, the HOV-lane network costs twice as much as Georgia agencies anticipated in their long-range plans for such lanes. Even with aggressive bonding and loans, the network would take almost 50 years to build and modernize. Clearly, this was not a solution for a metro area with existing congestion.

As a result of the HOV-lane challenges, Georgia agencies examined other options. High-occupancy toll (HOT) lanes or Managed Lanes emerged as the preferred option. The State Road and Tollway Authority (SRTA) published a detailed Managed Lanes network analysis in 2005, which made the case that building the network as HOT lanes instead of HOV lanes would produce greater transportation benefits while providing much-needed transportation revenue.[43] The ARC shifted its focus from a HOV network in Mobility 2030 to a Managed Lane network in PLAN 2040.[44] GDOT adopted a resolution in 2007 that stated:

1. All new-capacity lanes within limited-access corridors in Metro Atlanta shall be managed;
2. Mobility shall be guaranteed in the managed lane;
3. Lane management relies on eligibility, congestion pricing, and/or accessibility;
4. Within the context of a system-wide plan, each solution will be tailored to individual corridor needs; and
5. Managed lanes have applicability statewide.

This resolution was adopted as the Atlanta Regional Managed Lane System Plan in 2009.[45] With the adoption of the Managed Lanes plan, the transportation planning partners, including GDOT, SRTA, the Georgia Regional Transportation Authority (GRTA), the ARC, the Transit Planning

Board, the chamber of commerce, FHWA and Georgia's political leadership, began coordinating for the planning and implementation of such a system.

Other political, economic and institutional factors led to acceptance of Atlanta's Managed Lanes network. Many planners and policy makers at the ARC and GDOT now favor tolling new freeway lanes to encourage highway users to pay the full costs of construction and maintenance, to actively manage congestion and to increase transit-service quality. As Atlanta's recovering economy is still fragile, most politicians and taxpayers have a limited appetite for new taxes. This problem is especially pronounced when taxes are used for a general purpose and not for specific highway segments. With a lack of funds, GDOT is forced to spend more of its highway funds on maintenance, leaving less funding for new construction. Transit providers such as GRTA also see the potential to increase quality bus service on the Managed Lanes network.

Georgia's first Managed Lane, on I-85 from Chamblee-Tucker Road to Old Peachtree Road, was converted from an HOV lane that required two-plus people per car to a HOT lane that requires three people per car or payment of a toll that varies based on congestion. It is less than ideal for two reasons:

1. Many users remember only the Managed Lane's rocky launch (including high pricing and low demand) and are not aware of current conditions. The lanes have been a tremendous success, transporting more people per day than the HOV lanes ever transported, but reversing a bad first impression is challenging.
2. Managed Lanes are most effective when there are two lanes traveling in the same direction. This setup allows cars to pass slower-moving vehicles, mitigates the effects of traffic accidents and enables a higher traffic volume per lane. With only one lane in each direction—as is the case with the I-85 lanes in Gwinnett—motorists do not receive the maximum benefit. (Most other parts of the Atlanta Managed Lanes network include two lanes.)

Three other corridors are slated for construction in the next five years. Two reversible Managed Lanes are being added to I-75 between SR 155 and I-675/SR 138. This addition should help ease major congestion on this corridor between SR 20S and I-675. New Managed Lanes are being built on I-85 between Old Peachtree Road and Hamilton Mill Road. These will provide new capacity, not a conversion of existing capacity, and will help ease major congestion between I-985 and Hamilton Mill Road. The third project is two reversible lanes on I-75 between I-285N and I-575, one reversible lane between I-575 and Hickory Grove Road, and one reversible lane on I-575 between I-75 and Sixes Road. This project is expected to open to traffic in 2018. All other components of the Managed Lanes plan are stalled for two reasons. First, the plan requires public-private partnerships that some politicians do not fully understand. Second, the state lacks sufficient funding. For more information about public-private partnerships, see Appendix A. Chapter 7 addresses transportation funding.

3. Creating an Arterial Network

One of Atlanta's biggest challenges is its lack of an arterial road network. Arterial highways are the backbone of a metro area's transportation network. For years Atlanta has relied on its high-quality freeway network to transport substantial numbers of vehicles. While Atlanta has well-maintained multilane freeways, they can no longer absorb all of the region's traffic. The arterial system was never adequately developed and is one of the most ineffective arterial networks of any major city in the country.[46] Building a system of arterial highways from scratch in Atlanta is not an option due to existing residential and commercial development. Such a system would also be prohibitively expensive. Atlanta will have to improve its existing system.

This report divides arterial highways into two groups: major regional primary arterial highways and all other arterial highways. The plan uses grade separation, traffic-signal optimization, access management and strategic capacity expansion to upgrade selected existing arterials into a network of major regional primary arterials that offers an alternative to the existing freeway network. The network of major primary arterials detailed in Chapter 5 includes 11 of these highways. Improvements to other arterials are detailed in the Atlanta region spreadsheet, which includes a comprehensive list of all suggested improvements.

4. Dynamic Traffic Management Systems

Dynamic traffic management systems are cost-effective systems that improve traffic flow on freeways and arterials. These programs have been successfully deployed in Europe and Japan resulting in capacity improvements on major freeway corridors of up to 30%.[47] Significant increases in trip predictability and safety have also been realized.

Engineers in the U.S have been touting the benefits of one type of dynamic traffic management—intelligent transportation systems (ITS)—for over two decades and have installed vehicle sensors and message signs, as well as backbone communications systems, on most Atlanta major urban freeway corridors.[48] These sensors gather data about traffic conditions on a 24/7 basis, and this information is collected, compiled and distributed to the motoring public in near real-time through a variety of public and private information channels. However, except for a few ramp metering installations that operate in a demand-responsive mode, and the occasional major traffic alert posted on variable message signs in an attempt to dynamically route traffic to a different route, most of our freeways still operate on a *static* operations plan.

GDOT has recently implemented (or is in the process of implementing) several programs that are critical elements of the successful active traffic management plans for urban freeways elsewhere.[49] The more significant of these include:

- Ramp metering systems have been installed on most major entrance ramps in the Atlanta area and are currently being calibrated to adjust to traffic in a demand-responsive mode;
- Queue warning (currently used for traffic control or to enhance safety during major incidents);

- Hard shoulder running (a pilot program to increase peak period capacity on the GA 400); and,
- Speed harmonization (using variable speed limits to smooth traffic flow and improve safety), a pilot program currently being implemented on the northern portion of I-285 from I-20 west of the city to I-20 east of the city.

The deployment of these programs is significant as it demonstrates a change in mindset regarding how Atlanta's freeways should be managed. Other dynamic freeway operations concepts currently being used to actively manage motorways in Europe include:[50]

- Queue warning in conjunction with speed harmonization to warn drivers of queuing conditions ahead;
- Junction control (dynamically changing lane use based on conditions); and,
- Automated enforcement of dynamically imposed operating conditions.

A continuation of these and inclusion of other dynamic freeway operating concepts proven successful elsewhere will enable Atlanta to significantly increase peak period capacity on its urban freeway network without the costs and disruption of major civil construction projects.

The following components of dynamic transportation systems work together to improve traffic flow and transit operations on arterial highways:

- Intelligent transportation systems
- Queue jumps
- Access management
- Grade separation

Each of these concepts is explained in more detail below.

Intelligent Transportation Systems

The biggest congestion factor for all arterial highways is intersection capacity, which defines arterial capacity.[51] Traffic signals that are used to control vehicular movements at the intersection of two roadways must, by design, reduce the capacity of both roadways by reducing the number of vehicles that can travel through an intersection during a particular time period. Thus, optimizing and synchronizing traffic lights is critical.

"Green time" is the time allotted to a certain movement (i.e. all vehicles at one intersection going from one point of the intersection to another), and it is usually expressed as a percentage. For example, if an arterial highway has a capacity of 1,800 vehicles per hour per lane if there were no traffic signals, that same arterial highway would have a capacity of 1,080 vehicles per hour per lane if that movement received green time for only 60 percent of the hour. Sixty percent is a relatively large amount of green time for any one movement to have. Taking into account the cross

street through movements, protected turning movements and lost time for clearance intervals, the amount of green time for major movements can easily fall below 50 percent. In other words, it is common for an arterial lane to have less than 50 percent of the capacity of its uninterrupted-flow counterpart.

To reduce congestion, the base traffic light cycle must offer as much green time to the peak direction as possible. Traditionally, traffic engineers have used long traffic signals to extend green time on major arterial highways. As signal timing has become more precise, some engineers have shortened cycles to reduce delays on side streets while still maintaining a higher percentage of green time on arterial highways. This has the advantage or reducing wait times on side streets. But regardless of the approach chosen, it is imperative that traffic light cycles offer a high percentage of green time to traffic on arterial highways—especially the major arterial highways suggested in this report.

Effective traffic signal optimization changes traffic-light signals based on traffic conditions. Highways are fitted with traffic cameras and in-road loop detectors that monitor traffic speeds and congestion. And the pavement near most traffic lights is fitted with loop detectors to notify the traffic light when a car is on a side street. The light will then not turn green for the side street unless the loop detects a car on the side street. Engineers in traffic control centers use the data from these devices to dynamically adjust traffic signals and other traffic control devices such as reversible-traffic lanes. The sophistication of these systems continues to increase while the cost continues to decrease.

GDOT's program, having won an award from the Intelligent Transportation Society of America for its traffic-signal timing, is impressive. Nonetheless, Georgia's traffic-signal timing systems have room for improvement. First, many local municipalities still resist signal timing, worrying—for the most part incorrectly—that it will increase traffic congestion. Better cooperation is needed between the state and municipalities, as many highways and roads still feature poorly synchronized traffic lights. Second, while Georgia has a state-of-the-art camera system to *alert* drivers to traffic congestion, the state is not using the wealth of data the system produces to actively manage traffic and *prevent* congestion.

ITS systems also enable transit (or traffic) signal priority (TSP), an operational strategy that reduces the delay transit vehicles experience at traffic signals.[52] TSP enables communication between buses and traffic signals, allowing a priority green light as they approach. There are many different types of TSP. These include extending greens on the existing phase, altering phase sequences, and adding new phases that do not interrupt the overall traffic-signal synchronization loop. TSP has a limited effect on signal timing because it adjusts to normal timing and logic to serve a specific vehicle type. TSP can improve transit reliability, efficiency and mobility. It is important to remember that with TSP, a signal change is always optional; the computer or a traffic engineer in a control center can override the request. Moreover, the light cycle will include all phases for all movements—some of these phases may be shortened, but none will be eliminated.

Queue Jumps

Most TSP systems also use queue jumps. A queue jump is a roadway feature that provides a preference to certain vehicles—often transit vehicles—enabling them to bypass long queues (lines) at signalized intersections. Queue jumps are typically paired with signal-priority treatments, which give buses an early green light or extend a green light. An intersection with a queue jump provides an additional travel lane, which can be dedicated to transit vehicles or shared with right-turning vehicles on the approach to a signal. Specifically, queue jumps:

- Help buses to re-enter the traffic stream when a bus lane is ending;
- Allow buses to jump to the front of a queue at a traffic signal after they have picked up passengers at a bus stop; and
- Assist buses in crossing lanes ahead of other traffic to reach a left-turn lane without obstructions.

How does a queue jump work? When a bus reaches a red light in the right-turn lane with a queue jump and decides to use it, the bus receives a special signal to continue through the intersection. Sometimes the signal is instantaneous; other times the bus may have to stop completely and wait for a short period of time. The signal typically precedes the signal for other traffic in the same direction. Sometimes it will interrupt a signal for cross-traffic or for traffic turning left.

Access Management

Access management refers to the control of vehicles entering or exiting the road or highway. Arterial highways typically have moderate access, placing them between freeways, which have limited access, and local streets, which have frequent access. To reduce congestion and improve safety, this report recommends that major primary arterial highways feature fewer access points. Left-turning motions should be limited to grade-separated ramps and traffic signals. Side streets should either feature a traffic signal or allow only right-turn access to the primary regional arterial highway. A median or other barrier should separate traffic traveling in different directions. To compensate for fewer turning locations, turn lanes should be lengthened and all traffic signals should allow U-turn motions. Left-turn cycles should be lengthened to reduce queue time.

Grade Separation

Major primary arterial highways should also feature grade separations at major side streets. For the purpose of this study, major side streets will typically have at least four through lanes and average annual daily traffic volumes above 30,000 vehicles. There are several potential grade separations. The first is a full interchange with direct ramps for all turning motions. While this is the best option for two extremely busy roads, costs, aesthetics and neighborhood feelings may make building full interchanges less than desirable in most situations. Another option is to build a grade separation where the main lanes of the major primary arterial highways travel over or under the side street. Side-street movements and vehicles turning left or right from the major primary arterial highway onto the side street will use a traffic light. Since through traffic on the major primary arterial highway will use the grade separation, the traffic light will feature longer traffic signals for all other traffic movements.

The Role of Managed Arterial Highways

Managed Arterial Highways combine dynamic traffic management systems with pricing to offer drivers a premium travel option. A Managed Arterial Highway offers drivers the choice of using an overpass or underpass to bypass the intersection and traffic light.[53] Because overpasses and underpasses are costly to build, this option will require a small charge, generally $0.25 to $0.50 per intersection. Drivers can also choose to continue on the main road through the intersection for free.

Managed Arterial Highways were first studied in Lee County, Florida (Fort Myers) in 2002 under the Federal Highway Administration's Value Pricing Pilot Program. The Value Priced Queue Jump Study examined the possibility of using grade-separated overpasses at congested intersections to allow drivers who were willing to pay a toll to bypass the traffic signal and its queue.[54] The study examined operational issues, public acceptance and cost feasibility. The study found that from an operations standpoint, such grade separations are feasible. There are no technical or operational issues that would prohibit their use. With some nontolled, grade-separated intersections already in existence in Lee County, this finding was not surprising. For proper operation, any tolling must be done via all-electronic tolling.

The study used both focus groups and return-mail surveys, and public acceptance was positive.[55] Queue jumps were presented as a driver's choice. The ability to remain at-grade and utilize the intersection in a standard fashion remained an option. The element of choice was felt to be a major component of public acceptance. The tolls presented were relatively small, ranging between 10 cents and 50 cents per queue jump. The study presented varying the toll by time of day, which the public found acceptable.

The Managed Arterial concept is an accepted method for solving traffic congestion. The National Academy of Sciences Transportation Research Board (TRB) presented an overview of Managed Arterials at its 2012 annual meeting, and TRB's journal, *Transportation Research Record*, published a paper on the subject in issue number 2297.

5. Creating a Transit Network

Transit ridership fell in metro Atlanta between 1985 and 2008. While annual transit trips per capita increased from 201 to 215 in New York City and from 102 to 116 Washington, D.C., they declined in metro Atlanta from 106 to 90.[56] In addition, a total of 9.1 percent of metro Atlanta commuted by transit in 1978—the year before MARTA opened. In 2010, only 4.6 percent of Atlanta commuters chose transit—a decline of 50 percent.[57] While some of this decline is due to a more dispersed population, most of the drop results from an inadequate transit system.

Transit Research

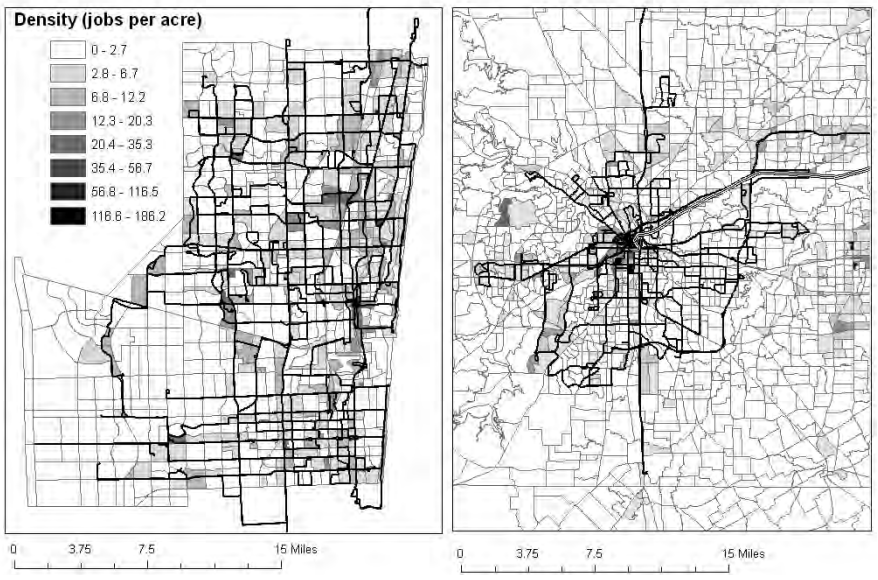
Substantial research has been conducted into the best way to operate transit service. Geographical orientation of service is one key aspect. Several studies conducted over the past decade have shown that multi-destination transit networks (grid networks) are most efficient in attracting passengers and are cheaper to operate than downtown-based systems (radial networks).

In 2008, Gregory Thompson, chair of the Transportation Research Board Light Rail Committee, and Jeffrey Brown, associate professor of transportation planning at Florida State University, studied 45 U.S. metro areas to determine whether radial or grid networks offer better service.[58] The authors also separated metro areas into those that have bus service only and those that have both rail and bus service. They found that the grid or multi-destination areas that used both rail and bus transit performed better. The radial approach connected neighborhoods to the central business district (CBD), but made reaching jobs outside of the CBD difficult. The multi-destination approach, while not as good at connecting neighborhoods to the CBD, was much better overall because it offered reliable transit service to more parts of the metro areas. Further, from 1984 through 2004, the grid metro areas experienced much smaller productivity declines (single digit) than the radial metros (25 percent). (Productivity refers to the number of people using the transit system compared to the cost to operate that service.) There was also a smaller increase in per-capita costs for the grid service compared with the radial service.

Thompson and Brown studied two bus-only systems in more detail. Broward County Transit (BCT) in Fort Lauderdale, Florida, and the T in Tarrant County, Texas (Fort Worth), cover similarly sized areas with similar growth patterns. While the T has a radial pattern, BCT has a grid focus. BCT had 31.72 boardings per hour, which was substantially higher than the T's 16.45. Operating expenses for BCT were also substantially lower, while load factor—the percentage of seats and standing room on a transit vehicle occupied—was substantially higher.

Figure 9 shows the difference between Broward County's grid service on the left and Tarrant County's radial service on the right.

Figure 9: Transit and Employment Access Broward County, FL, and Tarrant County, TX



Source: Jeffrey Brown and Gregory Thompson, Hub Spoke, the Grid, and the Future of Transit

In January 2012 the same authors studied Atlanta's transit network in more depth, and again concluded that transit systems are best organized in a grid network. Thompson and Brown also explained why many transit systems that focus mainly on aesthetics and pedestrians fail:

> *Workers use transit to get to jobs in a multitude of locations that do not possess the built environment characteristics long thought to be important by most scholars in determining transit ridership. The results of this study suggest that most U.S. transit managers of bus-only transit systems and urban planners interested in transit are focusing on the wrong policy variables for improving transit ridership. For example, a destination can be very pedestrian-friendly, very mixed-use and very aesthetically pleasing, but if there aren't the right kinds of jobs in these places, hoped-for ridership will not materialize. Before we try to change the built environment, we need to make sure transit takes riders where they need to go. The emphasis on making transit trips direct and linking riders to employment centers, which tend to be located in suburban locations, are two important lessons for agencies seeking to increase ridership.*

In addition, Thompson and Brown studied transit-oriented developments (TODs)—mixed-use residential and commercial developments designed to maximize access to transit, non-motorized transportation, and to incorporate features that encourage alternatives to the automobile—to determine if they increase transit ridership.[59] According to Thompson and Brown, TODs do not affect bus riders at either the origin or destination. For bus riders, the downtown central business district is not a significant destination; in fact, other employment centers, such as the perimeter business district, are far more important. For rail riders, the CBD is a somewhat important destination, but TODs are still relatively unimportant. Midtown and North Avenue are the only TODs that significantly contribute to rail patronage. Surprisingly, neither the Lindbergh TOD nor the Decatur TOD contributes significant ridership. Lindbergh has been cited by area boosters as one of the most successful TODs in the metro area. Decatur is one of the most popular live/work/play communities in metro Atlanta. But Thompson and Brown's research indicates TODs do not increase transit ridership whatsoever in either Decatur or Lindbergh.

That study also highlights the differences between Atlanta and other U.S. metro areas. New York, Chicago and several other major Northeastern metro areas experienced their fastest period of growth before World War II. Pre-World War II metro areas developed around walking and rail. They have higher population densities and are typically more compact. Atlanta, Houston, Phoenix and many other southern and western metro areas experienced their fastest growth mostly after World War II. These metro areas developed around the automobile. They have lower population densities and occupy a larger geographic area. Atlanta is a post-World War II metro area. The upshot is that regardless of policy, Atlanta will never have the transit ridership of New York City.

What does this mean for Atlanta's transit system? For one thing, it suggests we should be skeptical about new rail projects. Transit officials hoped that building MARTA would increase population density within ½ mile of stations. However, this did not occur. Only one station—Peachtree Center—has an adjoining density high enough to justify heavy rail. Many current MARTA stations have densities 25 times lower than the minimal threshold for rail. Even Midtown, which features higher densities than much of the rest of Atlanta, is still not dense enough for rail.

Nor is it likely that Atlanta could successfully engineer transit-supporting densities through regulation. Some post-World War II cities, such as Portland, have tried to duplicate the characteristics of pre-World War II cities using urban growth boundaries. Such boundaries limit the physical area of development, creating denser communities. The downside is they also drive up housing costs. Moreover, such boundaries have in fact had minimal success in increasing transit usage. Portland's transit usage is not much higher than that of Denver, Salt Lake City or San Diego—other western cities with less stringent land-use restrictions.

In any case, metro Atlanta's zoning actually cuts in completely the opposite direction at the moment, with traditional Euclidean zoning separating residential and commercial uses. This additional factor further limits the effectiveness of rail. And while mixed-use zoning has become popular in in-town areas of Atlanta, the majority of the Atlanta region is still zoned into traditional residential, commercial and industrial areas and considerable opposition exists to changing traditional zoning. Furthermore, while some residents are content to pay higher housing prices to live in a more dense area with more transit options, most residents still prefer a location in the suburbs.

The result of all this is that heavy and light rail—which work best in the context of mixed-use zoning and transit-oriented development—are unlikely to form the basis of an effective transit system in Atlanta. Further, even if Atlanta decided to build such a system, the costs are steep. The Atlanta Regional Commission estimated the costs for the rail lines in Concept 3: the costs for the East Corridor High Capacity rail service, I-285 North right-of-way, Clifton Corridor Rail and parts of the Atlanta BeltLine that are in the current long-range transportation plan total approximately $3 billion. This is the portion that may get built before 2040, yet it only represents 20 percent of the needed comprehensive system. The remaining $12.5 billion in rail projects are in the Plan 2040 aspirations section and are unlikely to get built without enormous funding increases.

The transit section of this transportation plan is far more realistic. It proposes to spend less money on transit but nonetheless create a comprehensive network using existing heavy rail, local bus, limited-stop bus, express bus or/and bus rapid transit. For the cost of two to three rail lines, this plan creates a comprehensive transit system for the entire metro area. These new routes could be completely implemented in five years—much quicker than rail—and also avoid the inevitable political battle over which geographic regions receive rail and when they receive it.

Atlanta's Best Transit Options: Bus-Rapid Transit, Express Bus Service and Expanded Local Bus Service

The easiest way to improve Atlanta's transit network is to connect different residential and employment centers with a redundant bus-based grid network. This includes several steps. First, metro Atlanta transit agencies need to adjust their bus schedules to better integrate bus service with MARTA rail service. Second, existing local bus networks need to add new routes and increase the frequency of existing routes. Third, different transit agencies need to reach cooperative agreements that allow them to operate multiple routes independent of county borders. Different counties should consider serving the same route at different times to increase service frequency. Finally, Atlanta needs a larger network of BRT and express buses to supplement the existing rail network. Such a grid would allow employees to reach additional employment opportunities that are currently difficult or impossible to reach.

Bus-rapid transit (BRT) and express buses feature rail-like service at a lower cost. These high-quality, low-cost transit services can significantly improve urban mobility.[60] While BRT and express buses are similar, they have several important differences. BRT operates on arterial roads or local roads, has frequent stops along the transit line every 0.25 to 0.5 miles, and serves multiple origin and destination pairs. Its service characteristics are similar to those of heavy or light rail. Express bus service uses primary arterial highways or freeways and has frequent stops every 0.25 to 0.5 miles at the residential origin and commercial destination but no stops in the line-haul or middle of the route. It serves multiple origins, but only one to two destinations. Its service characteristics are similar to those of commuter rail.

BRT is different from local bus service. Unfortunately, as BRT has become successful in the United States, many types of traditional bus services are now calling themselves BRT, which is problematic for several reasons. First, it dilutes the concept of BRT. Second, it raises expectations for local bus routes that do not operate true BRT service. Bus-system operators should accurately label their bus services to avoid these problems.

To help define and more fully explain BRT, the Transportation Research Board of the National Academy of Sciences is working on a technical definition of BRT. While the definition is not finalized, it is expected to include seven characteristics that differentiate BRT from local bus service. To be labeled BRT, the service must have each of these characteristics:

1. Running ways that give buses priority;

2. Unique station design;

3. Larger vehicles (often 60-seat articulated buses);

4. Electronic/SMART card/off-board fare collection;

5. Intelligent transportation systems such as priority signaling;

6. Branding differentiated from traditional bus service;

7. Frequent service, typically every 10 minutes or more.

Many BRT services also have the following optional components that can improve service:

1. Land-use/zoning changes;
2. Elevated boarding platforms level with the station;

3. Electronic signage displaying when the next bus is available.

Improving Transit Service

There are three improvements every transit operator in metro Atlanta can use to improve transit services. Contracting and competitive bidding, implementing distance-based and time-of-day-pricing, and coordinating agency and mobility management centers would help improve transit service while reducing system costs.

1) Contracting and Competitive Bidding: Transit agencies should consider contracting all transit service and having both outside vendors and the local transit operator (if there is one) competitively bid for the services.

When starting or renewing transit service, transit agencies should receive at least three outside bids plus an internal bid when applicable. The transit entity should insist on the best value, not simply the cheapest cost.

Agencies should also consider bundling transit routes into different contracts to ensure that profitable routes are combined with money-losing routes. Some transit entities use different contractors and bundle different routes to ensure the best deal for taxpayers.

At present, the Metropolitan Atlanta Rapid Transit Authority (MARTA) directly operates its heavy-rail, bus and demand-response transit service (DRT).[61] (DRT is a transit service featuring vehicles operating in response to calls from passengers or their agents to the transit operator, who then dispatches a vehicle to pick up the passengers and transport them to their destinations.)[62] Cherokee County directly operates its bus service, and Henry County Transit directly operates its demand-response service. Cobb Community Transit (CCT) and Gwinnett County Transit (GCT) contract both their bus and demand-response services.[63] The Georgia Regional Transportation Authority (GRTA) contracts its bus service. MARTA, Cherokee County and Henry County might be able to significantly cut transit costs and improve transit quality by contracting their transit services.

2) Implementing Distance-Based Pricing and Time-of-Day Pricing: In distance-based pricing, the fare is based on how far riders travel. In time-of day pricing, riders' fares are based on how many passengers use the service at a particular time. These market mechanisms help transit providers offer the best service. While existing express buses offer different prices based on distance traveled (blue zone, red zone, etc.), MARTA rail does not. MARTA is the only major post-World War II heavy-rail system that does not offer distance-based pricing. All Atlanta transit-service operators should consider distance-based pricing.

Here is one example of how distance-based pricing could substantially increase ridership and revenue. MARTA currently charges a flat $2.50 for all riders, a good value to travel the 18-station, 25-mile trip to the airport, but a poor deal for those traveling the two-station, 1.2-mile trip between North Avenue and Arts Center. According to federal IRS reimbursement rates, traveling to the airport by car costs $14.10. While cars offer more flexible travel times and other advantages, these do not equal $11.60. MARTA is losing revenue for offering such a low rate on the airport trip. By contrast, the trip between North Avenue and Arts Center by car, according to standard travel rates, costs $0.67. Considering the cost, walkability and density of the area, MARTA is losing substantial ridership by overcharging on this route by almost $2.00.

Transit services should also consider using time-of-day-pricing. Transit passengers value wait time above all other factors in choosing a transit service. Headway (the distance between trains) is more important than type of transit vehicle, fare and even travel time.[64] With service cuts, MARTA headways average 7.5 to 15 minutes on routes during rush hour.[65] Compare this with Washington, D.C. riders, who have headways of two to six minutes on routes in metro Washington.[66] If the longest wait customers can face is six minutes, they are much more likely to use transit. Time-of-day pricing has two benefits. First, providing more service when demand is highest is better for customers. Second, the increased price will cause some customers to shift their travel times to shoulder times (the hours immediately before and after rush hour) and relieve crowded vehicles. Time-of-day pricing thus provides better service when it is needed most.

Transit headways are often increased because of budget challenges. The problem is that each time headways are increased, fewer passengers use transit. The result is more budget cuts and additional headway increases, creating a never-ending transit-service death spiral. Distance-based and time-of-day pricing, while initially complicated to some riders, will encourage more ridership and result in more revenue.

Transit operators should also consider providing transit vouchers to some riders to offset potentially higher fares. Lower-income riders will be one of the biggest beneficiaries of time-of-day and distance-based pricing since service will increase for these transit-dependent commuters.

3) Coordinating Agency and Mobility Management Centers: Atlanta's transit services are composed of many different transit agencies (i.e., city, suburban, exurban, university and business-operated) and different technologies (i.e., HRT, BRT, express bus, local bus and shuttle bus). In the absence of a functioning free market in metropolitan transit, some entity needs to be organizing agencies and coordinating service so that different systems and technologies can work well together.

A mobility-management center operated by a coordinating agency should help oversee the different transit services. While primarily run by the coordinating agency, this center could be a partnership between the state, regional planning organizations such as the ARC and the regional transit entities. This center would coordinate private demand-response service for seniors and residents with disabilities, encourage route coordination between different transit agencies, enable vanpool and carpool partnerships, and help link business organizations and residential associations to transit providers. The center would work with county and city governments to ensure that local areas have the most effective type of transit service for their community needs. Denver's mobility-management center that coordinates carpools, vanpools, taxi vouchers and hourly car rentals is a potential model for Atlanta.[67]

The Transit Plan

To sum up, this study's proposed transit plan consists of the following parts:

- The existing MARTA rail system;
- A comprehensive, redundant local bus network composed of current MARTA, CCT, GCT, CATS, Xpress and new public and/or private bus service;
- A comprehensive Bus Rapid Transit and express bus network that operates on both freeways/Managed Lanes and arterials/Managed Arterials in peak and off-peak hours;
- A comprehensive vanpool system and a casual carpooling system;
- A comprehensive demand-response system;
- The opening of service to contracting and competitive bidding;
- Distance- and time-based pricing; and
- A coordinating agency and mobility-management center.

Part 4

Managed Lanes and Freeway Capacity

The first part of solving metro Atlanta's highway congestion and transportation problems involves adding limited general-purpose capacity and a Managed Lanes network.

All cost estimates in this section use the Atlanta Regional Commission Planning Level Cost Estimation Tool, the Fourteenth Amendment Highway Corridor cost estimates, the Third Infantry Division Highway Corridor Study, GDOT and ARC long-range transportation plan cost estimates, and actual costs from recently completed projects.

A. Managed Lanes Network

The most recent version of the Managed Lanes plan was released in 2010 by GDOT and HNTB Corporation.[68] While the HNTB document is an excellent plan, it needs some minor updates. First, some of the components have been built; others are under or nearing construction. The I-85 Managed Lane between Chamblee-Tucker Road and Old Peachtree Road is in operation. The I-75/I-575 Northwest Corridor, the I-75 South Corridor, and the I-85 extension are all in the preliminary engineering phase; construction will begin soon on each of those roads. Funding has been removed for the I-85 existing component and for the Northwest Corridor and has been reduced to include construction costs only for the I-75 South and I-85 extension. Second, HNTB's network included concrete-barrier separated lanes. The pylon barriers in use on the CA-91 and many other Managed Lanes are a better option for Atlanta. With traffic moving in the same direction, pylon barriers are a safe alternative to concrete barriers at a much lower cost. And pylon barriers have the added advantage of not damaging vehicles that need to cross the barrier in extreme emergencies. Incidents such as a traffic accident that blocks the road or an ambulance transporting a patient in critical condition to the hospital are rare but do occur. Affected vehicles could cross a pylon barrier but cannot cross a concrete barrier.

Third, because of the recession and somewhat lower material costs in Georgia, HNTB's Managed Lanes cost estimates are high. HNTB estimated it would cost approximately $2 billion to build the I-75 and I-575 Managed Lanes and associated ramps. GDOT was able to enter into an agreement to have the project completed for between $850 and $950 million. While the final project had some preliminary engineering already completed and did not include full ramps at I-75 and I-285, the preliminary engineering and reduction of interstate ramps does not equal a $1.1 billion cost difference. As a result of switching from concrete barriers to pylon barriers and the lower material costs, this transportation plan assesses the Managed Lanes costs at only 70 percent of the HNTB estimates.

Fourth, this plan changes the occupancy requirements. The HNTB report assumes that all vehicles with three or more passengers receive free passage in all Managed Lanes. This report recommends that only vanpools and buses receive free passage. This change will slightly increase the percentage of the Managed Lane network that can be covered through toll revenue.

Fifth, converting existing HOV lanes to HOT lanes is politically challenging. While converting an HOV lane to a HOT lane and raising the occupancy requirement is the ultimate solution, we understand the current political challenges. Fortunately I-20, I-75 and I-85 inside I-285 can be converted to two-person occupancy per car or higher HOT lanes. Such lanes would still provide free passage to carpools but would also allow single-occupant vehicles to use the lane for a fee. These lanes are underused, so this conversion will not cause congestion. In the future, however, occupancy requirements may need to be raised.

The HOV lane on the Downtown Connector between the Brookwood Split and the I-75S/I-85S split is failing badly, though. No alternative exists to converting this lane to a HOT lane and increasing the occupancy. To avoid the problems with the I-85 conversion project, the downtown connector conversion should be a two-step process. First, the occupancy requirement should be raised from two to three people. Then, after six months, if the lane has extra capacity, single-occupant vehicles could begin to use the lane for a fee.

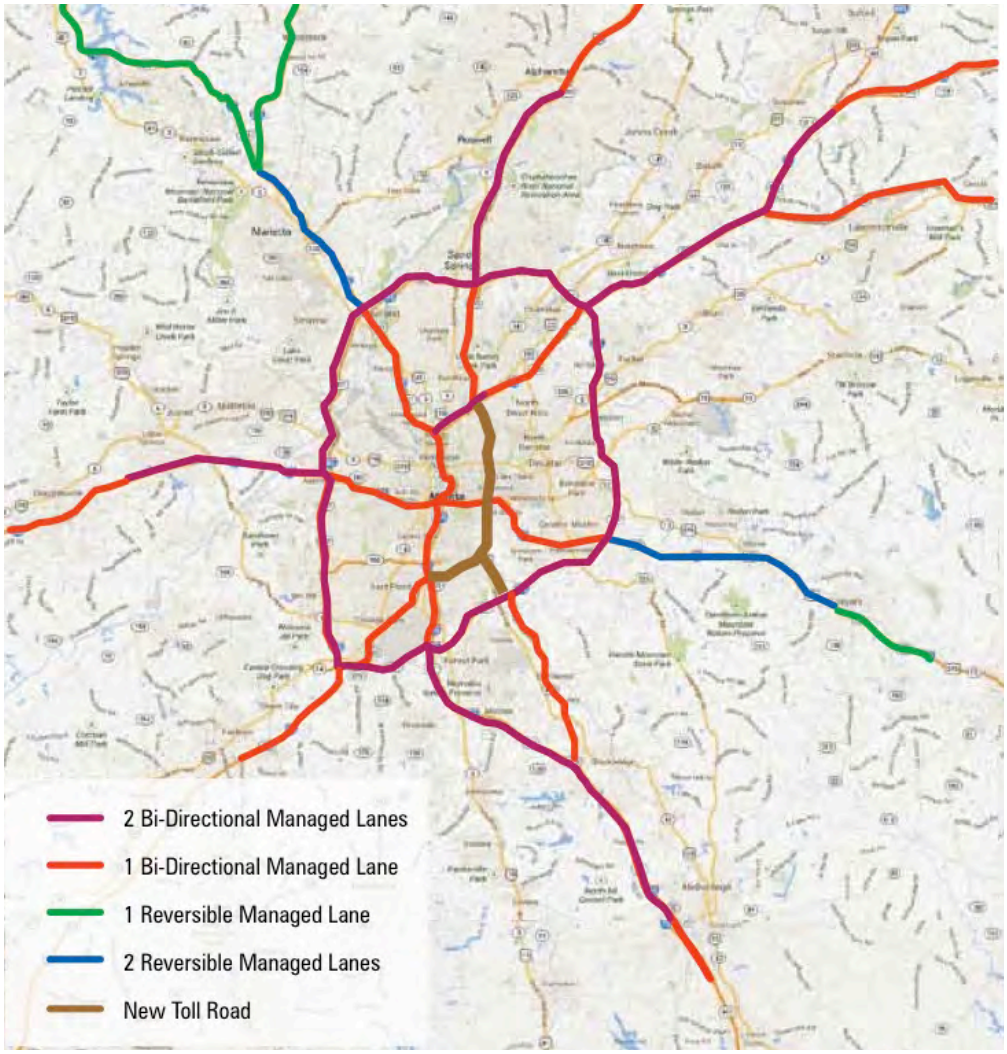
And last, the HNTB report estimated that the private sector would cover more than 55 percent of the costs of Managed Lanes. Even with the charging of all carpools, with lower VMT growth rates and changes to the network, this plan calculates the private-sector contribution to the network at 50 percent.

Figure 10 on the next page shows the complete Atlanta Managed Lanes network.

The Managed Lanes network is a comprehensive system of new lanes. The tiers are structured to first build the inner parts of the network where congestion is typically worse and then build the outer parts. The system needs to be built in this order to function effectively and reduce congestion. For example, most drivers from North Fulton and Forsyth counties who travel south on SR 400 in the morning and north in the afternoon exit at I-285 to travel either west toward Cobb County or east toward DeKalb and Gwinnett Counties. If the Managed Lanes on I-285N between I-75 and I-85 are not built before or concurrent with the Managed Lanes on SR 400 between I-285 and McFarland Road, then the 400 Managed Lanes will be less effective. Traffic in the SR 400 lanes will encounter a major bottleneck at I-285 as SR 400 Managed-Lanes traffic merges into the general-purpose lanes on I-285. This bottleneck could create a five-mile delay. Ideally, the reconstruction of the I-285 and SR 400 interchange, the SR 400 Managed Lanes, and the I-285 Managed Lanes can be synchronized to provide the most benefits.

The Managed Lanes on each highway will function together as a network. And the network is only as strong as its weakest link. Some parts of the network have better cost-benefit ratios than others. Some will transport more commuters than others, but the value lies in creating this total network offering uncongested travel throughout almost any part of metro Atlanta. As a result, it is critical that the entire network be built.

Figure 10: Managed Lanes



Almost all of the Managed Lanes proposed in this Reason Foundation transportation plan are adapted from HNTB's report for GDOT. Two exceptions are proposed lanes on the I-675 corridor from I-75 to I-285 and on the I-85S corridor from I-285 to SR74. Appendix B of this plan contains 11 tables—again, adapted from the HNTB report—which list all the projects needed to establish a comprehensive Managed Lanes network, detail how much they are projected to cost, and separate them into six different tiers, with each tier denoting when the Managed Lanes can be constructed and to what extent new resources will be required for their construction.

1. North–South Tunnel

The Managed Lanes network will also include a new tunnel connecting I-675 with SR 400. Atlanta's highway network funnels traffic on the north of downtown Atlanta from three freeways (I-75, I-85 and SR 400) and traffic south of downtown Atlanta from two freeways (I-75 and I-85)

into one freeway (I-75/I-85 Downtown Connector). Predictably, both of these merges, especially the Northside merge from 14 lanes to seven lanes, create major congestion and delays. This Northside merge causes SR 400 between the toll plaza and I-85 to be the most unpredictable, unreliable freeway segment in the country.[69] GDOT has restriped the I-85/SR 400 merge, but congestion relief has been minor.

Over the past 20 years, researchers have examined many solutions for reducing congestion on the Downtown Connector. There are three possibilities that add lanes on, east or west of the Connector and none of them is ideal. Option 1 is a tunnel connecting I-675 with SR 400. Option 2 builds a parallel tolled freeway between I-85 near the airport and I-75/I-85 at the Brookwood Interchange. Option 3 examines capacity improvements to the Downtown Connector. Option 1 does an excellent job of reducing traffic congestion but requires building an expensive tunnel. Option 2 is slightly cheaper than the I-675/SR 400 tunnel, but it does not do nearly as good a job at relieving congestion, and it could worsen congestion at the Brookwood Interchange. Option 3 is the most expensive, since it would require adding a second level to parts of the Connector. Constructing this second level would require closing parts of the existing freeway during construction, creating enormous traffic gridlock. And double-decking the Downtown Connector would not help with the overall goal of creating a network of highways. Therefore, despite the costs of building a tunnel, Option 1 is by far the most realistic since it reduces area congestion at an attainable price.

Traffic modeling shows that a tunnel with three lanes in each direction connecting I-675 and SR 400 would relieve most area freeway congestion.[70] The tunnel would also create a parallel highway adding redundancy to the network. The reduction of congestion on the Connector may also have major safety benefits. The one-mile section of the Downtown Connector between North Avenue and the Brookwood Interchange (I-75N/I-85N split) has more crashes than any other freeway section in Georgia partly because of the challenges of merging in heavy stop-and-go traffic.[71]

Residents in the area and Atlanta mayor Kasim Reed have expressed concern about a tunnel. Resident opposition to a tunnel is based on a misguided fear that tunnels deep underground will lower property values or otherwise adversely affect residents. But tunnels are a vast improvement over bulldozing city blocks to build surface freeways. During U.S. Interstate construction, most metro areas chose bulldozing, building Interstates through downtowns, specifically through low-income, minority areas. Sometimes, Interstates were constructed this way because the cheapest route was a straight line through the cheapest land. In other cases, such as the Grady Curve in Atlanta, the decision was a deliberate one to separate low-income minority communities from white downtown businesses.

Other countries with different urban-development policies built freeways differently. European countries in particular have built numerous tunnels. France constructed the A-86 toll road tunnel under Versailles near Paris.[72] Switzerland is building a new western bypass underground to avoid disturbing communities on the eastern side of Lake Zurich. Berlin, Germany constructed a six-lane underground tunnel to connect the eastern and western sides of the city.

Many U.S. areas are also constructing tunnels. Seattle is replacing the structurally deficient I-5 viaduct with a tunnel that should be structurally sound in a magnitude 9.0 earthquake.[73] Dallas has

built a tunnel under an airport.[74] Indeed, many Atlanta residents live above a giant tunnel and do not even realize it. Atlanta already constructed a giant water tunnel under parts of Buckhead for its new stormwater and sewer system.[75]

Building a tunnel will not be cheap. And modeling suggests that for the tunnel to have the strongest cost-benefit analysis, it will need to include a surface or subsurface link to I-85 south. The congestion-reduction mobility benefits are so large, however, especially as Atlanta traffic worsens, that the tunnel should be a top priority for metro Atlanta.

The north-south tunnel and link to I-85 are estimated to cost $4 billion, at least 50 percent of which could provided by the private sector through a PPP. Financial details are available in Appendix B.

2. East-West Bypass

The Managed Lanes network will also include a new east-west northern highway. This highway will not be a resuscitation of the Northern Arc, which was to be the first part of a tolled outer-perimeter highway. That highway had two major flaws. First, it was built too far south to serve as a bypass. Similar to the top portion of I-285, it would have functioned more as a commuter freeway. Second, DOT management of the highway left much to be desired. The new northern highway will follow a line from just north of Rome, to just south of Adairsville, to Ball Ground, to just north of Gainesville, to west of Commerce. Exits will be limited to reduce costs and rural growth.

The east-west bypass between the upgraded US 27 north of Rome and I-85 southwest of Commerce is estimated to cost $2.53 billion. This plan recommends that Georgia consider building this road as a limited PPP with tolled bridges. For this much-needed freeway, the estimated private sector contribution would be $530 million. Financial details are available in Appendix B.

B. Expressways or Freeways Outside Metro Atlanta

This plan also proposes upgrading certain arterials outside metro Atlanta to expressways with limited at-grade crossings or to freeways with no at-grade crossings. Adding these highways will create a more integrated road network. Currently, the Georgia freeway system routes all traffic traveling through Georgia through metro Atlanta. While the traffic bypassing Atlanta is a small portion of Atlanta's overall traffic share, it still includes a large number of vehicles. And even small reductions in vehicle numbers can substantially reduce congestion.

Since most travelers do not have the option of bypassing Atlanta, they currently arrange their trips so that they do not drive through Atlanta during the morning or evening rush hour. This less-than-optimal solution leads to reduced economic activity. And with the deepening of the Port of Savannah, the number of trucks traveling from the port to areas north and west of Atlanta will only increase. The upgraded highways outside of Atlanta will provide travelers the option of traveling through Georgia 24 hours a day, seven days a week without encountering major congestion. More details on these highways are provided in the *Relieving Congestion and Increasing Mobility in Georgia* supplement produced by the Georgia Public Policy Foundation.

C. New Freeway General-Purpose Capacity

As a result of political challenges, land prices and induced demand, adding general lane capacity is not the best solution to congestion on most Atlanta-area freeways. However, there are a few select freeways where modest new capacity could substantially reduce congestion. The highway sections shown in Table 8, below, need unpriced capacity because the number of general-purpose lanes is vastly insufficient, new off-peak capacity is needed, and/or the specific highway section is too short for Managed Lanes. These sections are derived from current and future projected traffic counts and cost-benefit analysis. Figure 11, below the table, shows their location on these corridors. Appendix C lists traffic counts for each of these freeway segments.

Table 8: Additional Metro Atlanta General-Purpose Lanes

Corridor	From	To	Scope	Funded Cost	In TIP/ LRP*
I-20E	Wesley Chapel Rd.	SR 20	Add one GP lane in each direction	$108M	Modified Form
I-20W	W of Riverside Parkway	I-285	Add one GP lane in each direction	$18M	No
I-75S	Spalding/ Henry County Line	I-675	Add one GP lane in each direction	$120M	Yes
I-75N	Barrett Parkway	Cherokee/ Bartow County Line	Add one GP lane in each direction	$48M	No
I-85N	I-985	Gwinnett/ Barrow County Line	Add one GP lane northbound from I-985 to SR 20; add two GP lanes northbound from SR 20 to Gwinnett-Barrow County Line; add two GP lanes southbound from I-985 to Gwinnett-Barrow County Line	$138M	Yes
SR 141	I-285	Peachtree Ind Blvd Split	Add one GP lane in each direction	$36M	No
SR 400	Glenridge Rd	Spalding Dr	Add Collector Distributor Lanes	$160M	Yes
SR 400	Spalding Drive	SR 140	Add two GP lane in each direction from end of Spalding Collector/Distributor to SR 140	$86.4M	No
SR 400	McFarland Parkway	Pilgrim Mill Rd	Add one GP lane in each direction	$64.2M	Yes
SR 400	SR 369	Dawson Co. Line	Upgrade to Freeway	$66.5M	No
I-575	I-75	SR 5	Add one GP lane in each direction	$87M	No
I-675	SR 138	I-285	Add one GP lane in each direction	$63M	No
I-985	I-85	SR 20	Add one GP lane in each direction from I-85 to SR 20	$21M	No
Ronald Reagan Parkway	I-85	Pleasant Hill Rd	Build four-lane freeway	$150M	No

*TIP=Transportation Improvement Program, LRP=Long-Range-Plan

Source: Atlanta Regional Commission Planning Level Cost Estimation Tool User's Manual

Figure 11: Additional General Purpose Lanes

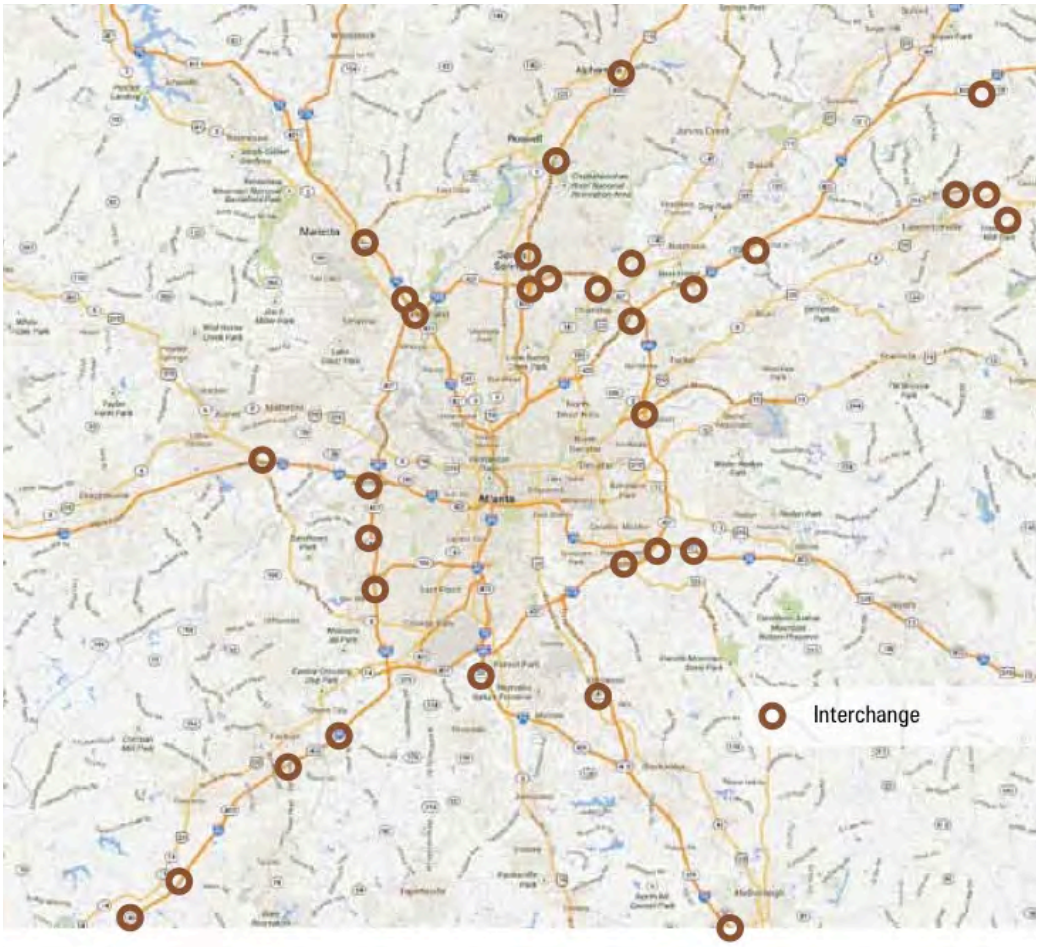
1. New Freeway Interchanges

There are several types of intersections and interchanges that need to be reconstructed. Some freeway interchanges, such as I-285 at I-20W, feature outdated, obsolete designs. These interchanges constitute both a congestion bottleneck and a safety danger due to weaving caused by the large number of entering and exiting vehicles. Other partial intersections, such as I-285 at SR 141, need to be upgraded to full intersections to handle current traffic volumes. Some at-grade arterial highway intersections need to be upgraded from signalized intersections to full interchanges. Table 9 lists interchanges not previously mentioned in the Managed Lanes section. In need of rebuilding. Figure 12, below the table, shows the location of these interchanges.

Table 9: Interchanges Needing Reconstruction		
Interchange	**Money in Plan**	**In TIP/LRP**
I-20 at Panola Road	$60M	Yes
I-20 at SR 6	$50M	Yes
I-75 at SR 85	$10M	Yes
I-75 at Windy Hill Road	$47M	Yes
I-75 at SR 120	$60M	No
I-75 at Bill Gardner Parkway	$9.5M	Yes
I-85 at SR 74	$11.3M	Yes
I-85 at SR 324	$33.3M	Yes
I-85 at SR 140	$60M	Yes
I-85 at Ronald Reagan Parkway	$50M	Yes
I-85 at SR 138	$40M	Yes
I-85 at Amaljack Blvd	$12M	Yes
I-85 at Poplar Rd	$25M	Yes
I-285 at Cascade Road	$11.8M	Yes
I-285 at US 78E	$60M	No
I-285 at SR 400	$112.5M	Yes
I-285 at I-75N	$36M	No
I-285 at I-85N	$26.5M	Yes
I-285 at I-20W	$74.5M	Yes
I-285 at Greenbriar Parkway	$36.4M	Yes
I-285 at SR 141	$100M	No
I-285 at I-20E	$94.6M	Yes
I-285 at SR 155	$28.6M	Yes
I-285 at Ashford Dunwoody Rd	$48M	Yes
I-675 at Double Bridge Road	$50M	No
SR 141 at SR 140	$60M	No
SR 316 at Harbins Road	$23M	Yes
SR 316 at US 29	$51M	Yes
SR 316 at Hi Hope Road	$61.9M	Yes
SR 400 at SR 120E	$20M	No
SR 400 at SR 140 and N Regional Primary Arterial	$100M	No
SR 400 at Abernathy Rd	$50M	No

Source: Atlanta Regional Commission Planning Level Cost Estimation Tool User's Manual

Figure 12: Interchanges Needing Reconstruction



Part 5

New Arterial Highways and Managed Arterial Highways

The next part of solving metro Atlanta's transportation challenges includes upgrading the existing arterial highway network and adding Managed Arterial Highways where appropriate.

All cost estimates in this section use the Atlanta Regional Commission Planning Level Cost Estimation Tool, GDOT and ARC long-range transportation plan cost estimates and actual costs from recently completed projects.

A. Major Primary Arterial Highways

Table 10, below, lists the major primary arterial highways suggested for metro Atlanta. Major primary arterial highways are upgraded highways featuring improved ITS systems, grade separation and access management. Table 10 provides a detailed description of each arterial highway's route and its estimated cost. Figure 13, shows the location of these major primary arterials.

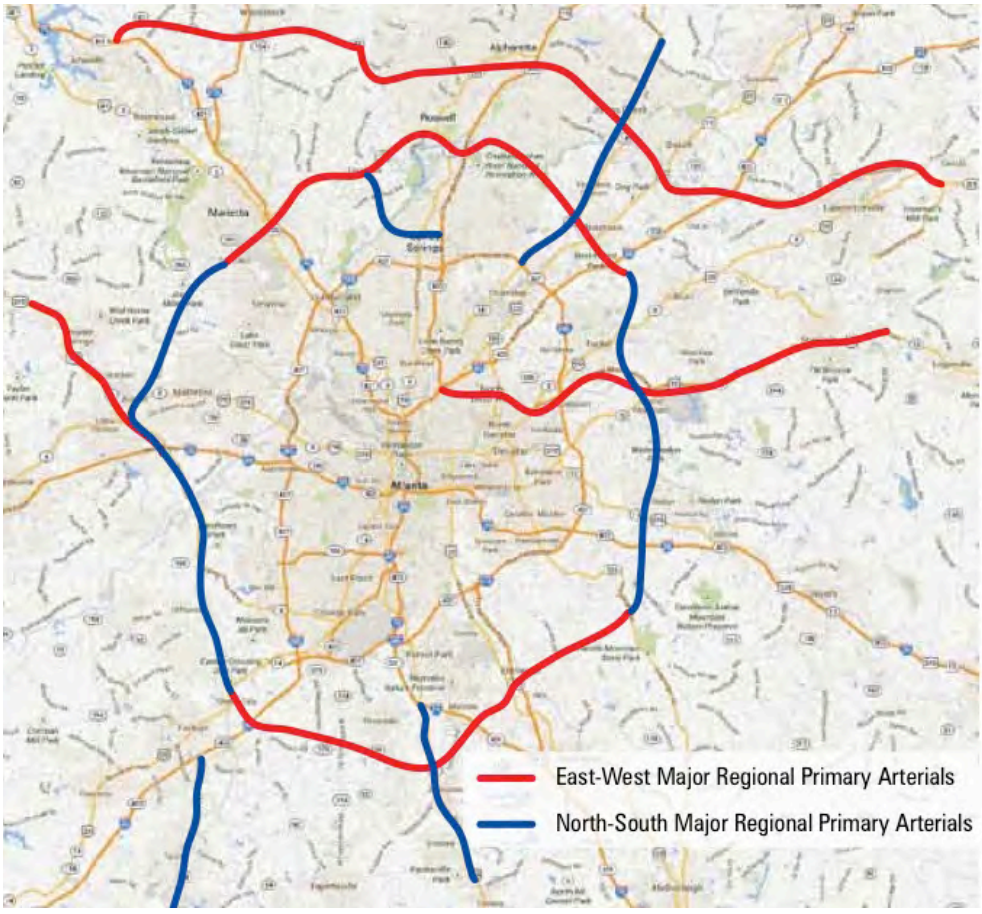
Table 10: Major Primary Arterial Highways

Corridor	From	To	Scope	Cost
North Primary Arterial Highway (SR 120, SR 9, SR 140)	Atlanta Rd. at Austell Rd. (SR 5)	Jimmy Carter Blvd. at Rockbridge Rd.	Build new six-lane highway between Atlanta Rd. and SR 120 at Franklin Rd.	$120M
			Widen SR 120 from Bridegate Rd. to Grand Vista Approach	$68M
			Build new highway between SR 120/9 intersection and Old Alabama Rd. following SR 9 to Riverside Rd. and then east near river.	$90M
			Build new highway along Old Alabama from Riverside Dr. to SR 140.	$36M
			Widen SR 140 between Old Alabama Rd. and US 13.	$103M
			Road Section Total/ITS Total	**$417M/$9M**
South Primary Arterial Highway	SR 138 at US 29	Panola Rd. at SR 155	Widen Mt. Zion Blvd. from McDonough St to Mt. Zion Rd and from Richardson Parkway to Rex Rd	$49M

Table 10: Major Primary Arterial Highways				
Corridor	**From**	**To**	**Scope**	**Cost**
(SR 138, Mt. Zion Blvd, Panola Rd)			Build new alignment and widen Double Bridge Rd from Rex Rd to Panola Rd	$58M
			Widen Panola Rd from Double Bridge Rd to SR 155	$45M
			Road Section Total/ITS Total	**$152M/$7M**
East Primary Arterial Highway (Panola Rd, Stone Mountain-Lithonia Rd, Mountain Ind. Blvd	Panola Rd. at SR 155	Jimmy Carter Blvd. at Rockbridge Rd.	Widen Panola Rd from SR 155 to Winslow Crossing Rd	$48M
			Widen SR 155 from Panola Rd East to Panola Rd West	$5M
			Widen Panola Rd from Thompson Mill Rd to US 278	$15.2M
			Widen/New Alignment Stone Mountain-Lithonia Rd and Ponce De Leon Dr from Rockbridge Rd to Hairston Rd	$30M
			Widen Mountain Ind Blvd from E Ponce De Leon Ave to US 29	$31.5M
			Road Section Total/ITS Total	**$129.7M/$7.2M**
West Primary Arterial Highway (Stonewall Tell Rd, Union Rd, Camp Creek Parkway, Maxham Rd, Austell Rd)	SR 138 at US 29	Atlanta Rd. at Austell Rd. (SR 5)	Build new four-lane alignment from end of Shannon Parkway/Dodson Rd to US 29 at Stonewall Tell Rd.	$12M
			Widen Stonewall Tell Rd. from US 29 to Union Rd.	$14M
			Widen Union Rd./Merk Rd. from Stonewall Tell Rd to Tom Lowe Shooting Grounds.	$16M
			Build new four-lane alignment from Tom Lowe Shooting Grounds to Camp Creek Parkway west of Enon Rd.	$12M
			Widen Thornton Rd. from Hicks Rd. to SR 280.	$36M
			Road Section Total/ITS Total	**$90M/$19.7M**
Peachtree Parkway (SR 141)	SR 141 at Peachtree Parkway/Peachtree Ind Blvd Split	SR 141 north of State Bridge Rd.	Widen SR 141 from Peachtree Ind. Blvd. to McGinnis Ferry Rd	$83.5M
			Road Section Total/ITS Total	**$83.5M/$2M**
East Cobb Connector (Abernathy Rd and Johnson Ferry Rd)	SR 400 at Abernathy Rd.	Johnson Ferry Rd. at SR 120	**Road Section Total/ITS Total**	**$0M/ $1.7M**
US 41S (US 41)	Battlecreek Rd.	Henry/Spalding County line	**Road Section Total/ITS Total**	**$0M/$5M**
Fulton-Fayette Parkway (SR 74)	I-85	Crabapple Lane/North Peachtree Pkwy./SR 74	**Road Section Total/ITS Total**	**$0M/$2.5M**
West Georgia Connector (US 278)	I-20	Cobb County/ Paulding County line	Widen Thornton Rd. to eight lanes between Oakridge Rd and Maxham Rd and to six lanes between US 78 and Garrett Rd.	$28M
			Road Section Total/ITS Total	**$28M, $3.7M**

Table 10: Major Primary Arterial Highways				
Corridor	**From**	**To**	**Scope**	**Cost**
Stone Mountain Parkway (La Vista Rd, North Druid Hills Rd, Stone Mountain Parkway)	SR 236 La Vista Rd. at SR 237 Piedmont Rd.	US 78 at Walton/ Gwinnett County line	Widen SR 236 to four lanes between Cheshire Bridge Rd. and North Druid Hills Rd.	$28M
			Road Section Total/ITS Total	**$28M/$6.7M**
CFG Parkway (SR 92, Rucker Rd, Old Milton Rd, State Bridge Rd, Pleasant Hill Blvd, SR 316)	SR 92 at I-75	GA 316 at the Gwinnett/Barrow County line	**Road Section Total/ITS Total**	**$0M/$10.5M**

Figure 13: Major Primary Arterial Highways



This plan proposes to transform SR 141 from the Peachtree Industrial Bridge split to the Forsyth County line into a Managed Arterial Highway. As a result of the rapid growth of North Fulton, Forsyth and Gwinnett Counties, this arterial needs widening and bridges and/or tunnels. In order to reconstruct this arterial relatively quickly, this study recommends adding optional variable tolls to the bridges and/or tunnels.

Many of these major regional primary arterial highways will include grade separations. Table 11, below, displays the proposed arterial and Managed Arterial grade-separated intersections. Figure 14, below the table, shows the location of these grade-separated interchanges.

Table 11: Major Primary Arterials' New Grade-Separated Exchanges

Interchange	Cost	Interchange	Cost
SR 120 at Johnson Ferry Rd.	$40M	**Total, West Primary Arterial Highway Interchanges**	**$354M**
SR 120 at Old Canton Rd.	$34M	SR 141 at Abbotts Bridge Rd*	$20M
SR 9/SR 120 at SR 120	$50M	SR 141 at State Bridge Rd*	$20M
SR 9 at Riverside Rd.	$44M	SR 141 at Holcomb Bridge Rd*	$20M
SR 140 at Old Alabama Rd.	$44M	SR 141 at Spalding Dr.*	$20M
SR 140 at Spalding Dr.	$50M	SR 141 at McGinnis Ferry Rd*	$20M
SR 140 at US 23	$50M	**Total, Peachtree Parkway Arterial Highway Interchanges**	**$100M**
Total, North Primary Arterial Highway Interchanges	**$312M**	SR 9 at Abernathy Rd.	$40M
SR 138 at SR 279	$40M	**Total, East Cobb Connector Arterial Highway Interchanges**	**$40M**
SR 138 at SR 314	$40M	US 41 at Flint River Rd	$34M
SR 138 at SR 85	$35M	**Total, US 41 Arterial Highway Interchanges**	**$34M**
SR 138 at US 19/41	$40M	**Total, Fulton-Fayette Parkway Arterial Hwy Interchanges**	**$0M****
SR 138 at SR 54	$35M	Thornton Rd. at Oak Ridge Rd.	$35M
Total, South Primary Arterial Highway Interchanges	**$190M**	Thornton Rd. at Maxim Rd.	$40M
US 278 at Panola Rd.	$40M	**Total, West Georgia Connector Arterial Hwy Interchanges**	**$75M**
Panola Rd. at Redan Rd.	$40M	La Vista Rd. at Druid Hills Rd.	$45M
Stone Mountain-Lithonia Rd. at Rockbridge Rd.	$35M	La Vista Rd at Briarcliff Rd.	$34M
Total, East Primary Arterial Highway Interchanges	**$115M**	US 23 at Druid Hills Rd	$40M
US 29 at Stonewall Tell Rd.	$40M	US 29 at Druid Hills Rd.	$40M
Stonewall Tell Rd. at S. Fulton Pkwy	$40M	US 78 at Bethany Church Rd.	$35M
SR 6 S of Enon Rd	$34M	US 78 at SR 124	$40M
SR 6 at SR 154/SR 166	$40M	**Total, Stone Mountain Parkway Arterial Hwy Interchanges**	**$234M**
SR 6 at SR 70	$40M	SR 316 at High Hope Rd.	$61M
Austell Rd. at East–West Connector	$40M	SR 316 at Harbins Rd.	$23M
Austell Rd. at Windy Hill Rd.	$40M	SR 316 at US 29	$51M
Austell Rd. at South Cobb Dr.	$40M	SR 120 from North Point Parkway to Kimball Bridge Rd	$37M
Austell Rd. at Atlanta Rd.	$40M	**Total, CFG Parkway Arterial Hwy Interchanges**	**$172M**

*All of the new grade-separated interchanges on the Peachtree Parkway Arterial Highway are tolled overpasses or underpasses that allow drivers to avoid waiting at an intersection. That makes this a Managed Arterial Highway, as described in Chapter 3. It is anticipated that 50 percent of the cost of these interchanges will be funded from toll revenue/private activity bonds. ** No new grade-separated interchanges are required on the Fulton-Fayette Parkway Arterial Highway.

Figure 14: Major Primary Arterials' New Grade-Separated Interchanges

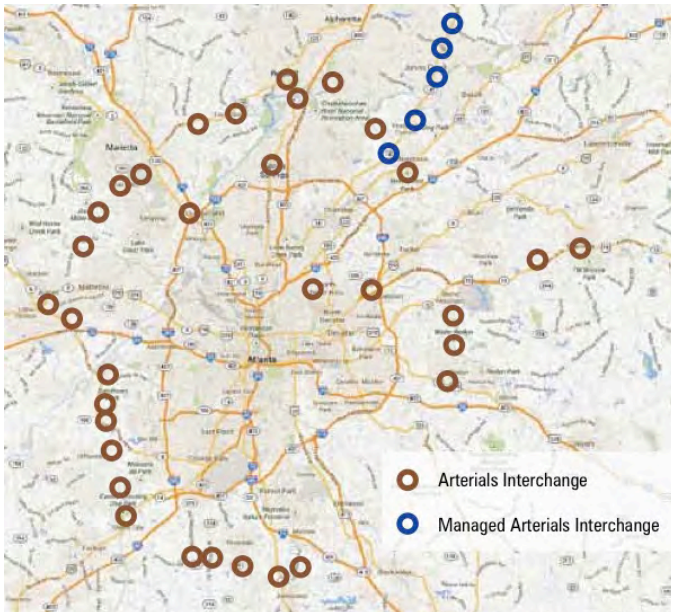
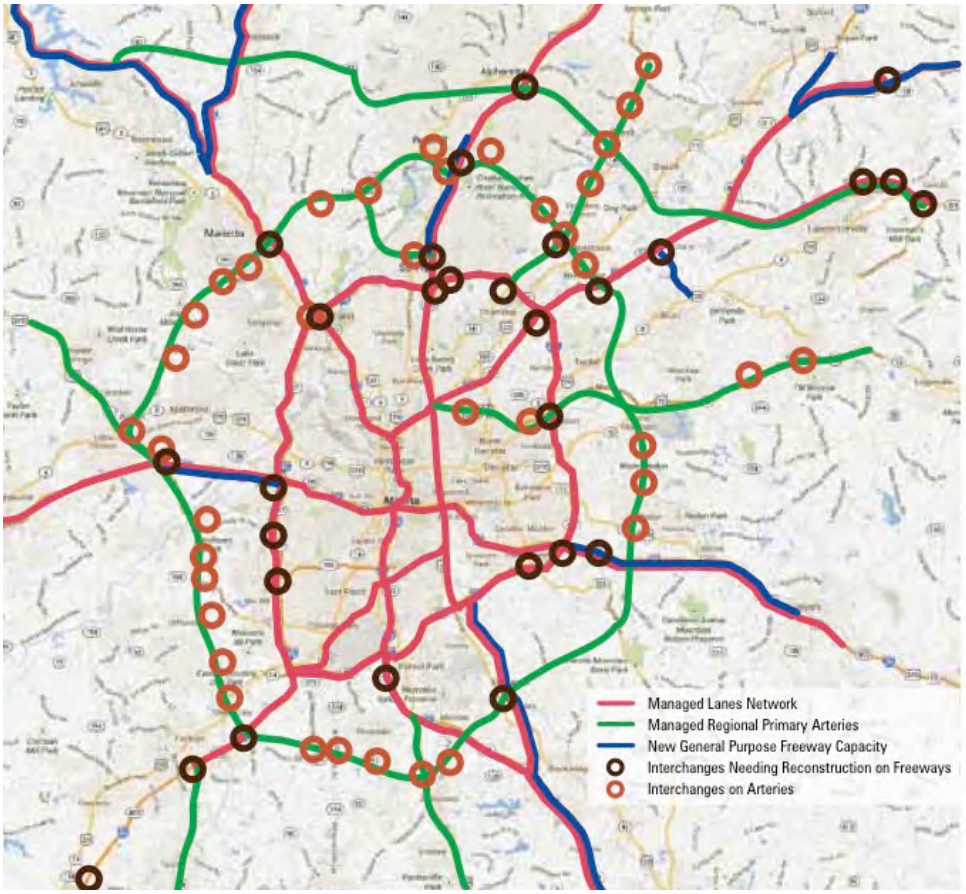


Figure 15, below, displays an overview of the Atlanta transportation improvements.

Figure 15: Full Highway Network



B. Other Arterial and Local Road Improvements

The full list of other proposed arterials and local road improvements is included as Appendix D.

Information on arterial highways outside of metro Atlanta is detailed in the *Relieving Congestion and Increasing Mobility in Georgia* supplement published by the Georgia Public Policy Foundation.

Part 6

Transit

Solving Atlanta's mobility problems requires improving the region's transit system. The region's system has evolved from the two-county Metropolitan Atlanta Regional Transportation Authority (MARTA) rail and bus network to five different transit operators offering several different services. While there are benefits to each county offering its own transit service, limited route cooperation and differing fare systems make using the patchwork of systems a hassle.

A. MARTA Rail

MARTA rail is a key component of the transit network in Fulton and DeKalb counties and in the city of Atlanta. Under this Reason Foundation plan, the current requirement that MARTA use 50 percent of its tax revenue on operations and 50 percent of its funds on capital would be eliminated. MARTA can use more of this funding for operations and decrease the headways of train service. The current requirement induces MARTA to overinvest in unneeded capital facilities and underinvest in maintenance. This is the opposite of how MARTA should be spending its money. As previously discussed, a rail system is not the right transit technology for metro Atlanta and should not be extended. MARTA's mission should shift from studying expansion to maintaining its existing network.

Most post-World War II heavy-rail systems are reaching 40–50 years—the age when they need substantial repairs and significant reconstruction. Washington, D.C.'s Washington Metro Area Transit Authority has embarked on a capital improvement program to replace rail switches, repair or replace the escalators and make substantial station modifications.[76] Over the next 10 years, MARTA will have to budget for these improvements as well.

1. Current Service

MARTA rail operates in Fulton County, DeKalb County and the city of Atlanta; the service is funded by a 1 percent sales tax in the three jurisdictions.[77]

MARTA operates four train lines. The yellow line operates from the airport to Doraville every 15 minutes on weekdays from 6:30 a.m. to 7:30 p.m. and every 20 minutes at other times.[78] The red line operates between the airport and North Springs every 15 minutes on weekdays between 6:30

a.m. and 7:30 p.m. and every 20 minutes on weekends. After 7:00 p.m., the line operates between Lindbergh Center and North Springs only. The blue line operates between H. E. Holmes and Indian Creek every 15 minutes on weekdays from 6:30 a.m. to 7:30 p.m. and every 20 minutes at other times. The green line operates between Bankhead and Candler Park every 15 minutes during weekday rush hours, between Bankhead and King Memorial during weekday middays every 15 minutes, between Bankhead and King Memorial every 20 minutes on weekends before 7:00 p.m. and between Vine City and Bankhead only after 7:00 p.m. every 20 minutes every day.

2. Expansion

In the future, MARTA might be able to build infill stations (stations between other stations) on some of its lines. One potential example is a North Midtown station near the Savannah College of Art and Design and Sherwood Forest. However, MARTA's rail lines should not be extended and no new lines should be built.

3. Future Operating Service

Headways on the combined red and gold lines and blue/green lines should decrease from seven and a half minutes to no more than five minutes during peak periods. A reduction to four-minute headways would be optimal.

B. Local Bus

Local bus service is the foundation of any transportation network. While visitors often marvel at subway systems in London and New York City, local bus networks that offer consistent, reliable service 24 hours a day are in fact the foundation of both systems.

1. Current Service

The Atlanta region has four entities that operate local bus service: MARTA, Cobb Community Transit (CCT), Gwinnett County Transit (GCT) and the Cherokee Area Transportation System (CATS).

MARTA is funded by a 1 percent sales tax in Fulton County, DeKalb County and the city of Atlanta. CCT, which operates in Cobb County; GCT, which operates in Gwinnett County; and CATS, which operates limited service in Cherokee County are funded from the county's general budget.

MARTA has 89 bus routes, which operate 7 days a week every 15–60 minutes.[79] MARTA also operates two shuttles, one from the Holmes Rail Station to Six Flags amusement park every 15 minutes when the park is open, and the Atlanta Braves shuttle from downtown Atlanta to Turner

Field as needed before, during and after baseball games.

CCT operates seven local bus routes that run mostly every 15–30 minutes on weekdays and every hour on Saturdays.[80] GCT operates five local bus routes that operate every 15–30 minutes on weekdays and every hour on Saturdays.[81] CATS operates two bus routes that run every 60 minutes on weekdays.[82]

2. Expansion

This transportation plan recommends adding 120 new bus routes to the existing 103 routes for a total of 223 routes. The new system would serve the 10 metro Atlanta counties plus Coweta, Forsyth and Paulding Counties. This plan does not specify where to add the bus routes. Developing a network would take a comprehensive travel survey. However, the local bus lines should be dispersed throughout the metro area. New bus lines should also operate based on travel patterns and not political boundaries.

3. Funding and Future Operating Service

To encourage local counties to fund bus services, this plan recommends that the state provide $33.3 million per year in matching funds to help support local bus service in metro Atlanta. Local counties must provide at least 50 percent of the funds for each route. The funds will be divided proportionally based on transit usage and the location of routes.

C. BRT and Express Bus

Express bus and BRT are two premium transit services that quickly move people long distances. They are the cost-effective alternative to rail.

1. Current Service

MARTA operates two BRT lines along Memorial Drive every 10 minutes during peak hours.[83] CCT, GCT and GRTA's Xpress service operate express buses. CCT operates three express routes that run every 30 minutes in both directions between Atlanta and Cobb County. And CCT operates eight express bus routes that run every 15–30 minutes in peak rush hour direction only between Atlanta and Cobb County.[84] GCT operates six express routes that run every 15–30 minutes in peak rush hour direction with limited off-peak service between Atlanta and Gwinnett County.[85] GRTA's Xpress operates 35 express bus routes that run during weekday rush hours every 30 minutes mostly in the peak direction but with some reverse-commute options between Atlanta and suburban residents in Cherokee, Clayton, Cobb, Coweta, DeKalb, Douglas, Fulton, Forsyth, Gwinnett, Henry, Paulding and Rockdale counties.[86]

2. Expansion

The Atlanta 2030 transportation plan recommends adding at least 20 BRT and express bus lines to the existing 54 lines. This upgrade would produce extensive BRT service across the metro area. Table 12, below, lists the 20 most promising arterial BRT corridors in metro Atlanta. These 20 routes below should not be considered exhaustive. Additional routes should be studied to determine their feasibility. Map 8, showing the initial 20 routes, appears below.

Table 12: Promising Arterial BRT/Express Bus Lines

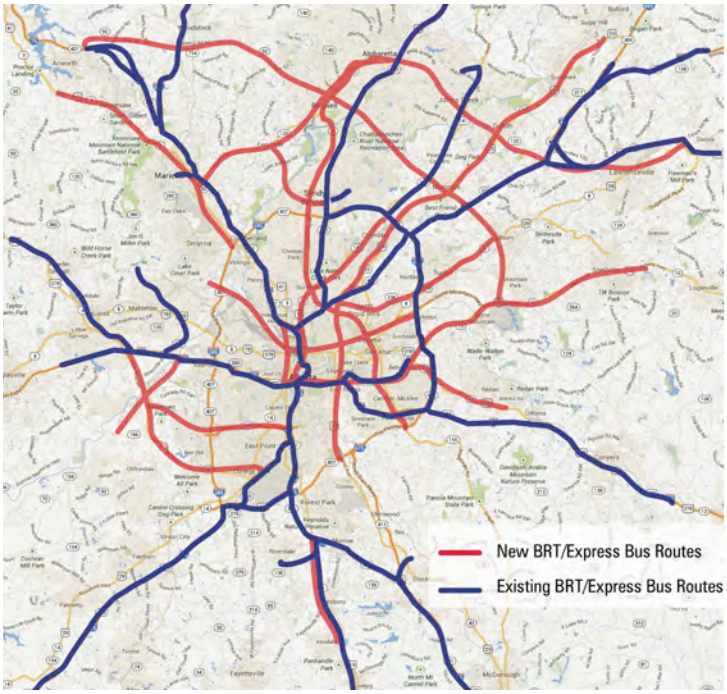
BRT Line	Starting Point	Ending Point
Buford Highway	Pleasant Hill Rd.	MARTA Lindbergh Station
Clairmont Rd./C-Loop	MARTA Decatur Station	MARTA Lindbergh Station
Campbellton Rd.	Camp Creek Parkway	MARTA Oakland City
Camp Creek Parkway/Thornton Rd.	I-85 South	I-20 West
Candler Rd.	Central Decatur	I-285
Downtown/Atlantic Station	MARTA Five Points	Georgia Tech/Atlantic Station
Fulton Industrial Blvd.	Campbellton Rd.	I-20 West
Johnson Ferry Rd./Abernathy Rd.	SR 120/Roswell Rd.	MARTA Sandy Springs Station
LaVista Rd./Lawrenceville Highway	MARTA Lindbergh Station	Jimmy Carter Blvd.
Memorial Dr.	Stone Mountain	MARTA Gannett Station
Moreland Ave./Briarcliff Rd.	I-285 South	North Druid Hills Rd.
Peachtree Rd.	Chamblee	Downtown Atlanta
Piedmont Rd./Roswell Rd.	Alpharetta	MARTA Lindbergh Station
Scott Blvd./Ponce De Leon Ave.	North Druid Hills Rd.	MARTA North Ave. Station
SR 92/SR 140	I-75 North	Stone Mountain
SR 120/State Bridge Rd. /Pleasant Hill Rd/Duluth Highway	Marietta	Lawrenceville
Tara Blvd.	I-75 South	Lovejoy
US 78/Stone Mountain Parkway	Rockbridge Rd.	Snellville
Atlanta Rd./Marietta Blvd.	Cumberland Parkway	Hollowell Parkway
US 41 South Cobb Parkway	SR 120 Roswell Rd.	I-75

Source: Modified from Georgia Regional Transit Authority, Regional Transit Action Plan

3. Future Operating Service

To encourage local counties and/or regional agencies to fund bus services, this plan recommends that the state provide $33.3 million per year in matching funds to help support BRT and/or express bus service in metro Atlanta. Local counties/regional agencies must provide at least 50 percent of the funds for each route. The funds will be divided proportionally based on service offered.

Figure 16: New Express Bus/BRT Service



D. Vanpools

A vanpool consists of a commercial van and a group of seven to 15 people who ride to and from work together. Most vanpools require a small monthly charge to pay for gasoline and insurance. Since seven to 15 people share the costs, however, commuting by vanpool is substantially less expensive and less time consuming than commuting alone. The drivers and substitute drivers for most vanpools either do not have to pay or receive a significantly discounted price.

1. Current Service

Several Atlanta governments and most of the transportation management associations (TMAs) offer vanpools. Douglas County offers 65 vanpools to destinations across the metro area;[87] Cherokee County offers nine.[88] The Cobb Commuter Club offers 57.[89] Other CIDs with vanpool programs include the Buckhead Area TMA, Clifton Corridor TMA, Downtown TMA, Midtown Transportation Solutions, Perimeter Transportation, Town Center Area Community Improvement District and Sustainability Coalition.

Currently, most Atlanta vanpools are coordinated and operated by counties and transportation management associations (TMAs). Two companies provide private vanpool vehicles and operational support. These are RideShare by Enterprise and VRide from VPSI.[90]

2. Expansion

Atlanta is fortunate to have one of the most extensive vanpool networks in the country. The ARC and many local governments have cultivated this inexpensive transit network. This report recommends funding a regional mobility center that will coordinate vanpools.

3. Future Operating Service

Vanpools are a cost-effective transit service. The Managed Lanes network and Managed Arterials will offer enhanced vanpooling opportunities on metro Atlanta's Interstates and arterial highways. Vanpool riders cover 100 percent of the vanpool's operating and capital costs. State and metro transportation agencies may also be able to provide discounted insurance for vanpool members who use a much smaller per capita amount of the region's infrastructure than other commuters. This incentive could increase the use of this cost-effective transit option.

E. Casual Carpooling

Casual carpooling is a less-organized form of vanpooling where commuters form carpools to take advantage of HOV or HOT lanes. While casual carpooling is not popular in Atlanta, it has proven successful in Houston and in Washington, D.C. A car needing additional passengers to meet the required minimum occupancy requirements of a Managed Lane pulls up to one of the casual carpool lines.[91] The driver usually positions the car so that potential passengers can enter on the passenger side. The driver either displays a sign with the vehicle's destination or simply lowers the passenger window to call out the destination. Atlanta destinations could include Perimeter Business Park or Midtown. The passengers first in line for that particular destination then get into the vehicle. Metro agencies can encourage such casual carpool lanes by providing dedicated meeting places near highway entrances. While new users sometimes have safety concerns, casual carpooling has been in effect for 20 years in Houston without a single reported incident.

F. Demand-Response Transit Service

With demand-response transit (DRT) service, individual passengers can request a ride from one specific location to another location at a certain time. Unlike local bus service, which offers a fixed-route service, the passenger must notify the transit operator of the need for service and the destination before he or she travels.

There are two types of DRT service. In suburban and rural areas with low populations, DRT service is offered in lieu of fixed-route transit service as a more cost-effective transit option. In metro areas, DRT service is for elderly and disabled residents who cannot use fixed-route transit services. The Americans with Disabilities Act requires transit providers who offer fixed-route service to offer DRT service as well. Buses, taxis, vans and cars are used as DRT vehicles.

1. Current Service

MARTA, CCT and GCT offer DRT service to the elderly and the disabled.[92] Henry County Transit offers DRT service to all area residents.[93]

2. Expansion

Substantial potential exists for increased DRT service to low-density areas in metro Atlanta. DRT service can supplement fixed-route service in counties such as Cherokee, Coweta and Paulding. The regional mobility center can help dispatch either vans or taxicabs to customers.

3. Future Operating Service

DRT service can be expanded in suburban and rural portions of counties in metro Atlanta that do not have sufficient density for fixed-route transit service. Some counties that operate limited fixed-route service might find DRT more cost effective. Counties should consider using state funds as a match for DRT service.

Part 7

Revenue and Financing

Historically, transportation has been funded primarily via gasoline taxes according to a users-pay, users-benefit principle. The idea is that a system's users pay for its maintenance and expansion. Residents who travel long distances between home and work and use the transportation network extensively pay more than residents who travel short distances and use minimal transportation. Residents who telecommute do not subsidize residents who travel 100 miles to work daily. This system is unlike other government programs, such as national defense, that require all taxpayers to contribute.

This Reason Foundation transportation plan's recommendations retain the users-pay, users-benefit system by recommending using gas taxes, tolling, public-private partnerships, Transportation Infrastructure Finance and Innovation Act (TIFIA) loans, value capture, bonds and the Georgia state infrastructure loan bank over general fees and unrelated funding such as sales taxes, license plate fees, property tax increases, ad valorem taxes, regional or statewide income taxes, and general-obligation bonds.

Although the terms "funding" and "financing" are often used interchangeably, they are not the same. A funding source is a dedicated source of revenue such as a fee or a tax. A financing source is a tool such as a bond or a loan used to help leverage funding. While these financing tools can help pay for infrastructure, some source of underlying revenue is needed for each project.

A. Funding Sources

The transportation improvements detailed in this plan can be fully funded with no new tax revenue, using the following sources.

1. Georgia's gas tax

Georgia's gas tax includes two components. Both are added to the final retail price of gasoline. The first is a 7.5 cent per gallon flat tax. The second is an average 7.2 percent gasoline sales tax. (In a few counties this tax is as low as 6%, but in most counties it is 7% or 8%.) Unlike the flat-rate component, this amount rises and falls based on the retail price of gasoline.

The gasoline sales tax can itself be broken down into two parts: a statewide 4 percent tax and a special-purpose local-option sales tax of 2–4 percent, which is levied by all local counties in Georgia. The local-option sales tax on gasoline averages 3.2 percent—equivalent to 10.1 cents per gallon. The statewide tax, meanwhile, raises 12.6 cents per gallon.

While Georgia's flat-rate 7.5 cent per gallon gasoline excise tax is the second lowest in the country, its additional state and local gasoline sales taxes increase the overall revenue from gasoline sales to 30.2 cents per gallon—the 20th-highest in the country.[94]

Only three-quarters of the 12.6 cents per gallon raised by the *statewide* tax—and none of the 10.1 cents per gallon raised by *local* taxes—supports transportation, however. The other 25 percent of the statewide tax revenue ends up in the state's general fund. Georgia only spends 16.35 cents in gasoline taxes per gallon of gasoline sold on transportation—a little over half of total the 30.2 cents total gasoline tax revenue. This spending places Georgia in the bottom five states in per-capita transportation funding.[95]

Lawmakers need to dedicate all 30.2 cents of gasoline sales taxes to transportation. Dedicating all of the 4 percent statewide gasoline sales tax to transportation will be simple. Georgia has a budget surplus for the first time in many years, which means that dedicating this funding solely to transportation can be accomplished without cutting other programs.

Dedicating the local portion of the gasoline sales tax—which averages an additional 3.2 percent—may be more challenging politically since some counties may resist shifting special-purpose sales tax money to transportation. However, since this tax is collected on gasoline, it should be spent on transportation-related projects. The local-option sales tax is approved by local residents, so this plan proposes allowing local counties and cities to decide how to spend this money on transportation, in cooperation with state and regional officials.

These county special-purpose local option sales taxes support many important programs, such as homestead exemptions, recreation and school construction. Dedicating the local sales tax paid on gas to transportation will slightly reduce funds for these special purposes, but this funding is needed to support transportation across much of the state.

Since counties will now have a local source of transportation revenue, this report recommends that the state stop providing local maintenance and improvement grant funds. Instead, the state should use these funds to build and maintain state roads.

Georgia legislators should also look at removing gas-tax exemptions. State agencies, for example, are currently exempt from the 4 percent state gasoline sales tax and the 3.2 percent average local option sales tax. The logic is that since those taxes do not support transportation, government agencies should not have to pay them. Since this report recommends that all gas taxes be devoted to transportation, state agencies should pay the full 7.2 percent gasoline sales tax, not the reduced rate of 3 percent. Agricultural vehicles and certain historic vehicles are also exempt. State policymakers should examine all exemptions and determine which should be eliminated.

2. Electric Vehicle Fee

Electric vehicles are a promising alternative to traditional vehicles because they do not need petroleum to operate. While there have been setbacks in the electric-vehicle industry, the Nissan Leaf, Tesla Roadster and Wheego all operate on the streets of metro Atlanta. Electric vehicles use the same roadway infrastructure as traditional vehicles, but since they never buy gasoline, they do not pay any gas taxes. To maintain a users-pay, users-benefit market, this report proposes that electric vehicles pay an annual infrastructure fee of $180 to the state of Georgia. This fee is calculated by dividing the average annual number of miles driven (12,000) by the average miles per gallon (20.15) to get 596. The 596 is then multiplied by Georgia's gas tax of $0.302 (30.2 cents) to reach $180. This $180 is also equivalent to a mileage-based user fee of .015 cents per mile.

While there are currently less than 1,000 totally electric vehicles in Georgia,[96] this fee will rise as electric car sales rise and will help to stem the diminishing value of the gas tax. Enacting the fee will be easier today, when there are few electric vehicle owners, than in the future, when a dedicated interest group is likely to oppose any such fee. This report leaves it to Georgia policymakers to decide whether now is the right time to implement this fee.

3. Tolling

Because of Metro Atlanta's extensive transportation needs, tolling will be a key funding component. Surveys repeatedly show that highway users prefer tolls compared to taxes to pay for highway improvements.[97] As tolling is the ultimate user fee—each motorist pays for exactly how much highway he uses—it is more efficient than a gas tax.

Today's tolling is not your father's tolling. Table 13, below, contrasts tolling circa 1950 with tolling in 2013.[98] Most importantly, 21st century tolling's primary purpose is to manage demand while paying for the operation, maintenance and improvement of the facility. Additionally, 21st century tolling does not use tollbooths. Instead, drivers who use the new tolled lanes rent transponders that detect each time the driver uses a specific highway segment and automatically deduct tolls from a prepaid account. In some states, visitors as well as residents who do not want to use a transponder pay a slightly higher toll after they use the facility. This toll is typically collected through the mail. Twenty-first century tolling addresses the two major problems with conventional toll roads or toll lanes. First, tolling does not become a cash cow for the government to divert to other uses. Second, there are no tollbooths to slow down traffic and cause accidents.

Tolling's biggest problem in the 1950s was its high collection costs, which often consumed 25 percent of collected revenue. Twenty-first century tolling's technological improvements have lowered toll-collection costs to approximately 5 percent,[99] a level similar to the gas tax's collection costs.[100] Table 13 shows the differences between traditional toll plazas and today's all-electronic tolling.

Table 13: Differences Between Traditional Toll Plazas and All-Electronic Tolling	
Toll Plazas	**All-Electronic**
Temporary; pays only for initial capital costs	Permanent; pays for all capital and operating costs, like electric utility bills
Flat rates	Variable rates
Occasional increases	Inflation-adjusted increases
Public toll agencies	Toll agencies or PPP concessions

Source: Daryl Fleming, Dispelling the Myths: Toll and Fuel Tax Collection Costs in the 21st Century

Twenty-first century tolling also uses congestion pricing to manage the demand for finite roadway capacity,[101] something other revenue sources cannot accomplish. The primary purpose of congestion pricing is not to raise revenue, but to managed traffic demand and reduce congestion. Most of the Atlanta toll lanes and toll roads will not generate enough revenue to fully cover operations, maintenance and debt-service payments, however. Congestion pricing through tolling is just one of the revenue forms required to build these highways.

4. Funding Transit from the Department of Community Affairs

Quality transit is vital for metro Atlanta. Using gas taxes to fund transit service, however, violates the users-pay, users-benefit principle on which the gas tax is based. Therefore, this plan recommends housing transit in the Department of Community Affairs (DCA), which receives its funding from the general fund. To ensure that transit receives consistent funding, it will be necessary to include a fixed formula that dedicates a certain amount of annual DCA funding to transit projects. Similar to highways, transit needs a reliable funding source to plan and implement multiyear projects. Moving transit to DCA could prove to be a win-win situation politically. Transit would receive the guaranteed, reliable and sufficient funding it currently lacks, while DCA would also likely increase its support base among those suburban and Republican legislators who frequently try to reduce its funding. Additionally, transit funding will not have to compete with highway funding over the same departmental resources—that, after all, is a battle transit is never likely to win.

DCA's transit program should be given an annual budget of $120 million—enough to cover new match funding for bus network expansion, and the establishment of the mobility management center. It is beyond the scope of this research to determine exactly where in existing state budgets this funding should come from, but with an overall budget of $16 billion and recent revenue growth, the state should not find it difficult to redirect $120 million annually to supplement transit. Many agencies have seen large increases in state funding, or are expecting them between FY 2013 and FY 2015. Diverting parts of these increases to support transit service would in many instances represent a much better use of taxpayer resources.

B. Financing Sources

Financing is composed of tools used to leverage transportation funding and revenue sources. This allows transportation agencies to raise the up-front costs needed to build projects and expedite the implementation of needed transportation improvements. Finance mechanisms are the tools used to expand upon existing funding sources at any given time; they include a wide variety of bonds backed by different types of revenue streams, together with credit enhancement and revolving loan programs designed to assist transportation agencies in expediting the implementation of transportation improvements. The financing components lower the amount of funds needed, which in turn means that taxes do not have to be increased.

1. Public-Private Partnerships

Public-private partnerships, or PPPs, are contractual agreements between a public agency and the private sector for the provision of facilities or services. PPPs are not themselves a funding source, but are a means of marshaling private-sector finance and shifting major risks from taxpayers to the private sector. States are increasingly using PPPs to provide and/or manage transportation capacity in both highways and transit. PPPs should be heavily used to build the Atlanta Managed Lanes network. For more information about PPPs, see Appendix A.

2. TIFIA Loans

The Transportation Infrastructure Finance and Innovation Act (TIFIA) program provides federal credit assistance via direct loans, loan guarantees and lines of credit.[102] The loans are available for "nationally or regionally significant surface transportation projects" including highway, transit and rail.[103] The program is designed to fill market gaps and to leverage substantial private co-investment by providing projects with supplemental or subordinate debt. The recently passed MAP-21 bill increased the program's budget authority to $1 billion per year, which would support $10 billion per year in loans. Projects must have a dedicated revenue source to repay the loan. TIFIA loans will allow Georgia to accelerate construction timelines.

3. Bonding

Bonding allows the state to accelerate construction timelines and to spread the cost of a transportation facility over its useful life.[104] Bonds raise the capital for a project up front, and they must be repaid over time from a dedicated revenue stream. This mechanism is similar to financing a home purchase via a mortgage, rather than buying it with cash. There are many different types of bonds that can be used for transportation projects. These include grant anticipation revenue vehicle (GARVEE), grant anticipation note (GAN), revenue, limited, hybrid, private-activity, and tax-credit bonds.[105]

- GARVEEs and GANs are debt-financing instruments that use future guaranteed federal funds to pay off current loans.[106]
- GARVEEs are used for highway projects and GANs are used for transit projects.
- Revenue bonds are used to finance projects that generate revenue, generally from user fees.
- Limited and special tax bonds are payable from a pledge of a specific tax, such as the gas tax.
- Hybrid bonds have characteristics of both revenue and general obligation bonds.
- Private-activity bonds are revenue bonds that allow private-sector activity, including development, design, finance, construction, operation and maintenance, while maintaining tax-exempt status.
- Tax-credit bonds give investors/bondholders federal tax credits instead of cash interest payments.

4. State Infrastructure Banks and Section 129 Loans

State infrastructure banks (SIBs) and Section 129 loans are two separate loan programs. SIBs function as banks that loan money at favorable terms. SIBs may be capitalized by either federal or state funds. A total of 34 states and Puerto Rico have some form of infrastructure bank. Georgia is one of five states with a state-capitalized infrastructure bank.[107] The bank has awarded limited funds and has $30 million available. Georgia could also use federal funds to capitalize its SIB. Section 129 loans allow states to negotiate interest rates to borrow federal funding. Section 129 loans are limited to specific types of highway projects.

5. Value Capture

One of the most promising ways to pay for transit, particularly BRT, is through value capture. Value capture uses land-rent income derived from development to fund transportation infrastructure costs within a set distance of a transit stop or highway.[108] Property owners pay a tax based on the increase in property value resulting from the new highway or transit line. The increase in land values ranges from five to 10 percent for residential properties and 10 to 30 percent for commercial properties. While tax increment financing is typically the optimal value-capture mechanism, other methods may be better in areas with limited redevelopment potential.

The different value-capture mechanisms are described in detail below.

Tax Increment Financing (TIF)

A special district is created during a development period. The tax base amount is frozen at the predevelopment level, on the assumption that redevelopment would not occur in the area without public investment or intervention.[109] Property taxes continue to be paid. However, taxes that are

derived from increases in assessed values (the tax increment) or that result from new development are assigned to a special fund created either to retire bonds that were issued to originate the development or to leverage future growth in the district.

One challenge is to ensure that TIF recovers the full transportation benefits, not merely the perceived rate. Most transportation improvements are included in transportation plans before they occur. Transportation agencies need to include the value of the property before information about the improvement is *released* and adjust for inflation and other factors.

Denver is one metro area that uses TIF.[110] In 2005, the assessed value of a vacant manufacturing site was $900,000. This property generated $50,000 in taxes. The taxable value associated with the property's original use is the base variation, and this revenue is paid to the original taxing authorities. In 2006, the Denver Urban Renewal Authority that oversees projects in the Denver area approved creation of the XYZ Urban Renewal Area and agreed to TIF to help finance infrastructure and other needs. The site was subsequently redeveloped and the assessed value quintupled to $5,000,000; in 2008, the property generated more than $380,000 in property taxes. The difference—$330,000—is used to fund infrastructure and other direct expenses. In most states, the funding is captured until the financing gap has been satisfied. Then, the funding is directed to the original taxing authorities.

Development Contributions and Fees

A development contribution or development fee is a one-time fee charged to a development based on a justifiable relationship between the impact of the proposed development and the improvements it makes. These contributions typically fund infrastructure improvements that are required as a direct result of development. Development contributions can fund approximately 17 percent of all capital expenditures.[111] To ensure that development contributions are used appropriately, developers may wish to establish certain rules stating that:

- They can be used only when the development requires new infrastructure;
- They can be used for capital expenditures only; and
- They require a written policy to determine use.

Joint Development

A joint development is a real-estate development that involves a cooperative arrangement between the public and private sectors. A joint development can include the lease of land, air rights or another type of unused space to a developer.[112] Arrangements may also include sale of land for a specific development or joint construction of a transit facility or private development. Similar to other PPPs, the public and private partners may share costs, revenues or financial risk. For example, a public entity may sell or lease a parcel to a private developer. The developer would then create a development, pay for a transit station and build a parking garage.

Special Assessment Districts

These districts designate a formal boundary in which taxes and fees are assessed on properties that are expected to see a benefit from the proximity of new facilities or transit service.[113] The revenue collected is used to pay for the facility or line. Typically, property owners will voluntarily form this district because it increases the value of their property and the rent they can charge. In many districts, developers pay a fee to help fund new transit. Fees vary based on the distance from the transit service.

6. How Much Financing Can Value Capture Provide?

Value capture is most useful for providing construction funds. In a 2010 study, the Government Accountability Office found that value capture has funded up to 40 percent of the project costs of new transit lines and is projected to fund four to 61 percent of the total project costs for nine major transportation infrastructure projects.[114] Value capture can be particularly effective for BRT service, since the average capital costs are lower than those for rail.

MARTA has had limited success with value capture; it only contributes about one percent of the agency's annual revenue. MARTA should examine how it can receive additional funding from value capture. Value capture has contributed substantial revenue for transit systems in Hong Kong, Honolulu and Portland.[115]

Some transportation projects have used multiple types of value-capture mechanisms; the Portland Streetcar used three. The first was bonds backed by increased short-term parking rates,[116] which raised 28 percent of the system costs. The second was tax-increment financing, which covered 22 percent of the costs. The third was the creation of special assessment districts that considered proximity to the line and size of the property.

Cooperation between the public and private sectors and between various government agencies is important. Often, a public agency will oversee transit development on land owned by a private party. Sometimes, an agency such as an airport authority will build the system while a transit agency will operate it. It is vital that these all of these agencies support the project and work together to implement it.

Value capture by itself will not make transit successful. It is critical that BRT lines are placed in densely developed areas with strong demand for transit. The line should include at least one origin (typically residential) and at least one destination (typically commercial). Value-capture will not produce a successful transit line in an area that lacks density, demand and other transit-friendly features. Value capture alone also will not provide sufficient funds to build or operate transit. In an era of tight funding, however, it can provide a substantial share of project funding.

C. The Complete Funding and Financing Package

The highway and intelligent transportation systems aspects of this Atlanta plan, combined with similar plans for the rest of the state, will cost an estimated $29.9 billion over 30 years. Dedicating *all* of Georgia's gas tax revenue to transportation, removing gas tax exemptions and enacting a modest fee on electric vehicles will cover $25.4 billion of this total or more than 85% of the cost. The remaining 15% will be funded by existing GDOT road construction monies.

The specific funding components are below:

- Shift the remaining quarter of the revenue from the 4 percent statewide gasoline sales tax from the general fund to transportation uses. This shift will generate $5.8 billion over 30 years.
- Dedicate the revenue from the special purpose local option sales taxes paid on gasoline to transportation. This change will generate $18.6 billion over 30 years.
- Eliminate all gas-tax exemptions for state vehicles. For state vehicles alone this will raise $1 billion over 30 years.

Additional revenues for the highway and intelligent transportation systems aspects of this mobility plan will come from the following sources:

- Use public-private partnerships to build Managed Lanes and Managed Arterial Highways (this plan expects the private sector to contribute $7.7 billion to these projects).
- Implement all electronic tolling on Managed Lanes and Managed Arterial Highways. Tolling revenue will contribute $2.9 billion of the Managed Lane construction costs and help keep the highways well maintained.
- Use PABs to help finance $4.4 billion in Managed Lane construction costs over 30 years.
- Use TIFIA loans or bonds to help finance $4.4 billion in Managed Lane construction costs over 30 years.

Funding and financing for transit can come from the Department of Community Affairs budget, local government transit funding, value capture and grant anticipation notes (GANs). Specifically, transit can be paid for in the following ways:

- House transit in the Department of Community Affairs. State transit support should equal $120 million per year, or $3.6 billion over 30 years—$2 billion of which would go to metro Atlanta. Necessary funding should be found in existing state government budgets, with parts of recent or impending spending increases in other areas redirected to DCA's new transit program.
- Use value capture—likely through tax increment financing—to supplement the costs of bus rapid transit lines. This source should generate at least $500 million over 30 years. Bus rapid transit can also be funded by DCA funds, existing local transit funding sources and GANs.
- Support MARTA rail repair with the MARTA local option tax, GANs and value capture.

The table below summarizes the total funding for each plan component. The private sector is a significant source of funds for the Managed Lanes aspect of the plan, contributing $7.7B over 30 years.

Table 14: Metropolitan Atlanta Transportation Plan, Costs and Funding Sources Over 30 Years

Project Category	Public Funding	Private Sector Funding	Total Plan Costs
General Purpose Freeway Lanes and Intersections	$3.1B		$3.1B
Managed Lanes	$9.1B	$7.6B	$16.7B
Primary Arterials	$2.3B		$2.3B
Managed Primary Arterials	$0.2B	$0.1B (minimum)	$0.3B
Other Road Projects	$2.6B		$2.6B
ITS Components	$1B		$1B
Local Bus Service Expansion	$1B		$1B
BRT/Express Service Expansion	$1B		$1B
Mobility Management Center	$0.1B		$0.1B
Metro Atlanta Total	**$20.4B**	**$7.7B**	**$28.1B**

Quite clearly, the proposed funding and financing changes adequately cover all plan costs. The $18.4 billion public share of funding for highway and ITS services is covered by metro Atlanta's share of gas tax revenues. The transit component is covered by the $2.0 billion of DCA funding and potential revenue from value capture.

Revenue and funding is the biggest challenge facing any major transportation plan. Georgia is fortunate to have sufficient revenue right now to significantly increase transportation resources without having to raise taxes. By ensuring that 100 percent of gas tax revenue is devoted to highways, leveraging private sector resources through the use of PPPs, developing new sources of toll revenue, refocusing existing state funds on transit, and making effective use of bonding and value capture, Georgia's policy makers can deliver high-quality, 21st century highway and transit networks—and all without it costing Georgian taxpayers an additional dime.

Part 8

Conclusion

Metro Atlanta's transportation system is at a crossroads. Neither the highway nor the transit network is satisfactory, and highway and transit interests need to do a better job of working together to solve the area's transportation problems. Fortunately, Georgia has the necessary funding; the proposals outlined in this study can largely be paid for by spending currently diverted gas tax funds on highway projects and using DCA funds to develop a better transit network. Necessary additional revenues will come from the elimination of gas-tax exemptions for state vehicles, all-electronic tolling on Managed Lanes and Managed Arteries, and the use of public-private partnerships, private activity bonds, TIFIA loans and value capture.

This Reason Foundation transportation plan:

- Adds a complete Managed Lanes network to Atlanta's highways by making extensive use of PPPs;
- Uses Intelligent Transportation Systems to build a network of primary arterial highways as an alternative to Atlanta's overused freeway network, while also providing funding to improve other arterials;
- Builds several new highways and adds lanes to existing highways where appropriate in metro Atlanta;
- Creates a comprehensive bus-based transit network that serves the entire region; and
- Provides sustainable long-term revenue sources to fund transportation.

Atlanta's insufficient transportation places the metro area at a competitive disadvantage compared with other southeastern metro areas. This comprehensive plan is designed to meet transportation goals while remaining politically realistic. Building all of the projects will take 30 years from when the Georgia General Assembly passes the plan. And it may take several years to make the funding changes. Nevertheless, this Reason Foundation plan lays out a cost-effective strategy for Atlanta to reduce its congestion and build a sustainable transportation network. And the sooner policy makers get started on implementing it, the better.

Appendix A

Appendix A: More Details on Public-Private Partnerships

One of the major components of Georgia's Managed Lane network plan includes using public-private partnerships to provide financing. PPPs are project-delivery mechanisms, not funding sources. While funding has a role, financing at least part of the costs of transportation infrastructure is a better way to pay for such projects. Financing involves raising capital up front from the capital markets and paying off the loans over time. A typical PPP is structured as follows:

Concessionaire Equity Investment	20%
State Contribution (Equity)	20%
TIFIA Loan	30%
PAB (Toll Revenue Bonds)	30%

- The concessionaire equity investments are the resources the private party brings to the deal.
- The state contribution is funding provided from general funds or gas taxes.
- The Transportation Infrastructure Finance and Innovation Act (TIFIA) loan program is a subordinated debt loan from the federal government. Applicants are allowed to finance up to 49 percent of their projects through TIFIA loans, but the amounts rewarded are typically no higher than 35 percent.[117] The recently passed MAP-21 bill increased TIFIA funding to $1 billion in 2014.
- Private activity bonds (PABs) are revenue bonds that allow private-sector activity, including development, design, finance, construction, operation and maintenance, while maintaining tax-exempt status.

For some of these projects, the state does not get any return on its investment since the project could not be financed by concessionaire equity investment, a TIFIA loan and PABs alone.

Also, loans get repaid in a particular order. PABs have the first claim on the toll revenues; the TIFIA loans have the second claim. After those two are repaid, the equity partners get a return. Sometimes no money is left for the equity partners, which is part of the risk that the private partners accept to work on the project.

PPPs provide approximately 20 percent of the needed $16.7 billion in funds to build the Managed Lane network, including the toll tunnel. Another 30 percent is debt backed by toll revenues. The private funding can also help leverage support for TIFIA loans and PABs. Without PPPs, taxpayers would be burdened with 100 percent of the project costs. The private-equity component alone contributes $4.2 billion.

Without using PPPs, and private activity financing sources such as PABs, Georgia could raise $7 billion in taxes through one of the following less-desirable methods. Each of these would be in effect for a minimum of 30 years:

- An additional 30-year, 5.8-cent gas tax;
- An additional $54 registration fee; or
- An increase in funding from the general fund by $233 million each year.

These options are both unrealistic and unnecessary.

PPPs have been used widely throughout the world for the last 50 years. PPPs have been used less in the U.S. because states have been able to rely on robust state and federal gas taxes. Because of improved vehicle fuel efficiency and a decrease in miles driven per capita, the gasoline tax is no longer sufficient. With the current federal budget deficit, federal funding for highway projects is likely to decrease substantially. As a result, Georgia needs to develop additional resources.

With substantial needs and limited funding, public-private partnerships are an important part of any future transportation plan. In the past, there have been legitimate problems with Georgia's PPP program. Its original 2003 law allowed only private entities to propose toll projects. After a private contractor's proposal to improve SR 316 was killed because of opposition to the conversion of existing general-purpose lanes to toll lanes and development concerns, the general assembly in 2005 rewrote the law to allow the DOT and private builders to propose projects.

A provision in this law created an evaluation committee to review proposed transportation improvements and suggest which ones should proceed. This change effectively brought the program to a standstill. The committee became ensnared in a debate over whether to approve plans for new toll lanes along GA 400 in Fulton and Forsyth Counties. After several years of debate, the committee voted to kill the project. This failure of the evaluation committee helped launch a second rewrite of the program, prohibiting all unsolicited proposals from private contractors.

By 2010, after a second rewrite of the laws, all of the problems had been solved. Three teams responded to GDOT's request for proposals to finance, build and operate the West by Northwest Managed Lanes project. Georgia received a $270 million TIFIA loan for the project. The governor's reservations about long-term contracts and involvement of non-Georgia companies resulted in the project's cancellation. GDOT subsequently rebid the project as a traditional state project.

Not all of Georgia transportation projects are suitable for PPPs. And PPPs are not a magic bullet. Transportation PPPs, however, used by countries across the world and 30 U.S. states, are a vital financing arrangement that brings new resources to projects by allowing private entities to invest in infrastructure.[118] Private entities overseen by federal and state governments produce food, manage the stock market, and operate correctional institutions. Why should transportation be any different? PPPs allow the free market to allocate resources to the most-needed projects. If a private company did not see a need for improving a road, it would not bid on that project.

The following clarifications correct some often-misunderstood facts about PPPs.

- **Highway and transit projects developed by international companies increase the number of Georgians employed in the construction industry.** PPP experiences in the U.S. show that international companies hire mostly U.S. workers. Transportation projects need construction workers, and workers in Spain cannot build a construction project in Georgia. As PPPs provide almost 50 percent of the resources for large projects, they increase local employment in the construction sector by 40 percent.[119] Other countries have many companies with decades of experience in PPPs because those countries do not have a dedicated gasoline tax to build infrastructure. With increasing gas mileage and materials costs, the U.S. is facing the same problem. U.S. engineering companies such as Parsons Brinckerhoff and HNTB Corporation are also involved in PPPs. U.S.-based investment firms such as Morgan Stanley and JPMorgan Chase are creating their own infrastructure funds to invest in PPPs. Many city- and state-owned pension firms are also investing in PPPs.
- **PPPs do not commit future generations any more than lottery, union or other state contracts.** The HNTB Corporation and Reason Foundation Managed Lanes plans limit PPP contracts to 35 years. State governments regularly make commitments that impact taxpayers for longer than 50 years. Bonding for infrastructure and changing public-employee pension benefits are two examples. Because the capital costs for major infrastructure projects are so high, it is necessary to finance them over long periods of time. And PPP documents are flexible. All concession agreements have detailed provisions to permit changes during their term. These provisions deal with such matters as negotiating and arbitrating disputes and employing independent parties to make fair financial estimates. Typically, the only limit to changes to the concession is that neither side be financially disadvantaged by the changes. With long-term commitments come long-term benefits. In the absence of funds, using PPPs to deliver new transportation infrastructure enhances the mobility of current and future generations and benefits the economy over the long term.
- **None of Georgia's proposed PPP deals include noncompete clauses that prevent state and local officials from building nearby competing roads.** While some early proposals had such clauses, the West by Northwest partnership allowed Georgia to build everything in its current long-range transportation plan. In fact, the Northwest Corridor PPP would have allowed a new parallel highway to be built adjacent to I-75 with no repercussions for the state. The only lanes the state could not build were new general-purpose lanes on I-75.

GDOT has a policy of not building new general-purpose lanes in metro Atlanta, so these lanes would not be built anyway. Full improvements could have been made to US 41 and SR 5 as well. The Northwest Corridor PPP was killed, however, in large part because politicians mistakenly thought it restricted the state's ability to build new lanes within five miles of the corridor. Even if Georgia changed its policies and found money to build new free lanes, today's PPPs spell out a compensation formula for some portion of toll revenue under any conceivable circumstances.

- **PPPs are accepted by leaders across the political spectrum: Democrats, Republicans and Independents.** The liberal-leaning Brookings Institute, the conservative Heritage Foundation and the nonpartisan Eno Transportation Foundation have all embraced PPPs.[120] PPPs have been used in California, Florida, Illinois, Indiana, New York, Ohio, Texas and Virginia. Democrats in Maryland and Republicans in North Carolina are interested in developing new PPP projects in their states.
- **States do not sell highways for PPP projects.**[121] In typical PPP arrangements, the government remains the owner at all times, with the private-sector partner carrying out only the tasks spelled out within the concession agreement and according to the terms set by the state.
- **Governments remain in control of public assets.** The entire legal foundation is a strong performance-based contract that spells out all of the responsibilities and performance expectations that the government partner will require of the contractor. The failure to meet any of thousands of performance standards specified in the contract exposes the contractor to financial penalties, and in the worst-case scenario, termination of the contract. In this case, the government takes over the highway for free.
- **PPPs transfer risk from taxpayers to the private sector.** In traditional transportation-construction projects, the public sector is responsible for all of the uncertainties, such as late completion, cost overruns, weather delays and other factors. In PPPs, private-sector investors are responsible for these risks. This arrangement has two advantages. First, unexpected circumstances will not affect taxpayers at all. Second, as private-sector firms need to make a profit, they will do everything in their power to make sure the project is finished on time and on budget.
- **The timing is right for infrastructure investment, especially for toll-revenue bonds.** Given that interest rates are at near-historic lows, now is the best time to pursue private-sector infrastructure financing. In the future, interest rates will rise, making debt financing more expensive. And the consensus in the finance community is that infrastructure remains an attractive investment; PPP projects have continued to be built in the United States and around the world.
- **PPPs do not sell roads to foreign companies.** International companies may win the bid to operate the road, as they have the most experience with PPPs. Countries such as Australia, New Zealand, the United Kingdom, France, Italy and Spain have used transportation PPPs for decades. Because the U.S. has had the gas tax, it has minimal experience with PPPs compared with other countries, but a domestic market is rapidly emerging.

- **Governments retain the authority to take private property through eminent domain in transportation PPP deals.** Georgia's PPP law has not delegated this power to private-sector companies. The eminent-domain power is always reserved by the state.
- **Government is protected if the private party in a PPP goes bankrupt.** In the event of a corporate bankruptcy by the private sector investor-operator, the asset reverts back to the project lenders who, with permission from the state, would select a new operator. Under certain scenarios, the state receives the highway for free. The lenders have strong financial incentives to continue to properly operate and maintain the road, since they risk losing the value of their investment. The state must approve any contract changes.

A growing Georgia needs public-private partnerships to help solve its transportation problems. It thus has two options. Georgia can welcome public-private partnerships and start aggressively using PPPs as recommended by the Georgia Department of Transportation and the Atlanta Regional Commission. The Georgia General Assembly might also choose to tweak certain state rules as necessary.

Or, Georgia can continue to shun public-private partnerships. The state will then have great difficulty improving either its highways or its transit system. The I-285/GA 400 and I-285/I-20W interchanges will be fixed eventually, maybe in 20 years, with public funds. Building these interchanges with state funds, however, will take far longer. More importantly, the other parts of the network, including I-20, GA 316 and parts of I-285, will not get built. Since the strength of the Managed Lanes plan is the network, building only parts of the network is not nearly as effective.

Appendix B

Appendix B. Managed Lane Projects and Phasing

Table B1: Tier 1 Projects (currently under construction or in preliminary engineering)

Corridor	From	To	Scope	Cost
I-75 North outside I-285	I-285	Hickory Grove Road	Build two HOT reversible lanes elevated to I-575 and one reversible lane at grade from I-575 to Hickory Grove Road	$900M* ^
I-575	I-75 North	South of Sixes Road	Build one reversible HOT lane at grade	
I-75 South outside I-285	SR 155	SR 138	Build one HOT lane in each direction from SR 138 to SR 155	$45M* ^
I-85 North outside I-285	Old Peachtree Road	South of Hamilton Mill Road	Build one HOT lane in each direction from Old Peachtree Road to Hamilton Mill Road	$85.4M* ^

*Does not include all work phases, ^ Project currently partially or completely paid for

Source: Adapted from HNTB Atlanta Managed Lanes System Plan

Table B2: Managed Lane Ramps, Tier 1 Projects

Interchange	Interchange Movements Included	Cost
I-85N/I-985	I-85NB to I-985NB; I-985SB to I-85SB	$21.6 M*

*Does not include all work phases

Source: Adapted from HNTB Atlanta Managed Lanes System Plan

Table B3: Tier 2 Projects
(can be constructed in the next ten years with limited new resources)

Corridor	From	To	Scope	Cost
I-75 North inside I-285	I-75N/I-85N	I-285N	Convert existing HOV-2 lanes (one lane in each direction) to provide one HOV-2/HOT-2 lane in each direction	$85.4M
I-85 North inside I-285	I-75N-I-85N	I-285N	Convert existing HOV-2 lanes (one lane in each direction) to provide one HOV-2/HOT-2 lane in each direction	$119M
I-75 South inside I-285	I-285S	I-75S-I-85S	Convert existing HOV-2 lanes (one lane in each direction) to provide one HOV-2/HOT-2 lane in each direction	$26.6M
I-20 East inside I-285	I-75-I-85	I-285E	Convert existing HOV-2 lanes (one lane in each direction) to HOV-2/HOT-2 to provide one HOV-2/HOT-2 lane in each direction	$85.4M

Source: Adapted from HNTB Atlanta Managed Lanes System Plan

Table B4: Tier 3 Projects
(can be constructed in the next ten years with significant new resources)

Corridor	From	To	Scope	Cost
SR 400 North outside I-285	I-285	South of SR 20	Build two HOT lanes in each direction to SR 140; build one HOT lane in each direction to SR 20	$411M
I-285 North	I-75N	I-85N	Build two HOT lanes in each direction from I-75N to I-85N	$683.2M
I-75 South outside I-285	I-285	SR 138	Build one HOT lane in each direction from I-285 to SR 138	$358.4M
New Alignment from East of Rome to West of Commerce	US 27	I-85	Build 4-lane freeway from US27 to I-85	$2,540M

Source: Adapted from HNTB Atlanta Managed Lanes System Plan

Table B5: Interchange Movements for Tier 3 Projects

Interchange	Interchange Movements Included	Cost
I-85N/I-285	I-85SB to I-285WB&EB; I-285WB to I-85NB; I-285EB to I-85NB	$275.1M
SR 400/I-285	SR 400SB to I-285EB&WB; SR 400NB to I-285EB; I-285EB to SR 400NB; I-285WB to SR 400NB&SB	$266.7M
Peachtree Industrial Blvd./I-285	All movements provided	$147M
I-75S/I-675	I-75NB to I-675NB; I-675SB to I-75SB	$30.8M

Source: Adapted from HNTB Atlanta Managed Lanes System Plan

Table B6: Tier 4 Projects (can be constructed in the next 10-20 years with significant new resources)				
Corridor	**From**	**To**	**Scope**	**Cost**
I-85 North outside I-285	I-285	I-985	Build one additional HOT lane in each direction from I-285 to I-985 (for a total of two HOT3+ lanes in each direction from I-285 to I-985)	$716.8M
I-285 East	I-85	I-20	Build two HOT lanes in each direction from I-85 to I-20	$513.8M
I-285 West	I-75	I-20	Build two HOT lanes in each direction from I-75 to I-20	$375.2M
I-20 West outside I-285	I-285	West of Bright Star Road	Build two HOT lanes in each direction from I-285 to Mt. Vernon Road; build one HOT3+ lane in each direction to Bright Star Road	$412.3M

Source: Adapted from HNTB Atlanta Managed Lanes System Plan

Table B7: Interchange Movements for Tier 4 Projects		
Interchange	Interchange Movements Included	Cost
I-20E/I-285	I-20WB to I-285NB&SB; I-285SB to I-20EB; I-285NB to I-20EB	$207.2M
US 78/I-285	All movements provided	$107.1M
I-20W/I-285	I-20EB to I-285NB&SB; I-285SB to I-20WB; I-285NB to I-20WB	$234.5M

Source: Adapted from HNTB Atlanta Managed Lanes System Plan

Table B8: Tier 5 Projects (can be built in the next 15-25 years with significant new resources)				
Corridor	**From**	**To**	**Scope**	**Cost**
I-20 East outside I-285	I-285	West of Salem Road	Build two elevated reversible HOT lanes to Sigman Road, and build one elevated reversible HOT lane to Salem Road	$506.8M
SR 316	I-85N outside I-285	East of High Hope Road	Build one HOT lane in each direction from I-85 to High Hope Road	$221.2M
I-85 South inside I-285	I-75S/I-85S	Loop Road	Build one HOT lane in each direction from the Brookwood Interchange to SR 400 North inside I-285	$164.5M
I-85 North inside I-285	I-75N/I-85N	SR 400 North inside I-285	Build one HOT lane in each direction from I-285 to I-85 North inside I-285	$350M
SR 400 North inside I-285	I-285	I-85 North inside I-285	Build one HOT lane in each direction from I-285 to I-85 North inside I-285	$42M
I-285 South/I-285 West	I-20E	I-20 West	Build one HOT lane in each direction from I-20 East to I-20 West	$499.1M
I-75-I-85	I-75S/I-85S	I-75N/I-85N	Convert existing HOV lanes (one lane in each direction) to HOT3+ lanes from I-75S/I-85S to I-75N/I-85N	$41.3M
New Alignment from I-285/I-675 to I-85/SR 400	I-285 at I-675	I-85 at SR 400	Build 6 lane tunnel with some sections at grade from I-675 to SR 400	$3,000M
New Alignment from I-75S/I-85S Split to SR 400 extension 2.5 miles S of I-20	I-75S/I-85S Split	SR 400 Extension	Build 4 lane freeway or tunnel from I-75S/I-85S split to SR 400 Ext	$1,000M

Source: Adapted from HNTB Atlanta Managed Lanes System Plan

Table B9: Interchange Movements for Tier 5 Projects		
Interchange	**Interchange Movements Included**	**Cost**
I-675/I-285	I-675NB to I-285EB; I-285WB to I-675SB	$50M
I-75S/I-285	I-75NB to I-285EB&WB; I-75SB to I-285EB; I-285WB to I-75NB&SB; I-285EB to I-75SB	$256.2M
I-85/SR 400	I-85NB to SR 400NB; SR 400SB to I-85SB	$180.6M
I-85S/I-285	I-85NB to I-285WB&EB; I-285EB to I-85SB; I-285WB to I-85SB	$173.6M
I-75S-I-85S/I-85S	I-75-I-85SB to I-75SB; I-75-I-85SB to I-85SB; I-85NB to I-75-I-85NB; I-75NB to I-75-I-85NB	$56M

Source: Adapted from HNTB Atlanta Managed Lanes System Plan

Table B10: Tier 6 Projects (can be built in the next 20-30 years with significant new resources)				
Corridor	**From**	**To**	**Scope**	**Cost**
I-75 North outside I-285	North of Hickory Grove Road	South of SR 113	Build one at-grade HOT reversible lane from Hickory Grove Road to SR 113	$297.5M
I-575 North	Sixes Road	North of Canton Road	Build one at-grade HOT reversible lane from Sixes Road to Canton Road	$79.8M
SR 400 North outside I-285	SR 140	South of SR 20	Build one additional HOT lane in each direction from SR 140 to Windward Parkway;	$205.8M
I-75 South outside I-285	I-285	South of Locust Grove Road	Build one HOT lane in each direction from I-285 to Locust Grove Road (for a total of two HOT lanes in each direction from I-285 to Bill Gardner Parkway)	$515.2M
SR 316	East of High Hope Road	East of SR 81	Build one HOT lane in each direction from High Hope Road to SR 81	$145.6M
I-20 West outside I-285	East of Mt. Vernon Road	East of Presley Mill Road	Build two HOT lanes from Mt. Vernon Road to east of Presley Mill Road (for a total of two HOT lanes in each direction from I-285 to Presley Mill Road	$74.9M
I-85 South inside I-285	Loop Road	I-285	Build one HOT lane in each direction from Loop Road to I-285	$65.8M
I-285 South/I-285 West	I-20 East	I-20 West	Build one additional HOT lane in each direction from I-20E to I-20W (for a total of two HOT lanes in each direction from I-20E to I-20W)	$397.6M
I-20 West inside I-285	I-75/I-85	I-285	Build one HOT lane in each direction from I-285 to I-75/I-85	$68M
I-675	I-75	I-285	Build one HOT lane in each direction from I-75 to I-285	$85M
I-85 South	I-285	SR 74	Build one HOT lane in each direction from I-285 to SR 74	$90M

Source: Adapted from HNTB Atlanta Managed Lanes System Plan

Table B11: Interchange Movements for Tier 6 Projects		
Interchange	**Interchange Movements Included**	**Cost**
I-85S Inside/I-285	I-85SB to I-285WB; I-285EB to I-85NB; I-85NB to I-285WB, I-285 EB to I-85SB	$180M
I-75-I-85/SR 166	I-75-I-85 SB to SR 166WB; I-166EB to I-75-I-85 NB	$54.6M
I-285/SR 166	SR 166WB to I-285NB&SB; I-285NB to SR 166EB; I285 SB to SR 166EB	$77.7M

Source: Adapted from HNTB Atlanta Managed Lanes System Plan

Appendix C

Appendix C: Traffic Volume Counts for General Purpose Lane Widening

Table C1: Traffic Count Data

Highway	Starting Point	Ending Point	Average Annual Daily Traffic	Current GP Lanes	Recommended GP Lanes
I-20	Wesley Chapel Road	Panola Road	146,650	6	10
I-20	Panola Road	Turner Hill Road	122,960	6	8
I-20	Turner Hill Road	Sigman Road	109,870	6	8
I-20	Sigman Road	Klondike Road	103,830	6	8
I-20	Klondike Road	GA 138	100,650	6	8
I-75	Henry/Griffin Line	Bill Gardner Pkwy	72,700	6	8
I-75	Bill Gardner Pkwy	SR 155	83,820	6	8
I-75	SR 155	SR 20/SR 81	102,350	6	8
I-75	SR 20/SR 81	Jonesboro Road	121,660	6	8
I-75	Jonesboro Road	Jodeco Road	137,340	6	8
I-75	Jodeco Road	Eagles Landing Pkwy	136,970	6	8
I-75	Eagles Landing Pkwy	I-675	145,530	7	10
I-75	Barrett Parkway	Chastain Road	127,580	6	8
I-75	Chastain Road	Wade Green Road	121,620	6	8
I-75	Wade Green Road	SR 92	99,200	6	8
I-75	SR 92	Glade Road	99,200	6	8
I-85	I-985	SR 20	91,150	5	8
I-85	SR 20	Hamilton Mill Road	78,720	4	8
I-85	Hamilton Mill Road	Gwinnett/Barrow Line	65,610	4	8*
I-985	I-85	SR 20	56,350	4	6*
SR 400	Abernathy Road	Northridge Road	169,860	8	12
SR 400	Northridge Road	SR 140	165,300	8	12

* While these traffic volumes would not necessarily warrant widening at current LOS C/D standards, we expect increased traffic volumes will make these widenings necessary.

Appendix D

Appendix D: Other Road Projects

Table D1: Miscellaneous Arterial and Local Road Improvements				
General Road Projects	**Type**	**New Funds Dedicated**	**Jurisdiction**	**In LRP/ TIP**
Pryor Street at CSX Line	Bridge Replacement	$32.1M	Fulton	Yes
Central Ave at CSX Line	Bridge Replacement	$27.1M	Fulton	Yes
Courtland St at CSX Line	Bridge Replacement	$22M	Fulton	Yes
Anderson Ave at CSX Line	Bridge Replacement	$5.2M	Fulton	Yes
Edgewood Ave at Airline St	Bridge Replacement	$2.2M	Fulton	Yes
Nelson St between Elliott St and Spring St	Bridge Replacement	$17.7M	Fulton	Yes
Martin Luther Kings St between Mitchell Dr. and Spring St	Bridge Replacement	$45M	Fulton	Yes
SR 140 from East Cherokee Dr. to Mountain Rd	Widening	$70M	Cherokee	Yes
SR 140 from I-575 to E Cherokee Dr.	Widening	$70M	Cherokee	Yes
SR 140 from Mountain Rd to Fulton County Line	Widening	$50M	Cherokee	Yes
SR 20 from E of I-575 to Forsyth County Line	Widening	$114.3M	Cherokee	Yes
US 19/41 from I-75 to Battle Creek Rd	Build Expressway	$102.2M	Clayton	Yes
Conley Rd from I-285 to SR 54	Widening	$28.5M	Clayton	Yes
SR 54 from McDonough Rd to US 19/41	Widening	$4M	Clayton	Yes
SR 85 from Adams Dr. to I-75 South	Widening and Inter-change Reconstruction	$17.2M	Clayton	Yes
SR 85 from Pointe South Parkway to Roberts Dr.	Widening	$22.2M	Clayton	Yes
US 23 from Lake Harbin Rd to Anvil Block Rd	Widening	$31.5M	Clayton	Yes
US 41	Intersection Improvements	$9.8M	Cobb	Yes
SR 360 from Paulding County Line to New Macland Rd	Widening	$14.5M	Cobb	Yes
US 41 at Windy Hill Rd	Build Interchange	$47M	Cobb	Yes
SR 92 from US 41 to Cherokee St	Widening	$29.1M	Cobb	Yes
Windy Hill Rd from SR 280 to US 41	Widening	$23M	Cobb	Yes
US 41 from Herodian Way to SR 120	Widening	$37.8M	Cobb	Yes
Mt. Vernon Rd from Fulton County Line to Chamblee-Dunwoody Rd	Widening	$12M	DeKalb	No
Mt Vernon Rd from Wickelford Way to Tilly Mill Rd	Widening	$18M	DeKalb	No
Chamblee-Dunwoody Rd from Roberts Dr. to Womack Rd	Widening	$10M	DeKalb	No
Ashford Dunwoody Rd from Peachtree Rd to Perimeter Summit Parkway	Widening	$34M	DeKalb	Yes

Table D1: Miscellaneous Arterial and Local Road Improvements				
General Road Projects	**Type**	**New Funds Dedicated**	**Jurisdiction**	**In LRP/ TIP**
Clifton Rd at CSX Railroad	Bridge Replacement	$35M	DeKalb	Yes
US 278 from I-285 to Ha	Widening	$25.2M	DeKalb	Yes
Lee Rd from I-20 to US 78	Widening	$18.9M	Douglas	Yes
SR 92-166 from Split to Fulton County	Widening	$20M	Douglas	Yes
US 78 from SR 6 to Tralee Dr.	Widening	$30M	Douglas	Yes
SR 54 from McDonough Rd to US 19-41	Widening	$4M	Fayette	Yes
SR 85 from Bernhard Rd to Grady Ave	Widening	$12M	Fayette	Yes
East Fayetteville Bypass from South of Jeff Davis Rd to SR 54	New Alignment	$35M	Fayette	Yes
Corrinth Rd fro SR 54 to SR 85	Widening	$14M	Fayette	Yes
SR 92 from Jimmy Mayfield Blvd to McBride Rd	Widening	$15.9M	Fayette	Yes
SR 279 from SR 85 to Fulton County Line	Widening	$40M	Fayette	Yes
SR 120 from State Bridge Rd to Jones Bridge Rd	Widening	$21M	Fulton	Yes
Windward Parkway from Westside Parkway to Union Hill Rd	Widening	$18.9M	Fulton	Yes
SR 140 from Cherokee County Line to Rucker Rd	Widening	$46M	Fulton	Yes
SR 120 from Parsons Rd to Peachtree Ind. Blvd	Widening	$28M	Fulton/ Gwinnett	Yes
SR 6 from I-85 to Welcome All Rd	Widening	$60M	Fulton	Yes
SR 9 from Mayfield Rd to Forsyth County Line	Widening	$33M	Fulton	Yes
SR 9 from Holcomb Bridge Rd to Mansell Rd	Widening	$6M	Fulton	No
SR 138 at Shannon Parkway	Intersection Improvements	$2M	Fulton	No
US 29 from SR 6 to SR 14	Widening	$37.8M	Fulton	Yes
US 23 from Old Peachtree Rd to Sugarloaf Parkway	Widening	$14M	Gwinnett	Yes
US 23 from Sawnee Ave to SR 347	Widening	$8M	Gwinnett	Yes
Pleasant Hill Rd from Howell Ferry Rd to Chattahoochee River	Widening	$11.6M	Gwinnett	Yes
SR 20 from Peachtree Ind Blvd to Chattahoochee River	Widening	$8M	Gwinnett	Yes
SR 20 from I-985 to US 23	Widening	$4.1M	Gwinnett	Yes
SR 120 from Langley Dr to SR 317	Widening	$38.4M	Gwinnett	Yes
Dacula Rd at CSX Line	Bridge Replacement	$10M	Gwinnett	Yes
Five Forks-Trickum Rd between Killian Hill Rd and Oak Rd	Widening	$10.4M	Gwinnett	Yes
Hillcrest Rd-Satellite Blvd Connector	New Alignment	$19.9M	Gwinnett	Yes
West Lidell Rd-Club Dr. Connector	New Alignment	$39.3M	Gwinnett	Yes
Sugarloaf Parkway from SR 316 to SR 20	New Alignment	$295M	Gwinnett	Yes
Hamilton Mill Rd from US 23 to SR 324	Widening	$40M	Gwinnett	Yes
SR 124 from SR 20 to Old Peachtree Rd	Widening	$25M	Gwinnett	Yes
US 23 from SR 138 to SR 155	Widening	$44M	Henry	Yes
SR 155 from Bill Gardner Parkway to Racetrack Rd	Widening	$48M	Henry	Yes
Bill Gardner Parkway from SR 155 to I-75	Widening	$27M	Henry	Yes
SR 155 from Spalding County Line to Bill Gardner	Widening	$10.5M	Henry	Yes

Table D1: Miscellaneous Arterial and Local Road Improvements				
General Road Projects	**Type**	**New Funds Dedicated**	**Jurisdiction**	**In LRP/ TIP**
Parkway				
Flat Shoals Rd from SR 162 to Old Salem Rd	Widening	$11.4M	Rockdale	Yes
Sigman Rd from Lester Rd to Dogwood Connector	Widening	$30M	Rockdale	Yes
Commerce Crossing from Old Salem Rd to Old Covington Highway	New Alignment	$25.9M	Rockdale	Yes
Parker Rd from Millers Chapel Rd to Flat Shoals Rd	Widening	$4.9M	Rockdale	Yes
Sigman Rd from Lester Rd to Dogwood Connector	Widening	$20M	Rockdale	Yes
Amaljack Blvd Extension	New Alignment	$8.5M	Coweta	Yes
Lower Fayetteville Rd from Newnan Lakes Blvd to past Shenendoah Rd	Widening	$32.5M	Coweta	Yes
Newnan Crossing Blvd from Stillwood Ave to Poplar Rd	Widening	$4M	Coweta	Yes
SE Newnan Bypass from Turkey Creek Rd to SR 16	Widening	$5M	Coweta	Yes
SR 154 from US 29 to SR 34	Widening	$33.7M	Coweta	Yes
SR 16 from I-85 to US 29	Widening	$1.3M	Coweta	Yes
SR 14/SR16/Pine Road	Intersection Reconstruction	$1M	Coweta	Yes
SR 74-85 Georgia Central Railway	Bridge Construction	$2.5M	Coweta	Yes
Bethelview Rd from SR 9 to SR 20	Widening	$14M	Forsyth	Yes
Brookwood Rd from McGinnis Ferry Rd to SR 141	Widening	$7M	Forsyth	Yes
SR 20 Intersection Improvements at Kelly Mill Rd, Veterans Memorial Blvd and West Maple St	Intersection Improvement	$1.4M	Forsyth	Yes
Old Atlanta Rd from James Burgess Rd to McGinnis Ferry Rd	Widening	$14M	Forsyth	Yes
Pilgrim Mill Rd from Pilgrim Lake Dr to Freedom Parkway	Widening	$10M	Forsyth	Yes
Ronald Reagan Parkway from McFarland Parkway to Pilgrim Mill Rd	Widening	$17.8M	Forsyth	Yes
SR 9 from SR 20 to SR 306	Widening	$12.4M	Forsyth	Yes
McGinnis Ferry Rd from Sargeant Rd to Union Hill Rd	Widening	$18.9M	Forsyth	Yes
SR 369 from SR 9 to SR 306	Widening	$26.1M	Forsyth	Yes
SR 371 from SR 9 to Kelly Mill Rd	Widening	$42M	Forsyth	Yes
SR 9 from SR 371 to SR 141	Widening	$44.9M	Forsyth	Yes
SR 20 from Cherokee County to Sawnee Dr.	Widening	$56.7M	Forsyth	YEs
SR 360 from SR 376 to SR 120	Widening	$22.5M	Paulding	Yes
SR 61 from Windale Rd to US 278	Widening	$8.2M	Paulding	Yes
US 278 from SR 6 to the Cobb County Line	Widening	$37.9M	Paulding	Yes
West Dallas Bypass	New Alignment	$54.7M	Paulding	Yes

Appendix E

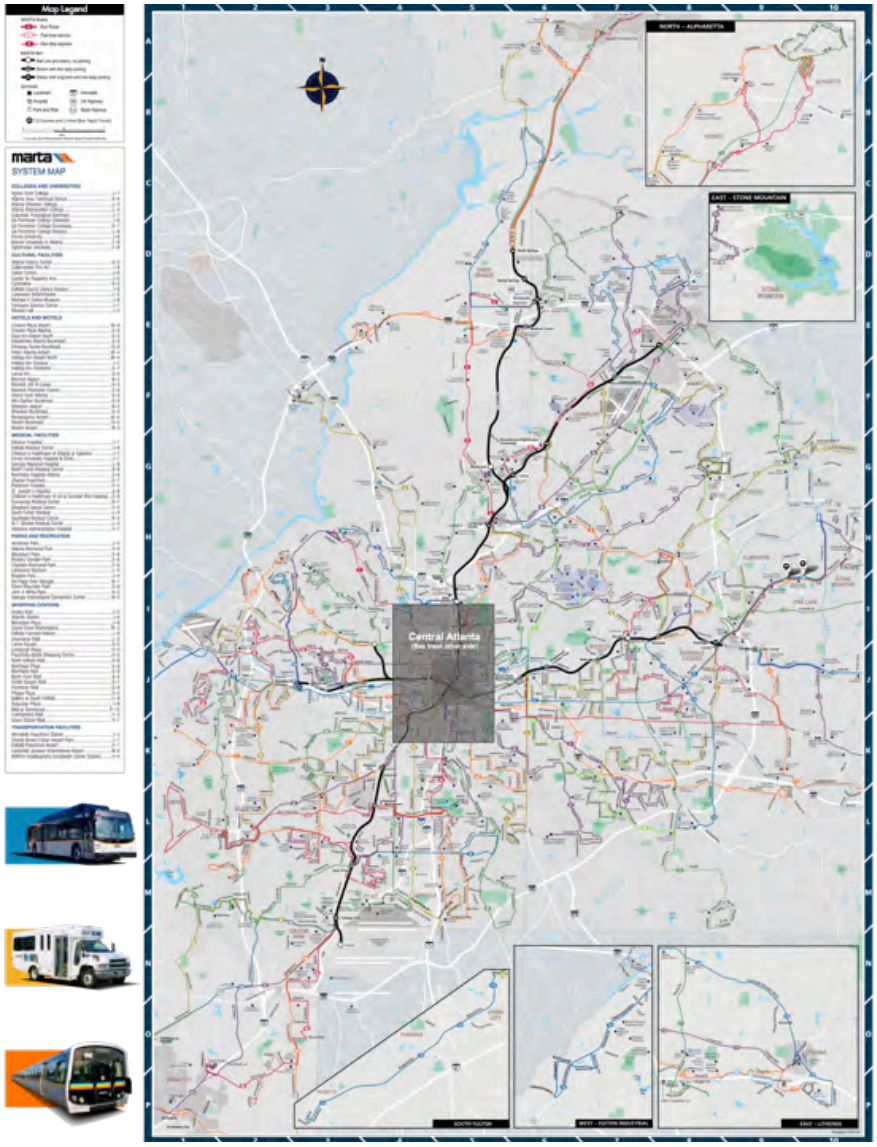
Appendix E: Existing Express Bus Lines

Table E1: Existing Express Bus Lines					
Location	**Route**	**Origin/Destination**	**Location**	**Route**	**Origin/Destination**
NE	GCT101	Buford to Downtown	S	430	McDonough to Downtown/Midtown
NE	GCT102	Indian Tr Pk & Road to Downtown	S	431	Stockbridge to Midtown
NE	GCT103	Sugarloaf Mills to Downtown	S	432	Stockbridge to Downtown
N	CCT100	North Cobb to Downtown	S	440	Hampton to Atlanta
N	CCT101	Marietta to Downtown	S	441	Jonesboro to Midtown
N	CCT102	Acworth to Midtown	S	442	Riverdale to Downtown
NE	400	Cumming to N. Springs & Downtown	S	450	Newnan to Downtown
NE	408	Doraville to Johns Creek Pkwy	S	451	Newnan to Midtown
NE	410	Sugarloaf Mills to Lindbergh MARTA	S	452	Newnan to Midtown
NE	411	Hamilton Mill to Midtown	S	455	Union City to Downtown
NE	412	Sugarloaf Mills to Midtown	W	460	Douglasville to Downtown
NE	413	Hamilton Mill to Downtown	W	461	Douglasville to Downtown/Midtown
NE	416	Dacula to Downtown	W	462	Douglasville to Downtown/Midtown
E	418	Snellville to Downtown	W	470	Hiram-Powder Springs to Downtown
E	420	W. Conyers to Downtown	W	475	Austell/Mableton/Six Flags-Downtown
E	421	W. Conyers to Midtown	W	477	Hiram/Powder Springs to Downtown
E	422	Panola Road to Downtown	N	480	Acworth to Downtown
E	423	Panola Road to Midtown	N	481	Town Center/Big Shanty to Midtown
E	424	Stone Mountain to Downtown	N	490	Canton-Woodstock to Downtown
E	425	E. Conyers to Downtown	N	491	Woodstock to Midtown
E	428	Panola Road to Perimeter Center			

Appendix F

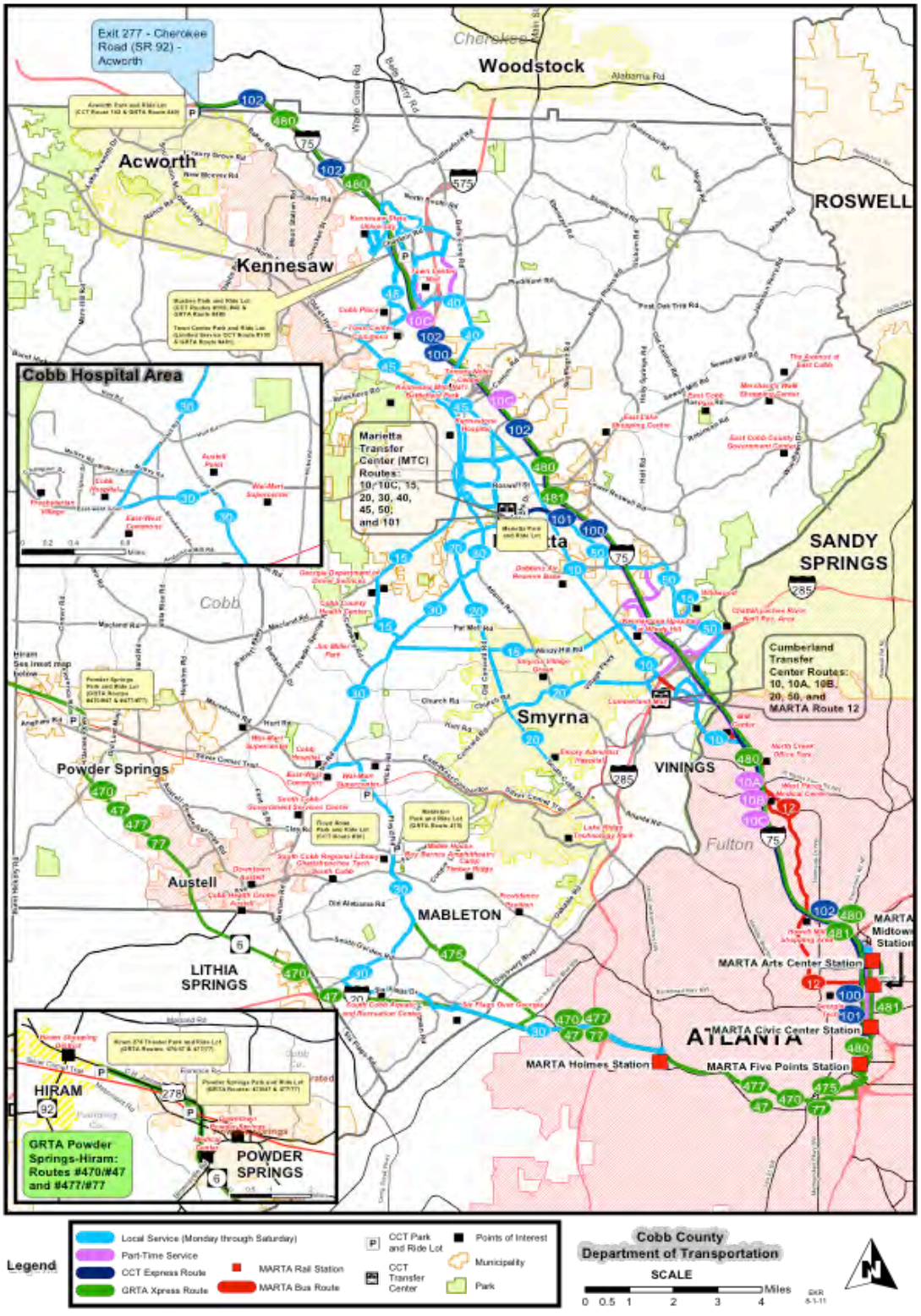
Appendix F: Current Transit Services in Metro Atlanta

Figure F1: MARTA Bus Service



Source: Metropolitan Atlanta Rapid Transit Authority

Figure F2: Cobb Community Transit Network



Source: Cobb Community Transit

Figure F3: Gwinnett County Transit Map

Source: Gwinnett County Transit

Figure F4: Xpress System Map

Source: Georgia Regional Transit Authority

Endnotes

[1] Texas A&M Transportation Institute, *2012 Annual Urban Mobility Report* (College Station, TX, Texas A&M University Press, 2012), p. 24.

[2] Ibid.

[3] Wendell Cox and Alan Pizarski, *Blueprint 2030: Affordable Mobility and Access for all of Atlanta and Georgia*, http://www.publicpurpose.com/atl-blueprint2030.pdf, June 2004, p. 20.

[4] Texas A&M Transportation Institute, *2012 Annual Urban Mobility Report*.

[5] Ibid.

[6] Atlanta Regional Commission, *Volume 1: PLAN 2040 Regional Transportation Plan*, http://www.atlantaregional.com/plan2040/documents--tools, 2011, pp. 1–3.

[7] Ibid., pp. 2–20.

[8] State Road and Tollway Authority, *Study of Potential Managed Lanes on I-75 South Corridor*, http://www.georgiatolls.com/assets/docs/I-75_VPPP_Final_Report.pdf, 2008; State Road and Tollway Authority, *Georgia 400 Variable Pricing Feasibility Study*, http://www.georgiatolls.com/assets/docs/GA_400_final_study.pdf, 2010; Metropolitan Atlanta Rapid Transit Authority, *Atlanta Beltline Tier 1 Draft Environmental Impact Statement*, http://www.itsmarta.com/uploadedFiles/About_MARTA/Planning/Beltline_Corr/Atlanta_BeltLine_DEIS_FTA_Appendices.pdf, 2011; Metropolitan Atlanta Rapid Transit Authority, *Clifton Corridor Locally Preferred Alternative*, http://www.itsmarta.com/uploadedFiles/About_MARTA/Planning/Clifon_Corr/Entire%20Document_LPA%20Report_Clifton%20Corridor.pdf, 2012; Metropolitan Atlanta Rapid Transit Authority, *I-20 East Transit Initiative Locally Preferred Alternative Corridor*, http://www.itsmarta.com/uploadedFiles/About_MARTA/Planning/I20_East_Corr/Full%20Document_LPA%20Report_I-20%20East%20Corridor.pdf 2012.

[9] Atlanta Regional Commission, *Volume 1: PLAN 2040 Regional Transportation Plan*.

[10] Both the Transportation Improvement Plan and the Long-Range Plan are required to be fiscally constrained. Concept 3 is a visioning document, not a formal plan.

[11] Atlanta Regional Commission, *Transportation Investment Act Final Report: Approved Investment List Atlanta Roundtable Region*, 2011.

[12] Travel times based on future congestion forecast with planned improvements.

[13] Robert Poole, *Reducing Congestion in Atlanta: A Bold New Approach to Increasing Mobility*, Policy Study No. 351 (Los Angeles: Reason Foundation, November 2006), p. 27.

[14] United States Census, *American FactFinder Table S0801*, 2012; United States Census, *Commuting*, 2012.

[15] Wendell Cox and Alan E. Pisarski, *Blueprint 2030: Affordable Mobility and Access for All of Atlanta and Georgia*, http://ciprg.com/ul/gbt/atl-report-20040621.pdf., June 21, 2004

[16] U.S. Department of Commerce, Census Bureau, *Table S0801 Commuting Characteristics by Sex* , 2012.

[17] Texas A&M Transportation Institute, *2012 Annual Urban Mobility Report—Excel Spreadsheet Congestion Data for 101 Metro Areas.*

[18] Adie Tomer et al., *Missed Opportunity: Transit and Jobs in Metropolitan America* (Washington, D.C.: Brookings Institution, May 2011), pp. 5–8, www.brookings.edu/research/reports/2011/05/12-jobs-and-transit.

[19] U.S. Department of Commerce, U.S. Census Bureau, *American FactFinder, Table S0801, Commuting Characteristics by Sex.*

[20] Cox and Pizarski, *Blueprint 2030*.

[21] Metropolitan Atlanta Rapid Transit Authority, *Station Schedules and Maps*, www.itsmarta.com/rail-schedules-or-route.aspx., 2013.

[22] Texas A&M Transportation Institute, *2012 Annual Urban Mobility Report*, p. 3.

[23] Jack Wells, Chief Economist, U.S. Department of Transportation, "The Role of Transportation in the U.S. Economy," presentation to the National Surface Transportation Policy and Revenue Study Commission, June 26, 2006.

[24] Glen Weisbrod et al., *Economic Implications of Congestion*, NHCRP Report No. 463 (Washington, D.C.: Federal Highway Administration, 2001).

[25] Remy Prud'homme and Chang-Woon Lee, "Size, Sprawl, Speed and the Efficiency of Cities," *Urban Studies* 36, No. 11 (October 1999), pp. 1849–1858.

[26] Cox and Pizarski, *Blueprint 2030*.

[27] Georgia Department of Transportation, *Truck Only Lanes Study*, www.dot.state.ga.us/informationcenter/programs/studies/trucklanestudy/Documents/Technical%20Memorandum%203Truck%20Only%20Lane%20Needs%20Analysis%20and%20Engineering%20Assessment-FINAL.pdf., 2008.

[28] Helena Oliviero, "Looking for Love in All the Close Places," *Atlanta Journal-Constitution*, October 15, 2002.

[29] Moody's Analytics, *Atlanta's Economic Outlook and Profile*, www.economy.com/home/products/snapshot/us/metro.aspx?g=MATL&src=PrecisMetro, 2011.

[30] United States Department of Transportation Federal Highway Administration Office of Operations, *Traffic Congestion and Reliability*, www.ops.fhwa.dot.gov/congestion_report/executive_summary.htm., 2005.

[31] Georgia Department of Transportation, *Metro Atlanta Incident Management Strategic Vision*, http://timetaskforce.com/documents/strategic%20vision%20flier.pdf, 2010.

[32] Bert Sperling and Peter Sander, *Cities Ranked and Rated* (Hoboken, N.J.: Wiley, 2004), pp. 182–697.

[33] Steve Lockwood, "The 21st Century Operations-Oriented State DOT," National Cooperative Highway Research Program, Transportation Research Board,

http://ssom.transportation.org/Documents/21stCenturyStateDOT.pdf, April 2005.

[34] Cambridge Systematics, Inc., *An Initial Assessment of Freight Bottlenecks on Highway Networks,* www.fhwa.dot.gov/policy/otps/bottlenecks/bottlenecks.pdf., 2005.

[35] Baruch Feigenbaum, *Getting Georgia Going* (Atlanta: Georgia Public Policy Foundation, May 2012), Appendix A.

[36] Poole, *Reducing Congestion in Atlanta*, p. 16.

[37] United States Department of Transportation Federal Highway Administration, *Office of Innovative Program Delivery*, www.fhwa.dot.gov/ipd/revenue/road_pricing/defined/demand_mgmt_tool.htm., 2012.

[38] Chao Chen and Pravin Varaiya, "The Freeway Congestion Paradox," *Access*, no. 20 (Spring 2002), p. 40.

[39] United States Department of Transportation Federal Highway Administration, *Office of Innovative Program Delivery*.

[40] Ibid.

[41] Jin, X., E. Beimborn, and M. Greenwald, *Impacts of Accessibility, Connectivity and Mode Captivity on Transit Choice,* (Milwaukee, WI: Center for Urban Transportation Studies, University of Wisconsin-Milwaukee), 2005.

[42] Atlanta Regional Commission, *Envision 6: Needs Assessment Report*, http://www.atlantaregional.com/File%20Library/Transportation/Transportation%20Plans/tp_e6needsassess_050106.pdf, 2006.

[43] State Road and Tollway Authority, *High Occupancy Toll Lanes*, 2005.

[44] Atlanta Regional Commission, *Volume 1: PLAN 2040 Regional Transportation Plan*, http://documents.atlantaregional.com/plan2040/docs/tp_PLAN2040RTP_072711.pdf, 2011, pp. 4–23.

[45] State Road and Tollway Authority, *High Occupancy Toll Lanes.*

[46] Cox and Pizarski, *Blueprint 2030*.

[47] United States Department of Transportation Federal Highway Administration, *Safety Application of Intelligent Transportation Systems in Europe and Japan*, International Technology Scanning Program, http://international.fhwa.dot.gov/ipsafety/, 2006.

[48] Intelligent Transportation Society of America, *Knowledge Center*, http://www.itsa.org/knowledgecenter/knowledge-center-20, 2013.

[49] Georgia Department of Transportation, *Statewide Strategic Transportation Plan*, Chapter 3 Cost Effective Strategies for Achieving Performance, http://www.dot.ga.gov/Projects/programs/Documents/Reports/SSTP-Final.pdf, 2010.

[50] United States Department of Transportation Federal Highway Administration, *Safety Application of Intelligent Transportation Systems in Europe and Japan*.

[51] United States Department of Transportation Federal Highway Administration, *Intersection Safety Issue Briefs: Access Management*, Issue Brief 13, http://safety.fhwa.dot.gov/intersection/resources/fhwasa10005/docs/brief_13.pdf, 2009.

[52] Federal Highway Administration Office of Operations, "Traffic Signal Timing," in *Traffic Signal Timing Manual*, 2013.

[53] Chris Swenson and Robert Poole, *Reducing Congestion in Lee County, Florida*, Policy Study No. 374 (Los Angeles: Reason Foundation, February 2009), p. 18.

[54] CRSPE, Inc., et al., *Lee County Queue Jump Study, Final Report* (Lee County Department of Transportation, January 2003).

[55] Swenson and Poole, *Reducing Congestion in Lee County, Florida*, p. 18.

[56] Randal O'Toole, *Defining Success: The Case Against Rail Transit*, Policy Analysis No. 663 (Washington, D.C.: Cato Institute, March 2010), pp. 4–5.

[57] Ibid.

[58] Jeffrey Brown and Gregory Thompson, "Hub Spoke, the Grid, and the Future of Transit: The Importance of System Planning for Public Transit's Success," paper presented at the Future of Transportation Conference, (Tallahassee, FL, September 15-17, 2012.)

[59] Atlanta Regional Commission, *Land-Use: Transit Oriented Development*, http://www.atlantaregional.com/land-use/transit-oriented-development, 2013.

[60] University of South Florida Center for Urban Transportation Research, "What is Bus Rapid Transit?," www.nbrti.org., January 2013.

[61] National Transit Database Tables Page, Table 27: Service Supplied and Consumed Ratios www.ntdprogram.gov/ntdprogram/pubs/dt/2011/excel/DataTables.htm., 2012.

[62] Federal Highway Administration, *Transit Fact Sheets: Demand Response Transit Service*, 2013.

[63] Ibid.

[64] Hiroyuki Iseki, Brian Taylor and Mark Miller, *The Effects of Out-of-Vehicle Time on Travel Behavior: Implications for Transit Transfers* (Los Angeles: Institute of Transportation Studies, 2006): pp. 13–20, www.its.ucla.edu/research/EPIC/Appendix%20A.pdf.

[65] Metropolitan Atlanta Rapid Transit Authority, *Station Schedules and Maps*, www.itsmarta.com/rail-schedules-or-route.aspx, 2013.

[66] Washington Metropolitan Area Transit Authority, *Rail Stations: Realtime Arrivals* www.wmata.com/rail/station_detail.cfm?station_id=14, 2013.

[67] National Conference of State Legislatures, *Regional Human Service Transit Coordinating Councils: Synthesis, Case Study, and Directory*, http://www.ncsl.org/documents/transportation/NCSL_Regional_HSTCC_synthesis_case_studies.pdf, January 2012, pp. 16–17.

[68] HNTB, *Atlanta Regional Managed Lanes System Plan Final Report*, www.georgiatolls.com/assets/docs/HOT_Final_Report.pdf., 2010.

[69] Texas A&M Transportation Institute, *2011 Congested Corridors Report*, Table 1: Reliably Unreliable, 2011.

[70] Poole, *Reducing Congestion in Atlanta*.

[71] Vance Smith, "Transportation in Georgia," paper presentation to Georgia Tech Civil Engineering Administration and Policy Class, (Atlanta, GA March 2010.)

[72] Peter Samuel, *Innovative Roadway Design*, Policy Study No. 348 (Los Angeles: Reason Foundation, September 2006), pp. 18–20.

[73] Washington State Department of Transportation, *Alaskan Way Viaduct Replacement Project*, *About*, www.wsdot.wa.gov/Projects/Viaduct/About., September 2012.

[74] "Addison Airport Toll Tunnel," www.roadtraffic-technology.com/projects/addison/., 2012.

[75] Debra Wood, "Clean Water: Cleaning up in Atlanta," *McGraw Hill Construction*, April 2006.

[76] Washington Metropolitan Area Transit Authority, *Finance and Administration Committee Information Item IV-B*, www.wmata.com/about_metro/board_of_directors/board_docs/110410_4BFY201217CIP.pdf., 2010.

[77] More information on bus systems is available in Appendix D.

[78] Metropolitan Atlanta Rapid Transit Authority, *Station Schedules and Maps.*

[79] Metropolitan Atlanta Rapid Transit Authority, *Bus Schedules and Routes,* www.itsmarta.com/bus-schedules.aspx., January 2013.

[80] Cobb Community Transit, *CCT Route Schedules*, http://portal.cobbcountyga.gov/index.php?option=com_content&view=article&id=576&Itemid=594, January 2013.

[81] Gwinnett County Government, *Routes and Schedules*, gwinnettcounty.com/portal/gwinnett/Departments/Transportation/GwinnettCountyTransit/RoutesandSchedules, January 2013.

[82] Cherokee Area Transportation Systems, *Fixed Routes Bus Schedule*, http://cats.cherokeega.com/fixedroutes2012.pdf., January 2013.

[83] Metropolitan Atlanta Rapid Transit Authority, *Bus Schedules and Routes*.

[84] Cobb Community Transit, *CCT Route Schedules*.

[85] Gwinnett County Government, *Routes and Schedules*.

[86] Xpress, *Routes by Number*, www.xpressga.com/index.php?option=com_content&task=view&id=38&Itemid=75, January 2013.

[87] Douglas County Georgia, *Rideshare, Vanpool,* www.celebratedouglascounty.com/view/departments/view_dept/&cdept=11&department=Rideshare,%20Vanpool,%20GRTA%20X-Press%20Bus, January 2013.

[88] Cherokee Area Transportation System, *Van Pool Services*, http://cats.cherokeega.com/cats_van.cfm, January 2013.

[89] Cobb Commuter Club, *Vanpool Routes*, http://commuterclub.com/vanpool_list.html, January 2013.

[90] Rideshare by Enterprise, *Start Vanpooling*, www.enterpriserideshare.com/vanpool/en.html, January 2013; vRide, *Why vRide,* www.vride.com/why-vride-overview, January 2013.

[91] Kalon Kelley, "Casual Carpooling-Enhanced," *Journal of Public Transportation*, vol. 10, no. 4 (2007), pp. 119–128.

[92] Metropolitan Atlanta Rapid Transit Authority, *MARTA Mobility* www.itsmarta.com/accessibility-mobility.aspx, January 2013; Cobb Community Transit, *CCT Paratransit Service*, http://portal.cobbcountyga.gov/index.php?option=com_content&view=article&id=583&Itemid=602, January 2013; Gwinnett County Government, *Paratransit Information*, www.gwinnettcounty.com/portal/gwinnett/Departments/Transportation/GwinnettCountyTransit/ParatransitInformation, January 2013.

[93] Henry County Georgia, *Henry County Transit*, www.co.henry.ga.us/Transit/index.shtml, January 2013.

[94] Georgia Institute of Technology School of Civil and Environmental Engineering, *Gas Tax Facts*, July 2012; American Petroleum Institute, *Gas Tax by State*, August 2013.

[95] Ibid.

[96] Georgia Department of Revenue, *Office of Tax Policy*, https://etax.dor.ga.gov/TaxLawandPolicy/index.aspx, 2013.

[97] Emily Ekins, *Reason-Rupe Poll* (Los Angeles: Reason Foundation, December 2011), p. 3, http://reason.org/files/reason_rupe_transportation_poll.pdf.

[98] Daryl Fleming, *Dispelling the Myths: Toll and Fuel Tax Collection Costs in the 21st Century*, Policy Study No. 409 (Los Angeles: Reason Foundation, November 2012), p. 17, http://reason.org/files/dispelling_toll_and_gas_tax_collection_myths.pdf.

[99] Ibid, p. 30.

[100] Ibid, p. 32.

[101] United States Department of Transportation Federal Highway Administration, *Road Pricing as a Demand Management Tool*, www.fhwa.dot.gov/ipd/revenue/road_pricing/defined/demand_mgmt_tool.htm, 2013.

[102] United States Department of Transportation Federal Highway Administration, *TIFIA Program Guide*, www.fhwa.dot.gov/ipd/tifia/, 2012.

[103] Ibid.

[104] American Association of State Highway and Transportation Officials, *Municipal/Public Bond Issues,* transportationfinance.org/funding_financing/financing/bonding_debt_instruments/municipal_public_bond_issues/, 2012.

[105] Ibid.

[106] Ibid.

[107] American Association of State Highway and Transportation Officials, *Tax Credit Bonds*, http://www.transportation-finance.org/funding_financing/financing/bonding_debt_instruments/municipal_public_bond_issues/tax_credit_bonds.aspx 2012.

[108] Jeffery Smith and Thomas Gihring, *Transit Systems Through Value Capture* (Victoria, CA: Victoria Transport Policy Institute, December 2012), www.vtpi.org/smith.pdf.

[109] Gregory Ingram and Yu-Hung Hong, "Value Capture and Land Policies," paper presented at the 2011 Land Policy Conference (Boston, MA, May 2011), pp. 11–15.

[110] Denver Urban Renewal Authority, *How Tax Increment Financing Works,* http://www.renewdenver.org/redevelopment/redevelopment-sections/how-tax-increment-financing-tif-works.html, 2013.

[111] New Zealand Transport Agency, *Value Capture Mechanisms to Fund Transport Infrastructure*, Research Report 511, http://www.nzta.govt.nz/resources/research/reports/511/, February 2013.

[112] Zhirong Jerry Zhao, Kirti Vardhan Das, and Kerstin Larson, "Joint Development as a Value Capture Strategy for Public Transit Finance," *The Journal of Transport and Land Use*, vol. 5, no. 1 (Spring 2012), pp. 2–3.

[113] Zhirong Jerry Zhao and Kerstin Larson, "Special Assessments as a Value Capture Strategy for Public Transit Finance," *Public Works Management and Policy*, vol. 16, no. 4 (October 2011), pp. 320–324.

[114] United States Government Accountability Office, *Federal Role for Value Capture Strategies for Transit Is Limited, but Additional Guidance Could Help Clarify Policies* Report No. 10-781, http://www.gao.gov/products/GAO-10-781, July 2010.

[115] Ibid.

[116] Sharada Vadali et al., "Planning Tolls to Assess the Real Estate Leveraging Potential for Roadways and Transit Technical Report, Report No. 6538-1 (College Station TX: Texas Transportation Institute, 2011), p. 80, http://ntl.bts.gov/lib/35000/35800/35848/0-6538-1.pdf.

[117] Federal Highway Administration: Innovative Program Delivery, *TIFIA* (Washington, D.C., 2012), www.fhwa.dot.gov/ipd/tifia/.

[118] Leonard Gilroy and Robert Poole, *Ten Myths and Facts on Transportation Public-Private Partnerships* (Los Angeles: Reason Foundation, 2012), pp. 2–6, http://reason.org/files/ten_myths_and_facts_on_transportation_p3s_(final).pdf.

[119] Ibid.

[120] Emilia Istrate and Robert Puentes, *Moving Forward on Public Private Partnerships: U.S. and International Experience with PPP Units* (Washington, D.C.: Brookings Institution, 2012), www.brookings.edu/research/papers/2011/12/08-transportation-istrate-puentes; William Reinhardt and Ronald Utt, *Can Public-Partnerships Fill the Transportation Funding Gap?* (Washington, D.C.: Heritage Foundation, 2012), www.heritage.org/research/reports/2012/01/can-public-private-partnerships-fill-the-transportation-funding-gap; Joshua Schank, *Reassessing Public and Private Sector Roles in Transportation* (Washington, D.C., 2012), www.enotrans.org/eno-brief/reassessing-public-and-private-sector-roles-in-transportation.

[121] Ibid.

Reason Foundation
5737 Mesmer Ave.
Los Angeles, CA 90230
310/391-2245; 310/391-4395 (fax)
www.reason.org