A Common Sense Approach to Transportation in the Atlanta Region

By
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Table of Contents

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Executive Summary

THE SITUATION

Atlanta is experiencing extraordinary population and employment growth. For decades, Atlanta has been one of the nation's fastest growing metropolitan areas. During the 1990s, only smaller Phoenix has grown at a faster rate and only much larger Los Angeles has added more population. This growth is continuing, and the Atlanta region is projected to have 4.8 million residents by 2025. Atlanta is a comparatively low density urban area, at only one-third the density of the most dense urbanized area in the nation. At the same time, Atlanta's strong employment growth is expected to continue. Like the population, employment has been dispersed throughout the region. Downtown, once home to 25 percent of employment, now accounts for just 6 percent. Other major centers ("edge cities") account for less than 20 percent of employment. The 75 percent balance of employment is dispersed at low density throughout the region. Most of the Atlanta region's employment and population growth has been to the north of the city of Atlanta. This has exacerbated traffic congestion in that part of the region.

Atlanta relies on highways. More than 97 percent of the travel in the Atlanta region is by personal vehicles. In the last decade, traffic volumes have risen 3.7 times the rate of roadway expansion. Traffic congestion has become severe, especially in the faster growing northern portion of the region. The Atlanta region is out of attainment with respect to federal air quality standards and has had federal transportation funding interrupted.

Atlanta's roadway system has difficulties. While the Atlanta region has one of the nation's most advanced freeway systems, some characteristics of the roadway system contribute to traffic congestion. For example: (1) The radial, downtown-oriented design of the freeway system is not well suited to serving the more dispersed nature of modern urban travel. (2) The convergence of major north-south roadways into the downtown connector, unique among major cities, unnecessarily forces traffic not bound for downtown through that congested area. (3) The surface arterial street system is insufficiently developed and generally fails to provide either an alternative or effective feeder system to the freeways.

Atlanta has invested heavily in transit. The core of the Atlanta region (Fulton and DeKalb counties) is served by the MARTA transit system. MARTA has built the nation's second most comprehensive new rail system and its services are, comparatively, intensively used by local residents. Since the rail system opened in 1979, approximately 50,000 new daily riders have been attracted. Like virtually all transit systems, MARTA is oriented toward the downtown area. Despite MARTA's expansion, transit's work trip market share (percentage of workers using transit for the work trip) has dropped since 1980. Moreover, the new ridership has been costly, on average more than $30 per one-way trip.

ANALYSIS OF TRANSPORTATION PROPOSALS

The *Regional Transportation Plan* identifies 25 years of transportation improvements. The transportation "blueprint" for the next quarter century is the Atlanta Regional Commission (ARC) *Regional Transportation Plan (RTP)*. The *RTP* relies on population projections and proposed land use policies in identifying $36 billion of transportation improvements.

Atlanta's growth is projected to continue. The *RTP* projects the Atlanta region population to increase from the present 3.366 million to 4.814 million in 2025. ARC anticipates a significant reorientation of growth from Cobb and Gwinnett counties to Fulton and DeKalb. Strong growth is also projected for the city of Atlanta. Similarly, employment growth is projected to be reoriented from Cobb and Gwinnett counties to Fulton and DeKalb, with a significant increase in the city of Atlanta. Achievement of these population and employment projections is questionable. There is no precedent in the United States or the developed world for such a reorientation of population and employment growth from suburban areas to the center.

Roadways will be expanded at a greatly reduced rate. The *RTP* would expand freeway and arterial capacity by 7 percent over the next 25 years, two thirds of which would be high occupancy vehicle lanes (not available to general traffic). This represents a nearly 85 percent reduction in the annual rate of roadway expansion over the past decade. At the same time, highway traffic volumes are projected to increase 42 percent, with average speeds dropping 10 percent and the average time spent in congestion per person rising 28 percent.

Transit investments will be substantial. In an effort to expand transit's market share, a number of transit projects would be built and 55 percent of financial resources would be spent on transit. More than 200 miles of rail systems would be opened, including MARTA extensions, an Arts CenterTown Center Mall light rail line, and four commuter rail lines and circulator projects in major commercial centers. While not a part of the *RTP*, a second light rail line (Marietta-Lawrenceville) and a high speed magnetic levitation train line to Chattanooga are proposed. In addition, local and express bus systems are proposed.

Low income access to jobs will be little improved. An intractable problem in Atlanta is the inability of low-income central area residents to access suburban employment locations by transit (the "reverse commute"). Only 34 percent of the region's employment is within 60 minutes transit access for low-income residents. Despite the planned transit improvements, the *RTP* would increase that figure to only 39 percent over 25 years. At this rate, it would take more than 75 years to make 50 percent of employment accessible.

The transit improvements are not cost effective. Generally, the transit improvements are exceedingly costly. In each case it would be less expensive to provide new rail commuters with a leased car. Further, the ridership projections for all of the rail systems are considered to be optimistic. But even if the ridership projections were

achieved, transit would carry only 3.44 percent of trips in the Atlanta area in 2025, up only slightly from the present 2.56 percent.

Transit expenditures could be even higher. Large transit projects frequently sustain large cost overruns. Indeed, the early stages of the MARTA rail system experienced a 58 percent capital cost overrun, according to a federal report. Based upon national averages and potential cost increases, the *RTP* could be up to $4.7 billion short in financial resources.

Land use strategies could increase traffic congestion and air pollution. The *RTP* anticipates that voluntary land use measures will reorient growth toward the central area and generate higher transit ridership. In fact, should the projected densification occur, traffic congestion and air pollution can be expected to be worse, consistent with the national and international experience. More interventionist land use regulation is likely to raise housing prices and even product prices in the area. The higher housing costs could displace central area residents. Increased densification could also face significant neighborhood opposition.

The RTP benefits a few at the expense of most Atlantans. The 55 percent spent on transit would yield a return of less than a 1 percentage point shift from automobile travel to transit. Such a spending level on transit is out of all proportion to the gain and is inexplicable in view of ARC's own projections of transit ridership. For the few who are able to take advantage of the improved transit services, the *RTP* would provide great benefits. But for the great majority of Atlantans, especially those unable to carpool, the *RTP* promises more time in more congested traffic. As a result, the Atlanta region could emerge as the nation's most congested area by 2025. And, traffic could get much worse, as the experience of other U.S. and international metropolitan areas indicates.

A NEW VISION

Local authorities must become more realistic. To sustain Atlanta's growth requires that traffic congestion be both contained and reduced. The ARC projections make it clear that local public agencies accept the fact that personal vehicle use will continue to represent virtually all new travel demand. What is missing is an acceptance by the responsible public agencies that the inevitable increase in personal vehicle use must be accommodated

A New Vision should seek to improve mobility and access. A new and realistic transportation plan (a "New Vision") should be developed. The primary objectives should be mobility (improving travel times) and accessibility (making larger areas of the region accessible by low-income residents). There is likely to be community opposition to transportation infrastructure improvements. However, the transportation agencies of the Atlanta region have a duty to objectively present a full array of strategies for improvement so that necessary choices can be made.

New roadway capacity is required. Because the fundamental transportation trend in the Atlanta region is increased traffic volume, the New Vision would rely heavily on improved roadway systems.

> Local officials should research and establish roadway capacity standards based upon the varying land use patterns throughout the area. Application of such standards, especially in newly developing areas, would ensure that sufficient capacity is provided.
>
> Perhaps the most important roadway improvement would be the development of an adequate surface arterial system. Major surface arterials should be provided on a terrain-constrained grid[1] at least each mile. The surface arterial network would supplement the capacity of the over-capacity freeway network by providing attractive alternative routes for many trips.
>
> New non-radial freeways may be justified in some corridors.

Existing roadways should be made more effective. Roadway improvements could also include: (1) conversion to "surface expressways," (2) limited access commercial bypasses, (3) auto-only "Metroroute" tunnels (such as are under construction in Paris), (4) double-decking of freeways, (5) development of truck freeways, (6) more extensive use of reversible lanes (such as presently employed on Northside Drive and Roswell Road), and (7) high occupancy toll lanes.

Short term improvements should be implemented. There are several strategies that can be immediately implemented in the short term to provide travel improvement. Removal of "bottlenecks," improved left-turn lanes, addition of shoulders to arterials, automated tolling, and improved traffic signal synchronization. could provide comparatively immediate travel improvement.

More efficient and effective transit service should be provided. Many more miles of transit services could be provided through much less costly rapid transit bus alternatives, which tend to be one-fifth as costly as comparable rail strategies. There are additional, more cost effective strategies. For example, financial incentives might be used to encourage more carpooling. Transit service could also be increased through more cost effective operations, through the use of competitive contracting, following the examples of Stockholm, Copenhagen, London, and many other international metropolitan areas. A shuttle van system could be established to make many more of the region's jobs accessible to low-income residents. Finally, as MARTA proved in the 1970s, transit ridership could be increased cost effectively through lower fares. For most of the 1970s the MARTA adult fare was $0.15. It is now $1.50, and proposed to rise to $1.75.

A transition to electronic road pricing should begin. It will be costly to provide the expanded road network that is required if traffic congestion is to be improved.

[1] Major north-south and east-west signalized arterials would be spaced no more than one mile apart. Roadways would curve as necessary to accommodate topographical features.

Conventional strategies could be used, such as increased gasoline taxes. But gasoline tax increases are difficult to obtain through the political process. It may be preferable to begin a transition to electronic road pricing, which would replace gasoline taxes with roadway use charges based upon miles traveled and the extent of congestion during use. For example, similar electronic road pricing programs have been begun in Singapore and Toronto.

Roadway provision should be de-politicized. Electronic road pricing would provide the opportunity to de-politicize the provision of roadway capacity. Segments of the region could be franchised to private firms for a limited period of time through competitive procurements. Roadway operators would be regulated as public utilities, in a manner similar to traditional electric utility or telephone regulation.

Market developments assist in controlling travel demand. At the same time, market innovations promise to assist in easing traffic congestion, such as on-board navigation systems, collision avoidance systems and telecommuting. Finally, commuters accommodate their commuting habits to the greater congestion. Average travel times have increased little, despite the much greater congestion and limited new highway capacity.

Objective and realistic choices should be presented to Atlanta residents. Once the New Vision is developed, it can be presented to the state legislature and the people. Through the democratic process the people of Atlanta can determine whether they wish to take the steps necessary to improve traffic congestion, or accept continued deterioration. The plans presently in place provide no such choice and accept further deterioration.

Introduction

Atlanta has been one of the nation's premier growth centers since World War II. From a medium-sized metropolitan area with less than 1,000,000 people in 1950, Atlanta has grown to nearly 4,000,000 and has become the principal metropolitan area of theSoutheast and one of both national and global significance.

But growth has brought problems to Atlanta. In recent years Atlanta's traffic congestion has been the subject of considerable national publicity. Partially as a result of that traffic, Atlanta has been declared a "non-attainment" area with respect to air quality, and federal transportation funding has been interrupted.

At the same time, Atlanta has suburbanized rapidly and there is a concern that this trend is accelerating. The Sierra Club has designated Atlanta as the "most sprawl threatened" city in the United States.[2]

In response to this situation, the state has established a powerful new regional transportation and land use agency, the Georgia Regional Transportation Authority (GRTA).

It is likely that the Atlanta region's continued growth and position in the global economy will, to an important degree, be dependent upon improving its transportation.

[2]Internet: http://sierraclub.org/sprawl/report/98/map.html.

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Chapter 1: The Situation

Demographics

Since 1990, the Atlanta area has been the second most rapidly growing among the 20 top metropolitan areas. The Atlanta growth rate of 30.3 percent compares to the Phoenix rate of 34.6 percent and is at least 40 percent above the growth rates of other fast growing metropolitan areas such as Dallas-Fort Worth, Houston, Seattle and Miami. Atlanta's 898,000 gain from 1990 to 1998 is second only to that of Los Angeles, which was nearly five times as large in 1990 (Table #1).[3]

Table #1
20 Largest Metropolitan Areas Ranked by Growth: 1990-1999

Rank	Metropolitan Area (County Based)	1999	1990	Change	%
1	Phoenix-Mesa, AZ MSA	3,014	2,238	775	34.63%
2	Atlanta, GA MSA	3,857	2,960	898	30.33%
3	Dallas-Fort Worth, TX CMSA	4,910	4,037	872	21.60%
4	Houston-Galveston-Brazoria, TX CMSA	4,494	3,731	763	20.44%
5	Seattle-Tacoma-Bremerton, WA CMSA	3,466	2,970	495	16.68%
6	Miami-Fort Lauderdale, FL CMSA	3,711	3,193	518	16.24%
7	Minneapolis-St. Paul, MN-WI MSA	2,872	2,539	333	13.13%
8	San Diego, CA MSA	2,821	2,498	323	12.92%
9	Los Angeles-Riverside-Orange County, CA CMSA	16,037	14,532	1,505	10.36%
10	Tampa-St. Petersburg-Clearwater, FL MSA	2,278	2,068	210	10.17%
11	San Francisco-Oakland-San Jose, CA CMSA	6,874	6,278	596	9.50%
12	Washington-Baltimore, DC-MD-VA-WV CMSA	7,359	6,726	633	9.41%
13	Chicago-Gary-Kenosha, IL-IN-WI CMSA	8,886	8,240	646	7.84%
14	Detroit-Ann Arbor-Flint, MI CMSA	5,469	5,187	282	5.44%
15	Boston-Worcester-Lawrence-Lowell-Brockton, MA-NH NECMA	5,902	5,686	216	3.80%
16	New York-Northern New Jersey-Long Island, NY-NJ-CT-PA CMSA/NECMA	20,103	19,480	623	3.20%
17	St. Louis, MO-IL MSA	2,591	2,512	80	3.18%
18	Philadelphia-Wilmington-Atlantic City, PA-N -DE-MD CMSA	5,999	5,893	106	1.80%
19	Cleveland-Akron, OH CMSA	2,911	2,860	51	1.78%
20	Pittsburgh, PA MSA	2,331	2,395	(63)	-2.65%

Population in thousands.
Source: U.S. Census Bureau (1999 data derived from U.S. Census Bureau county estimates.

Atlanta has outgrown rapidly expanding Seattle and Portland by a substantial margin. In 1950, the metropolitan Atlanta counties had one-third less population than Seattle, but now have at least 10 percent more. In 1950, Atlanta led Portland by approximately 100,000 residents. Today, the Atlanta area has at least 1,700,000 more residents. Since 1970, Atlanta has added a population equivalent to that of the Portland metropolitan area.[4]

[3] Internet: http://www.demographia/db-met99.htm
[4] Throughout the report, comparisons to Portland will be made because Portland is often cited as a model of urban success that Atlanta should follow. Doubt is cast on this view by these comparisons and by the author's op-ed article in *The Atlanta Constitution*, on June 23, 1999 ("Portland Not Sprawl Free").

The Atlanta area has suburbanized rapidly, consistent with the national and international trend.[5] In 1999, the city of Atlanta had approximately 400,000 residents, or just over 10 percent of the metropolitan population. This compares to the approximately one-third of the population that lived in the city in 1950. The core area of Fulton County (including Atlanta) and DeKalb County had approximately 1,340,000 residents, approximately 35 percent of the metropolitan population. This is down from 40 percent in 1990.

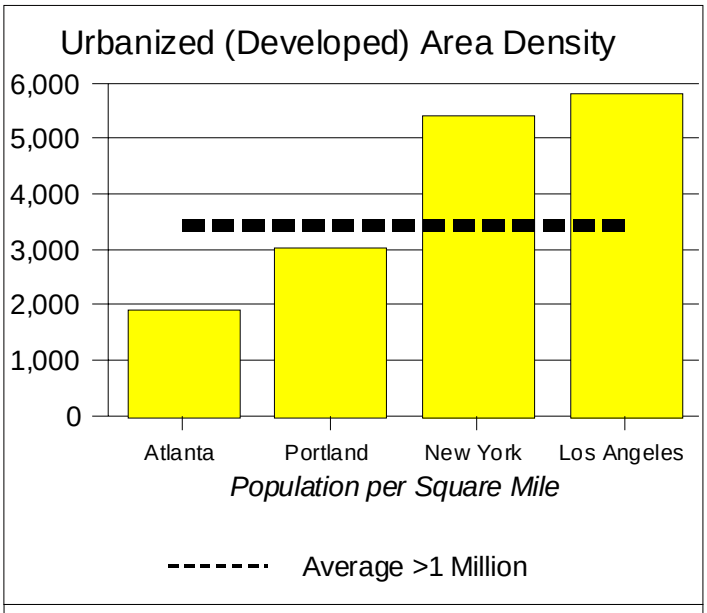

Figure 1
Source: U.S. Census, 1990 Data.

The urbanized area (developed area) of Atlanta[6] is comparatively sparsely populated, with a 1990 population density of 1,897 per square mile.[7] This is 44 percent below the average of urbanized areas with more than 1,000,000 population, and approximately one-third the density of the nation's most densely populated urbanized area, Los Angeles (Figure #1).[8]

Hysteria and Sprawl. The concern about acceleration in the 1990s of urban sprawl, however, does not appear to be justified. In labeling Atlanta as the most "sprawl threatened city," the Sierra Club relied upon Federal Highway Administration (FHWA) estimates that showed a 47 percent increase in developed area from 1990 to 1996.[9] The FHWA data, however, is not suited for such analysis. The FHWA data shows that the entire 47 percent increase in developed area occurred in a single year (from 1992 to 1993). For this to be true, each new residential unit that year would have been built on an average 27-acre lot.[10] During the other five years (199092 and 199396), not a single square mile is reported to have been developed, despite the addition of 800,000 people. Obviously this is questionable.[11]

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[5] Virtually all major cities in the developed world have suburbanized substantially in recent decades.

[6] There are at least six ways of defining the Atlanta region. The most commonly used indicator is the Metropolitan Statistical Area (MSA), which now includes 20 counties, but was 18 counties in 1990. The federal air quality non-attainment area includes 13 counties, all of which are in the MSA. The Atlanta Regional Commission area is comprised of 10 counties, all of which are in the federal air quality non-attainment area. The urbanized area is delineated by the U.S. Census Bureau at each decennial census and includes only developed areas. All of the urbanized area is within the ARC 10 county region. Finally, there is the seven county central area of the metropolitan area (Clayton, Cobb, DeKalb, Douglas, Fulton, Gwinnett and Rockdale Counties)

[7] Urbanized area data is compiled in connection with the decennial census. Later estimates are provided through Federal Highway Administration publications.

[8] Internet: http://www.demographia.com/dm-uaix.htm.

[9] Similar concerns have recently been raised with respect to the loss of agricultural land in Georgia. The United States Department of Agriculture's (U.S.DA) National Resources Inventory (NRI) announced in December 1999 that Georgia's rate of farm land loss had more than doubled in the past five years. This data, however, obtained by sampling, was in stark contrast to the U.S.DA Census of Agriculture (an enumeration) over the same period, which found an *increase* of 650,000 agricultural acres in Georgia, compared to the NRI loss of 720,000 acres. On April 19, NRI announced that there were errors in virtually all of its numbers and withdrew the data pending correction.

[10] Estimated, assuming average household size of 2.6 persons.

[11] There are numerous other problems with the FHWA data. For example, in 1996, Portland was listed as covering 469 square miles. In 1997, the Portland land area was raised to 685 square miles. In 1998 it was reduced to 468 square miles.

Further, the 47 percent developed land expansion estimate appears to be greatly overstated. A more reliable source is the Atlanta Regional Commission's estimate, based upon high altitude photographs. From 1990 to 1995, ARC estimates that the developed land in the Atlanta area has increased 17 percent, barely one-third of the Sierra Club estimate.[12] Moreover, based upon the ARC data, it appears that the density of new development outside the core counties of Fulton and DeKalb has been slightly greater than that of existing development. In other words, the suburbs are densifying somewhat.[13] Atlanta's continuing suburbanization in the 1990s is largely a function of its population growth: More people means more developed land area.

The overwhelming majority of Atlanta's population growth has been in the northern sector (the counties north of Atlanta and northern Fulton County). A recent Brookings Institution report indicated that more than 70 percent of Atlanta's population growth from 1990 to 1998 has been in the northern sector.[14]

Employment. Like the residential population, employment has dispersed considerably since World War II. In 1950, downtown Atlanta represented 25 percent of the employment in the Atlanta region. By 1980, downtown employment had fallen to 10 percent, and it is estimated that in 2000 downtown employment is 6.3 percent (Figure #2).[15] Over the past two decades, substantial high-rise development has occurred in employment centers located outside downtown, especially in Midtown, Buckhead, Cumberland-Galleria, Perimeter Center and the Airport area.[16] Yet all of these centers combined (called "Edge Cities"), plus downtown, contained barely 25 percent of metropolitan Atlanta's employment in 1990.[17] Approximately 75 percent of

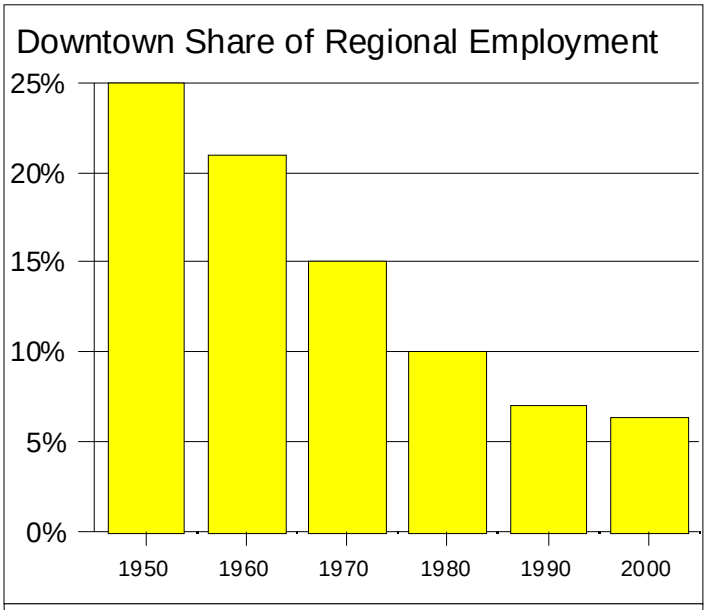

Figure 2
Source: ARC

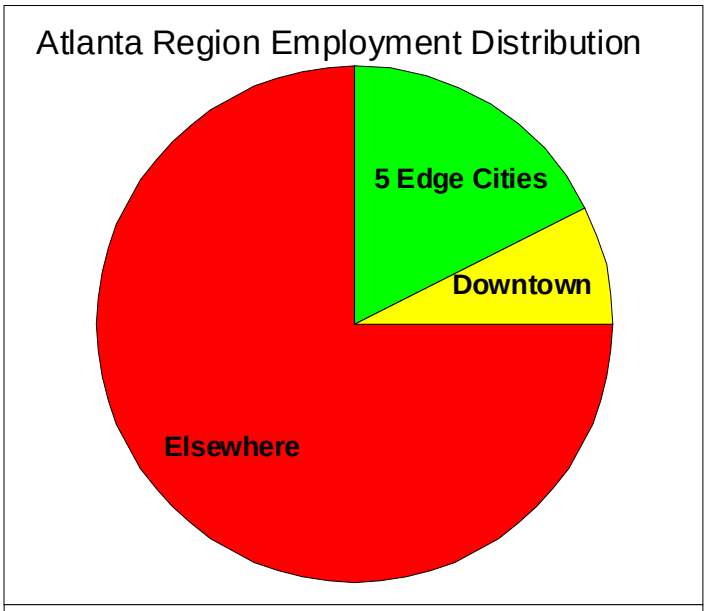

Figure 3
Source: Estimated from U.S. Census, 1990 Data.

[12] ARC *Regional Development Plan, Land Use Element.*
[13] Calculated from ARC data.
[14] Brookings Institution Center on Urban and Metropolitan Policy, *Moving Beyond Sprawl: The Challenge for Metropolitan Atlanta*, Brookings Institution, 2000.
[15] *Atlanta Regional Commission*, Regional Development Plan, 1999.
[16] There are also other "edge cities" in the Atlanta region, such as Marietta and the Northeast Corridor. These centers, however, have lower employment densities.
[17] Estimated from 1990 Census Bureau data.

the employment in the Atlanta region is dispersed outside the areas of comparatively high employment density (Figure #3).
Downtown remains by far the most dense employment center, with 1990 densities of more than 100,000 per square mile in the core and 70,000 overall. Other large centers (the "edge cities" of Buckhead, Cumberland Mall, Midtown, Perimeter Center and the Airport area) have densities of less than 25,000 per square mile, averaging approximately 9,200. In the rest of the urbanized area, employment densities average approximately 600 per square mile (Figure #4).[18]

As in the case of residential development, the greatest portion of commercial percent of the employment growth has occurred in the northern sector since 1990.[19]

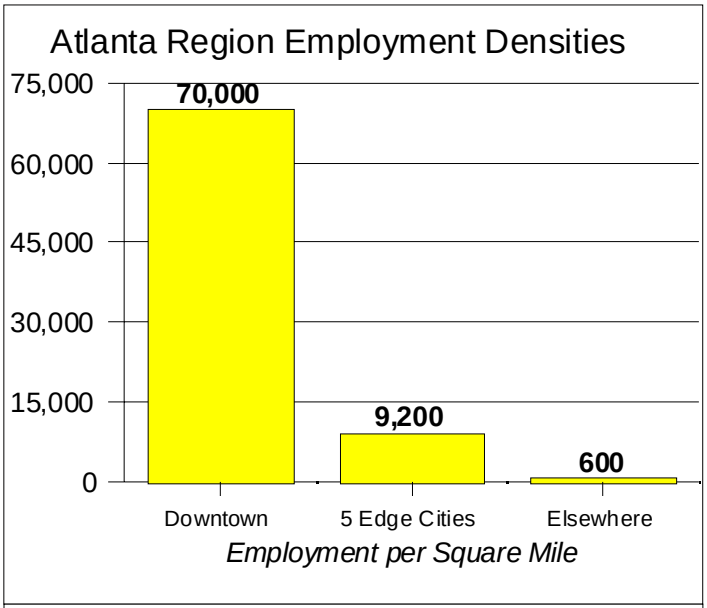

Figure 4
Source: Estimated from U.S. Census, 1990 Data.

Transportation

As the Atlanta region has grown, so has travel demand. It is estimated that the Atlanta region added at least 4,500,000 daily person trips from 1980 to 2000.[20]

Roadways

Roadways are important in the Atlanta region. ARC estimates that automobiles and trucks represent approximately 97.4 percent of motorized travel. Moreover, the growth in non-transit travel by roadway has been nearly 99 percent of the total since 1980.

The Atlanta area has the seventh most intensively used freeway system in the nation, averaging more than 35,000 daily vehicle trips per two-way lane mile (Table #2). The urban area with the greatest traffic congestion, Los Angeles, has 31 percent higher volumes per lane mile, while Portland has 3 percent less.[21] Based upon the ARC average vehicle occupancy ratio of 1.21, it is estimated that the average two-way freeway lane mile in Atlanta carries approximately 43,000 persons daily.

[18] Estimated using 1990 Census Bureau data.
[19] *Moving Beyond Sprawl.*
[20] The change in person trips was estimated using the population increase and ARC 2000 average daily trips per person.
[21] Federal Highway Administration data, 1998.

Table #2
Daily 2-Way Traffic per Lane Mile: 1998

Rank	Urban Area	Vehicle Count
1	Los Angeles	46,364
2	San Francisco-Oakland	38,682
3	Chicago	36,512
4	Seattle	35,976
5	Riverside-San Bernardino	35,656
6	Phoenix	35,494
7	Atlanta	35,468
8	Washington	35,072
9	Portland-Vancouver	34,448
10	Detroit	34,380
11	Boston	34,046
12	San Diego	33,938
13	Miami-Hialeah	33,272
14	Minneapolis-St. Paul	33,072
15	Sacramento	32,810
16	Houston	32,574
17	Denver	31,758
18	Cincinnati	31,610
19	San Jose	31,362
20	Fort Lauderdale-Hollywood-Pompano Beach	31,262

Source: Calculated from Federal Highway Administration data.

Table #3
Change in Lane Miles, Traffic Volumes and Population: 1988 to 1998
Atlanta Seven County Core Area

County	Change in Lane Miles	Change in Traffic Volume (Vehicle Miles)	Change in Population	Traffic Volume Change in Relation to Lane Mile Change	Traffic Volume Change Relative to Population Change
Clayton	7.9%	43.1%	21.2%	5.44	2.04
Cobb	26.0%	65.1%	28.0%	2.50	2.33
DeKalb	7.1%	30.0%	10.9%	4.24	2.76
Douglas	18.0%	51.7%	25.9%	2.87	2.00
Fulton	12.7%	65.4%	16.8%	5.17	3.90
Gwinnett	35.5%	107.6%	57.9%	3.03	1.86
Rockdale	5.6%	60.3%	26.4%	10.70	2.28
7 County Area	16.2%	59.6%	24.1%	3.68	2.47

Source: Metropolitan Atlanta: Breaking the Gridlock

In 1997, the Texas Transportation Institute rated Atlanta's traffic congestion to be the 8th worst in the nation, compared to a ranking of 17th worst fifteen years ago (Roadway Congestion Index[22]). In recent years, roadway expansion in the Atlanta region has not kept up with the increase in traffic volumes. From 1988[23] to 1998, traffic in the seven county Atlanta central area increased 59.6 percent. This is 3.7 times as great as the expansion of freeways,[24] arterials, and collectors,[25] at 16.2 percent (Figure #5).[26] Traffic volumes rose more than five times the rate of roadway expansion in Clayton, Fulton, and Rockdale Counties. Traffic volume increased 2.5 times the rate of population growth in the seven county area. By far the greatest ratio of traffic volume change to population change was in Fulton County (Table #3).

Atlanta's traffic congestion is made worse by the uneven growth in the area. There has been inordinate amount of growth in the northern part of the region. At the same time, traffic congestion in the central area, particularly on the downtown connector (I-75/85) has grown significantly.

Atlanta has some of the widest and most advanced design freeways in the nation. However, the system was largely planned before 1960. Since that time, the emerging growth and development patterns have rendered major elements of

[22] The Roadway Congestion Index estimates traffic volumes on freeways and principal arterials in relation to capacity. An index above 1.00 represents an excess of demand over capacity, while a score below 1.00 indicates that there is excess capacity.
[23] Earliest year for which data is available.
[24] For the purposes of this report, the term freeway includes limited access toll roads (such as Georgia 400).
[25] Surface thoroughfares (signalized through streets).
[26] Calculated from The Road Information Program, *Metropolitan Atlanta: Breaking the Gridlock* (Atlanta: Georgians for Better Transportation, 2000).

the freeway system less effective than they would otherwise have been: As a result, characteristics of the Atlanta area freeway system worsen traffic congestion.

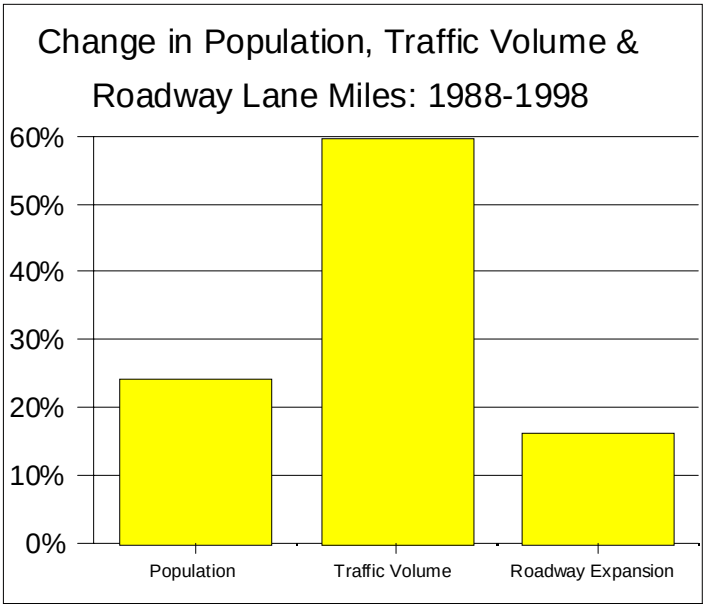

Figure 5
Source: Calculated from data in *Metropolitan Atlanta: Breaking the Gridlock.* For the seven central counties of the Atlanta region.

Radial Design. The freeway system is radial, as is the case with most urban freeway systems in the United States. Freeways tend to converge on downtown, and those that are not oriented toward downtown tend to be orbital (circumferential) in design (the Perimeter Highway and the proposed Outer Perimeter Highway). This design is consistent with urban areas as they existed and were understood in the mid-1950s when the Interstate highway system was designed. Downtown was the primary locus of activity and most commuting was downtown or in the central city. Travel patterns were generally radial, and the orbital roadways served as urban bypasses. In the intervening decades, however, suburb-to-suburb commuting has become dominant and orbital routes themselves have become urban routes serving the more dispersed employment and residential patterns. The more dispersed travel patterns that have emerged would be better served by a freeway system laid out in a grid, rather than a radial-orbital design. In Atlanta, the radial system forces a large percentage of cross-town traffic through the downtown area to get from one side of the urban area to another, or to use a circuitous routing on the orbital route. This results in greater traffic congestion. It is possible that Fulton County's comparatively high traffic volume increase to population increase ratio (above) reflects, to some degree, this radial routing of trips that would otherwise not need to travel through Fulton County.

The Downtown Connector. The north-south radial freeway system forces virtually all traffic into a single roadway through the central area of Atlanta. From the north, Interstate 75, Interstate 85 and Georgia 400 converge into the downtown connector. This design forces 14 lanes of traffic[27] into the combined I-75/85 roadway that has only 7 through lanes. North of this merger point, two of the freeways (I-75 and I-85) are each among the 20 most heavily used in the nation.[28] Further, a few miles south of this convergence, the downtown connector crosses highly traveled Interstate 20, which creates further traffic congestion.[29] The traffic congestion is exacerbated by the reduction of connector ramp lanes to as little as a single lane on the ramps between GA-400 and I-85. This design is unique - there is no other place on the national Interstate highway system that three radial freeways converge into a single roadway approaching a large downtown area.

[27] In each direction. As they converge on the downtown connector (I-75/85), I-85 has six lanes in each direction (north of GA-400), GA 400 has three lanes in each direction and I-75 has five lanes in each direction.
[28] Federal Highway Administration, 1996 data.
[29] Traffic congestion is usually worse at freeway interchanges.

Freeways Not Built. The freeway traffic situation is made worse by the fact that some planned freeways were not built.

> ...there is no other place on the national Interstate highway system that three radial freeways converge into a single roadway approaching a large downtown area.

Interstate 485 would have been built in the corridor between the south terminus of Georgia 400 and the north terminus of Interstate 675. This would have provided an alternate to the downtown connector, somewhat to the east.

The Stone Mountain Freeway would have served from downtown toward the east. Part of this freeway was built, but not in the core of the urbanized area, where it would have provided the most relief.

Interstate 420 would have been built from the east end of Georgia 166 (the Lakewood Freeway) to Interstate 20 in DeKalb County.

These freeways were not built primarily because of community opposition. This is not to suggest that regional mobility interests should have superseded the more local neighborhood interests. However, traffic congestion would be less severe today if these or comparable roadways had been constructed.

Wide Freeways. Atlanta's freeways are, on average, wider (in terms of the number of lanes) than every urbanized area except Los Angeles, at 7.5 lanes (Los Angeles averages 8.2).[30] In some places, Atlanta freeways are especially wide. For example, I-75 north of I-285 was reported to have 15 lanes by the Federal Highway Administration, which cited it as the widest in the nation.[31] The lanes are on two roadways, one northbound and one southbound. This exacerbates traffic congestion because the entire roadway is often brought to a stop due to traffic accidents and disabled vehicles as emergency vehicles service accidents or as passing motorists slow to observe the situation.

Surface Arterials. In many urban areas, surface arterials provide effective alternatives to freeways and are routinely used by drivers to avoid recurring or incident congestion. This is well illustrated in major portions of the Los Angeles area, where four to eight lane surface arterials are found each mile and often four lane arterials are found in the intervening one-half mile.[32]

Perhaps the most important impediment to the efficient operation of the Atlanta freeway system is the lack of a sufficiently supportive surface arterial system. For example:

[30] Calculated from 1998 Federal Highway Administration data.
[31] Internet: http://www.publicpurpose.com/ic-96is-wide.htm.
[32] Los Angeles is the nation's most densely populated urban area, at 5,800 per square mile, more than three times that of Atlanta. This high density makes Los Angeles traffic congestion the worst in the nation, despite this comparatively dense roadway system.

A large percentage of the arterials outside central Atlanta are two lane roadways, often without shoulders. In some cases arterial roadways are simply the county roads that pre-dated development. Besides the inherently low capacity of two lane roads, the lack of shoulders increases traffic congestion, due to incidents, left turns or right turns. Public transit buses are forced to impede traffic where there are no shoulders as they stop for passengers. Even where there are multiple lane arterials, such as Northside Drive (U.S.41) and Roswell Road (U.S.19), shoulders are often not provided.

Where left turns are provided, they are often insufficiently long to accommodate traffic volumes, which forces turning traffic into the general traffic lanes, making traffic congestion worse. This is especially true at some locations on streets that cross the northern sector of Interstate 285.

High Occupancy Vehicles

Currently, high occupancy vehicles (non-single occupant automobile trips) account for 11.5 percent of person trips in the Atlanta region. Some of this traffic is accommodated on more than 150 miles of high occupancy vehicle (HOV) lanes.

Intelligent Transportation Systems and Traffic Management

Intelligent Transportation Systems (ITS) refers to computerized technology that is being increasingly used to improve the flow of traffic. ITS is emerging as a principal strategy in traffic management. The Atlanta area has been a leader in this technology, and is using video surveillance of freeways, freeway message boards that advise motorists of delays, and an incident management (accident) system that seeks to quickly removed disabled vehicles from the roadway.

Transit

Most public transit in the Atlanta area is provided by the Metropolitan Atlanta Rapid Transit Authority (MARTA), which operates nearly 600 buses and a metro (heavy rail) system extending 46 miles.[33] MARTA carries more than 98 percent of the transit riders in the Atlanta region. MARTA services operate primarily in Fulton and DeKalb Counties, where they are supported by a one-cent sales tax enacted by a voter referendum in 1971.[34] MARTA also receives financial support from the federal government. Other bus services are provided by Cobb County.[35]

In 1999, 77.7 million passenger journeys were taken on MARTA trains and buses, up 23 percent from the 1979 figure of 63.0 million (the last year before rail service commenced). This represents a weekday ridership increase of approximately 50,000 in the 20 years since MARTA rail service began.

Despite perceptions to the contrary, transit use is comparatively intense in Atlanta. Within its service area, MARTA ridership per capita (passenger miles) ranks second per capita only to the New York City Transit Authority, and 25 percent ahead of third ranked Boston.[36] MARTA's ridership per capita is approximately 50

[33] National Transit Database, 1997.
[34] Some MARTA services extend into Clayton, Cobb, and Gwinnett Counties.
[35] Douglas County also provides van pool services, with fewer than 200 daily riders (*RTP Needs Assessment Report*, May 1999).
[36] Calculated from National Transit Database, 1966.

percent higher than that of the Chicago Transit Authority and more than 130 percent higher than Portland's Tri-Met (Figure #6).[37]

MARTA's rail system focuses on the downtown area, with lines converging (crossing) at Five Points Station. MARTA has coordinated bus and rail service to more effectively use its resources, so that many bus routes act as feeders to the quicker, high-capacity metro rail system.

The MARTA rail system operates faster than any U.S. metro system with the exception of San Francisco's BART, which has much longer distances between stations.[38] MARTA's higher rail operating speed makes its services more attractive as an alternative to driving downtown.

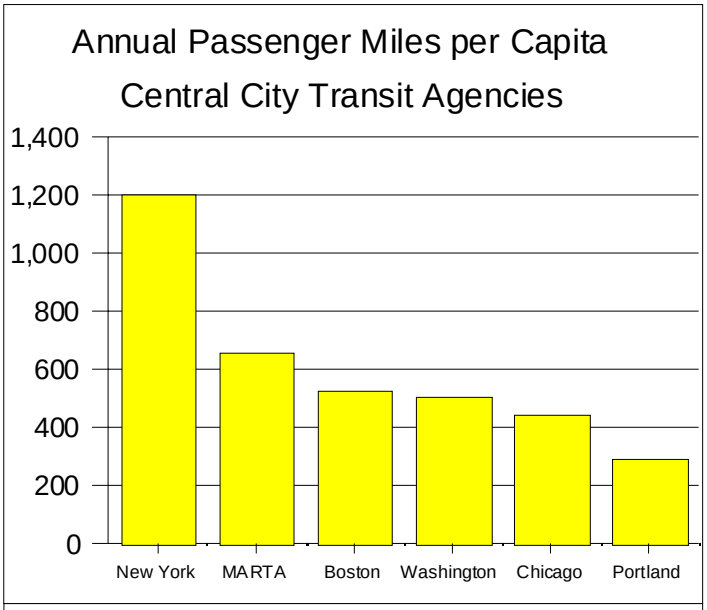

Figure 6
Source: Calculated from 1997 National Transit Database.

The MARTA rail system operates faster than any U.S. metro system with the exception of San Francisco's BART, which has much longer distances between stations. MARTA's higher rail operating speed makes its services more attractive as an alternative to driving downtown.

Overall Transit Market Share. The Atlanta Regional Commission estimates that transit's share of all trips in the Atlanta area is 2.56 percent in 2000, which is above the national urban figure of approximately 1.83 percent.[39] There is considerable variation in transit's market share, ranging from 8.9 percent in the city of Atlanta to zero in areas with no transit service.[40] Within the MARTA service area of Fulton and DeKalb Counties, transit's market share

[37] Ridership per capita is a standard measure for comparing the patronage levels of transit agencies. The ridership referred to in this case is within the MARTA service area only. As in the case of all transit agencies, some of the riders do not actually live in the service area. In some cases, transit agency service areas are effectively limited to the core city, as in the case of the New York City Transit Authority, the Chicago Transit Authority and the San Francisco Municipal Railway. In other cases, the central area of the metropolitan area is served, such as MARTA, Seattle's King County Metro and the Los Angeles County Metropolitan Transportation Authority. Finally, some areas have transit agencies that serve the entire metropolitan area, such as Denver's Regional Transportation District and Houston's Metropolitan Transit Authority. The intensity of MARTA's ridership is illustrated by its per capita ridership being higher than all of the core city transit agencies except for New York and all of the transit agencies that serve larger central areas. Ridership generally tends to be higher in core areas and central areas in the developed world.
[38] National Transit Database, 1997.
[39] http://www.publicpurpose.com/ut-usptshare45.htm. Public transit market shares are much higher in Europe and Japan. More than 60 percent of travel in the Tokyo metropolis is by transit and nearly 25 percent of London travel is by transit. The highest U.S. public transit market share is in the New York area, which has been variously estimated at under 10 percent. For example, see http://www.publicpurpose.com/ut-97usptdata1.htm.
[40] Trip destinations.

is 5.1 percent. Over 60 percent of MARTA trips begin in the city of Atlanta.

In recent decades, the intensity of transit use has declined. During the 1980s, transit passenger journeys per capita in MARTA's Fulton-DeKalb service area fell 9.7 percent. This decline moderated in the 1990s, with a 3.5 percent decline projected for 19902000. These declines are in contrast to the strong gains achieved in the 1970s, when per capita ridership rose more than 50 percent (Figure #7). During much of that period, MARTA's passenger fares had been reduced substantially, which increased ridership. In the early 1970s, MARTA's adult bus fare was reduced to $0.15, where it stayed until the late 1970s. The MARTA adult fare is now $1.50[41] and is proposed to rise to $1.75.

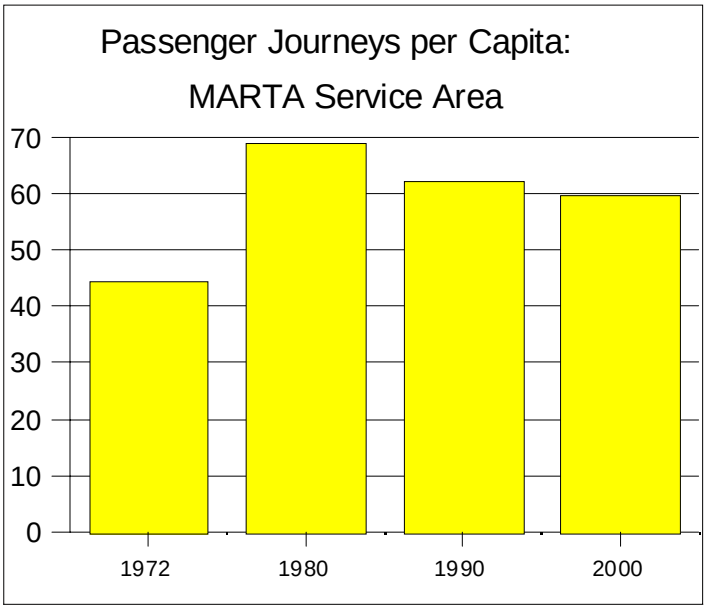

Figure 7
Source: Calculated from MARTA & US Census Bureau data.

Transit Work Trip Market Share. Despite the considerable investment in transit in the 1980s, transit market share has declined. From 1980 to 1990, when the MARTA rail system grew to 33.5 miles and approximately 227,000 daily boardings,[42] transit's work trip market share in the Atlanta metropolitan area[43] dropped 37.9 percent. Smaller transit work trip market share declines were sustained within the MARTA service area, with Fulton County declining 27.0 percent and DeKalb County declining 14.9 percent (Figure #8).[44]

From 1970 to 1980, the Atlanta region work trip market share had declined by a lower rate, 6.9 percent (Figure #9).[45] It is possible that the more favorable performance in the 1970s was a result of very low transit fares, which had been promised as a part of the referendum that established the MARTA local sales tax.[46]

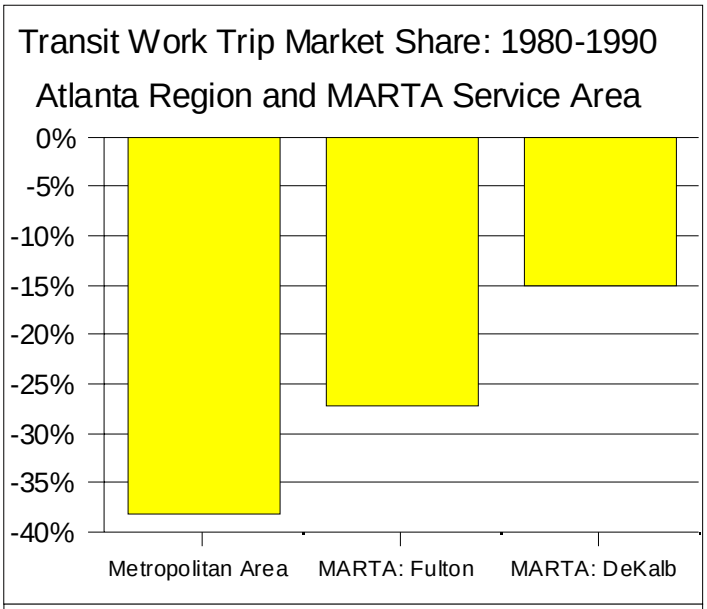

Figure 8
US Census Bureau data.

[41] Substantial fare discounts are available, through lower senior citizen fares and passes. The average fare per passenger journey in 1999 was $1.16.
[42] By 1997 daily MARTA rail boardings had risen to 246,000 (National Transit Database).
[43] Metropolitan Statistical Area.
[44] Calculated from U.S. Census Bureau data.
[45] Calculated from U.S. Census Bureau data.
[46] A similar dynamic occurred in Portland, where lower fares in the 1970s fueled a 40 percent increase in transit work trip market share from 1970 to 1980. Despite opening its light rail system in 1986, transit's work trip market share dropped more than 35 percent from 1980 to 1990, to a level below that of 1970 (calculated from U.S. Census Bureau data).

Overall, in the 10-county ARC region, 7.1 percent of work trips are carried by public transit. The concentrated nature of work trips to downtown makes it possible for transit to play a significant role in that market. MARTA's effectiveness with respect to downtown work trips is demonstrated by its considerable market share, estimated at 28.6 percent in 2000.[47] Outside downtown, transit's 1990 market share was 5.9 percent. This consists of:

> 16.5 percent of work trips to locations in the city of Atlanta outside downtown.
>
> 9.1 percent of work trips to locations in DeKalb County.
>
> 1.1 percent of work trips to parts of the 1990 metropolitan area outside Fulton and DeKalb Counties.

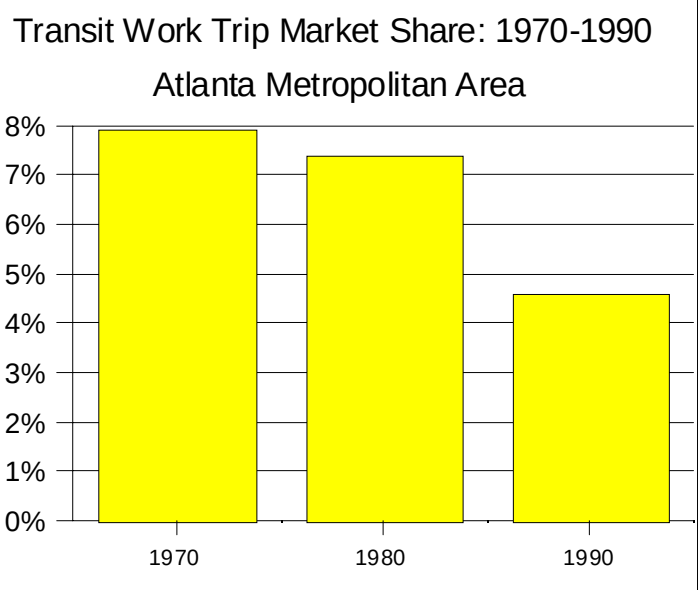

Figure 9
US Census Bureau data.

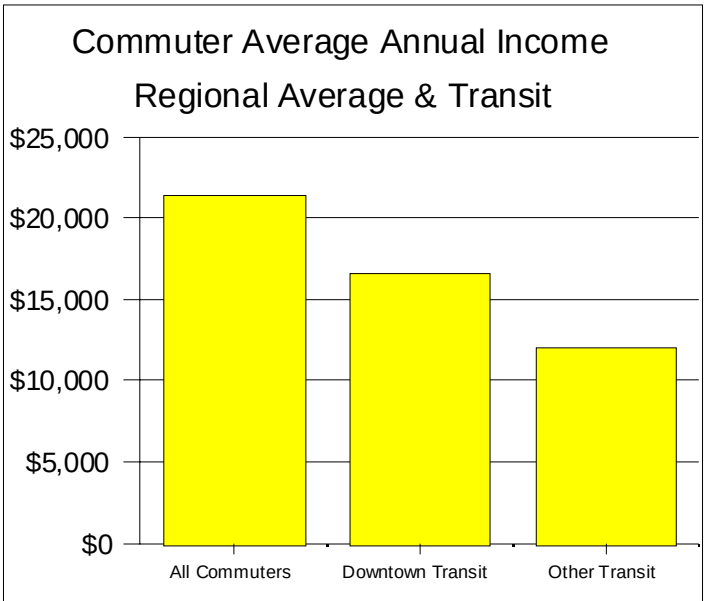

Figure 10
Source: Calculated from MARTA & U.S. Census Bureau

Transit commuters to downtown have considerably higher income than commuters to other parts of the area. In 1990, downtown transit commuters had incomes 23 percent below the area average. Among transit commuters who work outside downtown, incomes were 50 percent below average. This illustrates the transit dependent nature of transit commutes to areas outside downtown (Figure #10). Generally such commutes are less convenient, because of the higher incidence of transfers and longer walking distance from transit stops to work locations. This suggests that a significant percentage of non-downtown transit commuters do not have access to automobiles for their trip.[48]

Moreover, rail commuters are more affluent than bus commuters. Rail commuter incomes are 6 percent below average, compared to 48 percent below average for bus commuters (Figure #11). Downtown rail commuters have slightly higher incomes than average (3 percent higher), while rail commuters

[47] 1990 U.S. Census Bureau data indicated that the Atlanta metropolitan area had a transit work trip market share of 4.6 percent, with 15.9 percent downtown and 3.9 percent outside downtown. The variance is at least partially due to differing area definitions.
[48] Calculated from 1990 U.S. Census Bureau data.

to the rest of the city of Atlanta have incomes 8 percent below average. However, rail commuters to locations outside the city of Atlanta had incomes more than 25 percent below average, again suggesting a lower rate of automobile availability.

Fares. MARTA has among the highest fares in the nation, at $1.50 (and a fare increase is proposed). This is a considerable change from MARTA's early years, when there was a flat $0.15 fare. MARTA has implemented significant fare increases in the last 20 years. Since 1979, the last year before rail service was established, average fare per passenger journey has risen 174 percent, *after* adjustment for inflation (Chart #12)

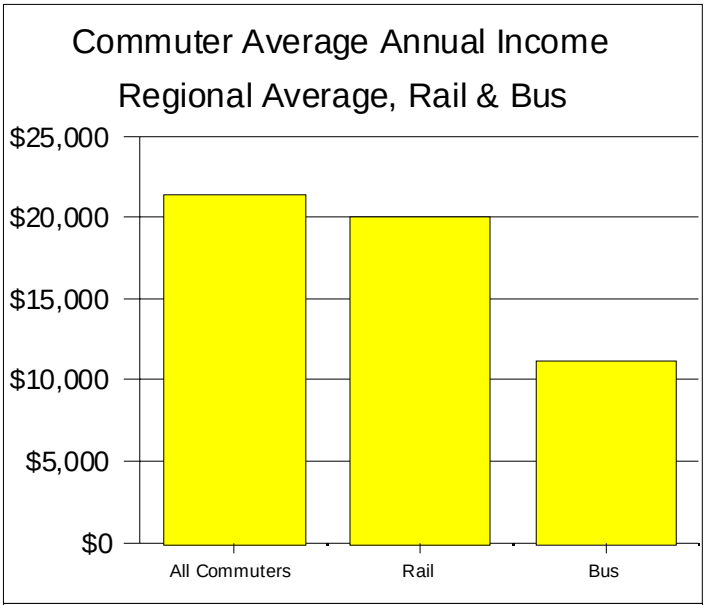

Figure 11
Source: Calculated from 1990 US Census Bureau data.

Air Pollution

Because of its non-attainment status, Atlanta has faced sanctions with respect to federal highway and transit construction funding. This has been instrumental in the creation of the Georgia Regional Transportation Authority, which is intended to implement policies to improve transportation and reduce air pollution.

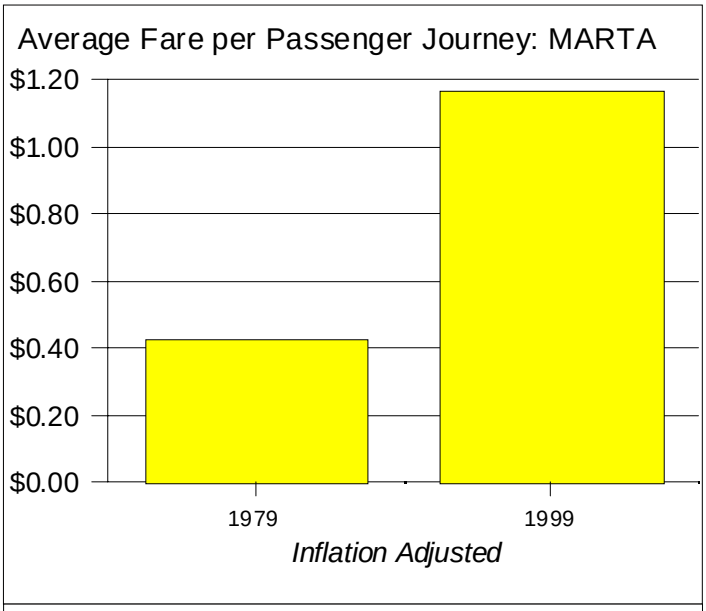

Figure 12
Source: Calculated from National Transit Database and MARTA data.

Political Reality

The political environment in Atlanta, as elsewhere around the nation, is increasingly less receptive to developments that cause neighborhood or commercial district disruption. This development, often called "NIMBY" ("Not In My Back Yard") makes the provision of new transportation facilities very challenging.

Situation Assessment

By transit standards, Atlanta has experienced a sizeable increase in ridership, though less than the increase in population and roadway traffic (Figure #13).

MARTA ridership increased at an average annual rate of 1.0 percent from 1979 to 1999.

Population in the Atlanta urbanized area increased 3.2 percent annually from 1982 to 1997.

> Daily traffic volumes in the Atlanta urbanized area increased 6.1 percent annually from 1982 to 1997. [49]

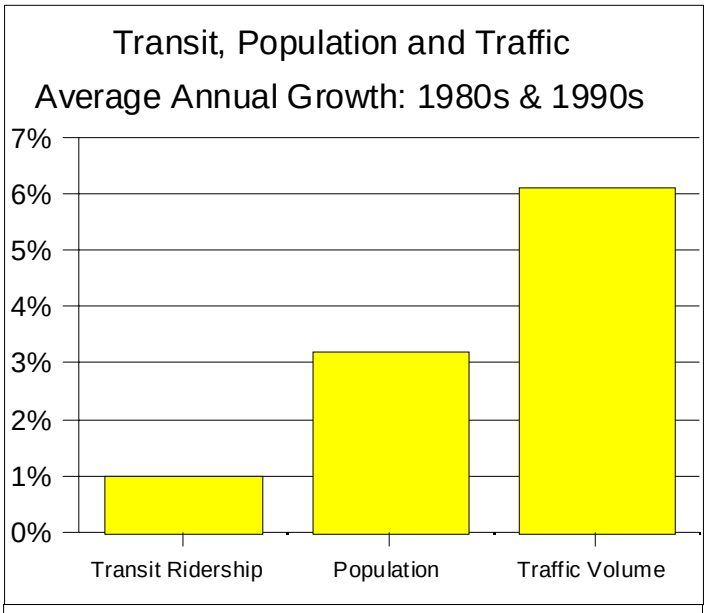

Figure 13
Calculated from ARC, MARTA and Texas Transportation Institute data.

Moreover, the transit ridership expansion has been expensive, with an incremental cost per new ride of approximately $32.20, or $13,600 annually for each new commuter.[50] If the same amount had been spent per new person trip on roadways, there would have been an increase in the Atlanta region of approximately $50 billion annually[51] from 1979 to 1999 (approximately $15,000 per capita). This is one-third more than is proposed for expenditure over the next 25 years for all transportation purposes in the Atlanta region, and approximately the same as the combined expenditure for highway construction and maintenance of all 50 state governments in 1998.[52]

But because transit's market share is so small, even the 50,000 daily increase in ridership from 1979 to 1999 represented barely 1 percent of the 4.5 million new trips in the Atlanta region. All but a minuscule portion of the new travel demand in Atlanta since World War II has been highway, and most in single occupant vehicles.

[49] Urbanized area population and traffic volume data available only during the 1982 to 1997 period.
[50] Cost per new one-way ride calculation: Total through 1996 ($2.622 billion according to MARTA), discounted at 7 percent over 40 years equals a $197 million annual capital cost. To this figure is added the annual operating cost increase for the MARTA system from 1979 to 1999, $152 million (inflation adjusted) and the 1999 debt service of $94 million, for an overall annual incremental cost of $443 million in 1999. This figure is divided by the annual increase in MARTA passenger journeys, 1979 to 1999, 14,645,000. The resulting $32.20 is then multiplied by the average number of commute trips annually (225 days, twice daily for a total of 450) to obtain the annual cost per new commuter of $13,600. The actual cost per new commuter is actually higher, since bus capital expenditures over the period are not included in the calculation (this data is not readily available).
[51] Based upon the estimate of 4.5 million additional daily trips (above).
[52] According to the Federal Highway Administration, highway construction expenditures for all states and the District of Columbia were $38.5 billion (Table HF-10, *Highway Statistics 1998*).

Chapter 2: Analysis of Transportation Proposals

This section evaluates various plans and proposals for improving the transportation situation in the Atlanta area. The primary criteria for evaluation will be the extent to which such proposals contribute to reducing the amount of time spent in traffic congestion and improving overall travel speeds. The comparative cost of each proposal will also be evaluated.

Atlanta's long-term (25 year) transportation plan, *Transportation Solutions for a New Century (*the *Regional Transportation Plan* or "*RTP*"*)*[53] has been prepared by the Atlanta Regional Commission (ARC). The most recent edition was approved in March 2000. There may, however, be some uncertainty about the *Regional Transportation Plan*. The new Georgia Regional Transportation Authority has just begun to operate and may proceed with revised or even different strategies. Moreover, the United States Department of Transportation has raised criticisms of the *RTP*, the most relevant of which are described below. Nonetheless, the strategies in the *RTP* are evaluated because they are likely to be representative of the types of strategies that will be eventually adopted and employed as the planning process continues.

Demographics: 2000 to 2025

The *Regional Transportation Plan* projects demographic trends in the 13-county area. Between 2000 and 2025:

Population. Population is projected to increase 43 percent from 3,366,400 to 4,813,600. ARC projects a major shift in population growth from the northern part of the area to the core counties of Fulton and DeKalb.

From 1980 to 2000, the two core counties accounted for 20 percent of the population growth in the 13-county region, adding 277,000 residents. Between 2000 and 2025, ARC projects that Fulton and DeKalb Counties will experience 35 percent of the growth, for an increase of 510,000 residents.

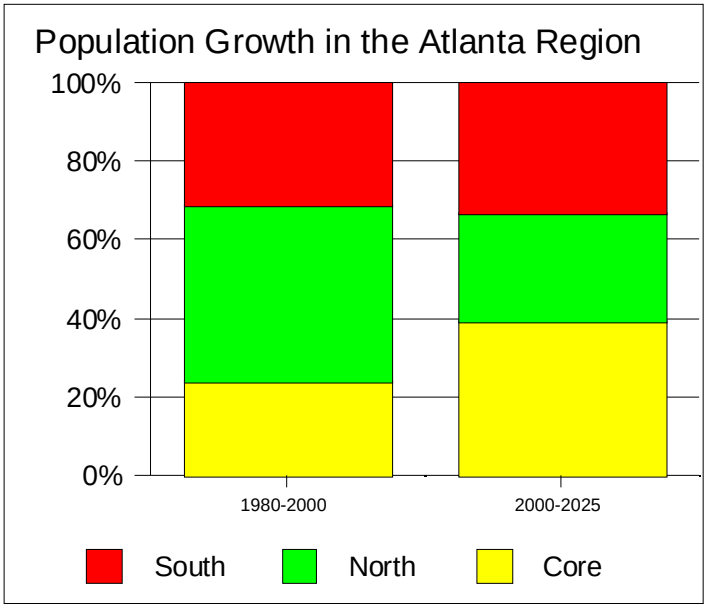

Figure 14
Source: Calculated from ARC data.

From 1980 to 2000, the two northern counties of Cobb and Gwinnett accounted for 44 percent of the population growth in the 13-county region, adding 605,000 residents. Between 2000 and 2025, ARC projects that Cobb and Gwinnett Counties will experience only 25 percent of the growth, for an increase of 363,000 residents (Table #4 and Figure #14).

[53] Atlanta Regional Commission, *Transportation Solutions for a New Century: 2025 Regional Transportation Plan (Regional Transportation Plan)*, March 22, 2000.

These population projections would represent a radical reversal in subregional growth that is unlikely to occur. For most of the last century, Atlanta and other urban areas have been suburbanizing, with the overwhelming majority of growth occurring in suburban areas. There is no precedent, either in the United States or elsewhere in the developed world, for such a reorientation of population growth, even where much more regulated land policies have been employed. Even Portland, with the most restrictive land use policies in the nation, has not achieved such a reversal.[54]

Table #4
Projections and Population Increase History

Subregion	2000-2025	Share	1980-2000	Share
Core (DeKalb & Fulton)	509,707	35.2%	277,273	20.1%
North (Cobb & Gwinnett)	362,870	25.1%	605,372	44.0%
South*	431,797	29.8%	355,676	25.8%
Cherokee, Coweta & Forsyth	142,825	9.9%	138,466	10.1%
Total	1,447,199	100.0%	1,376,787	100.0%

Source: Calculated from Atlanta Regional Commission data.
*Clayton, Douglas, Fayette, Henry, Paulding & Rockdale.

The city of Atlanta is projected to grow from its approximately 430,000 current residents[55] to 565,000 by 2025, a gain of 31.4 percent. Atlanta would account for nearly one-half of Fulton County's population gain from 2000 to 2025, compared to 25 percent in the 1990s. As in the case of other central cities, such as Chicago and Denver, it is not unlikely that Atlanta will grow over this period, as new developments and redevelopments attract new residents, especially young professionals. However, these population increases are likely to be modest. The overall population projection for the city of Atlanta appears to be exceedingly high. The city of Atlanta is essentially "fully built out."[56] It contains little undeveloped open space that would be available for increasing population. To achieve the projected 30 percent higher population in 2025 would require intensification of densities in already developed areas. Most fully built out central cities that have not annexed new territory in the developed world have experienced *declining* population in recent decades.[57] Among the few fully built out cities that have increased their population, none has achieved a 30 percent population increase in 25 years.[58]

[54] From 1990 to 1998 approximately 95 percent of the growth in the Portland metropolitan area was outside the city of Portland.
[55] Approximate boundaries used by ARC.
[56] A fully built out city is one in which there is little, if any, room available for "green field" development ("Green field" development occurs on sites that are not or have not been previously occupied by urban development. In contrast, "brown field" development represents redevelopment of sites that are or have been occupied by urban development).
[57] The decline of U.S. central city population is well known, with St. Louis losing 60 percent of its population since 1950 and other cities, such as Detroit, Cleveland, Chicago, Baltimore and Washington losing more than 25 percent. The same trend has occurred, however, outside the United States. Examples include London, Paris, Stockholm, Copenhagen, Vienna, Tokyo, Osaka, Liverpool, Glasgow, and others. In some cases, such as Chicago and London, there has been a recent modest reversal in population, but not at a rate that would significantly increase population densities or restore these cities to their population peaks. The smallest U.S. population losses have occurred in New York and San Francisco, which have experienced approximately 5 percent declines from their peak populations. Central city population trends can be reviewed at http://www.demographia.com/dbx-europe.htm and http://www.demographia.com/dbx-japan.htm and http://www.demographia.com/dbx-uscity1850.htm.
[58] The only two such cities in North America are Vancouver, which gained 21 percent from 1971 to 1996, and Miami, which gained less than 10 percent from 1970 to 1995. Much of the growth in these two cities was due to immigration (Cuban and other Caribbean to Miami and Hong Kong to Vancouver).

Employment. Employment is projected to increase 45 percent, from 1,947,000 to 2,815,000.

From 1980 to 2000, the two core counties accounted for 36 percent of the employment growth in the 13-county region, adding 354,000 jobs. Between 2000 and 2025, ARC projects that Fulton and DeKalb Counties will experience 47 percent of the growth, for an increase of 383,000 jobs.

From 1980 to 2000, the two northern counties of Cobb and Gwinnett accounted for 43 percent of the employment growth in the 13-county region, adding 417,000 jobs. Between 2000 and 2025, ARC projects that Cobb and Gwinnett Counties will experience only 30 percent of the growth, for an increase of 244,000 jobs (Table #5 and Figure #15).

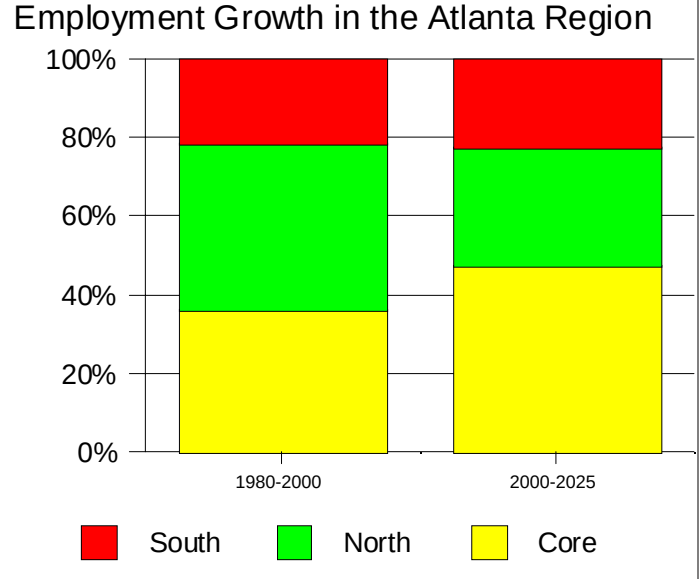

Figure 15
Source: Calculated from ARC data.

Table #5
Projections and Employment Increase History

Subregion	2000-2025	Share	1980-2000	Share
Core (DeKalb & Fulton)	383,131	47.3%	353,709	36.1%
North (Cobb & Gwinnett)	244,399	30.2%	416,572	42.5%
South*	181,630	22.4%	209,904	21.4%
TOTAL	809,160	100.0%	980,185	100.0%

Source: Calculated from Atlanta Regional Commission data.
*Clayton, Douglas, Fayette, Henry, Paulding & Rockdale.

The city of Atlanta is projected to experience an increase in employment from 426,000 to 601,000 by 2025, a gain of more than 40 percent. Atlanta would account for 61 percent of Fulton County's employment gain from 2000 to 2025, compared to 31 percent in the 1990s.

Downtown, the largest and by far most dense employment area, is expected to grow approximately 30 percent, but will experience an employment market share decline of 16 percent, from 6.3 percent to 5.3 percent. This compares to a 10 percent loss from 1990 to 2000 (Figure #16)[59]

As in the case of the population projections, the employment projections are considered to be unattainable. Throughout the developed world, population *and* employment have been dispersing for decades. There is no reason to believe that Atlanta will reverse that trend.[60] There is no precedent for a reorientation of regional growth from suburban areas to the core anywhere in the developed world.

[59] According to ARC, Downtown's market share was 7.0 percent in 1990.
[60] Throughout the developed world, jobs have followed residences to the suburbs.

The Regional Transportation Plan

The *Regional Transportation Plan* projects transportation spending at $36 billion over the next 25 years. Major projects are expected to include 205 miles of new rail construction (compared to approximately 46 miles in operation today) and 800 miles of new freeway lanes, most of which would be high occupancy (HOV) lanes (lanes available to car pools and buses, but not to single occupant vehicles). Transit would represent 55 percent of expenditures, general-purpose roadways 30 percent, and 10 percent would be spent on HOV lanes. An additional 5 percent would be spent for pedestrian, bicycle, and intelligent transportation systems[61] strategies (Figure #17). The major elements of the *Regional Transportation Plan* are discussed below.

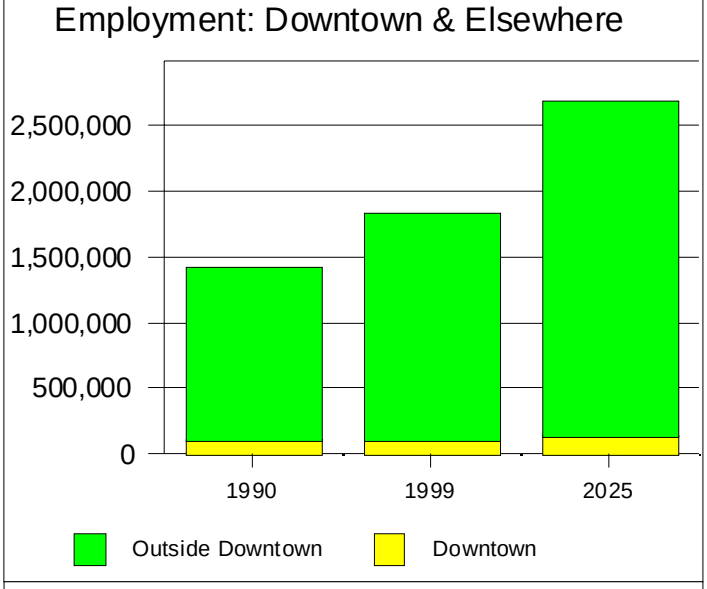

Figure 16
Calculated from ARC data.

Roadways

It is projected that $4.3 billion will be spent for new roadways and roadway expansions over the next 25 years.[62]

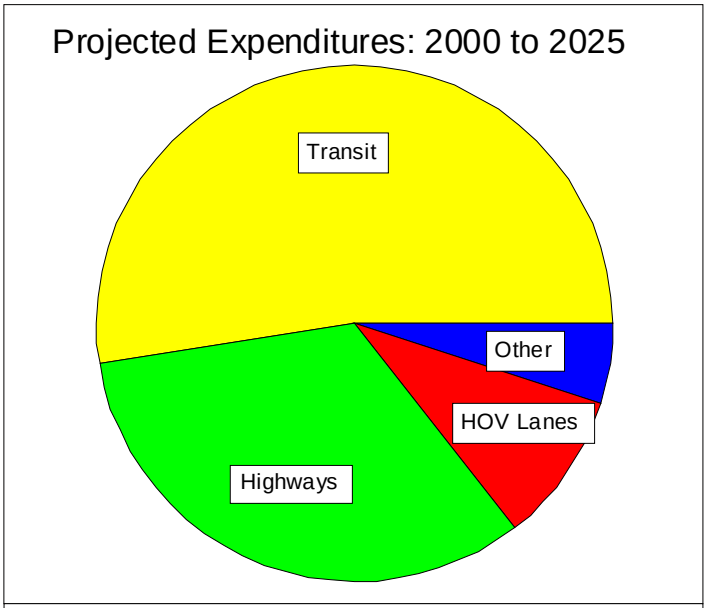

Figure 17
Calculated from *RTP* data.

Freeways

The *Regional Transportation Plan* envisions the addition of nearly 700 lane miles of freeways and arterials in the seven-county central area[63] over the next 25 years.[64] This represents an approximate increase of 7 percent in roadway capacity

It may appear that 700 miles of new roadway lanes would provide substantial additional capacity. However, most of the additional capacity will not be available to general purpose (single occupant) traffic. Nearly two-thirds of the roadway expansion (approximately 425 lane miles) is in proposed high occupancy vehicle (HOV) lanes, which would be limited to car pools and

[61] Information technology applied to roads and traffic.
[62] *Regional Transportation Plan*, p. 3-6.
[63] This area is used because of the availability of lane mile data. The seven county central area includes Clayton, Cobb, DeKalb, Douglas, Fulton, Gwinnett, and Rockdale Counties. The lane mile increase estimate is based upon information in the *Regional Transportation Plan.*
[64] Based upon information in *Metropolitan Atlanta: Breaking the Gridlock.*

transit vehicles.[65] As a result, less than 3 percent capacity expansion will be available to single occupant automobile drivers, who account for approximately 75 percent of the traffic in the Atlanta region today, a number that will change little by 2025, according to ARC projections.[66]

High Occupancy Vehicle Lanes

The majority of new freeway lane additions will be in HOV lanes. By 2025, approximately 440 miles of HOV lanes will be built. The HOV lanes would cost $3.6 billion, or 10 percent of *RTP* resources. At the same time the *Regional Transportation Plan* projects a slight *reduction* in HOV market share, from 11.50 percent to 11.43 percent over the period.

Nearly two-thirds of the roadway expansion (approximately 425 lane miles) is in proposed high occupancy vehicle (HOV) lanes, which would be limited to car pools and transit vehicles. As a result, less than three percent capacity expansion will be available to single occupant automobile drivers, who account for approximately 75 percent of the traffic in the Atlanta region today, a number that will change little by 2025, according to ARC projections.

Intelligent Transportation Systems and Traffic Management

Atlanta's already advanced ITS system will be upgraded and extended in the coming years under the *RTP* and a Georgia Department of Transportation 20 year strategic plan.

Roadway Impact and Assessment

The most significant roadway improvements would have costs of from $0.32 per new trip to $7.73.[67] This represents an annual (recurring) cost per new commuter of from $240 to $3,480. The Northern Arc would cost $3.36 per new trip, or $1,529 per new annual commuter. The average for the six new roadways for which ARC provides data is $2.55 per new trip, or $1,147 per annual commuter. The overwhelming portion of these costs would be paid by users, through gasoline taxes.

Under the RTP, overall vehicle miles of travel on the roadway system would rise 41 percent, from 112.4 million daily in 2000 to 158.3 million in 2025. This represents a 1 percent improvement over making no improvements (the "no-build" alternative), under which vehicle miles would be 160.0 million daily. Under the RTP:

> Overall vehicle hours of travel on the roadway system would rise 56 percent from 4.373 million daily in 2000 to 6.836 million in 2025.

[65] In the larger ARC region, 25 percent of the new freeway capacity will be in the Northern Arc of the Outer Perimeter Highway. This is outside the seven county central area and outside the urbanized area. Because of this location, the Northern Arc is likely to have comparatively little impact on the areas of greatest traffic congestion in the developed northern portion of the urbanized area (north and south of the Perimeter Highway, Interstate 285).
[66] Single occupant trips represent 75 percent of all travel in 2000 and are projected to be 74 percent in 2025 (includes transit trips).
[67] *RTP Needs Assessment.*

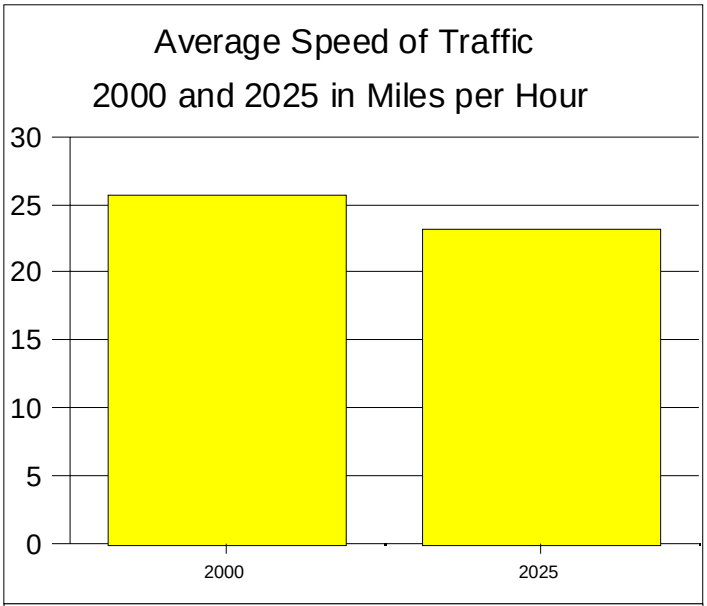

Figure 18
Source: ARC.

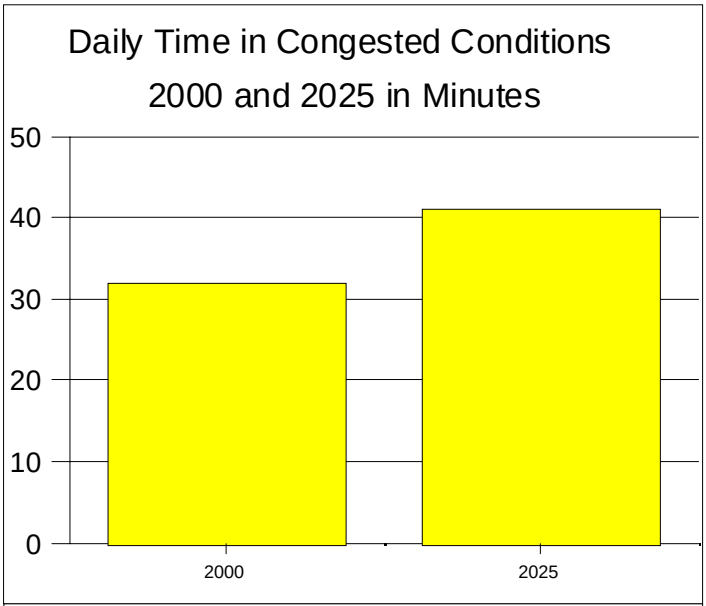

Figure 19
Source: ARC.

The average roadway system operating speed would fall 10 percent, from 25.7 miles per hour in 2000 to 23.2 miles per hour in 2025 (Figure #18).

The average time spent in congested conditions per person would increase from 32 to 41 minutes daily, an increase of 28 percent (Figure #19).

The average work trip travel time would increase 4 percent.

Table #6
Present and 2025 Traffic Volumes

Scenario	Daily Vehicle Miles of Travel *(in millions)*	Change From 2000
Present (2000)	112.432	-
No-Build (2025)	159.956	42.3%
With all Transit & Highway Improvements (2025)	158.280	40.8%

Source: Regional Transportation Plan

As is indicated above, Atlanta has become one of the most congested urban areas in the United States. The *Regional Transportation Plan* strategies will not materially improve traffic in the Atlanta area. The basic problem is that traffic congestion will increase at a rate considerably above the increase in traffic capacity. From 2000 to 2025, traffic is projected to grow approximately 42 percent in the seven-county central area, approximately 15 times the increase in general purpose (non-HOV) roadway capacity. The increase in traffic is projected to be at least six times the capacity increase including HOV lanes (Figure #20). This represents a significant retrenchment in roadway construction. From 1988 to 1998, the annual rate of lane mile expansion in

the seven-county area was 1.51 percent. From 2000 to 2025, plans (including HOV lanes) call for an annual increase of 0.27 percent, less than one-fifth the 1988 to 1998 rate (Figure #21).

ARC's projections support the general finding that traffic congestion will become more intense in the next 25 years, with average time spent in congested conditions rising 28 percent.

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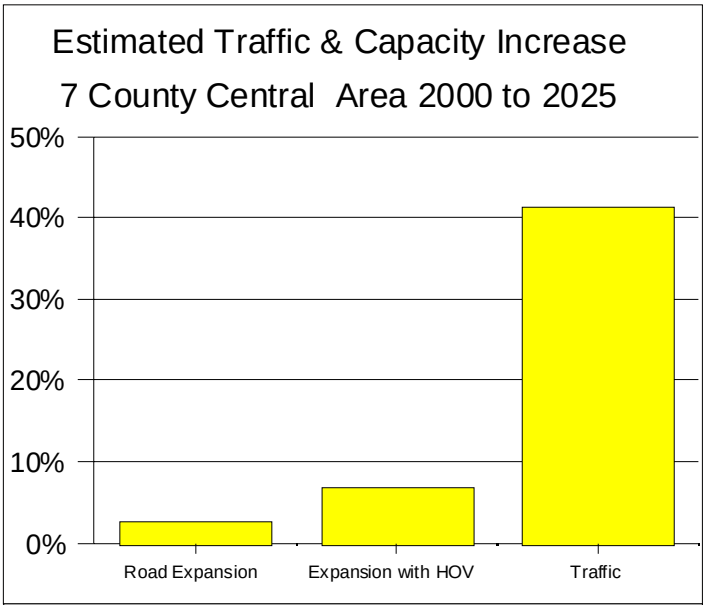

Figure 20
Source: Estimated from ARC data.

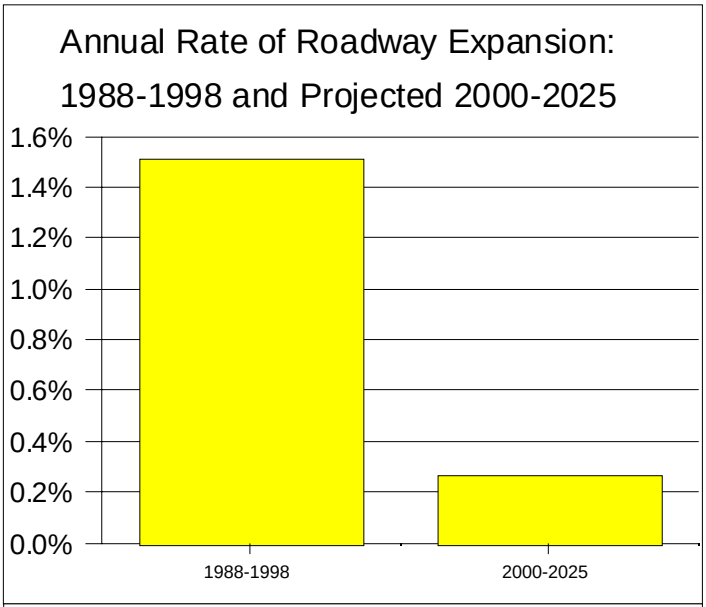

Figure 21
Source: Estimated from ARC data.

Transit

Transit Introduction

The *Regional Transportation Plan* anticipates spending 55 percent of projected transportation funding ($20 billion) on public transit over the next 25 years.

Rail Proposals

Approximately $11 billion is planned for spending on new and expanded passenger rail services. A total of 205 new miles of rail would be built, approximately two-thirds of which would be somewhat low volume commuter rail on four lines radiating from downtown.

MARTA Extensions

MARTA's rail system would be expanded 22 miles under the *Regional Transportation Plan*, at a cost of $2.2 billion.

At approximately $100 million per mile, the MARTA extensions could be significantly under costed in the *Regional Transportation Plan*. The average cost per mile of new heavy rail systems is currently approximately

$130 million per mile.[68] Moreover, the current Dunwoody to North Springs extension is expected to cost more than $240 million per mile. In the worst case, MARTA extension cost overruns could add $3.1 billion to the cost of the *Regional Transportation Plan*.[69] Cost overruns on projects of such significant scope are fairly routine. A National Academy of Sciences report evaluated the international experience in transportation system projections (such as fixed guideways) and found:[70]

> *... the main lessons are that cost overruns of 50 to 100 percent are common for large transportation infrastructure projects: overruns above 100 percent are not unusual.*

The United States Department of Transportation found that urban rail systems averaged cost overruns of 46 percent in a 1989 report.[71] Indeed, the MARTA rail system, which was among those evaluated by the United States Department of Transportation, experienced a 58 percent cost overrun on the construction of its first 27 miles.

At the same time, MARTA rail ridership is projected to rise approximately 99 percent from 2000 to 2025, to 413,000 daily riders. The cost per new trip on the MARTA extensions ranges from $12.22 to $19.59 per new trip (from $5,500 to $14,400 per new commuter annually)[72] The overwhelming portion of these costs would be paid by subsidies, not user fees.

System length (in mileage) would increase approximately 47 percent, from 48 miles to 71 miles. This would indicate that for every 1 percent increase in mileage, ridership is projected to increase nearly 2.1 percent.[73] By comparison, from 1990 to 1997, when the MARTA rail mileage increased 38 percent, the increase in ridership was only 8 percent. This is 0.2 percent for each 1 percent increase in rail mileage, one-tenth the projected amount for the next 25 years. This reflects the general tendency for core-oriented early segments of rail systems to be more productive than later extensions. Generally, rail lines draw people from beyond the suburban ends of lines to park and ride stations and feeder buses. As a result, as lines are extended further, diminishing returns are achieved in terms of additional passenger loads.

As a result, it seems unlikely that the MARTA rail extension ridership forecasts will be achieved. Based upon the MARTA experience, it would seem that a forecast of 230,000 daily riders would be more reasonable for 2025.[74]

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[68] Calculated from 2001 FTA new starts report.
[69] Assumes $240 million per mile.
[70] Mette K. Skamris and Bent Flyvbjerg, "Accuracy of Traffic Forecasts and Cost Estimates on Large Transportation Projects," *Transportation Research Record* (Washington, DC: Transportation Research Board, National Research Council), 1996.

[71] *Urban Rail Transit Projects: Forecast Versus Actual Ridership and Costs* (U.S. Department of Transportation, 1989).
[72] Cost per one-way new trip from ARC, *Regional Transportation Plan: Needs Assessment Report*, 1999. Cost per annual commuter is 450 times the cost per new trip (above).
[73] Ridership on the existing and expanded system.
[74] Applies the 0.2 increase in ridership for each 1.0 percent increase in system mileage (based upon the MARTA 1990 to 1998 experience). This is based upon the ARC 2000 model output of 212,000 daily rail riders (207,000 on existing services and 5,000 on extensions). In reality, rail ridership is already above that level, having been 251,000 in 1998 according to the MARTA National Transit Database report. For consistency with the *RTP*, the lower number is used. If the higher ridership number were used as a base, the projected ridership in 2025 would be 285,000, still considerably short of the 413,000 ARC projection.

Light Rail

New light rail lines are also proposed for the Atlanta area. Light rail tends to operate at the surface, instead of underground or elevated as in the case of MARTA's existing rail system, which is referred to as "heavy rail." There tend to be numerous grade crossings of streets and more frequent stations. As a result, operating speeds are much slower: The average new light rail line in the United States averages 40 percent slower than MARTA's rail system. Because of its slower operating speed, light rail is not rapid transit. Two light rail routes have been proposed.

Arts Center Light Rail Line

The *Regional Transportation Plan* includes a new 22-mile light rail line that would be built from the MARTA Arts Center station to Town Center Mall . The Arts Center light rail line is estimated to cost $1.7 billion and is projected to carry 52,300 passenger trips daily in 2025.[75] The incremental cost per new one-way trip would be approximately $15.68, or $7,100 per annual new commuter.[76] The overwhelming portion of these costs would be paid by subsidies, not user fees. At $77 million per mile, the Arts Center light rail line is within the capital cost range of other light rail projects in planning across the nation. There is, however, a possibility that capital costs could increase.

The average new light rail line in the United States averages 40 percent slower than MARTA's rail system. Because of its slower operating speed, light rail is not rapid transit.

The projection of 52,300 daily riders is considered unreasonably high, based upon the following factors:

> The addition of rail to MARTA's transit system resulted in the addition of less than 50,000 daily riders from 1979 to 1999. MARTA's rail system is nearly twice as long as the proposed light rail system. MARTA's rail system operates 70 percent faster than the 17 miles per hour average of new U.S. light rail lines, which makes it more attractive to automobile users.

Typically, new light rail systems attract one-half or more of their ridership from existing bus riders.[77] Unlike each of MARTA's present rail lines, the Arts Center light rail line would not connect directly to downtown. Riders would be required to transfer from one line to the other to complete their trips.

> The nation's new light rail lines average approximately 17,800 daily riders per downtown oriented corridor,[78] approximately two-thirds less than the Arts Center light rail projection.[79]

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[75] Data from *RTP: Needs Assessment Report*, 1999.
[76] Calculated from ARC data. The ARC *Needs Assessment* (1999) places the cost per one-way transit ride (not new ride) at $10.65. The *RTP* indicates a reduction from 61,500 daily riders to 52,290. Based upon information in the *RTP,* 10,530 bus riders would switch to the light rail line, meaning that there would be 41,760 new riders daily. The $15.68 figure is derived by adjusting the *Needs Assessment* cost per ride based upon the lower figure for new ridership.
[77] Wendell Cox, "Coping with Traffic Congestion," *A Guide to Smart Growth: Shattering Myths, Providing Solutions* (Heritage Foundation and Political Economy Research Center), 2000.
[78] Calculated from 1998 second quarter American Public Transit Association data.
[79] Internet: http://www.publicpurpose.com/ut-usrcorridor.htm

As noted above, the Arts Center light rail line does not directly serve downtown, which has by far the highest work trip market share. To reach downtown, riders will have to transfer to MARTA rail services, which would add inconvenience and time to the trip and make light rail less competitive with respect to the automobile. As a result, the Arts Center light rail line is likely to experience lower levels of ridership than average. The south end of the line is located in Midtown, one of the largest "edge cities" in the Atlanta region. Midtown's transit work trip market share in 1990 was approximately one-third below that of downtown and had approximately one-half the employment base.

Based upon these factors, it seems unlikely that ridership projection would reach 15,000 daily in 2025, most of whom would be attracted from bus services. At this revised ridership level, the cost per new one-way ride would be $43.67, or $19,700 annually per new commuter.[80]

Based upon national passenger mile ratios, the ARC Arts Center ridership projection converts to 8,600 passenger miles per route mile daily.[81] This is approximately 80 percent less than the average passenger miles per single freeway lane (43,000, above) in the Atlanta area (Figure #22). The Arts Center light rail line is not likely to materially reduce traffic congestion.

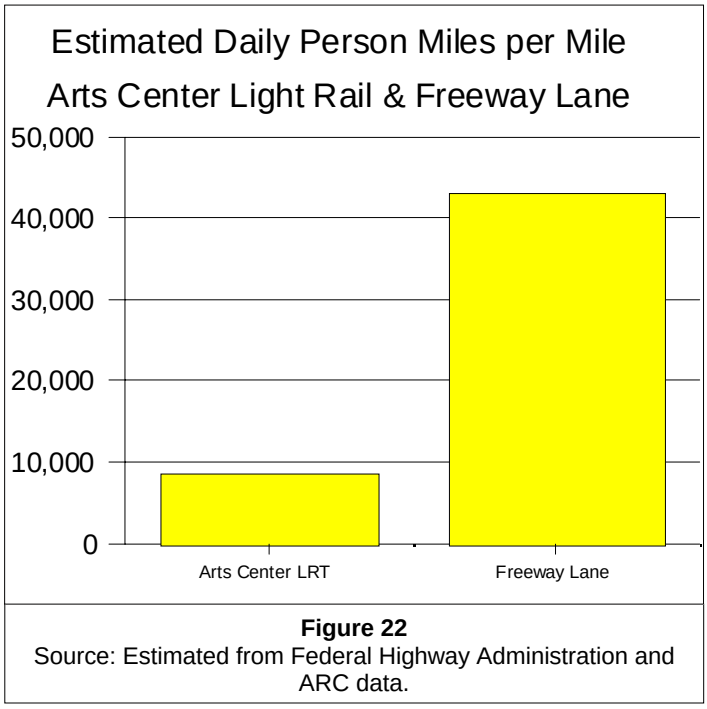

Figure 22
Source: Estimated from Federal Highway Administration and ARC data.

> The Arts Center light rail line is not likely to materially reduce traffic congestion.

Marietta-Lawrenceville Light Rail

There is also a proposal for building a 41 mile light rail line from Marietta to Lawrenceville. Funding for this project is not included in the *Regional Transportation Plan*, but generated considerable local interest. It is anticipated that the Marietta-Lawrenceville light rail line would cost $2.3 billion and is projected to carry 25,500 new daily riders. This calculates to a cost of $34.21 per new ride,[82] or $15,395 per new annual commuter, recurring each year.[83] The overwhelming portion of these costs would be paid by subsidies, not user fees. At $56 million per mile, the Marietta-Lawrenceville light rail line is within the capital cost range of other light rail projects in planning across the nation. There is, however, a possibility that capital costs could increase.

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[80] Assumes 10,530 riders transfer from the bus, as in the ARC projection.
[81] Ratio of average passenger trip length to route length. Calculated from the National Transit Database.
[82] Data from *RTP: Needs Assessment Report*, 1999
[83] Cost per new ride refers to the one-way operating and capital cost for each additional trip taken on a transit service. The annual cost per new commuter multiplies the cost per new ride by 450, which is the number of trips to and from work that would be taken by the average employee (225 day work year assumed). This is *not* a one-time cost, it is a cost that occurs every year.

The Marietta-Lawrenceville light rail line neither serves downtown nor is oriented toward downtown. This would severely limit its potential for attracting passengers.[84] Further, unlike virtually every other light rail line built in the last 20 years in the United States, there is no pre-existing bus service. Because former bus riders routinely represent 50 percent or more of light rail ridership, the potential for attracting large numbers of passengers is very slim. It is likely that the Marietta-Lawrenceville light rail line would carry well below 10,000 passengers daily, far below the ARC projection of 25,500. At 10,000 new riders, the Marietta-Lawrenceville light rail line would have a cost per new one-way trip of $87.24, or $39,300 annually per new commuter. This would make the route one of the most expensive ever planned or built in the United States. Because so few riders would be carried, it can be expected that the Marietta-Lawrenceville light rail line would have no material impact on traffic congestion.

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Circulator Systems

The *RTP* indicates that circulator systems ("people movers") would be built in major centers, such as Perimeter Center, Cumberland-Galleria and Buckhead. People movers are automated guideway transit systems that are fully grade separated mode. Similar systems operate in downtown Miami, Jacksonville and Detroit. In a localized area, such as these centers, there is the potential for circulator systems to provide comparatively rapid connecting service from MARTA rail stations. It can be expected that a high percentage of such rail-circulator passengers will be low-income people who, not having access to automobiles, would otherwise not be able to easily access these employment locations. There is a risk, however, that automated guideway systems may be comparatively ineffective in these centers.

The *Regional Transportation Plan* indicates that approximately $515 million would be spent on the three circulators. The *RTP Needs Assessment* indicates that costs per mile will be approximately $50 million. This is well below the cost of the Miami and Detroit systems, which cost approximately $120 million per mile.[85] If the cost of the circulators approximates the Miami and Detroit average, $1.35 billion would be required, an increase of $800 million.

[84] Transit systems are most effective when oriented toward downtown. As is indicated later, the only major activity center to which large numbers of people with automobiles travel on transit is the downtown area. The fundamental reason for this is that the central business district is the only location to which transit can provide comparatively quick service to within walking distance of many destinations from throughout the urban area. This is not just an Atlanta phenomenon, it is true of virtually all U.S. urban areas, and increasingly true in European urban areas. On the other hand, automobiles provide comparatively quick access to virtually every destination in the urban area. As a result, downtown oriented roadway systems are less effective in the modern urban area than systems that distribute traffic more uniformly throughout the area (such as freeway systems designed on a "grid").

[85] Calculated from data in FTA *New Starts* reports and *Urban Rail Transit Projects: Forecast Versus Actual Ridership and Costs* (U.S. Department of Transportation, 1989).

It will be important to ensure that the planning process gives fully objective treatment to all potential circulator technologies...

Inaccurate Ridership Projections. Automated fixed guideway circulator systems have been largely unsuccessful in achieving their ridership projections among new U.S. rail systems. For example:[86]

Miami's Metromover (people mover) was projected to carry 41,800 riders daily by 1988 and missed its projection by nearly 75 percent. The system was carrying 13,400 daily riders in 1999; 68 percent below projection despite a more than doubling of the route's length.

Jacksonville's downtown monorail was to have carried 10,000 daily riders in its original alignment and 38,000 when completed. In 1996 the monorail was carrying under 1,000 daily riders; 90 percent below the 10,000 projection. The system has since been nearly tripled in length, and ridership has risen to 1,800.

Detroit's downtown people mover was projected to carry 67,700 daily riders in the late 1980s. In 1996, the system carried fewer than 7,000 daily riders, approximately 90 percent below the projection.[87]

The Cumberland-Galleria people mover is projected to carry 8,300 daily riders in 2025. The Buckhead people mover(s) is projected to carry more than 10,000 daily riders. Neither of these centers has the transit "friendly" characteristics of a downtown. They are not served by transit routes that radiate throughout the urban area and they have lower employment densities than downtown areas.[88] It would thus seem unlikely that circulators in these centers could equal the ridership of the least unsuccessful downtown circulators (Miami and Jacksonville). Based upon these factors, it would seem unlikely that ridership would exceed 50 percent of the projection.

Lower Employment Densities in Atlanta Centers. Centers such as Perimeter Center, Cumberland-Galleria, and Buckhead are comparatively dispersed compared to the downtown areas in which similar circulators currently operate. This means that to reach each of the large buildings, it may be necessary to have multiple circulators, circuitous routes or even one-way routes. Generally, it can be expected that many riders of the current company-sponsored van services will experience longer trip times.

It will be important to ensure that the planning process gives fully objective treatment to all potential circulator technologies, including the "low tech" strategies, such as vans and buses, that may be more cost effective and have the potential to provide better service to the customers. Finally, it is likely that most employees with automobiles available will commute by car. As a result, the circulators are likely to make little difference in traffic congestion, even in the centers.

Commuter Rail

Four commuter rail lines are proposed to serve downtown from corridors extending to Athens, Bremen, Griffin and Senoia. Commuter rail uses the tracks of conventional freight railway companies. In newer applications, commuter rail is diesel powered and it uses conventional rail cars.[89] Generally stations are spaced miles apart,

[86] All data obtained from or calculated from Federal Transit Administration or American Public Transit Association.
[87] Ridership is now considerably lower, as a result of an unrelated building collapse which damaged the line.
[88] Their larger employment bases are spread over a considerably larger area than the downtown areas.
[89] Older systems in New York and Philadelphia use electric propulsion.

Officials of major railroads have indicated that it would be necessary to build a second track along the rights of way, because the large and growing volume of freight traffic would otherwise make commuter rail schedules unreliable, if not impossible to achieve.

which allows comparatively rapid average speeds, often exceeding 40 miles per hour. Normally, the majority of inbound trips end at a single downtown station.

These routes are projected to carry a total of 24,000 daily riders over 133 route miles. The capital cost is projected at approximately $225 million, or approximately $1.7 million per route mile. This is a cost per new ride of $6.79, or $3,055 per annual new commuter. The overwhelming portion of these costs would be paid by subsidies, not user fees.

At nearly 6,100 passengers per downtown-oriented corridor, the Atlanta commuter rail system would nearly double the national average for new systems (3,210).[90] It would also exceed the most heavily used new commuter rail system, that of Los Angeles, by 40 percent. This level of ridership seems implausible, given the fact that urbanized area population densities are nearly 200 percent higher in Los Angeles than Atlanta, and Los Angeles has more downtown employment. A system-wide daily ridership of 12,000 or fewer seems more likely, based upon the comparative national data.

The proposed capital cost for the commuter rail system appear to be very optimistic. The cost of new commuter rail projects has averaged $4.2 million[91] per route mile since 1990, approximately 2.5 times the projected $1.7 million Atlanta cost projection. Officials of major railroads have indicated that it would be necessary to build a second track along the rights of way, because the large and growing volume of freight traffic would otherwise make commuter rail schedules unreliable, if not impossible to achieve. The cost of the Atlanta commuter rail system could easily reach $550 million based upon the national experience and the potential requirements for substantial right of way upgrades.

Because each of the commuter rail lines originates outside the Atlanta region, a large percentage of the ridership will not be Atlanta area residents. It is estimated that 50 or fewer percent of riders will be within the Atlanta area.[92] As a result, the cost per new one-way ride is more likely to be approximately $13.00, or $5,900 annually per new commuter.

Commuter rail will serve to encourage further suburbanization, making it possible for commuters outside the urban fringe to use the comparatively quick service to their downtown Atlanta jobs. In the overall context, however, this sprawl inducing characteristic of commuter rail is limited by its very small ridership.

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[90] Calculated from 1998 second quarter American Public Transit Association data.
[91] Internet: http://www.tppf.org/tran6.html, costs inflated to 2000$.
[92] Estimated using data in *RTP Appendix V* and *Needs Assessment Report.*

But most importantly, the number of riders that would be carried, even if the optimistic ridership projections were met, would be exceedingly small. Based upon national passenger mile ratios, the ARC commuter rail ridership projection converts to 3,700 passenger miles per route mile daily. This is more than 90 percent below the average passenger miles per single freeway lane (43,000, above) in the Atlanta area (Figure #23).[93] Commuter rail will have an imperceptible impact on traffic congestion.

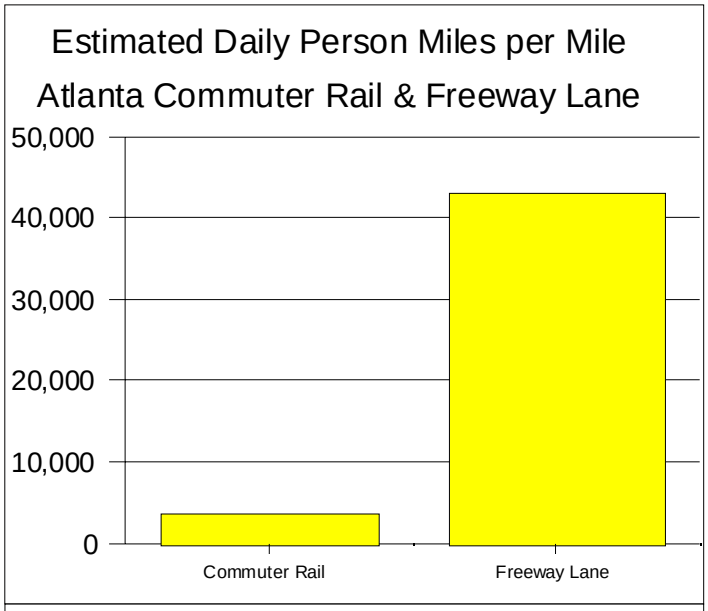

Figure 23
Source: Estimated from Federal Highway Administration and ARC data.

Bus Service

It is estimated that MARTA buses would experience an approximately 70 percent increase in ridership by 2025,[94] to approximately 516,000. At the same time, there would be virtually no increase in MARTA bus service. Buses used in peak operation would rise less than 3 percent, from 579 in 2000 to 593 in 2025.[95] There is no precedent anywhere in the United States or the rest of the developed world for such an increase in transit ridership without a significant increase in service. From 1979 to 1997, MARTA bus service levels were expanded 11 percent, while bus ridership rose 7.5 percent. At this ratio of a 0.68 percent ridership increase for each 1.0 percent service increase, 2025 bus ridership would more likely be approximately 310,000 daily boardings.[96]

The *RTP* assumes that MARTA bus unit costs (costs per mile or hour) will remain within the inflation rate from 2000 to 2025. In fact, from 1979 to 1997, MARTA bus costs per vehicle hour have risen 15 percent in relation to inflation. If this annualized cost increase rate[97] were to occur from 2000 to 2025, approximately $450 million would be required to operate the projected level of MARTA bus service.

ARC also projects the establishment of additional local bus systems in Cherokee, Clayton, Douglas, Fayette, Gwinnett, Henry and Rockdale Counties. In addition to local services, these systems would provide a number of express bus services, operating along the HOV lanes. Data in the *RTP* indicates that more than 60,000 riders would be carried throughout the Atlanta area on express buses daily. Most express bus services would feed MARTA rail stations or operate to Downtown. Approximately 25 percent of the service would be routed to

[93] Estimated based upon national average trip length compared to line length. It is estimated that average daily person miles per two-way route mile will be 3,700.
[94] The *RTP* does not specifically project MARTA bus ridership. This figure is estimated from the overall data, from which rail, express bus and new bus system estimates are deducted.
[95] *Regional Transportation Plan.*
[96] Applies the 0.68 increase in ridership for each 1.0 percent increase in system mileage (based upon the MARTA 1979 to 1997 experience). This is based upon the estimated ARC 2000 model output of 305,000 daily MARTA bus riders. In reality, bus ridership appears to be well below that level, having been 264,000 in 1998 according to the MARTA National Transit Database report. For consistency with the *RTP*, the lower number is used. If the higher ridership number were used as a base, the projected ridership in 2025 would be 270,000, still considerably short of the 516,000 ARC projection.
[97] 0.79 percent per year.

other destinations, such as Cumberland-Galleria or Perimeter Center. Outside Downtown-oriented trips, express buses would carry at most 0.5 percent of work trips in the region, making it unlikely that there would be a perceivable reduction in automobile traffic volumes.

These systems are likely to provide important local mobility to people who do not have access to automobiles. Because they will carry comparatively few rides these new systems will have virtually no impact upon traffic congestion.

Mag-Lev High Speed Rail

The *Regional Transportation Plan* also mentions the future possibility of constructing a magnetic levitation ("mag-lev") high speed train system from Atlanta to Chattanooga.[98] Generally, high speed rail systems have little or no impact on traffic congestion, especially in the automobile-oriented nations of western Europe and the United States.[99] Moreover, such systems are inherently intercity-oriented and, as a result, provide virtually no benefit *within* urban areas. The *RTP* indicates that the system would cost "approximately $1 billion" (less than $9 million per mile). This is exceedingly optimistic. The *Transrapid* mag-lev system, which was to have operated over the 180 mile Berlin to Hamburg, route was recently canceled when costs escalated to over $30 million per mile.[100] Similar costs would make the Atlanta to Chattanooga corridor a $3.5 billion project.

But costs could be even higher. As the National Academy of Sciences report indicates (above), cost overruns of 50 to 100 percent are common on projects of this magnitude.[101] In view of the fact that "mag-lev" has never been built over a long intercity passenger route, there is significant potential for even more cost escalation.

It is also likely that "mag-lev" would require substantial subsidies. The German system, for example, was to require a majority of tax funding for its capital costs. A U.S. Department of Transportation study found that proposed "mag-lev" systems across the nation would need from 60 to 85 percent in subsidies to cover their costs.[102]

Further, even if constructed, there is little prospect for material traffic reduction as a result of "mag-lev." Because its primary purpose would be longer-distance travel, where demand is considerably below that within the urbanized area, it would take little traffic off roadways in the Atlanta region. Even between cities, its impact would be slight. For example, one of the world's most successful high speed rail systems, operating from Paris to Lyon, removes 10 percent of automobiles from the adjacent tollway, despite the fact that the cost of tolls and gasoline are generally higher than the rail fare between the two cities.[103] The now cancelled proposal for a high speed rail link between Miami, Orlando and Tampa would have removed from 0.2 to 11 percent of traffic from

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[98] The mag-lev line is not a part of the *RTP*.
[99] Wendell Cox, *Evaluation of the FDOT-FOX Miami-Orlando-Tampa High Speed Rail Proposal*, James Madison Institute, 1997: Internet: http://www.publicpurpose.com/lk-flfox.htm.
[100] Costs had escalated more than 40 percent since the project was proposed. "Germany: Mag-lev Dropped for Fast Trains," *The Financial Times*, February 11, 2000.
[101] Mette K. Skamris and Bent Flyvbjerg, "Accuracy of Traffic Forecasts and Cost Estimates on Large Transportation Projects," *Transportation Research Record* (Washington, DC: Transportation Research Board, National Research Council), 1996.

[102] *High Speed Ground Transportation for America*, United States Department of Transportation, Federal Railroad Administration, September 1997.
[103] Association des Societes Francaises d'Autoroutes data (French toll road owner).

...one of the world's most successful high speed rail systems, operating from Paris to Lyon, removes 10 percent of automobiles from the adjacent tollway, despite the fact that the cost of tolls and gasoline are generally higher than the rail fare between the two cities.

the adjacent interstates highways and toll roads.[104] It is possible, however, that such a system could provide targeted benefits to high-income commuters who might be able to work in downtown Atlanta and live more than 100 miles away. Like commuter rail, "mag-lev" is likely to encourage further suburbanization in the Atlanta region. Moreover, mag-lev systems are heavy consumers of electricity, which could add to the air pollution produced in the air by electric power plants.

Reverse Commute

One of the nation's most intractable problems is the persistence of poverty. Employment is crucial to the reduction of poverty. Yet in Atlanta and elsewhere in the country, many low-income citizens live in inner-city areas where there is little job growth. At the same time, there is rapid job growth in the suburbs, but suburban jobs are often inaccessible because many low-income people do not have cars and because such locations are often beyond the reach of transit service. This creates a "reverse commute" problem.

Suburban employers routinely encounter difficulty obtaining employees to fill unskilled or entry level positions, because so many of the candidates for such positions do not have automobiles. The problem is exacerbated by the fact that public transit to suburban locations is either non-existent or extremely inconvenient. According to ARC estimates, only 34 percent of the region's jobs were within a one-hour public transit ride for low-income people in 2000.[105] While the Atlanta situation is particularly bleak with respect to suburban transit access for people without cars, it is not unique. A federal report, for example, found that only 14 percent of the employment in suburban Boston locations is accessible to central city low-income residents by less than a one-hour transit ride.[106]

As traffic congestion worsens in Atlanta over the next 25 years, it will impact low-income people inordinately. Low-income citizens will spend more time in congested conditions than they do today. The average time in congested traffic will rise from 34 to 39 minutes per low-income person daily from 2000 to 2025. At the same time, the time spent by the 25 percent of workers with the highest income will rise only two minutes, from 27 minutes to 29 minutes.

The *RTP* strategies will increase transit access for low-income people from 34 to 39 percent of the jobs in the Atlanta region (Figure #24). While this is an important advance, it still leaves low-income citizens without transit access to most jobs. At that rate, it would take 200 more years for 75 percent of all jobs to be accessible by transit to low-income residents. Even what might be considered a more modest goal of access to 50 percent of jobs would take more than 75 years. For the unemployed low-income person without the means to seek

[104] Based upon projections of project developers, as cited in *Evaluation of the FDOT-FOX Miami-Orlando-Tampa High Speed Rail Proposal.*

[105] Even this figure is optimistic, since ARC includes destinations within 0.40 miles as within walking distance of transit. The national and international standard assumption with respect to walking distance is 0.25 miles. Use of this standard would reduce all Atlanta region transit access figures cited in this report.

[106] U.S. Department of Transportation, *Welfare Reform and Access to Jobs in Boston*, January 1998.

employment in the suburbs, the fact that 60 percent of jobs will remain beyond transit access in 2025 is not likely to be seen as sufficient progress.

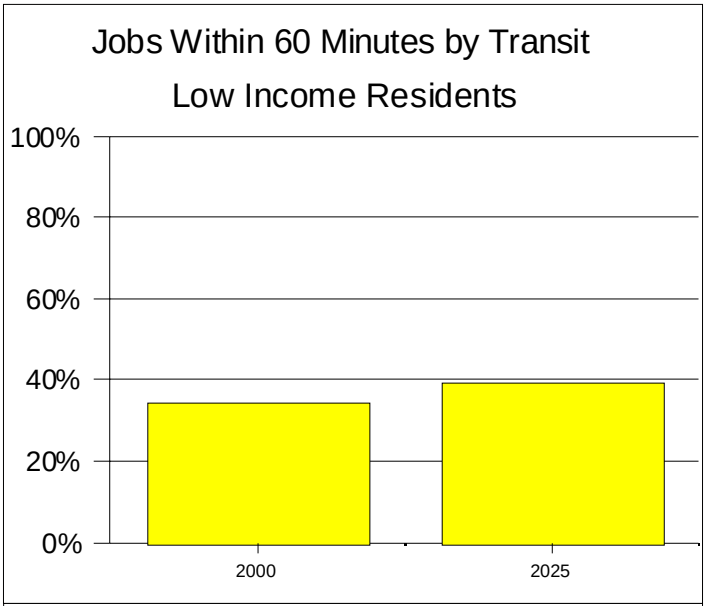

Figure 24
Source: Estimated from ARC data.

Transit Impact and Assessment

According to ARC, the *Regional Transportation Plan* transit strategies would result in the following conditions:

> Overall public transit market share (in daily trips) would increase from 2.56 percent in 2000 to 3.40 percent in 2025, an increase of 33 percent. Weekday passenger journeys on transit would rise from 282,000 in 2000 to 538,000 in 2025, an increase of 91 percent.
>
> Transit's work trip market share would increase from 7.2 percent in 2000 to 9.7 percent in 2025, a market share increase of 37 percent.[107]
>
> The downtown transit work trip market share (trips from home to downtown) is projected to increase from 28.6 percent in 2000 to 34.9 percent in 2025, a market share increase of 22 percent. More than 60 percent of new downtown commuters are projected to ride transit to work.
>
> Generally, transit's work trip market share would increase at a greater rate outside downtown, which would account for only 11 percent of the increase.
>
> In the balance of the city of Atlanta, the transit work trip market share would increase from 16.5 percent in 2000 to 21.9 percent in 2025, a market share increase of 33 percent.
>
> Within the MARTA service area of Fulton and DeKalb Counties, transit's work trip market share would rise from 12.6 percent to 16.3 percent, a market share increase of 29 percent from 2000 to 2025.
>
> Outside the MARTA service area, transit's work trip market share would rise from 1.1 percent to 3.2 percent, a market share increase of 183 percent from 2000 to 2025.

Each of these transit market share increases is considered overly optimistic. This is illustrated by comparing the 37 percent work trip market share increase that ARC projects to that of other areas. Such an increase would be unprecedented.

> A U.S. Department of Transportation study surveyed work trip market share trends among the largest U.S. metropolitan areas. Among the 23 U.S. metropolitan areas with a transit work trip market share of

[107] Calculated from *RTP Appendix V*.

more than 5 percent in 1970 (including Atlanta), market share has risen only in one (Seattle). Seattle's work trip market share from 1970 to 1990 was less than 4 percent, barely one-tenth of the increase projected for Atlanta.[108]

Among 15 large, developed world metropolitan areas[109] in an international survey, 10 lost work trip market share from 1970 to 1990. The largest work trip market share increase was in Munich, at 21 percent, slightly more than one-half the projection for Atlanta.

The *Regional Transportation Plan* transit strategies, which would consume 55 percent of the resources available, would attract less than 1 percent of automobile trips. The transit strategies would do so at excessive costs per new commuter. The new rail lines and extensions would cost from $3,000 annually per new commuter for commuter rail, to $5,500 for the least expensive MARTA expansions, to over $15,000 for the Marietta-Lawrenceville light rail line.[110] This range is not a "one-time" cost, it is a cost per new commuter, every year, regardless of what year the new commuter begins using transit. In the worst case, the cost per new commuter could rise to nearly $40,000, as estimated above for the Marietta-Lawrenceville light rail line.

Amounts of this magnitude are sufficient to lease a new automobile in perpetuity for each new rider. For example, a new small car can be leased for less than $3,000 annually. A new Ford Taurus, Honda Accord, or Toyota Camry can be leased for less than $5,500 annually. And Lexus 400, Jaguar XJ8 or BMW 7-series luxury cars can be leased for less the $15,000 annually.[111]

Perhaps more striking is the fact that, due to cost escalation or failure to reach ridership projections, the cost per new commuter annually on at least the Arts Center and Marietta-Lawrenceville light rail lines could easily exceed the annual spending by a family in the lowest quintile (one-fifth) of income.[112] When calculated over a 40 year career, the gross spending per new commuter would range from $120,000 to $600,000 under the ARC projections.[113]

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[108] Calculated from data in *Journey-to-Work Trends in the United States and its Major Metropolitan Areas: 1960 to 1990*, U.S. Department of Transportation, Federal Highway Administration, 1993. Twenty-three metropolitan areas had work trip market shares exceeding 5 percent in 1970.

[109] Metropolitan areas are in Canada, Australia, Japan and Europe. Frankfurt is excluded from the analysis because data is provided only for the central city, not for the metropolitan area. Information from an analysis of Jeffrey R. Kenworthy and Felix B. Laube, *An International Sourcebook of Automobile Dependence in Cities: 1960-1990* (Boulder, CO: University Press of Colorado, 1999).

[110] This assumes the present capital cost estimates. As projects proceed to implementation, costs often increase. As above, the cost per new commuter is calculated using 450 annual trips (two per work day), which is multiplied by the operating and capital cost per new ride.

[111] The cost per each automobile removed is even higher, since some new rail riders are former car pool passengers or may have not taken the trip before.

[112] Above it was estimated that the annual cost per new commuter of the Arts Center light rail line could reach $19,600 and the Marietta-Lawrenceville light rail line could reach $39,300. Even higher costs could result from project cost increases. In 1998, the average family in the lowest quintile of income spent $16,630 for all goods and services. Data from U.S. Census Bureau.

[113] The career cost per new commuter could easily exceed $1.0 million (at the lower ridership estimated in this report, the Marietta-Lawrenceville light rail line would cost $1.6 million over a career for each new commuter.

...rail strategies will have virtually no impact on Atlanta's traffic congestion and their excessive costs could deny development of more efficient and effective mobility alternatives.

Such excessive costs, whether at the projected or higher levels, render rail systems to exorbitant boutique strategies. This is not to deny the significance of the benefits obtained, at great public expense, by the few able to arrange their lifestyles to use rail or have a proclivity toward rail use. However, rail strategies will have virtually no impact on Atlanta's traffic congestion, and their excessive costs could deny development of more efficient and effective mobility alternatives.

The U.S. Department of Transportation has criticized the transit market share projections (ridership projections) in the *Regional Transportation Plan*: "The modest shares predicted for transit appear to be very ambitious compared to current mode shares in Atlanta and experience in other cities." This is valid criticism, based upon the national and international experience. The ARC plan projects a reversal in transit ridership and market share trends that is unprecedented among major urban areas in the developed world.

> Among the 33 U.S. urbanized areas with more than 1,000,000 residents in 1990, none experienced work trip market share increases from 1960. One area experienced a work trip market share increase from 1970 to 1990, Phoenix, which by 1990 had a transit work trip market share that had risen to only 2 percent.
>
> Overall transit ridership (unlinked trips) per capita in the MARTA service area (Fulton and DeKalb Counties) is estimated to rise more than 40 percent from 2000 to 2025 according to the *Regional Transportation Plan*.[114] This is exceedingly optimistic, since MARTA already ranks second only to the New York City Transit Authority in passenger miles per service area resident (above).
>
> MARTA bus ridership is projected to increase 70 percent with virtually no increase in bus service. This has never been accomplished before and is simply not believable.
>
> Overall bus and rail passenger journeys are projected to increase more than 250,000 daily from 2000 to 2025. This is five times as many new passengers as have been attracted to MARTA rail and bus services over the past 20 years. It is not likely that this result will be achieved.

It appears that U.S.DOT's reservations are well founded. A number of the *RTP* transit services and projects exhibit overly optimistic ridership projections. The overall 1,097,000 daily transit boardings projected by ARC in 2025 thus appears to be high. It would appear that a more reasonable projection would be approximately 649,000 daily transit boardings, 40 percent below the ARC projection. However, the 649,000 figure represents a more than 20 percent increase in transit ridership (Table #7). This projection would convert to a 2.01 percent transit market share in 2025, somewhat below the present 2.56 figure.

[114] Estimated based upon projections in the *Regional Transportation Plan*. Actually the projected increase would be greater. Some of the Arts Center light rail ridership would be in Fulton County and is not included in the MARTA figure.

Table #7
2000 Transit Boardings and 2025 Projections

Service	2000 per RTP	2025 RTP Projection	This Report 2025 Projection
MARTA Rail	213,000	413,000	230,000
MARTA Bus	305,000	516,000	310,000
Arts Center Light Rail	0	52,000	15,000
Circulators	0	19,000	9,000
Commuter Rail	0	24,000	12,000
Other Bus	27,000	73,000	73,000
Total Regional Transportation Plan	544,000	1,097,000	649,000
Exhibit: Marietta Lawrenceville Light Rail	0	25,500	10,000

Source: ARC *Regional Transportation Plan* and this report (above).

The large ridership increase projected for the MARTA service area appears to be related to a projected shift in population and employment growth from the more suburban counties to the core counties of Fulton and DeKalb, which have the overwhelming majority of transit service As was noted above, there is no precedent for such a shift of growth to the core area, and as a result the projections for MARTA transit ridership are also likely to be optimistic.

Finally, there could be a significant shortfall in funding for transit projects. In the worst case, an additional $4.7 billion could be required, as a result of higher than projected capital costs for rail projects and continuing escalation of MARTA bus costs (Table #8).

Table #8
Worst Case Transit Funding Shortfall: Through 2025

Project	Amount in Millions
MARTA Rail Extensions	$3,100
MARTA Bus Costs	450
Circulators	800
Commuter Rail	325
Total	$4,675

Source: This Report

Cycling is best understood as a recreational mode of travel. In Atlanta, with its extremes of temperature, humid summers and long commuting distances, it is unlikely that cycling could ever contribute meaningfully to the reduction of traffic congestion. Even in the Netherlands, where there is a long tradition of commuting by bicycle and urban population densities 10 times that of Atlanta, market share is less than 8 percent.

Bicycle

The *Regional Transportation Plan* anticipates spending $525 million on bicycle improvements from 2000 to 2025. No attempt is made by the *Regional Transportation Plan* to quantify regional benefits that might accrue as a result of this investment. Cycling is best understood as a recreational mode of travel. In Atlanta, with its extremes of temperature, humid summers and long commuting distances, it is unlikely that cycling could ever contribute meaningfully to the reduction of traffic congestion. Even in the Netherlands, where there is a long tradition of

commuting by bicycle and urban population densities 10 times that of Atlanta, market share is less than 8 percent.[115]

Air Pollution

The *RTP* indicates that Atlanta will achieve air quality attainment by 2003, and be well within air quality standards by 2025. Attainment in 2003 is achieved virtually without any significant improvement in the transportation system, either transit or highway. The primary factor in this progress appears to be the continuing improvement in vehicle emission technology.

Land Use

The *Regional Transportation Plan* assumes that significant land use changes will occur by 2025, of a nature that will encourage much higher transit use and less automobile use. The proposed land use policies, delineated in the ARC *Regional Development Plan (RDP)*, seek to increase residential and employment densities. ARC intends for development to be encouraged in activity centers ("town centers"), the largest of which are Downtown, the Perimeter Center, Cumberland-Galleria, Midtown, Buckhead, and the Airport area. Currently, these activity centers have many more jobs than residents. Major commercial centers tend to have fewer residents than jobs. This strategy would seek to reduce this imbalance. A principal objective is the reduction of automobile use, and the substitution of transit and walking. These types of land use policies are generally categorized as "smart growth," or the "new urbanism" (Appendix 2: "Portland and Smart Growth").

The *RTP* indicates that Atlanta will achieve air quality attainment by 2003, and be well within air quality standards by 2025. Attainment in 2003 is achieved virtually without any significant improvement in the transportation system, either transit or highway. The primary factor in this progress appears to be the continuing improvement in vehicle emission technology.

The *RDP* land use strategies would rely on incentives, rather than "command and control" mandates, such as have been employed in Portland. Certainly, incentive based strategies are preferable to mandatory approaches in the accomplishment of public objectives. But there is a more fundamental question. Is the ultimate objective of the public policy in the public interest? Generally, the answer appears to be "no" with respect to the ARC land use policies. If successful, the policies are likely to have negative impacts on traffic congestion, air pollution, the cost of living and social cohesion.

1. **Traffic and Air Pollution.** For so-called "smart growth" policies to improve air pollution and traffic congestion requires that there be a significant shift of travel from automobiles to transit and walking. While it is possible to achieve greater residential and employment balance in some centers, the modern metropolitan area is far to complex and interdependent to expect major travel changes. People who live in lofts in the downtown area will not only work downtown. People may do some shopping at the small local markets that would develop in transit-oriented developments. As regards major shopping trips, it is likely that many shopping trips will be made by car to conventional malls, strip developments or "big box" retailers. This will especially be the case among the large percentage of people for whom low prices are a requirement.

[115] Internet: http://www.publicpurpose.com/ut-nl.htm

Across the metropolitan area, regardless of the density of development, employment for all but a few requires automobile travel, as does most shopping. Moreover, the segmented nature of modern trips (trips that combine, for example travel to employment with shopping or child care) makes alternatives to the automobile impractical for most trips. In the modern American urban area, increasing residential and commercial densities is largely incompatible with reducing traffic congestion.

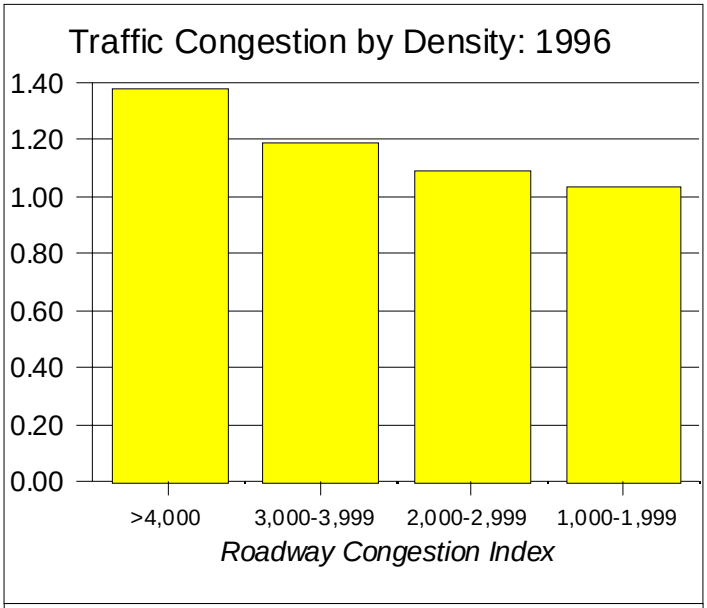

Figure 25
Calculated from Texas Transportation Institute data.

Densification, in an affluent society, will simply not produce enough of a transfer of travel from automobiles to transit and walking to counteract the higher automobile demand that occurs from having more people (and more cars) in a particular area. The evidence suggests that there is virtually no prospect of such a change in travel behavior.

Higher Densities Induce Greater Traffic Congestion. Data in the United States and anecdotal information from around the world indicates that traffic congestion is worse where population densities are higher. U.S. traffic congestion, as measured by the Roadway Congestion Index (RCI) tends to be worse as urbanized areas increase in density. In 1996, urbanized areas with population densities of less than 2,000 had an average RCI of 1.03, considerably lower than the 1.38 of urbanized areas with more than 4,000 persons per square mile (New York and Los Angeles). The RCI tends to increase exponentially as population density increases. The difference in RCI between the 1,000 to 1,999 category and the 2,000 to 2,999 category is approximately 5 percent. Between 2,000 to 2,999 and 3,000 to 3,999 the difference rises to 9 percent, while between 3,000 to 3,999 and 4,000 and above escalates to more than 15 percent (Figure #25).

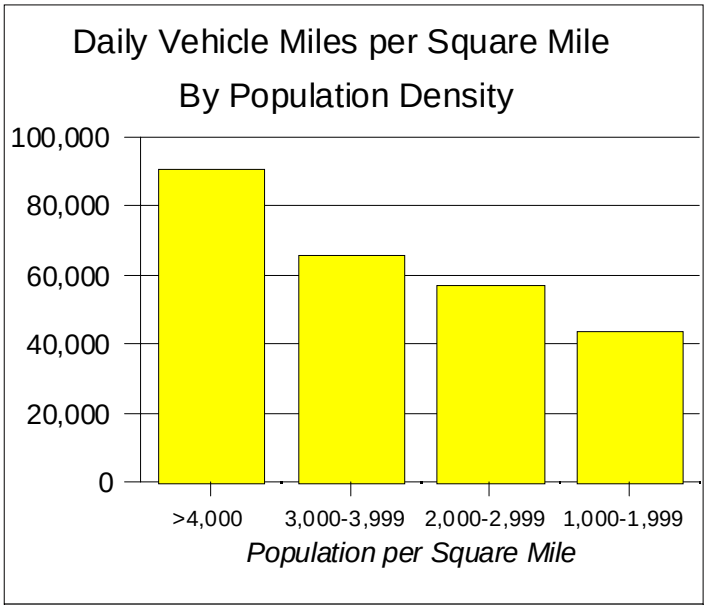

Figure 26
Calculated from 1997 Federal Highway Administration data.

Moreover, traffic congestion is greater in more dense urban areas because traffic volumes are more dense. As urban area density increases, so does vehicle miles per square mile (Figure #26). In urban areas with population densities greater than 4,000 per square mile, vehicle miles per

square mile is more than double that of urban areas with population densities of 1,000 to 1,999 per square mile. This does not mean that low density urban areas necessarily have less traffic congestion. If, as in the case of the Atlanta region, the provision of new roadway capacity lags far behind population growth and travel demand, traffic congestion can get serious. At the same time, the traffic congestion would be even worse if the Atlanta region were more compact.

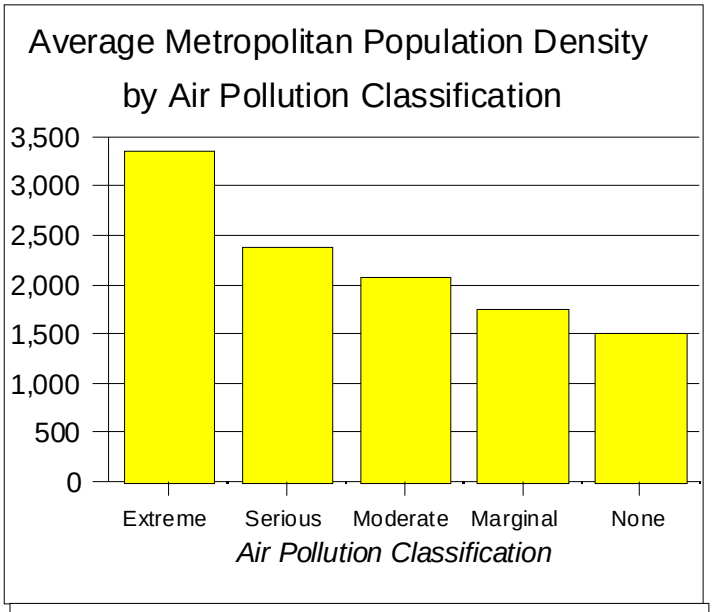

Figure 27
From O'Toole based upon US Environmental Protection Agency data.

Traffic Congestion Is Intractable In "Transit Oriented" Metropolitan Areas. While comparable international traffic congestion data is not available, it appears that traffic congestion is considerably greater in international urban areas with higher densities, such as London, Paris, Tokyo and Osaka than it is in lower density U.S. urban areas. These metropolitan areas, as in the case of a small number of U.S. metropolitan areas (New York and Chicago are examples) are centrally configured in a manner that is very conducive to transit use and walking. Yet, traffic congestion is severe.

Higher Densities Result in Greater Air Pollution. Where there are higher densities, there are higher densities of travel (vehicle miles per square mile), as noted above. In consequence, air pollution is more severe. This is illustrated by the average density of U.S. urbanized areas based upon their air pollution classification, Urbanized areas rated "extreme" with respect to air pollution had an average population density of nearly double or more than that of urbanized areas with no air quality problem (Figure #27).[116]

Slower Speeds Increase Air Pollution. The density and traffic related increase in air pollution results from more than the mere increase in traffic volumes. As traffic congestion increases, average speeds are reduced and air pollution increases.

For two of the three primary mobile source pollutants (CO and VOX), the optimal average operating speed is approximately 55 miles per hour. Average speeds of 35 miles per hour produce approximately 30 percent more pollution, 20 miles per hour 110 percent to 140 percent more and 10 miles per hour 335 percent to 380 percent more.

With respect to the third primary mobile source pollutant, (NOX) the optimum average speed is approximately 20 miles per hour, though 45 miles per hour produces little additional pollution. Above 45 miles per hour NOX pollution increases more rapidly.

[116] Randal O'Toole, "Dense Thinking," *Reason*, January 1999, based upon U.S. Environmental Protection Agency data.

Thus, with respect to air pollution, optimum operating speeds is approximately 45 miles per hour. Nationally, average work trip speeds are less than 34 miles per hour, indicating that air pollution could be generally improved by increasing average automobile operating speeds (Figure #28).

Ballston: Density and Traffic. The problem is illustrated by the case of Ballston, Virginia, a transit-oriented development around a Washington Metrorail station with five times the residential density of nearby single family neighborhoods. Per capita vehicle miles traveled have been reduced by 20 percent. However, because there are so many more people in a small area, overall traffic volumes are 400 percent higher than in the nearby single family communities.[117] The net effect is greater traffic congestion, which results in slower speeds, more intermittent traffic speeds and greater air pollution. It is likely that the higher traffic volumes have reduced speeds, which would mean that drivers in Ballston are spending more time per capita in their cars than drivers in the nearby communities. The key to reducing traffic congestion with higher density development is for total vehicle hours to be reduced by an amount to more than compensate for the higher automobile demand created by the higher density. Thus, for example, in Ballston, just to maintain traffic congestion and air pollution at single family neighborhood levels would require vehicle hours per capita to be reduced by 80 percent.[118] To reduce traffic congestion by 25 percent would require an 85 percent reduction in per capita vehicle hours.

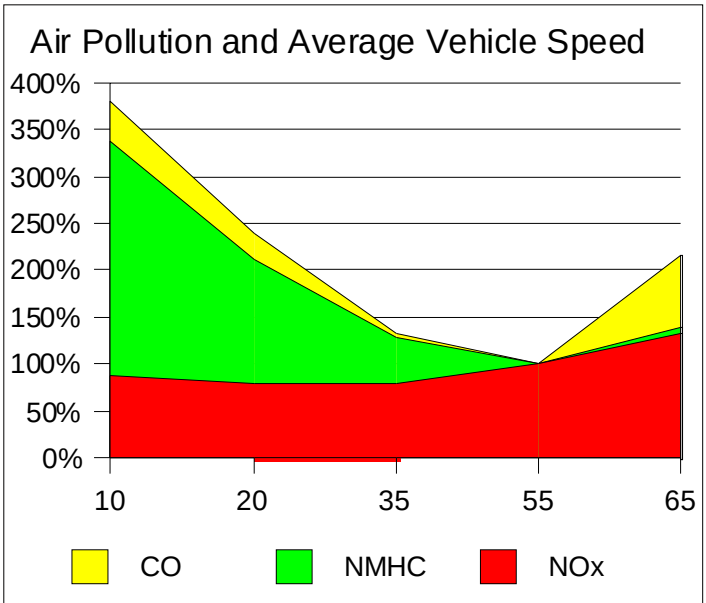

Figure 28
Calculated from EPA data. Index based upon pollution at 55 miles per hour equaling 100.

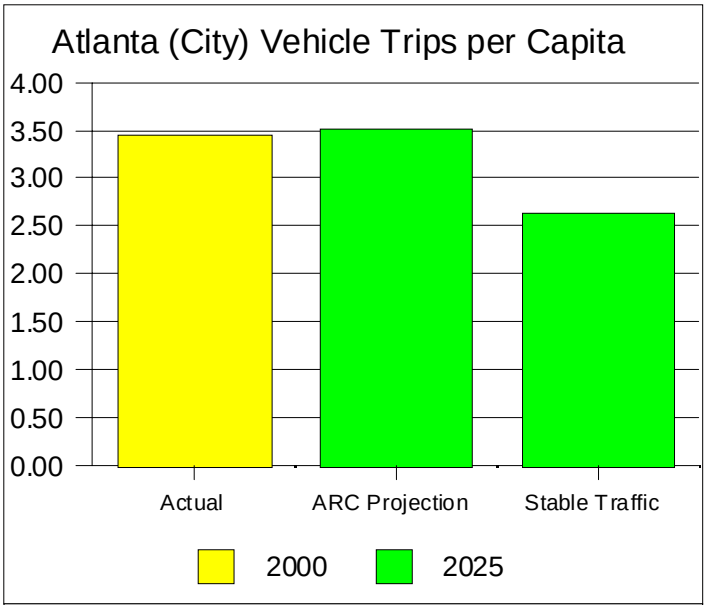

Figure 29
Calculated from ARC data.

[117] "Transit Oriented Development (TOD): Vision and Reality," *Innovation Briefs*, May-June 1999.
[118] Calculation: For single family residence area traffic level: 100%/500% = 20%. Change from current: 100% - 20% = 80%.

The traffic and resultant air pollution impacts of densification are well illustrated by the ARC projections for the city of Atlanta. ARC projects an increase of 31.1 percent in Atlanta's population and population density by 2025. At the same time, ARC projects a 31.0 percent increase in daily vehicle trips.[119] To reduce or even to maintain traffic volumes at present levels would require a *reduction* in daily vehicle trips per capita. Just to maintain present levels of traffic at the projected higher population density would require a 23.9 percent reduction in daily vehicle person trips per capita (Figure #29).[120] ARC projections indicate a far smaller reduction, at –0.4 percent (Figure #30). As a result, without a radical shift in travel patterns from cars to transit and walking, higher density development, regardless of its composition along corridors or in centers, will tend to increase traffic congestion and air pollution relative to lower densities (unless there is an at least corresponding increase in highway capacity).

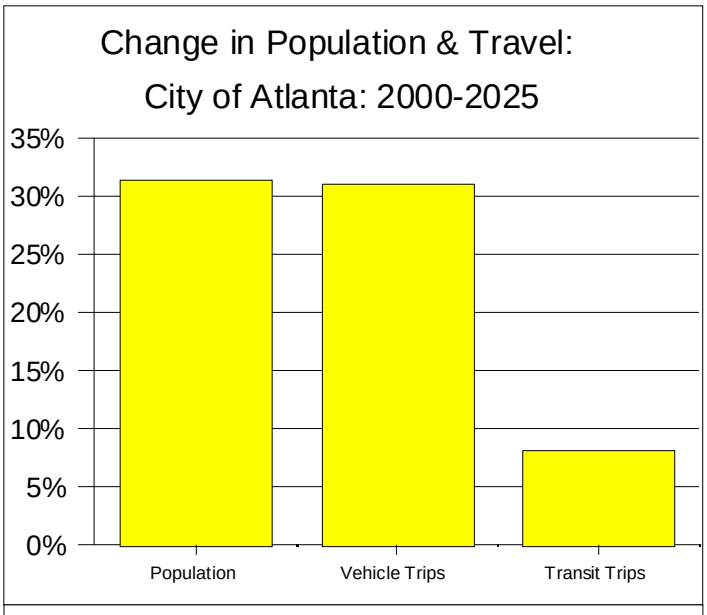

Figure 30
Source: Calculated from ARC data.
Change in vehicle trip and transit trip percentages calculated based upon the 2000 vehicle trip total.

At least one of Atlanta's "edge cities" already provides an example of the traffic congestion that occurs from densification. The Buckhead area suffers from intense traffic congestion, which did not exist before significant residential and office construction occurred in that area in the 1980s. This is despite the fact that Buckhead is well served by the MARTA rail system.

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Densification and Traffic in Fulton and DeKalb. As was noted above, the *RTP* anticipates a significant percentage of future population growth will be in the core counties of Fulton and DeKalb. Overall travel is expected to increase 37 percent from 2000 to 2025 in the core counties. More than 90 percent of this increase will be by personal vehicle, and only 8.6 percent by transit.[121] At the same time, it is estimated that freeway and arterial capacity in the core will

[119] 30.6% divided by 31.0%.
[120] City population in 2000 (430,000) divided by city population in 2025 (565,000) minus 1.
[121] Even this small incremental market share for transit is considered very high.

increase at a substantially lower rate. As a result, as in the case of Ballston and the city of Atlanta, traffic in the balance of the core counties will become more congested, which will make air pollution worse than it would be otherwise.[122] Moreover, throughout the Atlanta region, traffic volumes are projected to grow at rates above that of roadway expansion, which will intensify traffic congestion. Unpopular as it might be, the only way to accommodate the increased traffic volumes that would result from higher densities would be to undertake a more than correspondingly aggressive program of road building in the core counties.

Impact on Automobile Users. For the average motorist, therefore, the ARC *RDP* land use policies will only intensify the worsening traffic congestion. Even if the more dense core area results in slightly shorter average trip lengths, it will be of little benefit to drivers, because the time spent in the automobile is likely to stay the same or even increase.

People tend to perceive travel time more than distance. Indeed, people are more likely to be frustrated by the "stop and go" traffic typical of dense urban centers than by the free traffic flows that occur in urban areas with greater roadway capacity. To this extent, then, shortening the distance traveled while maintaining or even increasing travel time will not be perceived by travelers as progress.

2. Other Densification Consequences. Densifying and to centralize activities will have other impacts as well.

Less Affordable Housing. To the extent that there is greater regulation of land development, there will be less competition among developers. This raises the price of land and the other factors of housing production. These higher prices will be reflected in higher housing costs, as has already been observed in Portland. Such regulation can lead to a situation in which governments must "pick winners" with respect to developers, which could lead to inappropriate attempts to influence political decisions.

Higher Product Prices. To the extent that there is greater regulation of retail development, higher product prices will occur. This would also result from the higher land prices and could be exacerbated by limits on store sizes and "big box" retailers.

Displacement of Low Income Residents. In short, the policies of densification could raise the cost of living for Atlanta residents. Perhaps most importantly, Atlanta's comparatively affordable housing market could become more expensive, effectively raising the economic ladder for young people and low-income people (a disproportionate share of whom are minorities) seeking to purchase homes. This would be particularly disruptive in the lower-income core areas, especially in the city of Atlanta. Higher densities could only be achieved through new development. This would take the form of new construction and improvement of existing structures. The result would be similar to that of the relatively small scale "gentrification" trends in the 1970s, when middle and higher income people supplanted low-income people in formerly economically distressed neighborhoods. As a result, low-income people are likely to be forced out of their living quarters by higher rents and higher property taxes. They would be forced to seek accommodations in suburban areas, which would have also experienced escalation of housing costs due to the land regulation that is required to achieve the densities. Another social

[122] The continuing improvement in vehicle emission technology could well result in improved air quality, even in the more dense conditions. But air quality will be worse than it would have been at lower densities.

consequence is that many displaced lower-income people who would have previously used the dense MARTA inner city transit system for employment and other trips could find little or no transit service available. This could restrict both mobility and access for low-income residents, leading to lower employment rates and living standards.

Higher Infrastructure Costs. It is unlikely that the infrastructure system in the densifying core area will be sufficient to accommodate a substantial population increase without major improvements. As a result, regional costs for sewers, roadways, and water systems are likely to be significantly increased by densification.

Impact on the Atlanta Economy. Just as drivers respond to keep their commuting time within tolerable limits (below), commercial developers seek locations where traffic congestion is tolerable. As traffic congestion intensifies within the urban area, it can be expected that commercial development, including offices, manufacturing and retail, will gravitate to less congested areas beyond the urban area. The higher densities sought through the *RTP* land use policies could lead to greater dispersion of both residences and commercial development. This potential dispersion is likely to be exacerbated by the higher housing prices that will inevitably result from artificially limiting competition for land.[123]

According to the ARC *RTP*, the overwhelming majority of new travel will be by automobile (nearly 95 percent). Even in the core counties of Fulton and DeKalb, more than 90 percent of new travel will be by automobile.

The longer term impacts on the Atlanta region are unclear. If residential and employment development is diverted to counties near the Atlanta region, the economic impacts will be less severe on the Atlanta region. In effect, the Atlanta region will no longer be 10, 13 or 20 counties, but many more. While there may be some interest in balancing the economies of the "two Georgias,"[124] development is much simpler to drive away than to redirect. Much of the growth is likely to be diverted to other metropolitan areas, in the southeast or elsewhere. The Atlanta region and the rest of Georgia could suffer a loss in growth and economic progress.

U.S. Department of Transportation Criticism. The U.S. Department of Transportation has criticized the ARC *Regional Transportation Plan* with respect to land use, suggesting that implementation of the local zoning and land use plans necessary to implement ARC would be very difficult politically.[125]

The political complexity of densification should not be underestimated. Often neighborhoods oppose increased densification. A good example is the dense suburban area of Arlington in the Washington, DC area, where residents are opposing efforts to densify the area.[126] Densification can also force low-income residents out as core areas become more attractive to development. The result may be a more dense and, to some, a more attractive city. But for low-income residents, the move means unanticipated costs, probably a higher cost of

[123] As currently planned, the land use strategies would rely on incentives rather than mandates. It is unlikely that a voluntary program would achieve the significant land use changes sought by the *RTP*.
[124] The Atlanta region and the rest of Georgia.
[125] Letter from Susan Schruth, Federal Transit Administration (U.S.DOT) and Larry R. Driehaup, Federal Highway Administration to ARC Director Harry West, March 21, 2000.
[126] "Challengers Tap Growth Anxiety in Alexandria," *Washington Post*, April 12, 2000.

living, and less access to employment by means of transit, because the core area has by far the best transit access in the region.

Overall Assessment

Based upon the analysis above, the transportation realities facing the Atlanta region during the next 25 years are the following:

Strong population and employment growth is likely to continue.

According to the ARC *RTP*, the overwhelming majority of new travel will be by automobile (nearly 95 percent). Even in the core counties of Fulton and DeKalb, more than 90 percent of new travel will be by automobile.

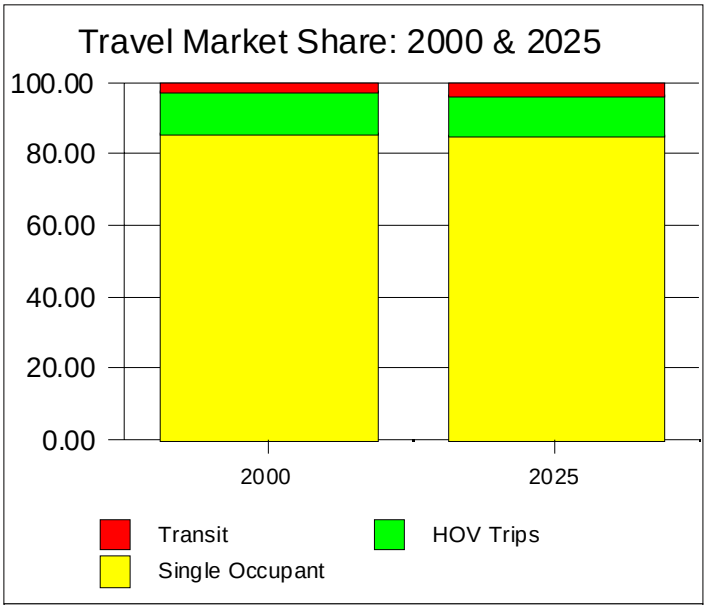

Figure 31
Calculated from ARC data.

According to the ARC *RTP*, most of the new travel will be by single occupant vehicles, rather than high occupancy vehicle trips. Yet more than one-quarter of highway spending will be for HOV facilities. Facilities available to single occupant vehicles will cost $0.127 billion per point of market share, compared to $0.319 billion for HOV facilities, 2.5 times the investment per trip of single occupant facilities. Spending per new single occupant trip will be $2.70, compared to $6.75 for high occupancy vehicle person trips.

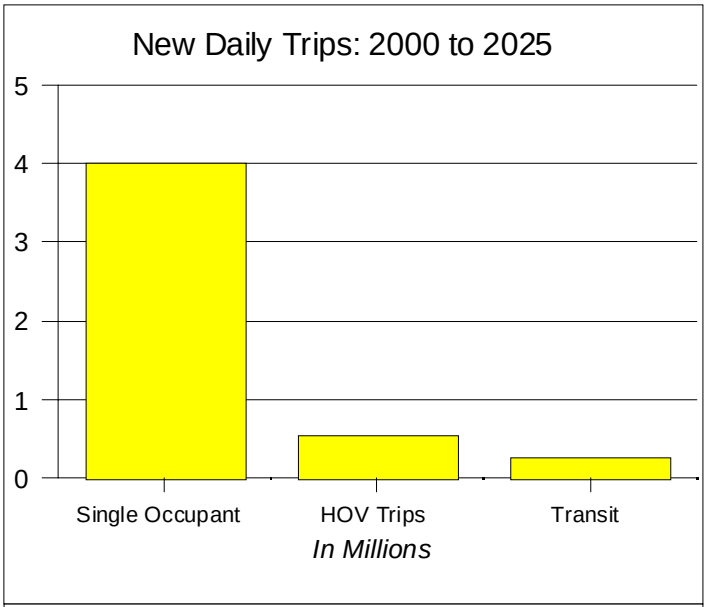

Figure 32
Source: Calculated from 1997 National Transit Database.

According to the ARC *RTP*, transit will play a limited role, attracting only 5 percent of new trips. Despite this significant shift of resources toward transit, and the assumption that transit friendly land use patterns will emerge (this is considered highly unlikely by the report and the U.S. Department of Transportation), transit's share of trips is projected to rise only from 2.56 percent in 2000 to 3.40 in 2025 (Figure #31). Overall daily roadway person trips would increase 4,550,000, compared to a 255,000 increase in transit trips (Figure #32). Transit would receive $5.883 billion per point of market share, 46 times the $0.127 billion received by highways (Figure #33). Spending per new transit trip will be $78.24, compared to $2.70 for single occupant vehicle trip and $6.75 for high occupancy vehicle person

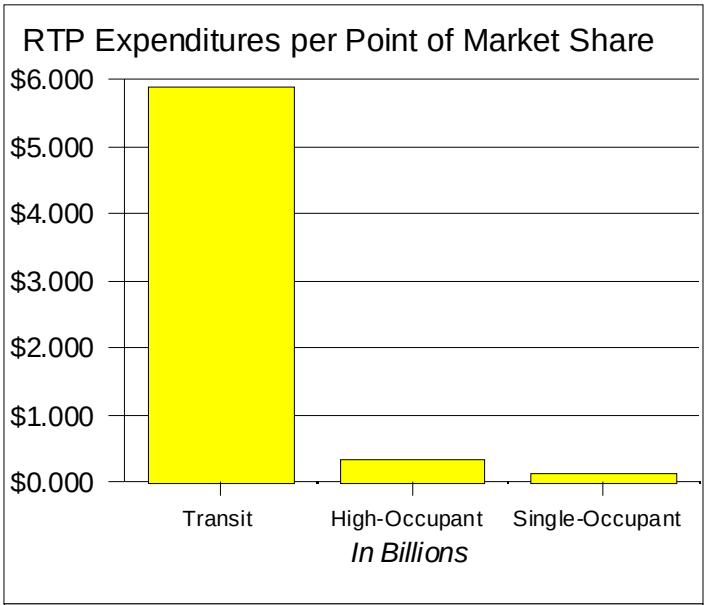

Figure 33
Source: Calculated from *RTP* data.

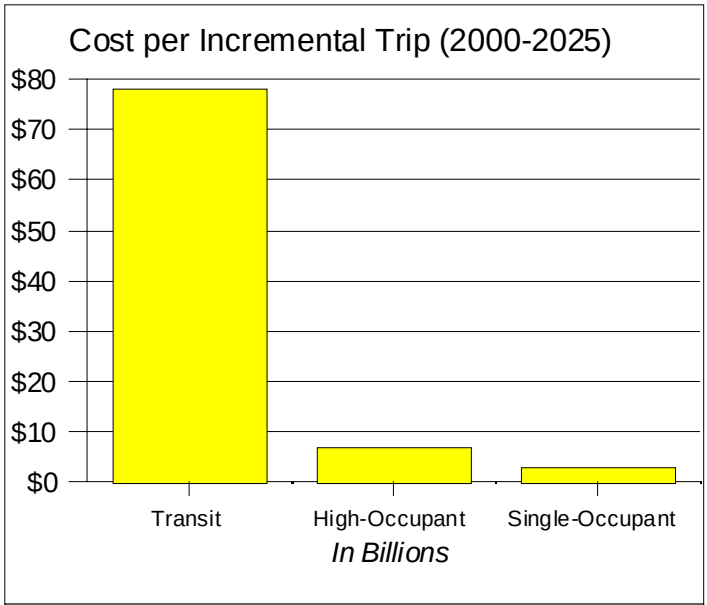

Figure 34
Source: Calculated from *RTP* Data.

trips (Figure #34). Even so, the United States Department of Transportation has indicated skepticism with respect to even this modest shift of trips to transit.

This report projects more modest transit ridership increases, and estimates that the incremental reduction of traffic volumes due to the $20 billion in transit improvements on traffic volumes by 2025 will be 0.20 percent percentage points.[127] While this is well below the ARC projection of 1.05 percent,[128] the difference with respect to traffic volumes is so slight as to be unperceivable (0.85 percent[129]). In view of the minuscule impact of the transit improvements on regional mobility, access, and traffic volumes, the *Regional Transportation Plan's* emphasis on transit seems inexplicable (Figure #35.)[130] (There is a tendency in many quarters to presume that transit is capable of

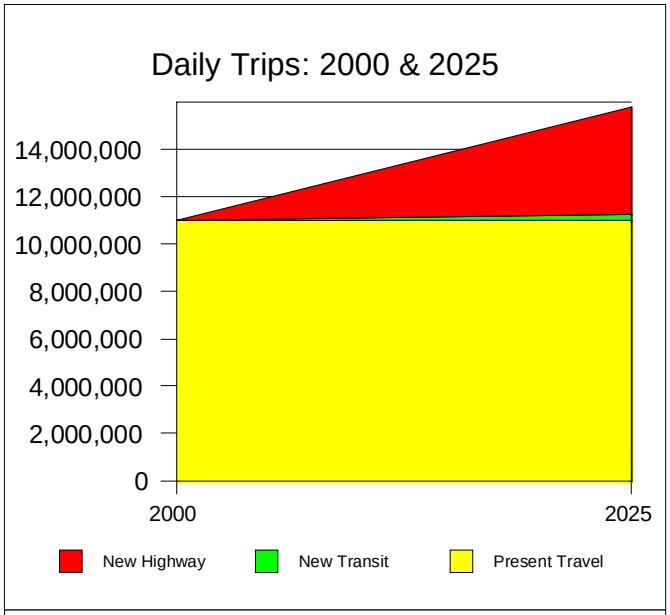

Figure 35
Source: *RTP*

[127] Calculation method: 158.280 (with transit improvements) divided by 159.956 (without transit improvements). Such percentage calculations require subtraction of 1.00 from the result.
[128] Calculation method: 158.638 (with transit improvements) divided by 159.956 (without transit improvements). Such percentage calculations require subtraction of 1.00 from the result.
[129] Calculation method: 1.05 minus 0.20.
[130] Because the transit share of new trips may be difficult to see, this figure has been enlarged to the maximum size possible on the page.

making a significant contribution to reducing present traffic congestion or its future growth. The reality is much more modest. This is discussed in Appendix #1, "Transit's Potential: Perception and Reality").

Table #9
Daily Traffic Volumes: 2000 & 2025: ARC Projection and This Report Projection

Scenario	Daily Vehicle Miles of Travel *(in millions)*	Change From 2000
Present (2000)	112.432	-
No-Build (2025)	159.956	42.3%
With all Transit & Highway Improvements (2025)	158.280	40.8%
This Report Projection (2025)	159.638	42.0%

Source: Regional Transportation Plan and This Report

Comparing Transit and Road Improvements

The *Regional Transportation Plan* indicates that rail transit improvements are considerably more costly than roadway expansion. On average, the rail construction programs are from nearly three times to more than eight times as expensive as roadway expansions.[131] This is similar to the cost per passenger mile of urban freeway and rail systems throughout the nation. In 1996, the average cost per person mile of urban freeway lane was from one-fifth to one-ninth that of new urban rail systems.[132] Express buses operating on HOV lanes very likely have a cost per new rider similar to that of the roadway improvements, and certainly below that of commuter rail. The *RTP* does not provide cost per new trip data on the HOV express buses. Federal research cited below indicates that express buses are considerably more cost effective than rail strategies. There is a more important point to cost comparisons between transit and highways.

Simply put, it is that there is no achievable cost at which transit can materially substitute for automobile use, because transit simply cannot be designed to be competitive with the automobile for all but a small minority of trips. For example, at MARTA rail operating speeds (which are comparatively competitive with the automobile), it would be possible to provide access to only 55 percent of the urban area, even with a one-half mile grid of rail lines.[133] Such a system would require annual operating and capital expenditures more than double the annual U.S. spending on transit. The annual subsidy per household in the Atlanta area could exceed the annual household income.[134]

[131] Most of the roadway improvements are high occupancy vehicle (HOV) lanes. HOV lanes are at least as costly to build as additional general purpose freeway lanes. As a result, this cost is considered representative of the cost of expanding roadways.

[132] http://www.publicpurpose.com/hwy-tr96$.htm

[133] It may not be technologically feasible to attain average MARTA rail operating speeds of 30 miles per hour with the comparatively short one-half mile station spacings that would be necessary.

[134] Assumes the Atlanta urbanized area as delineated by ARC in 1995. To provide automobile competitive mobility would require, for example, a grid system of rail lines one-half mile apart, so that all locations would be within a one-quarter mile walking distance. MARTA operating costs and operating speeds are assumed. The national heavy rail capital cost is assumed lower, but still prohibitive costs costs would be required for a bus based system. Annualized capital and operating costs are estimated at more than $55 billion, at least twice the current national transit spending total of approximately $27 billion. Assuming achievement of a 20 percent market share (very aggressive given the fact that the present market share is 2.56 percent), the annual subsidies per household would be approximately $60,000, which exceeds the annual household income of the Atlanta metropolitan area, which was $48,300 in 1998 (U.S. Department of Labor, Bureau of Economic Analysis).

Traffic can get much worse in Atlanta and it will unless steps are taken to accommodate the increasing automobile demand that ARC has projected.

At the same time, the transit improvements will, as noted above, have little impact on traffic congestion. Consequently, the transit improvements will have little influence on air pollution.[135]

Finally, up to this point, highways and arterials in the Atlanta area have been fully or mostly paid for by the user fees of motorists who fully fund their own operating costs. On the other hand, rail transit expansions are fully paid out of subsidies, while their operations are largely paid out of subsidies (Table #10).

Table #10
Comparison: Transit and Road Improvements

Improvement	Per New Trip	Commuter: Annual (450 trips)	Commuter Lifetime (40 Years)	Paid By	Air Quality Impact Potential	Traffic Congestion Impact Potential
MARTA Rail	$21.29	$9,582	$383,280	Primarily Subsidies	Small-because so few drivers attracted.	Small-because so few trips can compete with auto.
Light Rail	$24.95	$11,225	$449,010	Primarily Subsidies	Small-because so few drivers attracted.	Small-because so few trips can compete with auto.
Commuter Rail	$6.80	$3,061	$122,445	Primarily Subsidies	Small-because so few drivers attracted.	Small-because so few trips can compete with auto.
Roadways	$2.55	$1,147	$45,870	Primarily User Fees	Could be substantial-dependent upon extent of expansion	Could be substantial-dependent upon extent of expansion

Calculated from data in the *RTP Needs Assessment.* Arts Center light rail line costed based upon higher costs and ridership levels later reported in the RTP.

Traffic Congestion Will Get Worse. The *RTP* projects the amount of travel in congested conditions[136] will increase by 28 percent from 2000 to 2025. that average speeds will drop 1.5 percent from 2025 and that per capita times spent in automobiles will increase nearly 8 percent. The situation will be even worse for single occupant commuters, because most of the new freeway lane mileage will be in high occupancy vehicle (HOV) lanes, which will be open only to car pools and buses. As a result, traffic will continue to grow at a faster rate than roadway expansion, which will lead to greater levels of congestion. ARC's land use policies, if implemented, will exacerbate traffic congestion because many more cars and people will be competing for little more road space.

Single Occupant Travelers, The Choices. There may be a tendency to believe that it is equitable to spend inordinately on high occupancy vehicle trips and transit trips in relation to single occupant trips. The view is often expressed that Americans have a "love affair with the automobile." But it is not so simple as that. Americans no more have a love affair with the automobile than they do with air conditioning or refrigerators. The automobile, like air conditioning, refrigerators, and other modern conveniences, has become a necessity of the modern lifestyle. Policies that are punitive toward single occupancy automobile users might be reasonable if

[135] Evidence of this is the fact that the region is expected to achieve air quality attainment in 2003, before any of the rail transit improvements are in service. Lower, but still prohibitive costs would be required for a bus based system.
[136] Levels of service E and F.

The dispersion of jobs and residences throughout the Atlanta region make car pooling virtually impossible for most people in the area.

transit use or high occupancy vehicle trips could be readily substituted for all or even a significant number of single occupant trips. But there is no practical alternative to the single occupant automobile for most trips. .

As was noted above, approximately 90 percent of employment is not competitively accessible by transit to the vast majority of people who have automobiles available.

The dispersion of jobs and residences throughout the Atlanta region make car pooling virtually impossible for most people in the area.

Many people, especially single parents and families with two wage-earners, find it necessary to "chain" work trips with trips to day care and other errands, which makes it even more difficult to use transit or car pool.

The Regional Transportation Plan: Mobility and Access for the Few. For the few who can use the improved transit and HOV facilities, the *Regional Transportation Plan* will improve mobility and access. But the $23 billion in transit and HOV improvements will, according to *RTP* projections attract only a 0.75 percentage point increase in market share. For the overwhelming majority of Atlantans, however, the *Regional Transportation Plan* strategies might be considered punitive, because they make their lives more difficult without any compensating benefit to the rest of the community.

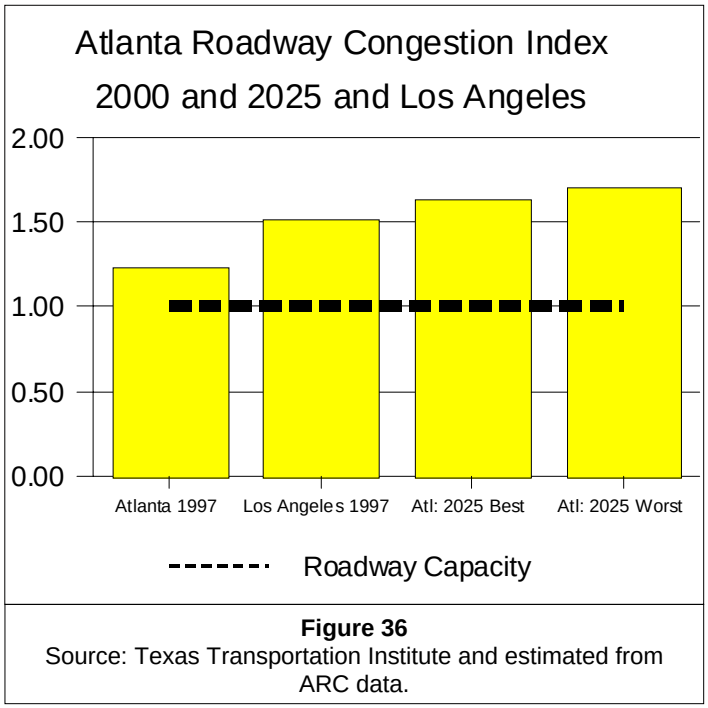

Figure 36
Source: Texas Transportation Institute and estimated from ARC data.

Atlanta's Traffic Could Become the Nation's Worst. It is estimated that Atlanta's 1.23 Roadway Congestion Index will escalate to at least 1.63 by 2025 as a result of this shortage of capacity.[137] Depending upon the effectiveness of the HOV lanes, the Roadway Congestion Index could rise to as high as 1.70 by 2025. At approximately two-thirds above capacity, Atlanta roadways will be more congested than those in Los Angeles, which had a Roadway Congestion Index of 1.51 in 1997 (Figure #36).

Current plans do not achieve that end, indeed, by ARC's own projections, they will make things worse. There are places in the world with worse traffic congestion than Atlanta. Examples are central Paris, central London,

[137] Estimated based upon the estimated seven county roadway capacity increase (including HOV lanes) and projected traffic increase.

Tokyo and many other areas, where work trip travel times are substantially greater than in Atlanta.[138] Traffic can get much worse in Atlanta and it will, unless steps are taken to accommodate the increasing automobile demand that ARC has projected.

[138] Work trip travel times are 70 percent greater in Tokyo, 45 percent greater in Osaka and 30 percent greater in Paris, London, and Stockholm. http://www.publicpurpose.com/ut-intljtwtime.htm.

Chapter 3: A New Vision: Inclusive Mobility and Access in the Atlanta Region

If the residents of the Atlanta region are to experience transportation improvements in their day to day lives, then steps must be taken to improve traffic congestion. Moreover, if the Atlanta area is to continue to grow and see its quality of life maintained or improved, then traffic conditions must improve. Traffic conditions can improve, but it will require policy directions that accommodate the inevitable continued reliance on the automobile. The wishful thinking must be rejected that seeks major increases in transit use that, even if successful, would produce little shift from automobiles and worsened traffic conditions.

If the residents of the Atlanta region are to experience transportation improvements in their day to day lives, then steps must be taken to improve traffic congestion. Moreover, if the Atlanta area is to continue to grow and see its quality of life maintained or improved, then traffic conditions must improve. Traffic conditions can improve, but it will require policy directions that accommodate the inevitable continued reliance on the automobile. The wishful thinking must be rejected that seeks major increases in transit use that, even if successful, would produce little shift from automobiles and worsened traffic conditions.

The New Vision

Instead, transportation agencies should accept the responsibility for reducing traffic congestion by accommodating the increased highway demand that has been projected. This requires planning that accommodates highway travel, to the benefit of the many, instead of the few that would be served by the overly expensive niche transit and HOV strategies. With the new Georgia Regional Transportation Authority, Atlanta's transportation institutions are well positioned to develop a new vision of improvement instead of the managed decline that typifies the *Regional Transportation Plan*.

GRTA, ARC, the Georgia Department of Transportation, MARTA and the local government units responsible for transportation should cooperate to develop a "New Vision" for transportation in the Atlanta region. The fundamental objective behind the New Vision must be to facilitate traffic movement, while improving economic opportunity by increasing regional access for low-income residents.

> **Mobility.** For the vast majority of Atlanta region residents who have automobiles available, and for commercial interests who rely upon the highways, the objective of the New Vision should be to improve mobility by reducing traffic congestion, thereby decreasing travel times and reducing pollution. The New Vision should set specific, largely non-congested "level of service"[139] targets and adopt programs to achieve such improvements.

[139] "Level of service" is a technical term. Traffic congestion is classified from "A" (uncongested) to "F" (highly congested).

Access. For the largely low income population that does not have access to automobiles, the New Vision should improve access throughout the Atlanta region, particularly to employment opportunities in the suburbs.

The starting point of the planning process needs to be an understanding that Atlanta's traffic congestion problem is overwhelming and will only get worse unless effective action is taken. This requires a comprehensive array of solutions, not simply road widening projects "here and there."

Obviously, in an environment of "NIMBY" ("not in my backyard") thinking, any comprehensive infrastructure improvement program is going to have opposition. But the choice that faces Atlanta is to either let the situation get considerably worse or take what must be significant steps to implement sustainable improvements. It is possible that, having reviewed such an unconstrained mobility improvement strategy, the Atlanta region will choose higher levels of traffic congestion to the difficult process of providing new capacity. But the public agencies responsible for transportation owe the citizens of the Atlanta region an objective presentation of the full range of choices that can be made available to reduce traffic congestion.

The following discussion outlines a number of elements that are likely to emerge from an objective review of strategies for mobility and access opportunities.

Roadways

There is a popular conception that it is impossible to build sufficient roadway capacity to accommodate traffic. This view holds that virtually any new road space provided will quickly be filled to capacity. If this were true, there would be little point in expanding roadways. But, a review of the data in large U.S. urban areas does not support this view

As was noted above, there are significant difficulties with Atlanta's roadway system, the most important being that major features of its design are not suited to modern travel patterns. Perhaps the most important deficiency is the primitive nature of the surface arterial system, which is so important in feeding, supporting and providing alternatives to the freeway system.

Moreover, Atlanta has less freeway and arterial roadway mileage per capita than other low density urban areas. If, for example, Atlanta had the roadway capacity per capita of low density urban areas such as Kansas City or Nashville, there would be a sufficient supply of road space to accommodate traffic. Rather than Atlanta's 1.23 Roadway Congestion Index (23 percent above capacity), Kansas City and Nashville capacities would result in below capacity Roadway Congestion Indexes of 0.95 or 0.83 respectively. To a significant extent, improvement of the transportation situation in Atlanta will require the provision of an improved roadway system. This is counter to the currently popular notion that traffic congestion cannot be alleviated by building new roadway capacity. The evidence does not support this view (Appendix #3).

Roadway Capacity Standards. To provide sufficient roadway capacity requires an understanding of the roadway capacity levels that are required to adequately support various forms of development. The local transportation agencies should cooperate to develop minimum roadway capacity standards for the travel demands that occur in varying urban and suburban densities and land use configurations. For example, at residential densities of 5,000 per square mile, more road space will be required than at densities of 1,500. Any

number of additional factors might be considered, such as employment densities, location of major traffic generating facilities, etc.

These standards could be used by growing communities to ensure that sufficient roadway capacity is provided as development occurs. The imposition of roadway capacities standards in already developed areas will, of course, be difficult, but a full review of options requires an examination of what would be required to accommodate current and future demand.

First and foremost, Atlanta needs an adequate surface arterial network. Such a system would be comprised of multilane roadways, with shoulders, left turn lanes, and right turn lanes.

Surface Arterial Network. First and foremost, Atlanta needs an adequate surface arterial network. Such a system would be comprised of multilane roadways, with shoulders, left turn lanes, and right turn lanes. The arterials should be designed to accommodate travel across the urban area by being extended uninterrupted for long distances. This would make the surface arterials effective alternatives to freeway travel. This would be of particular value when there are traffic interrupting incidents on freeways. Freeway travelers could divert to the surface arterial system and thereby improve their travel time, as occurs in metropolitan areas with well developed arterial systems. Other travelers, seeking to avoid the congestion that occurs on freeways, would use the arterials instead of the freeways and experience somewhat longer travel times but less frustration.

Based upon the roadway capacity standards that would have been developed, it is likely that the surface arterial network would be designed on no more than a one mile grid. Given the hilly terrain of the Atlanta region, this would not be a regular grid, but would be terrain constrained, with arterials curving as necessary to accommodate the topography. At a minimum, the surface arterial network would be comprised of four lane roadways, but it is possible that some would need to be six or eight lanes. Generally, providing for sustainable traffic movement would require reservation of at least six lane rights of way, so that future expansion could be more easily facilitated.

Provision of new freeway capacity in non-radial and non-orbital configurations would improve traffic in the Atlanta area.

The surface arterial network would be no more intrusive than such systems are already in other urban areas. For example (as noted above), most of the Los Angeles area is served by a multi-lane one-half mile pattern of north-south and east/west signalized arterials. Other urban areas, such as Denver, Phoenix, and and Sacramento are similarly well served by surface arterial networks.

New Freeway Capacity. Provision of new freeway capacity in non-radial and non-orbital configurations would improve traffic in the Atlanta area. It is possible that the Roadway Capacity Standards could identify corridors in which additional freeway capacity is required. To accommodate the non-radial demand that is typical of the modern dispersed urban area, future freeways follow more of a grid orientation, allowing for effective connection and operation with the present system.

For example, there is a distance of 20 miles between the northern section of the Perimeter Highway (I-285) and the proposed Northern Arc of the Outer Perimeter Highway. There is no east-west freeway capacity between these two roadways. It would seem likely that Roadway Capacity Standards would identify the need for at least one east-west freeway between these roadways. It is also possible that the Surface Arterial Network could effectively serve this need.

Further, it may be that Atlanta's freeways are now "wide enough." It would seem unlikely, for example, that a 15 lane freeway would undergo significant widening in the future. It may be preferable, where feasible, for new freeways to be built as an alternative to major widening projects, or for extremely wide freeways to be built with multiple roadways in each direction.[140] This type of design reduces delays due to incidents, and can facilitate emergency routing around periodic freeway blockages.

Innovative Roadway Strategies. The Surface Arterial Network and new freeway capacity might be provided using more advanced roadway technologies, such as the following:

Surface Expressways. Surface arterials can be converted into "surface expressways," which limit grade crossings to signalized intersections and forces left turns to the right on access roads. New Jersey pioneered this strategy decades ago on surface roadways such as U.S.-1 and U.S.-22. A slightly different concept is used on major arterials in the Detroit area, which forces left turns through median, signalized u-turn lanes (portions of U.S.-12 and U.S.-24 are examples). Las Vegas has considered a similar concept, called "super streets," which use limited grade separation.

Limited Access Commercial Bypasses. As new retail and employment centers continue to be built in developing areas, the surface arterials on which they are located become congested. Traffic congestion could be relieved by building new bypass roadways, which may or may not be grade separated, but on which entrance and egress is controlled. These arterials would be similar to the New Jersey surface expressways described above.

A minimally intrusive mechanism for expanding roadway capacity is the *Metroroute*, which is a single tunnel carrying two decks of automobile (only) traffic.

Metroroute Tunnels. A minimally intrusive mechanism for expanding roadway capacity is the *Metroroute*, which is a single tunnel carrying two decks of automobile (only) traffic. Limiting access to automobiles allows the tunnel to have a smaller diameter, which makes it considerably less costly. Paris, with the western world's most intensely developed urban rail system, will build 60 miles of under city tunnels to alleviate traffic congestion.[141] The first of these is already under construction.[142] This represents a recognition that, despite exceedingly high costs, additional capacity must be provided for growing travel demand. The under construction A-86 Metroroute tunnel will cost $40 million per lane

[140] This design is used on Interstates 78, 80 and 95 (the New Jersey Turnpike) in New Jersey and the MacDonald-Cartier Freeway in Toronto (Route 401).
[141] Christian Gerondeau, *Transport in Europe* (Boston: Artech House), 1997.
[142] This roadway would complete the Paris outer perimeter highway (A-86) over a six mile segment that will run under Versailles. Other metroroutes are to be built under the inner city of Paris itself.

mile.[143] There, as might be the case in Atlanta, the exceedingly high cost of construction could be financed by tolls. Similarly, the city of San Francisco is considering underground toll expressways. This is an important development, since San Francisco might be considered the "birthplace" of anti-freeway revolts, based upon 1960s project cancellations.[144] Metroroute tunnels might be considered for expansion of capacity on the downtown connector, the Peachtree Road corridor, or wholly new routes in the Atlanta region.

Double Decking. Texas has pioneered the development of advanced freeway double decking, which makes it possible to add up to six lanes of traffic without taking additional right of way (examples are Interstate 35 in Austin and Interstate 10 in San Antonio). Single pillar facilities are built in the shoulder on each side of the freeway. Such an approach could be used to expand the capacity of high volume roads, such as the downtown connector. Another alternative for consideration is the double deck express highways that Tokyo and Osaka have built and are building above surface arterials to expand capacity. These roadways are built on a single pillar in the median of the street (an example is National Route 409 as it approaches the Tokyo Bay Aqua Line Tunnel).

Truck Freeways. Exclusive roadways can be built above congested freeway corridors for commercial traffic, largely trucks. Such a system has been proposed for the Los Angeles area, and would be financed by tolls.

Reversible Lanes. Already some streets in the Atlanta region, such as Northside Drive and Roswell Road, have reversible lanes that are adjusted during peak periods to better accommodate demand. This comparatively low cost strategy should be considered for other arterial roadways.

High Occupancy Toll Lanes. The *Regional Transportation Plan* proposes development of a region-wide HOV lane system. As was noted above, this $3.6 billion expenditure will *not* increase the percentage of travel by car pools in the Atlanta region. It is likely that, as in other locations around the nation, the HOV lane network will be underutilized. If this system is built, it should be opened to non-HOV traffic for a toll. One such "High Occupancy Toll" (HOT) lane, on Route 91 in the Los Angeles area has reduced travel times from 20 to 40 minutes per one way commute. At the same time, peak period congestion on the adjacent general purpose lane has been reduced.[145] The toll revenues could finance the HOT-HOV lanes, freeing the planned funding for other roadway uses.

Immediate Strategies. At the same time, less capital intensive strategies should be undertaken even in advance of comprehensive plan development

[143] *Toll Roads Newsletter*, March 2000.
[144] Such as the double-deck Embarcadero Freeway, which would have connected the San Francisco-Oakland Bay Bridge to the Golden Gate Bridge. Less than one mile of this route was constructed. This small section was dismantled after having been damaged in the 1989 earthquake.
[145] Internet: http://www.bol.ucla.edu/~jrbgeog/calpol.html

Removal of "Bottlenecks." Traffic "bottlenecks" should be removed. For example, removing bottlenecks at the nation's 18 most congested freeway interchanges would significantly reduce local mobile source air pollution, while saving commuters an average of nearly 40 minutes per day.[146]

Improvement of Left Turn Lanes. Left turn lanes should be lengthened or even converted to double left turn lanes, justified by traffic demand.

Addition of Shoulders to Arterials. Shoulders should be provided on all arterials, so that accidents are less disruptive to traffic and transit buses can stop for passengers without stopping traffic.

Automated Tolling. Georgia 400 should be converted as soon as possible to electronic tolling, similar to the system used on the Route 407 beltway in Toronto. All tolls are collected through electronically read cards on windshields. License plates of cars that do not have the electronic cards are photographed and users are billed through the mail. Elimination of the toll booths would reduce traffic congestion, speed travel, and improve air pollution in the local area.[147]

Intelligent Transportation Systems and Traffic Management

While Atlanta has been a leader in ITS implementation, steps should be taken to optimize the movement of traffic on arterials throughout the region, using state of the art traffic synchronization systems. The impending expansion of on-board navigation devices in motor vehicles will extend the effectiveness of the ITS system by providing more immediate information to motorists as they travel.

Twenty-five miles of express busway can be built and operated for the cost of five miles of rail.

Transit

Transit will continue to be important to the niche markets it can effectively serve, low-income residents and downtown commuters who otherwise would use their automobiles. Transit service can be maintained and expanded in the markets where it is most effective through the use of competitive incentives.

Major Capital Improvements. The *Regional Transportation Plan* would use an inordinate percentage of resources to build new and extended rail lines. There are considerably more efficient and effective strategies. To the extent that new fixed facilities are justified, it will generally be found that bus alternatives are considerably less costly. In a U.S. Department of Transportation report, John Kain found that bus-based rapid transit strategies tended to be one-fifth as costly per passenger mile as rail strategies.[148] This means that far more comprehensive transit service coverage can be provided through bus-based strategies; 25 miles of express busway can be built and operated for the cost of five miles of rail. Express bus strategies can effectively

[146] Cambridge Systematics, Inc, *Unclogging America's Arteries: Prescription for Healthier Highways,* (Washington: American Highway Users Alliance), 1999. Three of the 18 interchanges studied were in the Atlanta region, I-75/I-85, I-75/I-285, and I-85/I-285.

[147] As in the Toronto case, out of state drivers would billed based upon drivers licenses. Cooperative agreements could be established with other states, such as have been put in place between the Province of Ontario and nearby states and provinces.

[148] John Kain, Ross Gittell, Amrita Daniere, Tsur Summerville and Liu Zhi, *Increasing the Productivity of the Nation's Urban Transportation Infrastructure*, United States Department of Transportation Federal Transit Administration, January 1992.

substitute for rail extensions, especially since the *RTP* anticipates development of a comprehensive system of HOV lanes. Express buses would be able to operate at free flow freeway speeds to their downtown or major suburban center destinations. Due to their rapid operating speed (generally above 50 miles per hour),[149] express buses would be able to provide faster trips to destinations than MARTA's rail extensions, and generally faster than the proposed commuter rail lines. Express buses could operate considerably faster than the Arts Center light rail line on HOV lanes. Federal, state and local funds that otherwise would have been used to construct the rail lines could be applied to building, enhancing, and expanding the HOV-HOT lane system, and to building stations and transfer facilities.

Due to their rapid operating speed (generally above 50 miles per hour), express buses would be able to provide faster trips to destinations than MARTA's rail extensions, and generally faster than the proposed commuter rail lines.

A recent traffic reduction success in Atlanta is the Turner Broadcasting Company's initiative to encourage employees to take transit or car pool to work. It is reported that 20 percent of Turner Broadcasting Company employees began to use transit or car pool.[150] Such programs are most likely to succeed where there is a large concentration of employment, especially in large companies. The potential for establishing similar programs for more dispersed employment centers should be reviewed. Such programs could be funded by groups of employers with contributions from public funding sources, such as MARTA. It is likely that the cost of removing automobiles from the road through such programs will be well short of the exorbitant costs associated with rail (as noted above, all rail systems proposed would require financial resources in excess of the cost of leasing a new car for each new commuter).

Improved Cost Effectiveness. Around the world, major transit systems have and are being converted to competitive contracting, under which the transit agency maintains full policy control of the system, while awarding limited time contracts for the operation of routes or segments of the system. Fares, route alignments, timetables, and service standards are established by the transit agency, which administers contracts to ensure that adequate performance is achieved. Both bus and rail service have been competitively contracted. In each of these cases, the transit system remains an integrated whole, and customers are largely unaware of the fact that the system is provided by multiple operators. For example:

> London has competitively contracted the world's largest bus transportation system, with over 6,000 vehicles. The conversion took place over a 15 year period and resulted in a 42 percent reduction in costs per mile (inflation adjusted). Overall operating costs have fallen 26 percent (inflation adjusted), while service levels have been expanded 28 percent. Ridership has risen 10 percent.[151]
>
> Stockholm has competitively contracted all of its bus, metro (heavy rail), light rail, and commuter rail services. Cost savings per mile have been 20 percent, with a conversion period over less than 10 years. Ridership is up 10 percent.[152]

[149] *RTP* Appendix IV.
[150] "Turner Commuter Plan Serves as Model," *Atlanta Constitution*, April 25, 2000.
[151] Calculated from London Transport Annual Reports.
[152] Calculated from Storstockholmslokaltraffic Annual Reports.

Other examples of conversion to competitive contracting are other metropolitan areas throughout Sweden (such as Goteborg and Malmo), Copenhagen, all metropolitan areas in New Zealand, Perth, and Adelaide. South Africa is preparing for a national conversion.[153]

In the United States, progress toward competitive contracting has been much more modest, in large part due to special federal labor provisions for transit employees, and the absence of mandates that would have required costs to be maintained at competitive rates. However, there are important success stories:[154]

In San Diego, a gradual competitive contracting conversion of the bus system has been underway for 20 years. By 1999, approximately 43 percent of bus service was competitively contracted. From 1979 to 1997, costs per vehicle hour of operation declined 41 percent (inflation adjusted) to $49.31. At the same time, bus ridership has increased more than 50 percent. [155]

During the 1990s, fast growing Las Vegas has established a new public transit bus system, which is 100 percent competitively contracted. Ridership has risen by more than 400 percent compared to the previous private monopoly system, and costs per vehicle mile were $41.91, 36 percent below MARTA bus costs.

In the Atlanta region, the Cobb County transit system is competitively contracted. Costs per vehicle hour in 1998 were 21 percent below those of MARTA buses.[156]

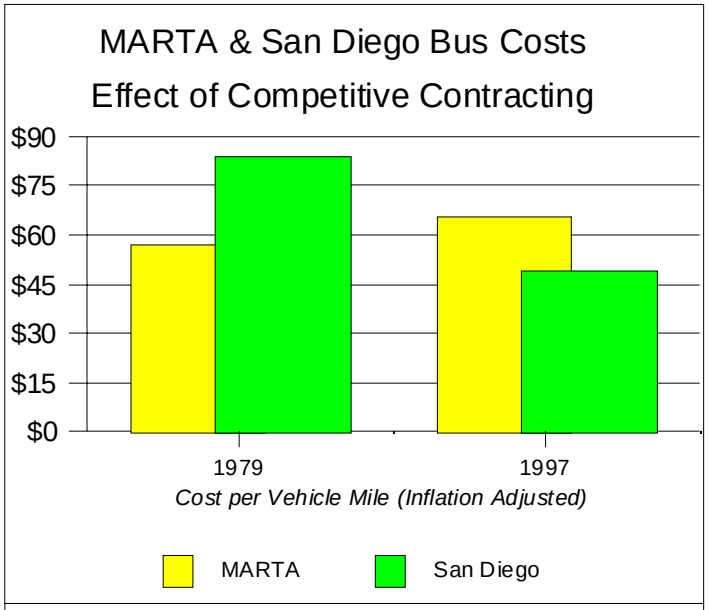

Figure 37
Calculated from National Transit Database.

In contrast to San Diego's 41 percent cost reduction, MARTA's bus costs per vehicle hour rose 15 percent (inflation adjusted) from 1979 to 1997 (Figure #37). If MARTA's bus costs had been reduced at the San Diego rate, more than $75 million annually would have been freed, an amount equal to five-sixth of the total bus and rail fares in 2000.

An attrition based (no-layoff) competitive contracting strategy, following the San Diego and Las Vegas examples, could reduce costs over the next 25 years by approximately $800 million,[157] which could be applied

[153] Internet: http://www.publicpurpose.com/t5.htm.
[154] The Cobb County transit system is competitively contracted.
[155] Calculated from National Transit Database and San Diego Metropolitan Transit Development Board information.
[156] The National Transit Database indicates that MARTA's bus cost per vehicle hour was $65.69, while Cobb County was $52.07.
[157] The savings relative to MARTA spending if cost inflation continues at the 1979 to 1997 rate would be $1.25 billion.

the *Regional Transportation Plan* strategies would still leave more than 60 percent of employment beyond one hour transit access to the Atlanta region's low income population. The operating cost savings from a program of competitive contracting could be applied to the development of a shuttle van system to provide mobility to a much higher percentage of these jobs.

to improved transit service.[158] For example, this rate of savings would allow bus services to be expanded 50 percent by 2025, or a system of reverse commute vans might be established (below). In addition, it is possible that the effects of competition would keep MARTA rail cost increases under greater control.

Employment Access for Low Income Residents

As was noted above, the *Regional Transportation Plan* strategies would still leave more than 60 percent of employment beyond one hour transit access to the Atlanta region's low-income population. The operating cost savings from a program of competitive contracting could be applied to the development of a shuttle van system to provide mobility to a much higher percentage of these jobs. Such a system might be administered by MARTA or by GRTA or another organization.[159] It would provide connections from rail stations to more remote employment locations and from low-income neighborhoods directly to jobs in areas where transit access cannot be guaranteed within a one-hour period.

It would be best to organize such a system on a user subsidy basis, with the administering agency issuing vouchers similar in concept to those used in public housing. Low income users would pay the regular passenger fare, supplemented with the voucher, which would be presented by the private entrepreneurs to the administering agency. This system design is similar to that of taxi voucher programs that serve senior citizen passengers in a number of urban areas. The face value of the vouchers would be established through competitive bidding procedures, through which the administering agency obtains commitments for sufficient service levels. It is also possible that major portions of the system might operate profitably within the transit fare structure. At the same time, shuttle van operators should also be permitted to operate routes outside the public system, not accepting vouchers and charging market-based fares where possible.

Such a shuttle van system would greatly increase the percentage of employment within a 60 minute transit ride of the low-income population. Moreover, for many low-income users, it would be a transitional program that would be used only so long as necessary to obtain sufficient resources to purchase an automobile and provide for their own mobility. As a result, while the shuttle van program could be somewhat expensive,[160] its success in improving the economic status of its customers would limit its growth, while providing an important mechanism of upward social mobility. It is likely that there is no less expensive or more effective way of providing more comprehensive access throughout the region to low-income citizens.

[158] Assumes annual progress toward a 36 percent real reduction in costs per vehicle hour by 2025, with bus services converted to competitive contracting of 7 percent annually.
[159] MARTA might contract with another organization to administer this service, or simply fund the service if administered by another agency.
[160] Though inexpensive in relation to rail construction and operation.

Transit Affordability

As a number of reports have noted, many of the Atlanta region's low-income residents live in the central area. From a transportation perspective, it is fortunate the transit service provided by MARTA in this area is the most intensive in the region. It is less fortunate, however, that low-income residents have experienced such a massive increase in fares (174 percent since 1979[161]). A series of fare increases over a long period of time may look minor to middle income and upper income people who are not forced to rely on transit. For low-income residents, however, it is another matter. Virtually every "nickel" counts. Regional officials should review opportunities to reduce fares to reduce the burden on low-income residents, which will also tend to make commuting to work affordable for more residents. There are a number of alternatives, such as an across-the-board fare reduction, distance-based fares, lower fares for buses than rail, and others. MARTA's period of greatest ridership increase was during the 1970s, when fares were substantially reduced.

Regional officials should review opportunities to reduce fares to reduce the burden on low income residents, which will also tend to make commuting to work affordable for more residents. There are a number of alternatives, such as an across-the-board fare reduction, distance-based fares, lower fares for buses than rail, and others.

Transit: "Back to the Drawing Board"

The *Regional Transportation Plan* strategies would expend a disproportionately large amount of funding to obtain a comparatively miniscule increase in transit's role in the community. At the same time, much of the transit resource would be used to attract commuters from automobiles, again with little impact. Nonetheless, transit has an important role to play in the Atlanta region. Transit resources should be reallocated to better serve the low-income residents of the Atlanta region, by expanding service to make more employment accessible in a reasonable amount of time, and by making it more affordable. In short, the transit strategies in the *RTP* should be completely re-evaluated.

Paying for Roads

There is no question that providing the transportation capacity that the Atlanta region needs will require additional funding, principally from the Atlanta region. There are a number of alternatives, including the more conventional approaches of highway user fees (gasoline taxes) and general funds.

Electronic Road Pricing. There is also a more innovative approach: Electronic road pricing. Electronic road pricing would substitute peak period and mileage-based user charges for the present gasoline tax funding. Higher user charges during peak travel periods would encourage some diversion of vehicle travel to less congested periods. Electronic road pricing would expand the Toronto Route 407 technology to a wider range of roadways. Similar technology is already used on a larger network in Singapore.[162]

[161] In 1979 the average fare per passenger journey was $0.18 ($0.43 inflation adjusted to 1999). By 1999, the average fare rose to $1.17.

[162] Howard Husock, *Implementing Electronic Road Pricing in Singapore,* (Cambridge, MA: Kennedy School of Government Case Program), 1999. Singapore has erected overhead "gantries" that read debit cards on the windshields of automobiles as they enter the central business district. A similar technology is now being applied to a larger area on the city's expressways.

Competitive Franchising of Roadways

There is also the potential to improve the provision of roadways through a combination of electronic road pricing and competitive franchising.

Atlanta's road infrastructure crisis is made all the more difficult to solve because improvements rely primarily on the political system, especially federal and state government. As a result, needs are considered in a broader context that produces less than optimal results with respect to the unique needs of Atlanta. It is unlikely that Atlanta's roadway system can be sufficiently improved under the present set of roadway funding circumstances. It would be preferable to convert to a more direct user-pay system that is less reliant on the political process.

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In contrast with roadways, there is not a crises with respect to infrastructure provided by the private sector. The traditional commercial user pay system of financing the building and operation of infrastructure continues today with respect to those services provided by the private sector, generally water service, telecommunications, electricity and natural gas. Companies in these businesses have the advantage of operating with little or no political interference in their commercial decisions. As a result, the financing crises that typically plague governments have little impact on privately provided infrastructure. The situation is similar to other private commercial sectors, where companies price and provide services and products largely in response to the market. As a result, in both private infrastructure and the remainder of the private sector, there is normally no shortage of goods or services and no cost crisis.

The private or competitive model can be applied in the provision of roadways. Government can harness the competitive market to control costs and ensure effective supply of infrastructure services. The competitive procurement process minimizes the political manipulations that can make it difficult for government to provide what is essentially a consumer service.

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As a result of the automated tolling and electronic road pricing advances (above), it is now possible for communities to competitively franchise their roadway systems, thereby de-politicizing roadway provision, while improving efficiency and effectiveness. This could be accomplished by a competitive procurement in which a community specifies various standards, such as average speeds, levels of service, safety considerations and capacities. Fees for roadway use could be broadly regulated using rates awarded through the competitive process and inflation adjustments. Competitive franchising of local or regional roadways would reduce or eliminate political interference that might otherwise lead to less than optimal roadway investments. An important consideration will be to keep the conversion to competitive road franchising "revenue neutral," so that users do not pay both road user fees and fuel taxes.

In the Atlanta region, competitive franchising could be used as the financial mechanism for delivering the Surface Arterial Network. Arterial systems within geographical sectors of the regions could be competitively franchised, with contract awardees committed to providing roadway infrastructure and services consistent with broad specifications established by the appropriate public agency or agencies.

Competitive franchising could provide the depoliticized funding mechanism for improving Atlanta's roadway system. At the same time, so long as the present federally dominated highway funding system is in operation, recipient agencies would apply that funding to roadway segments not competitively franchised (such as the freeway system). In the longer term, it is to be hoped that overall funding reform at the federal and state level would permit conversion of the entire roadway system to a competitive, depoliticized system.

People and Markets

At the same time, continuing changes in behavior and technology are likely to assist in reducing traffic congestion. For example:

Navigation Systems. Computerized navigation systems are now being installed in automobiles and other vehicles. As technology improves, these systems will provide traffic information to drivers, obtained from the Georgia Department of Transportation. This will assist in guiding drivers to alternate routes to avoid traffic congestion. The potential of these systems in the Atlanta region, however, will be severely limited by the primitive nature of the existing surface arterial system (above).

Collision Avoidance Systems. On-board safety systems that provide collision warnings to drivers or even prevent collisions are likely to be available in the near future. Such systems will reduce accidents, and thereby the traffic congestion that they cause.

Transportation Demand. As the information technology revolution continues, expanded use of the Internet, personal computers, mobile telephones and other communications technologies are moderating travel demand by facilitating "telecommuting."

> Some companies are "hoteling," a strategy by which employees who spend considerable time outside the office are assigned temporary instead of permanent offices.
>
> Telecommuting is increasing, and it is likely to increase even more in the future. From 1995 to 1997 telecommuting increased nearly 30 percent.[163] In 1990 it was projected that telecommuting will remove between 50 billion and 150 billion passenger miles nationally from roadways by the year 2000.[164] By 1997 there were indications that the lower projection for 2000 had already been achieved.[165]

[163]"U.S. Telecommuting Trend Surpasses 11 Million: Strong Economy, Internet Spur Growth," Emerging Technologies Research Group, Internet: http://etrg.findsvp.com/prls/pr97/telecomm.html

[164]"Telecommuting Forecasts Released," Telecommuting Research Institute (Los Angeles, 1990.)

[165]The Emerging Technologies Research Group Internet report noted above indicated that the number of telecommuters in 1997 exceeded the projection for 2000 made in 1990.

Telecommuting is also likely to be expanded to the extent that land use regulation expands. If Atlanta is constricted in its physical growth, traffic congestion will increase at a greater rate, creating incentives to avoid the work trip altogether and convert to telecommuting. Moreover, as people continue to express their preferences for less dense housing patterns, much more rapid development of larger lots is likely to take place outside the urban area, which would lead to increased telecommuting.[166]

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Market Resilience. Finally, people change their commuting and travel habits in response to changes in development and traffic. This is illustrated by the comparatively stable national data on work trip travel times. From 1983 to 1995, the average work trip increased from 18.2 to 20.7 minutes, an increase of 14 percent. This is in spite of the fact that roadway expansion was less than the increase in travel demand (The Roadway Congestion Index increased 24 percent).

Decision Process

Once the New Vision is adopted, it could be placed before the public and the state legislature in various formats. It could be presented as an overall regional program to be funded regionally. Or, it could be presented in subregional components, such as at the county level. Through the democratic process the people of Atlanta can determine whether they wish to take the steps necessary to improve traffic congestion or accept continued deterioration. The plans in place at this time provide no such choice, and accept further deterioration.

Conclusion

Summarized, the above analysis finds that:

Traffic demand exceeds the supply of road space in the Atlanta region

Nearly all new travel in the Atlanta region will be highway rather than transit demand. Most of the new highway demand will be for single occupant vehicle travel.

Current plans call for a significantly smaller increase in road capacity rather than in traffic volumes.

Securing the Atlanta region's future growth depends upon solving the traffic congestion problem

[166]Sir Peter Hall's *Cities in Civilization* describes the resistance of Stockholm area residents to planning dictates that required higher housing densities. In recent years, most new housing has been, as in U.S. suburbs, single family detached (New York: Pantheon, 1998).

There is virtually no prospect for reducing traffic congestion in the Atlanta region except through facilitating the increased highway demand through capacity enhancements and improved traffic management.

Responsible authorities should undertake the development of a revised regional transportation plan that seeks to *reduce* traffic congestion, while recognizing these realities.

Appendix 1: Transit's Potential – Perception and Reality

The modern urban area faces a dilemma in transportation. There is what might be called a "blind faith" that transit is the antidote to urban traffic congestion.[167] In reality, however, this view is largely false and leads to unrealistic expectations of transit.

There is a recognition that the suburbanized urban form that has emerged in the 20th century has been associated with much greater automobile use. Whether because sufficient roadways have not been provided or because to provide such space is politically impossible (below), the effect has been that traffic congestion has become much worse.

From a theoretical perspective, the answer seems clear to some : reduce automobile usage, which would require significant substitution of trips by transit, walking, and cycling.

The reality, however, is that reducing automobile use is no simple matter. In the modern urban area, destinations are far apart and dispersed throughout a geographical expanse that cannot be competitively served by transit and makes walking and cycling either infeasible or unattractive for the overwhelming majority of trips.

While densification strategies may at the micro (personal) level allow for some reduction of automobile use for a few, the overwhelming majority of trips even in the denser areas will be by automobile. At the macro (community or regional) level, little, if any change in travel behavior will be observed, and traffic will continue to get worse.

Transit Market Segments. Transit service serves some markets better than others (Table #10). Transit has the most important role to play with regard to passengers who do not have access to automobiles for their trips.

> **The "Captive" Market: Low Income Access In the Core.** Low-income people are far more likely to not have automobiles available for their trips. As a result, they may be captive to transit for their mobility. Transit provides effective access, primarily within the central city, for people without access to automobiles. Transit also provides access for central city residents to some suburban employment centers. In general, however, transit is unable to provide access to suburban jobs that are dispersed throughout the urban area. This is not just an Atlanta phenomenon (as in the case of Boston, above).
>
> **The "Captive" Market: Disabled Access Throughout the Service Area.** People unable to use the transit system by virtue of disability are provided with door-to-door service by MARTA, pursuant to federal requirements. This service provides alternative access throughout the MARTA service area.

[167] This is illustrated by the above cited Brookings Institution Atlanta report, which analyzed the traffic situation and concluded that expanded transit was an important solution, with minimal discussion of the connection between transit expansion and traffic.

The Discretionary Market. With respect to the discretionary market (people who have automobiles available), transit's potential is much more limited.

Discretionary Market; Downtown Work Trips. Transit provides an alternative to the automobile for downtown commuters. Downtown is the only location in the urban area to which transit provides service that is time competitive with the automobile. This is because transit service is oriented toward downtown as a hub. Moreover, Atlanta has arguably one of the best transit served downtown areas in the nation.

Discretionary market; Non-Downtown Work Trips. Suburban employment centers and other non-downtown employment locations, even when comparatively densely developed, tend to be particularly pedestrian unfriendly, with buildings spaced far apart and often without sidewalks. Pedestrian "friendliness" is important to public transit, because its riders walk to their places of employment from transit stops. This is illustrated in the Perimeter Center area, which is served by the MARTA Dunwoody rail station. Comparatively few of the thousands of Perimeter Center jobs are within walking distance (1/4 mile) of the station. As a result, a number of employers operate van shuttle services from the rail station, which are particularly effective in providing mobility to employees who do not have access to cars.

Suburban (non-Downtown) employment centers generally do not have automobile competitive transit service, by virtue of the fact that travel times are excessively long. This is because most suburban work trips would require travel to Downtown and transferring to another bus or train.

The dilemma for the potential non-Downtown transit commuter is similar to what occurs in the airline hub and spoke system. A person seeking to fly from Charlotte to Cleveland could fly on Delta Airlines from Charlotte to Atlanta and then transfer to a flight to Cleveland. This indirect and time consuming itinerary, however, is not likely to appeal to the majority of travelers. Unless there is no choice, or there is a significant cost difference, the Charlotte to Cleveland air traveler will take the direct flight rather than the itinerary that requires a transfer (change of plane).

Commuters with automobiles do the same. According to ARC, the average work trip commute time is 30 minutes in the Atlanta area. Generally, transit commuting takes longer than commuting by car. In 1990, the average transit commute in the Atlanta area was 30 percent higher than the average single automobile commute to Downtown (Downtown transit commutes took 40 minutes each way). To non-Downtown locations, transit commuting took 60 percent longer. But few jobs outside Downtown are within a 40 minute transit commute. In 2000, it is estimated that 10 percent of the jobs in the Atlanta region are within 40 minutes transit access to people with income levels that have reliable automobile availability (the top 75 percent of income levels). By 2025, this figure will increase to 11 percent. One-half or more of these transit accessible jobs are located in the Downtown area (Figure #38)

This suggests that to make transit competitive with the automobile for 50 percent of the automobile owning population would require nearly five times as much in expenditures as is planned by 2025. To

achieve access for all would cost at least nine times as much in expenditures -- annual operating spending would need to be at least $4.5 billion (2000$).[168]

As a result, in Atlanta and around the nation, even densely developed suburban employment centers have comparatively low transit work trip market shares.

Discretionary Market; Other Trips. Generally transit service to non-work destinations is far too slow and inconvenient in comparison with automobile travel. An exception is travel to sporting and other special events in the Downtown area, where there is some transit use by people who have access to automobiles.

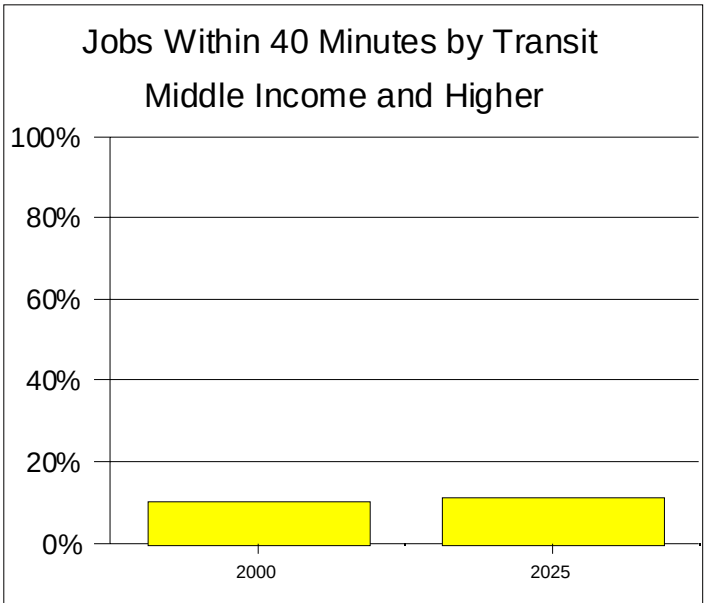

Figure 38
Source: Estimated from ARC data.

Downtown Orientation; An Appropriate Design. This is not to suggest that the transit system in Atlanta should be reconfigured to better serve suburban employment centers. Generally, MARTA's hub and spoke Downtown oriented transit system represents the most effective possible design. To replicate the downtown oriented design in other areas would require separate hub and spoke systems oriented to virtually every employment center to be served. This would require literally hundreds of buses for each hub and spoke system. Worse, because of the lower employment densities and the less favorable transit environment in such centers, transit demand would be considerably lower than in Downtown. In short, to provide auto-competitive transit service to locations other than Downtown is impractical, extravagant and effectively impossible. As a result, neither ARC nor other regional planning organizations around the nation have ever seriously proposed transit systems that would provide auto-competitive mobility throughout a metropolitan area.

[168] Even these levels of investment would not achieve these levels of transit access, since employment outside Downtown, of which 80 percent is outside the large employment centers, is so much more expensive to serve than Downtown employment.

Table #10 Transit Market Segments and Extent of Transit Use			
Market Segment		Description of Transit Service	Extent of Transit Use
1.00	**"CAPTIVE" MARKET (Automobile Not Available for Trip)**		
1.10	**Disabled**		
1.11	Live in MARTA Service Area	Served by Dial-A-Ride	HIGH
1.12	Live Outside MARTA Service Area	Little or No Service	NONE TO LOW
1.20	**Other Transit Dependent Residents** (66% of Jobs More than 1 Hr. Ride)		
1.21	Live in Central Area	Relatively Frequent Service	HIGH
1.22	Live Outside Central Area	Little or No Service: Generally Requires Transfer	LOW TO MEDIUM
2.00	**DISCRETIONARY MARKET (Automobile Is Available for Trip)**		
2.10	**Work Trips** (90% of Jobs More than 40 Minute Ride)		
2.11	Employment Downtown (6% of Jobs)	Bus and Rail Service Time Competitive with Autos, Generally No Transfer Required	MEDIUM
2.12	Employment Elsewhere (94% of Jobs)	Little or No Transit Service. Where Available Tends to Require Transfer. Too Slow to be Auto Competitive	NONE TO LOW
2.20	**Other Trips**		
2.21	Downtown Special Events	Downtown Oriented Network Provides Service from Throughout the MARTA Service Area	LOW TO MEDIUM
2.22	All Other Trips	Service Generally Too Slow and Infrequent in Comparison with Auto.	NONE TO LOW

Appendix 2: Portland and "Smart Growth"

Among U.S. urban areas, Portland has proceeded the farthest in implementing "smart growth" policies, with far more intense land regulation than is proposed by ARC for Atlanta. For example, Portland has adopted an urban growth boundary to force new development within a prescribed area, has imposed higher residential and commercial density requirements and intends to severely limit the amount of new roadway provided. These measures are having or are projected to have the following effects.

The imposition of the urban growth boundary reduces the amount of developable land. This artificial scarcity increases the cost of land and has resulted in significant increases in housing prices. Portland, which was an affordable housing market in 1990, has become the most unaffordable major metropolitan area outside California. Homes are affordable for twice as high a percentage of median income households in Atlanta as in Portland, and nationally housing is 70 percent more affordable.[169] Defenders of the Portland urban growth boundaries have suggested that the escalation of housing prices is a result of Portland's attractiveness to new residents. However, it appears that the Atlanta area is more attractive than Portland. The Atlanta region has grown 40 percent more quickly than the Portland area since 1990,[170] and over the same period comparative housing affordability in Atlanta has *improved*, in contrast with Portland's decline.[171] The net effect of the public policy induced higher housing prices will be to make home ownership more costly and less available to young people and lower income citizens, especially minority populations that have not yet achieved middle and upper middle income levels.

Portland has also relied upon a strategy of building light rail in hopes of reorienting development and land use. Present ridership is 60,000 daily, less than one-third that of MARTA's rail system. To encourage development, however, Portland has had to offer 10 year property tax abatements. The proximate cause of any such development is more likely to be tax policy than the rail access. The belief of Portland officials and others that rail is a significant influence in accomplishing more compact development is countered by the fact that all the Sierra Club's top three most "sprawl threatened" urban areas have completed major rail programs (Atlanta, Washington and St. Louis).

Portland's traffic congestion is rapidly deteriorating. Along the light rail corridor that has been operating nearly 15 years, automobile usage has increased at a greater rate than any other radial corridor (more than 70 percent).[172] Portland's Roadway Congestion Index has risen to 1.22, just under Atlanta's 1.23, and has risen at a faster rate than that of Atlanta since 1985. It is projected, based upon Portland metropolitan government projections, that traffic congestion in Portland will exceed the current Los Angeles rate by 2015 (Los Angeles has by far the nation's worst traffic congestion, with a Roadway Congestion Index of 1.51).[173] Indeed, more intense traffic appears to be a planning goal of Portland

[169] Internet: http://www.demographia.com/dm-nahb9804.htm
[170] http://www.demographia.com/db-met99.htm
[171] http://www.demographia.com/dm-nahb9804.htm
[172] http://www.publicpurpose.com/ut-porfy.htm
[173] Wendell Cox, *The President's New Urban Sprawl Initiative: Program in Search of a Problem*, The Heritage Foundation, 1999. Internet: http://www.demographia.com/db-hersprawl.htm

officials, who have adopted traffic improvement plans that require severe congestion before capacity enhancements are considered.[174]

Yet, while driving up housing prices and inducing higher levels of traffic congestion, Portland will not materially increase the amount of travel on transit or decrease the amount of automobile use. Transit's share of motorized trips[175] is projected by the same metropolitan officials to increase from 3.0 percent in 1990 to 6.3 percent in 2040, while the automobile market share would decline from 97.0 percent to 93.7 percent.[176]

[174] http://www.demographia.com/db-por-reloca.htm
[175] Non-motorized trips (such as bicycle and walking) would rise from 5.2 percent of all trips in 1990 to 5.7 percent in 2040.
[176] Calculated from data in Portland *2040 Plan.*

Appendix 3: Induced Traffic – Myth and Reality

Public officials have been led to believe that building new roadways does not reduce traffic congestion – indeed, that it increases automobile use substantially. Two studies are often cited that purport to demonstrate the futility of accommodating traffic by building more roadways.

> A study by Hansen and Huang[177] found that the percentage increase in freeway traffic is 90 percent of the percentage increase in freeway lane mileage. This is, effectively, a finding that the mere provision of additional capacity causes people to drive more. This is referred to as "induced demand." This type of conclusion has led to the view that it is impossible to "build our way out of congestion."
>
> A report[178] by the Surface Transportation Policy Project (STPP) analyzed the 70 urbanized areas in the 1996 Texas Transportation Institute Roadway Congestion Index (RCI) survey. STPP found that the one-half of the urbanized areas that built fewer new roadway miles from 1982 to 1996 had approximately the same RCI as the one-half that built more miles.

The Hanson-Huang study, however, was limited to freeway and did not quantify the impact of freeways expansion on adjacent arterials and other surface streets. It is to be expected that when faster roadways, such as freeways, are opened, drivers will switch from slower arterials. It is likely that a large percentage of the "induced demand" found by Hanson and Huang was simply demand that was transferred from other roadways.[179]

The STPP report failed to note, however, that the RCI in urbanized areas that built less roadway increased one-third more than where more roadway was built. Moreover, STPP failed to account for differences in population growth -- the urbanized areas that built more roadway grew 13 percent more than the areas that built less (Figure #3). In the one-half of urbanized areas that built more roadways, the population adjusted Roadway Congestion Index rose 8.9 percent, less than one-third the 30.5 percent rate of change in the urban areas that built less roadway.

If the mere provision of additional highway capacity were a primary generator of additional traffic, then it would be expected that per capita street and highway travel would have increased significantly more in urbanized areas that expanded their highway systems at a greater rate. This, however, is not the case. From 1982 to 1997:[180]

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[177] Mark Hansen and Yuanlin Huang, "Road Supply and Traffic in California Urban Areas," *Transportation Research A,* 1997, Volume 31.

[178] Surface Transportation Policy Project, *An Analysis of the Relationship Between Highway Expansion and Congestion in Metropolitan Areas: Lessons from the 15-Year Texas Transportation Institute Study,* 1998.

[179] One advantage of building freeways is improved safety. In 1994, fatalities per 100 million passenger miles were 60 percent lower on freeways than on the rest of the roadway system (calculated from Federal Highway Administration data).

[180] Analysis of Texas Transportation Institute RCI data, 1982 to 1997, urban areas of more than one million population.

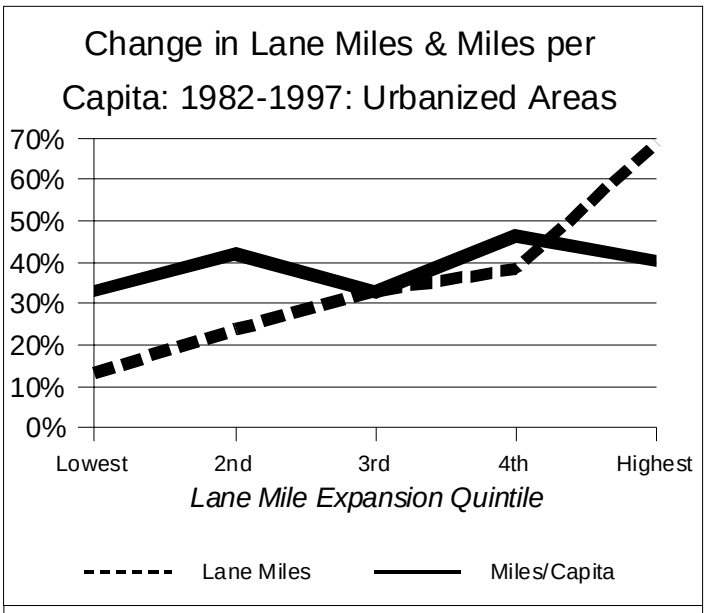

Figure 39
Urban Areas over 1,000,000 (1997). Calculated from Texas Transportation Institute data.

The urban areas that expanded highways the most from 1982 to 1997 did so 423 percent more than the urban areas that expanded highways the least.[181]

The high expansion urban areas experienced street and highway travel per capita increases 22 percent more than the low expansion urban areas (bottom quintile). Compared to the low expansion urban areas, traffic increased at approximately 5 percent the rate of highway expansion in the high expansion urban areas.[182]

Among the low expansion urban areas, each 1.00 percent increase in roadway capacity is associated with a 2.51 percent increase in traffic --- more than four times the 0.59 percent increase among high expansion urban areas (Table #11 and Figure #39).

Moreover, even this small induced factor may be misleading. It is likely, for example, that as additional roadway capacity increases, average speeds increase as drivers transfer from slower routes to the quicker new routes. Thus, for example, a shopper may be induced to drive to a shopping center 10 miles away as a result of the new highway capacity, instead of a previous five mile trip to a closer center. Yet there may be no increase in travel time because of the higher speed. While there does not appear to be any research on this issue, it is possible that the small "induced traffic" factor might disappear where traffic is measured in time traveled rather than miles. It is also likely, because air pollution generally falls with higher urban speeds (above), that the new roadway could result in lower emissions.

Table #11
Highway Expansion and Traffic Trends: 1980-1997

Quintile	Change in Freeway Equivalent Lane Miles	Vehicle Miles per Capita	Ratio
Top 8	69.0%	40.4%	58.6%
2nd 8	38.3%	46.4%	121.1%
Middle 7	32.9%	32.4%	98.6%
3rd 8	23.7%	42.0%	177.0%
Bottom 8	13.2%	33.1%	251.0%
Top Compared to Bottom	422.7%	22.0%	

Calculated from Texas Transportation Institute data for urban areas of more than 1,000,000 population.

There is no relationship (no statistically significant relationship) between roadway expansion and the increase in vehicle miles traveled per capita.[183] This is not to suggest that there may be a small increase in miles traveled as a result of new roadways. Faster roadways make it possible for people to gain access to more distant locations without increasing their travel time, which could encourage longer trips. But

[181] Comparison of quintile (8) of urbanized areas over 1,000,000 population that expanded highways the most to the quintile that expanded highways the least. Calculated from Texas Transportation Institute data, 1997.
[182] Calculation: 22%/423%.
[183] Lane miles per capita is used to factor out the traffic volume increasing impact of larger population. A regression analysis found the relationship between lane miles added and the change in vehicle miles per capita to be not statistically significant in urban areas of more than one million population (r^2 of 0.0013, degrees of freedom: 37).

the actual time traveling is not likely to increase. This is illustrated by the fact that the average journey to work time has changed little in recent years (above). As traffic congestion becomes worse, people make adjustments so that their travel times do not materially increase.