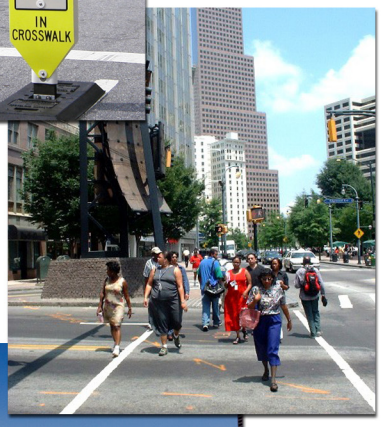

BikePed

Atlanta Region Bicycle Transportation & Pedestrian Walkways Plan

ARC

ATLANTA REGION BICYCLE TRANSPORTATION AND PEDESTRIAN WALKWAYS PLAN

FINAL REPORT

PREPARED FOR:

ATLANTA REGIONAL COMMISSION

PREPARED BY:

SPRINKLE CONSULTING, INC.

June 2007

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PEDS
Atlanta Bicycle Campaign
Georgia Bikes!
Roswell Bikes!
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Georgia Mountains RDC
Chattahoochee Hill Country Alliance
Park Pride
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GLOSSARY OF TERMS

Bicycle Level of Service - A nationally-recognized methodology for modeling bicyclists' sense of safety and comfort while riding along a roadway, based on measurable criteria and expressed on a pseudo-academic (A-F) scale

Bike Lane – A portion of a roadway which has been designated by striping, signing, and pavement markings for the preferential or exclusive use of bicyclists

High Potential Demand – A relative position in the results of the Latent Demand analysis (see below)

Livable Centers Initiative (LCI) - A program offered by the Atlanta Regional Commission that encourages local jurisdictions to plan and implement strategies that link transportation improvements with land use development strategies to create sustainable, livable communities consistent with regional development policies

Latent Demand – A methodology for estimating the potential demand for non-motorized travel at a location based on proximity and mix of origins and destinations; those locations where there are higher occurrences of evenly mixed origins (e.g. residences) and destinations (e.g. workplaces and retail establishments) will usually have higher potential demand for biking and walking; this potential could be released with improvements to biking and walking conditions

Paved Shoulder – The paved portion of the roadway contiguous with the traveled way for accommodation of stopped vehicles, for emergency use and for lateral support of sub-base, base and surface courses; paved shoulders, while not specifically designed for bicycle use, are frequently used by bicyclists

Pedestrian Level of Service - A nationally-recognized methodology for modeling pedestrians' sense of safety and comfort while riding along a roadway, based on measurable criteria and expressed on a pseudo-academic (A-F) scale

Premium Transit Services – Transit services that operate on a regional scale and offer alternatives to the automobile for longer commutes; Premium Transit includes Express Bus service, Bus Rapid Transit (BRT) service, Heavy or Light Rail service, Commuter Rail

Regional Strategic Transportation System – A system of multi-modal transportation facilities and services designated by ARC as having priority for Federal funding assistance; these facilities and services have been deemed essential to meeting regional mobility and accessibility goals and include Premium Transit Services, National Highways, State Highways, as well as selected other principal arterials and other roadways

Shared Use Pathway – A bikeway physically separated from motorized vehicular traffic by an open space or barrier and either within the highway right-of-way or within an independent right-of-way; shared use pathways may also be used by pedestrians, skaters, wheelchair users, joggers, and other non-motorized users

Sidewalk – The portion of a street or highway right-of-way designed for preferential or exclusive use by pedestrians

Sidepath – A shared use pathway that is within the adjacent roadway right-of way

List of Acronyms

AASHTO – American Association of State Highway and Transportation Officials

ADA – Americans with Disabilities Act

ADAAG – *ADA Accessibility Guidelines for Buildings and Facilities*

ADT – Average Daily Traffic

ARC – Atlanta Regional Commission

DCSN – Detailed Corridor Study Needed

GDOT – Georgia Department of Transportation

LCI – Livable Centers Initiative

LOS – Level of Service

MUTCD – *Manual on Uniform Traffic Control Devices*

MPO – Metropolitan Planning Organization

RDC – Regional Development Center

RDP – Regional Development Plan

RSTS – Regional Strategic Transportation System

RTP – Regional Transportation Plan

SR2S – Safe Routes to School

TAZ – Traffic Analysis Zone

TIP – Transportation Improvement Plan

TTI – Travel Time Index

UGPM – Unified Growth Policy Map

Executive Summary

In 2002, the Atlanta Regional Commission (ARC), the federally designated Metropolitan Planning Organization (MPO) for the 18-county Atlanta Region[1], produced the *Atlanta Region Bicycle Transportation and Pedestrian Walkways Plan (Bike/Ped Plan)*, a policy and project oriented plan that encouraged regional coordination of non-motorized planning efforts. Since that time, the ARC Bicycle and Pedestrian Task Force has expressed that future plans need to continue to focus policies and projects on a regional bicycle network and pedestrian planning around activity centers. This *Plan* update builds on the strategies of the previous plan with the intention of creating both a regional scale bicycle network that includes both on-road facilities and shared use pathways and a pedestrian network focused around major activity centers. The recommendations of this *Plan* are designed to improve mobility for the citizens of the Atlanta Region, thereby encouraging ancillary benefits such as energy savings, air quality improvements, health benefits, and environmental justice.

To guide the development of this *Plan*, a series of logical, realistic, and implementable goals and objectives have been developed; these goals and objectives are based on proven existing goals and objectives, an analysis of existing conditions, a review of existing goals and documents, and input received from ARC staff, the Bicycle & Pedestrian Task Force, and the general public. All of these sources led to a series of regionally significant issues related to bicycle and pedestrian transportation, and the goals and objectives are designed to address these issues; if these Goals and Objectives are achieved, the residents of Atlanta Region will enjoy the numerous benefits associated with non-motorized travel.

The Existing Conditions Report describes and analyzes the level of accommodation for bicyclists and pedestrians on roadways within the Atlanta Region; the technical analyses and public input confirmed that conditions for biking and walking are very challenging across the Region. These two modes are examined in different ways using different performance measures. The level of bicycle accommodation has been surveyed along a selected study network of regionally significant routes across the 18-county Atlanta Region. This focus reflects a strategic decision to examine the bicycle and pedestrian facilities associated with roadways that are part of ARC's Regionally Strategic Transportation System (RSTS),

1 As the MPO for the 18 county region, ARC is charged with coordinating regional plans and policies to meet transportation needs; ARC also serves as the Regional Development Center for 10 counties in the Atlanta region, and in that capacity coordinates work on other regional issues such as economic development, land use and cooperation between local governments.

which are most competitive for federal funding assistance due to their potential to address regional goals related to congestion relief and prevention and air quality. The RSTS network was evaluated to determine the degree of safety and comfort its roadway segments provide to bicyclists. The Bicycle Level of Service (Bicycle LOS) results indicate that the average score for the ARC Bicycle Study network is an "E" (relatively poor). The level of pedestrian accommodation has also been examined through a sampling of high-demand areas from around the Region. The walking experience is analyzed in three distinct components: the condition for walking along the roadside, the condition for crossing the roadside at signalized intersections, and the condition for crossing the roadside at uncontrolled locations. The evaluation of roadside walking conditions in sample areas from around the region revealed various challenges to pedestrians' sense of safety and comfort. ARC staff, representatives from local jurisdictions, stakeholder groups, and the general public confirm the analytical finding that the Region's roadways poorly accommodate bicycling and walking.

The Needs Assessment Report proposes methodologies for evaluating projects submitted to ARC for funding assistance; the methodologies described will help ARC and member agencies alike clarify the relative "need" for various projects by providing an objective framework that quantifies the contribution of a particular bicycle or pedestrian improvement project to the regional goals, focusing on providing safe and effective bicycle and pedestrian transportation networks. For the bicycle study network, specific facility type recommendations are made, including re-striping of roadways to include designated bike lanes, adding paved shoulders, or performing more detailed corridor studies. A project prioritization methodology is also contained in the Needs Assessment Report; this methodology has been carried out for the bicycle study network, and can be applied to other RSTS facilities when specific candidate bicycle and pedestrian projects are submitted by local jurisdictions for funding requests.

In order to implement the changes necessary to achieve the identified goals and objectives (i.e., improved bicycling and walking conditions and access), governing policies must be adopted. The final chapter of this *Plan* recommends specific policies and programs that encourage non-motorized transportation. These policy recommendations include: adopting a clarified project funding approach; taking steps to routinely accommodate bicyclists and pedestrians in roadway construction projects; guidance on retrofitting existing facilities to better accommodate bicyclists; guidance on improving accommodation of pedestrians at unsignalized intersections and mid-block crossing locations; guidance on land-planning practices to increase bicycle and pedestrian connections from residential areas; and continuing the growth of planning and programming to improve bicycle transportation and pedestrian walkways. Adoption and implementation of these programs and policies by state, regional and local agencies and jurisdictions will ultimately lead to increased levels of bicycling and walking, thereby improving energy consumption, air quality, and health.

As a supplement to the *Atlanta Region Bicycle Transportation and Pedestrian Walkways Plan*, a separately bound Technical Appendix has been prepared. This Technical Appendix contains many of the *Plan*'s detailed analysis methodologies and results.

CHAPTER 1: GOALS, OBJECTIVES, AND REGIONAL ISSUES

INTRODUCTION

This chapter of the *Plan* discusses the regionally significant bicycle and pedestrian issues that were incorporated into the *Scope of Service* for this project as it was developed. This chapter identifies the rationale for inclusion (referenced to ARC documents) of particular issues, and then proposes bicycle and pedestrian goals that address these issues. Reasonably attainable objectives for improving regionally significant bicycle transportation corridors and pedestrian areas are then proposed. While these objectives emphasize the strategic focus on regional mobility, they also address standards for future development, the recreational and health benefits of bicycling and walking, and other crucial regional issues. The numerous benefits of bicycling and walking, which can be attained through the fulfillment of the goals and objectives outlined herein, are summarized at the end of this chapter.

REGIONALLY SIGNIFICANT ISSUES THAT SHAPE THE GOALS

One of the purposes of this *Plan* is to develop "a series of logical, realistic, implementable goals and objectives...based on the proven existing goals and objectives, the analysis of existing conditions, the review of existing goals and documents, and input received from ARC staff, the advisory committee and the public."[2] Through listening to ARC staff in the kickoff meeting and a review of the 2002 *Regional Bicycle Transportation and Pedestrian Walkways Plan* and other ARC documents, several crucial regional issues have been identified. These issues were then refined based upon further input from ARC staff and input obtained through the *Plan*'s public involvement component. This final list, which was used to develop and refine goals and objectives, includes Congestion Mitigation, Air Quality, Environmental Justice, Mobility, Accessibility, Safety, and Healthy Living. Each of these issues is either explicitly identified in regional documents (RDP, RTP, *2002 Bike/Ped Plan, Scope*) or implied in policies outlined in those same documents, as shown in Table 1.1.

2 Scope of Service: Atlanta Region Bicycle and Pedestrian Walkway Plan (2006), Atlanta Regional Commission, p. A-6.

Table 1.1 - Crucial Regional Issues and their Source Documents

ISSUE	SOURCE
Congestion Mitigation:	– "reduction of lane miles" affected by delay is identified as a performance measure in the RTP – has been the focus of the Governor's Congestion Mitigation Task Force and was recommended by that task force to be the most heavily weighted factor in prioritizing transportation funds – can be gleaned from policies of *Envision6* and the RDP as well as their underlying planning principles
Air Quality:	– is a fundamental factor in the development of the RTP – is implied in environmental and historic preservation policies of RDP – "air quality conformity" is identified as an issue in the Scope
Environmental Justice:	– is the subject of a stand-alone ARC document – is implied in RTP goal to improve mobility for "all people and goods" – is an explicit concern of RDP policies on housing
Mobility*:	– is identified as an issue in the RTP
Accessibility*:	– is identified as an issue in RTP and LCI program – is implied in RDP policies concerning Transit-Oriented Development
Safety:	– is identified as an issue in the RTP
Healthy Living and "Livability" Initiatives:	– are the subject of separate initiatives, including LCI program – are implied in the 'quality of life' concerns of RTP and RDP

* Note: "Mobility" and "Accessibility" need thorough situational definition due to multiple specific connotations held by each term

BICYCLE GOALS AND OBJECTIVES THAT RESPOND TO REGIONALLY SIGNIFICANT ISSUES

Based on the crucial regional issues identified in the previous section, the following bicycle goals and objectives are proposed. These goals are organized around the crucial regional issues, while the objectives propose specific types of facility improvements and educational or promotional initiatives that will advance the associated goals. The goals (numbered) and objectives (lettered) for bicycle transportation are:

1. Provide a safe and effective network for bicycle transportation for the entire Atlanta region:

A. Accommodate bicyclists within the Regionally Strategic Transportation System (RSTS) by improving the level of accommodation to the targeted Bicycle Level of Service (Bicycle LOS B within the boundaries of LCI study sites and "Regional Places" designated on the Unified Growth Policy Map, and Bicycle LOS C on roadways outside these areas); achieve these targets for 75% of the plan-identified Bicycle Study Network within the next decade; achieve these targets for the entire study network and an additional 500 miles of RSTS routes by 2030.

B. Local governments, through their land development regulation, will require accommodation of bicyclists to achieve the targeted Bicycle LOS in all new development and re-development projects.

C. Continue to support the growth and development of the off-road bicycle network throughout the region.

2. Provide safe and convenient bicycling access to schools.

A. Accommodate bicyclists at the targeted Bicycle LOS on 75% of Bicycle Study Network segments that are within two miles[3] of schools within the next decade.

B. Develop, promote, and implement programs to promote safe cycling for schools in the region

3 All targeted distances named in these objectives are derived from average trip lengths for biking and walking as reported in the 2001 National Household Travel Survey, which were also the basis for the trip lengths used in this *Plan*'s latent demand analysis.

and to acknowledge children who ride their bikes regularly.

C. Continue to support the development of bike lanes or parallel sidepaths along roadways within ½ mile of all schools, especially those roadways in areas of high potential demand[4].

D. By 2030, all schools in the region will have designated secure bicycle parking areas.

3. Provide safe and convenient bicycling access to high demand destinations that are consistent with ARC land use policies outlined in the Regional Development Plan and *Envision6*.

A. Accommodate bicyclists at Bicycle LOS B on 75% of Bicycle Study Network segments within the boundaries of LCI study areas within the next decade; prioritize the improvement of bicycle accommodation on other RSTS roadways within these boundaries.

B. Accommodate bicyclists at Bicycle LOS B on 75% of Bicycle Study Network segments within the boundaries of ARC-identified major activity centers (i.e. "Regional Places" on the Unified Growth Policy Map) within the next decade; prioritize the improvement of bicycle accommodation on other RSTS roadways within these boundaries.

C. Prioritize supplemental funding for end-of-trip facilities (bike parking, etc.) within LCI study areas and "Regional Places."

4. Provide transportation options to residents of the Atlanta Region, thereby improving mobility for people who do not own cars, cannot drive, or wish to drive less, reducing motor vehicle congestion and improving air quality.

A. Accommodate bicyclists at the targeted Bicycle LOS on 75 % of Bicycle Study Network segments within two miles of MARTA rail and other premium transit operations service centers within the next decade.

B. Continue to support the development of bike lanes or parallel sidepaths along roadways within a one-mile radius of MARTA rail and other premium transit operations service centers.

C. Accommodate bicyclists at the targeted Bicycle LOS on 75% of Bicycle Study Network segments that parallel highly congested arterial routes within the next decade.

D. Accommodate bicyclists at the targeted Bicycle LOS on 75% of Bicycle Study Network segments within traffic analysis zones (TAZs) identified by

4 Roadways with "High potential demand" will be defined by the results of the Latent Demand analysis performed as part of Task 3 of this plan.

ARC as Environmental Justice communities (those with a high incidence of poverty and/or minority population) within the next decade.

E. Develop, promote, and implement programs to promote safe bicycle commuting in the region.

F. By 2030, a minimum of 10% of all trips between 1 to 3 miles in length will be made by bicycle. 5% of all trips from 3 to 5 miles will be made by bicycle.

5. Enhance the health, fitness, and quality of life of the citizens of Atlanta Region.

A. Accommodate bicyclists at the targeted Bicycle LOS on 75% of Bicycle Study Network segments within two miles of parks or green space within the next decade.

B. Identify and promote a network of long-ride recreational routes that are presently at Bicycle LOS C or better. Prioritize the improvement of extensions of this network to Bicycle LOS C.

C. Develop, promote, and implement programs and materials to promote safe recreational cycling in the region.

D. Continue to support the development of bike lanes or parallel sidepaths along roadways within a one mile radius of major parks and greenways.

E. Support adoption of local policies that integrate land use and transportation needs by encouraging development patterns that make biking a viable mode for traveling on small errands, shopping trips, and commuting to work or school, either alone or in conjunction with transit use.

While this list of goals and objectives is organized to respond to the set of crucial regional issues, in practice most goals and objectives will address multiple issues beyond the primary issue they for which they were drafted. Table 1.2 illustrates some of this cross-seeding between issues and goals.

Table 1.2 - Bicycle Goals Matched Against Regional Issues

✓ = Primary issue addressed by goal + = Secondary issue that benefits from achievement of objectives

	ISSUES						
GOAL or OBJECTIVE	CONGESTION MITIGATION	AIR QUALITY	ENVIRONMENTAL JUSTICE	MOBILITY	ACCESSIBILITY	SAFETY	HEALTHY LIVING
1) Provide safe and convenient bicycling throughout the region	+	+	+	✓	+	✓	+
2) Provide safe and convenient bicycle access to schools	+	+	+	+	+	✓	+
3A) Provide safe and convenient bicycle access to LCI study sites	✓	+	+	+	✓	+	✓
3B) Provide safe and convenient bicycle access to Activity or Town Centers	✓	+	+	+	✓	+	+
4A, 4B) Improve bicycling access to MARTA stations	✓	+	✓	+	✓	+	+
4C) Improve bicycling conditions on routes parallel to congested arterials	✓	+	+	+	+	+	+
4D) Improve bicycling conditions in Environmental Justice communities	+	+	✓	+	+	+	+
5A) Provide safe and convenient bicycle access to parks and green space	+	+	+	+	+	+	✓
5B) Identify a long-ride network	+	+	+	+	+	+	✓

PEDESTRIAN GOALS AND OBJECTIVES THAT RESPOND TO REGIONALLY SIGNIFICANT ISSUES

Based on the crucial regional issues identified previous section, the following pedestrian goals and objectives for the *Atlanta Region Bicycle Transportation and Pedestrian Walkways Plan* have been identified. The goals are organized around the crucial regional issues, while the objectives propose specific types of facility improvements and educational or promotional initiatives that will advance the associated goals. These goals and objectives are similar in many ways to the bicycle goals and objectives, but they are more focused on zones within closer proximity to high potential pedestrian activity areas. It is important to note that improvements to pedestrian conditions must be compliant with the standards of the Americans with Disabilities Act (ADA); local jurisdictions should consult their own ADA Transition Plans and the ADA Accessibility Guidelines for Buildings and Facilities (ADAAG) for guidance on the ADA requirements of specific projects. The goals (numbered) and objectives (lettered) for pedestrian walkways are:

1. To provide a safe and effective network of pedestrian walkways for the entire Atlanta Region by improving roadside walking conditions and crossing conditions at both uncontrolled locations and signalized intersections.

A. Accommodate pedestrians within the RSTS by improving the level of accommodation along roadsides to the targeted Pedestrian Level of Service (Pedestrian LOS "B" within the boundaries of LCI study sites and "Regional Places" designated on the Unified Growth Policy Map and Pedestrian LOS "C" along roadways outside these areas).

B. Require the accommodation of pedestrians to the targeted Pedestrian LOS—and also comply with ADA standards and with design guidelines of adopted regional and/or local plans—in all new development and re-development projects.

2. Provide safe and convenient pedestrian access to schools.

A. Accommodate all pedestrians at the targeted Pedestrian LOS on RSTS roadsides that are within one mile of schools; give priority to those roadways in areas of high potential demand.

B. Develop, promote, and implement programs to promote pedestrian safety for schools in the region.

3. Provide safe and convenient pedestrian conditions around high demand destinations that are consistent with ARC land use policies outlined in the Regional Development Plan and *Envision6*.

A. Accommodate pedestrians at Pedestrian LOS B along RSTS roadsides within the boundaries of LCI study areas.

B. Accommodate pedestrians at Pedestrian LOS B along RSTS roadsides within the boundaries of ARC-identified major activity centers (i.e. "Regional Places" on the Unified Growth Policy Map).

4. Provide transportation options to residents of the Atlanta Region by improving overall walking conditions and especially improving pedestrian access to transit, thereby improving mobility for people who do not own cars, cannot drive, or wish to drive less, reducing motor vehicle congestion and improving air quality.

A. Accommodate all pedestrians at the targeted Pedestrian LOS along RSTS roadsides within one mile of MARTA rail and other premium transit operations service centers.

B. Accommodate pedestrians at the targeted Pedestrian LOS along RSTS roadsides that parallel highly congested arterial routes and are served by transit routes.

C. Accommodate pedestrians at the targeted Pedestrian LOS along RSTS roadsides within TAZs identified by ARC as Environmental Justice communities (those with a high incidence of poverty and/or minority population).

5. Provide guidance to jurisdictions and agencies around the Atlanta Region on strategies to better accommodate pedestrians crossing the Region's roadways, especially at unsignalized intersections and mid-block locations.

6. Enhance the health, fitness, and quality of life of the citizens of Atlanta Region.

A. Accommodate pedestrians at the targeted Pedestrian LOS along RSTS roadsides within one mile of parks or green space.

B. Develop, promote, and implement programs and materials to promote safe recreational walking in the region.

C. Support adoption of local policies that integrate land use and transportation needs by encouraging development patterns that make walking a viable mode for traveling on small errands, shopping trips and commuting to work or school, either alone or in conjunction with transit use.

Table 1.3 - Pedestrian Goals Matched Against Regional Issues

✓ = Primary issue addressed by goal + = Secondary issue that benefits from achievement of objectives

	ISSUES						
GOAL or OBJECTIVE	CONGESTION MITIGATION	AIR QUALITY	ENVIRONMENTAL JUSTICE	MOBILITY	ACCESSIBILITY	SAFETY	HEALTHY LIVING
1) Provide safe and convenient pedestrian walkways throughout the region	+	+	+	✓	+	✓	+
2) Provide safe and convenient pedestrian access to schools	+	+	+	+	+	✓	+
3A) Provide safe and convenient pedestrian conditions around LCI study sites	✓	+	+	+	✓	+	✓
3B) Provide safe and convenient pedestrian conditions around Activity or Town Centers	✓	+	+	+	✓	+	+
4A) Improve pedestrian conditions around to MARTA stations	✓	+	✓	+	✓	+	+
4C) Improve pedestrian conditions in Environmental Justice communities	+	+	✓	+	+	+	+
5) Provide guidance to improve pedestrian crossing conditions	+	+	+	✓	✓	+	+
5A) Provide safe and convenient pedestrian conditions in areas around parks and green space	+	+	+	+	+	+	✓

As with the bicycle goals and objectives, these pedestrian goals and objectives are organized to respond to the set of crucial regional issues and most address multiple issues beyond the primary issue they were drafted in response to. Table 1.3 illustrates some of this cross-seeding between issues and goals.

BENEFITS OF BIKING AND WALKING: PERSONAL, LOCAL, REGIONAL

Active transportation modes, including biking and walking, play important, but often overlooked, roles in an efficient, equitable, and healthy transportation system. Improved active transportation conditions and increased use of these modes provides a multitude of benefits, particularly when it substitutes for motor vehicle travel. Some of these benefits are obvious and widely recognized; others are less well known. This section outlines various categories of the benefits, all of which can be achieved by reaching the *Plan* goals and objectives.

TRANSPORTATION OPTIONS (MOBILITY)

- Improved biking and walking conditions provide basic mobility for people who do not have personal automobiles.
- Improved biking and walking conditions provide access to public transit for longer trips.
- Improved biking and walking conditions provide opportunities for drivers to save money on gas and car maintenance.

CONGESTION MITIGATION

- Improved bicycle and pedestrian conditions allow commuting options for people who live relatively close to work.
- Improved biking and walking conditions provide access to public transit for longer trips that replace long-distance motor vehicle travel.
- Improved biking and walking conditions are cost-effective ways to accommodate more trips through our existing transportation rights-of-way.

AIR QUALITY

- Biking and walking create no vehicle emissions.

- Enhanced opportunities for local walking and biking, as well as easy access to transit, allow individuals to do their part to help solve the problem of air pollution.

- Vehicles burn fuel less efficiently before their engines have warmed up, increasing harmful emissions.[5] Biking and walking can replace short trips that pollute at a disproportionately high level.

HEALTHY LIVING AND QUALITY OF LIFE

- 30 minutes of moderate exercise, five days a week, can significantly reduce risks for many illnesses including heart disease, high blood pressure, arthritis, depression and obesity.[6]

- Various studies[7] indicate a median average cost savings of $128 per person per year for individuals who report a lack of recommended physical activity. Providing improved bicycle and pedestrian facilities could potentially save the Atlanta Region approximately $360 million over ten years in this regard.[8]

- Biking and walking on short errands can provide the sort of moderate exercise needed to reduce these risks.

- Improved biking and walking conditions provide transportation benefits while also providing opportunities for physical activity.

- Improved biking and walking conditions add to the vitality and quality of life of community centers across the Atlanta Region.

5 Tips to Taking the Sting Out of High Gasoline Prices. United States Department of Energy. http://www1.eere.energy.gov/femp/newsevents/fempfocus_article.cfm /news_id=9364. Accessed Apr. 12, 2007.

6 U.S. Department of Health and Human Services. Physical Activity and Health: A Report of the Surgeon General. Atlanta GA: U.S. Department of Health and Human Services, Centers for Disease Control and Prevention, National Center for Chronic Disease Prevention and Health Promotion, 1996. p. iii.

7 Conserve by Bicycle Program Study, Florida Department of Transportation, forthcoming.

8 Based on the U.S. Census 2006 estimated population of the 18 counties at least partially contained by the MPO (4.8 million), a 60% insufficient activity level as estimated from CDC data, and an assumed 10% increase in sufficient activity level (6% of the total population) through the increased provision of bicycle and pedestrian facilities.

CHAPTER 2: EXISTING CONDITIONS REPORT

In order to gauge progress of the identified goals and objectives, it is necessary to have an accurate picture of existing conditions that can serve as a baseline measure. Accordingly, biking and walking conditions have been evaluated based on a series of performance measures. The existing conditions evaluations have been performed against the backdrop of several trends that have a direct relationship to non-motorized transportation: increasing congestion and associated energy/air quality impacts, increasing obesity among the Atlanta Region's residents, especially children, and the common practice of constructing roads without the provision of bicycle and pedestrian facilities.

This Existing Conditions Report describes and analyzes the level of accommodation for bicyclists and pedestrians on roadways within the Atlanta Region. The two modes are examined in different ways using different performance measures. The level of bicycle accommodation has been surveyed along a selected study network of regionally significant routes across the 18-county ARC planning area. This focus reflects a strategic decision to examine the bicycle and pedestrian facilities associated with roadways that are part of ARC's Regionally Strategic Transportation System (RSTS), which are most competitive for federal funding assistance due to their potential to address regional goals related to congestion relief and prevention and air quality. This chapter explains the process of selecting the study network, describes the methods of analysis used, and summarizes the results of the analysis.

The level of pedestrian accommodation has also been examined through a sampling of high-demand areas from around the Region. The walking experience is studied in three distinct components: the condition for walking along the roadside, the condition for crossing the roadside at intersections, and the condition for crossing the roadside in areas between intersections. This chapter describes the selection of the pedestrian focus areas and discusses the general challenges faced by pedestrians in the three distinct components of the walking environment, as well as the specific factors that affect the walking experience.

This chapter also provides a snapshot of the types of policies in place around the Region which aim to increase the level of accommodation for bicyclists and pedestrians.

BICYCLING CONDITIONS IN THE ATLANTA REGION

THE BICYCLE STUDY NETWORK

The bicycle transportation network that serves the citizens of the Atlanta Region consists of nearly every roadway in the 18-county ARC planning area, with the exception of those routes—such as interstate highways and other limited-access freeways—on which bicycles are specifically prohibited. This network includes roads of all functional classes as well as off-street pathways. Individual cyclists choose their own routes within this extensive network based on various factors including the purpose of their trip, their comfort with riding in traffic, and their knowledge of route alternatives. These variable factors combine to present several options for each individual trip and, in aggregate, present a total network comprised of thousands of corridors that form an infinite number of routes.

Because this Plan is focused on improving conditions for bicycle transportation across the 18 counties of the Atlanta Region, a study network was established for the planning process based on selected corridors that are significant to regional transportation needs and have a federal funding priority for a high potential for mitigating congestion. These strategic corridors have been prioritized for "stand-alone" bicycle projects that utilize federal funds. Due to extremely limited federal funding, improvements on other facilities will generally be realized through the implementation of "Routine Accommodation" policies and incorporated within the design of a broader roadway improvement project, or be financed through local funds or other sources.

This *Plan* uses a study network of regionally strategic bicycle corridors which serve as links between regionally significant nodes (Figure 2.1). The links and nodes that comprise this study network are based on classifications of regionally significant destinations (nodes) and roadways (links). The primary nodes of this network are ARC-defined Livable Centers Initiative (LCI) study sites, Town Centers, and Activity Centers, incorporated cities with populations over 5000, county seats, and staff-designated "Major Activity Centers." These regionally significant nodes are connected by regionally significant roadways, selected from ARC's RSTS, to create the *Plan*'s study network.

While the fundamental structure of the study network is based on where the RSTS roadways connect the regionally significant nodes—and the analysis is focused on how these roads can be improved to be more multi-modal—there are some additional study links beyond the RSTS (or require a choice between two RSTS segments) that were chosen for specific reasons, including the following:

- A regionally significant node is not located on an RSTS roadway.

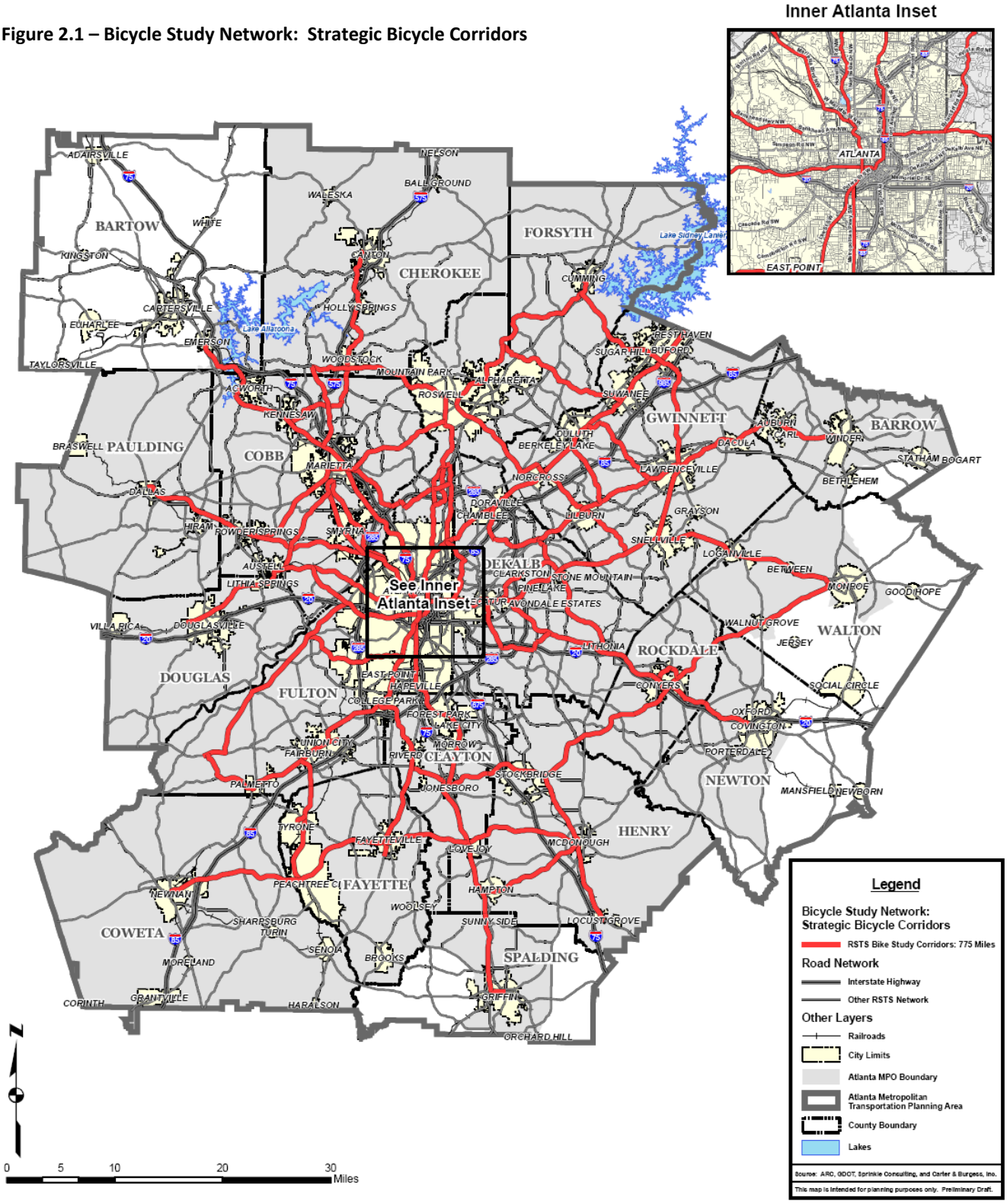
- Diversion toward an existing or programmed Regional Transit facility (MARTA rail station, express bus park & ride, etc.), when these facilities are not in close proximity to an RSTS road.

- Diversion onto an existing off-street multi-use pathway when that pathway makes a direct connection between regionally significant nodes.

Certain sets of regionally significant nodes presented multiple opportunities for connection via different RSTS roadways. While multiple links between nodes may have been selected in some cases, a primary study link was designated based on multiple factors including, but not limited to, proximity to: schools, parks and open space, recreation areas, and transit routes.

While the study network for this *Plan* is drawn from links between regionally significant nodes via RSTS roadways, it is important to stress that the total bicycle network for the Atlanta Region is much more extensive, as stated above. This *Plan* covers the total bike network through its goals, objectives, performance measures, and policies; the study network has been selected for analysis in the *Plan* document to serve as a "blueprint" for an on-going process of expanding the network of regionally significant bicycling corridors in the growing Atlanta Region.

Figure 2.1 – Bicycle Study Network: Strategic Bicycle Corridors



METHOD OF EVALUATION FOR THE BICYCLE STUDY NETWORK

For a picture of the overall level of accommodation for bicyclists, bicycling conditions on nearly 700 miles of roadway along the selected study network were evaluated using a popular method known as the Bicycle Level of Service Model, Version 2.0. This performance measure has been developed with a background application of over 200,000 miles of evaluated urban, suburban, and rural roads and streets across North America. It is adopted by numerous states and metropolitan areas as the standard for determining existing and anticipated bicycling conditions. Many urbanized area planning agencies and state highway departments are also using this established method of evaluating their roadway networks. This statistically reliable mathematical model yields numerical scores stratified into service categories[9] (A, B, C, D, E, and F) for each roadway, reflecting users' perceptions of how safe or comfortable the roadways are for bicycle travel; participants in the research that developed the model were instructed to rate those environments they found most accommodating with an "A" and those they found least accommodating with an "F." Factors considered in this evaluation include: volume, mix, and speed of vehicular traffic on the roadway; the width of the outside travel lane and the width of any paved shoulder or bike lane; the pavement condition; and the presence and occupancy rate of on-street parking (for a detailed description of this widely-used method and its development, see Appendix A).[10] This evaluation required an extensive field-based data collection effort to gather information regarding the typical configurations, dimensions and surface conditions of the study networks segments, with re-segmentation occurring as changes in any of the principal factors were observed. These field data were supplemented with Average Daily Traffic (ADT) volumes from the Georgia Department of Transportation (GDOT) Roadway Characteristics (RC) database as well as an estimated truck traffic percentage derived from a given segment's traffic volume, posted speed limit,

9 Level of Service categories for non-motorized modes are similar to those for motor vehicles, with one important exception: the Highway Capacity Committee has designated Level of Service "D" as standard minimum "acceptable" level of service. The Bicycle Pedestrian Level of Service Models, however, were developed with input by bicyclists and pedestrians operating in real environments, who assigned letter grades on an A-F scale, with A representing the most accommodating conditions and F representing the least accommodating conditions. In practice, then, an "acceptable" level of service is determined with each evaluation, depending on local needs and expectations. For more information see NCHRP 3-70.

10 Certain local conditions required some tailoring of the assessment methodology. For example, there are many miles of study network roadways that pass through rural areas and often will have rumble strips embedded in their shoulders. In these cases, only that part of the shoulder that lies outside the rumble strip is measured as the width of the paved shoulder. If that remainder was less than three feet, it was not counted as a rideable shoulder at all, and the lane width dimension was taken from the outside of the motor vehicle travel lane stripe. Those shoulders which had more than three feet remaining after subtraction of the rumble strip area were counted as rideable shoulders.

and urban or rural setting. These data were then entered into the Bicycle Level of Service equation to derive the scores for each category.[11]

BICYCLE LEVEL OF SERVICE EVALUATION RESULTS

The distance-weighted average score for the ARC Bicycle Study network is 4.54, which translates to a Bicycle Level Service grade of "E." The distribution of Bicycle Level of Service Grades across the network is as follows:

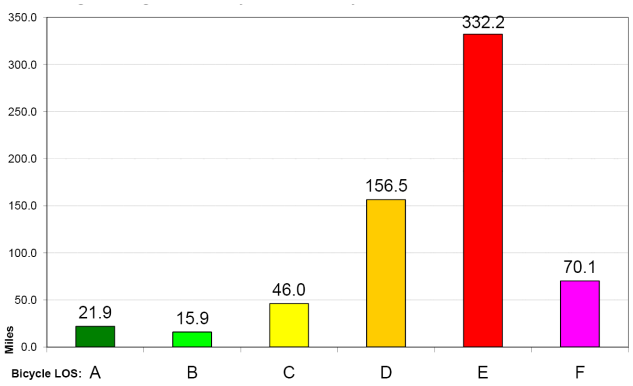
Bicycle Level of Service A:	3.4%	(21.9 miles)
Bicycle Level of Service B:	2.5%	(15.9 miles)
Bicycle Level of Service C:	7.2%	(46.0 miles)
Bicycle Level of Service D:	24.3%	(156.5 miles)
Bicycle Level of Service E:	51.7%	(332.2 miles)
Bicycle Level of Service F:	10.9%	(70.1 miles)[12]

These results are depicted graphically in Figure 2.2 below and in Figure 2.3 (map); the full database and individual results for the Bicycle Level of Service assessment is contained in Appendix B.

FIGURE 2.2 - Bicycle LOS results for ARC Regional Bicycle Study Network

Distance weighted average for entire network:

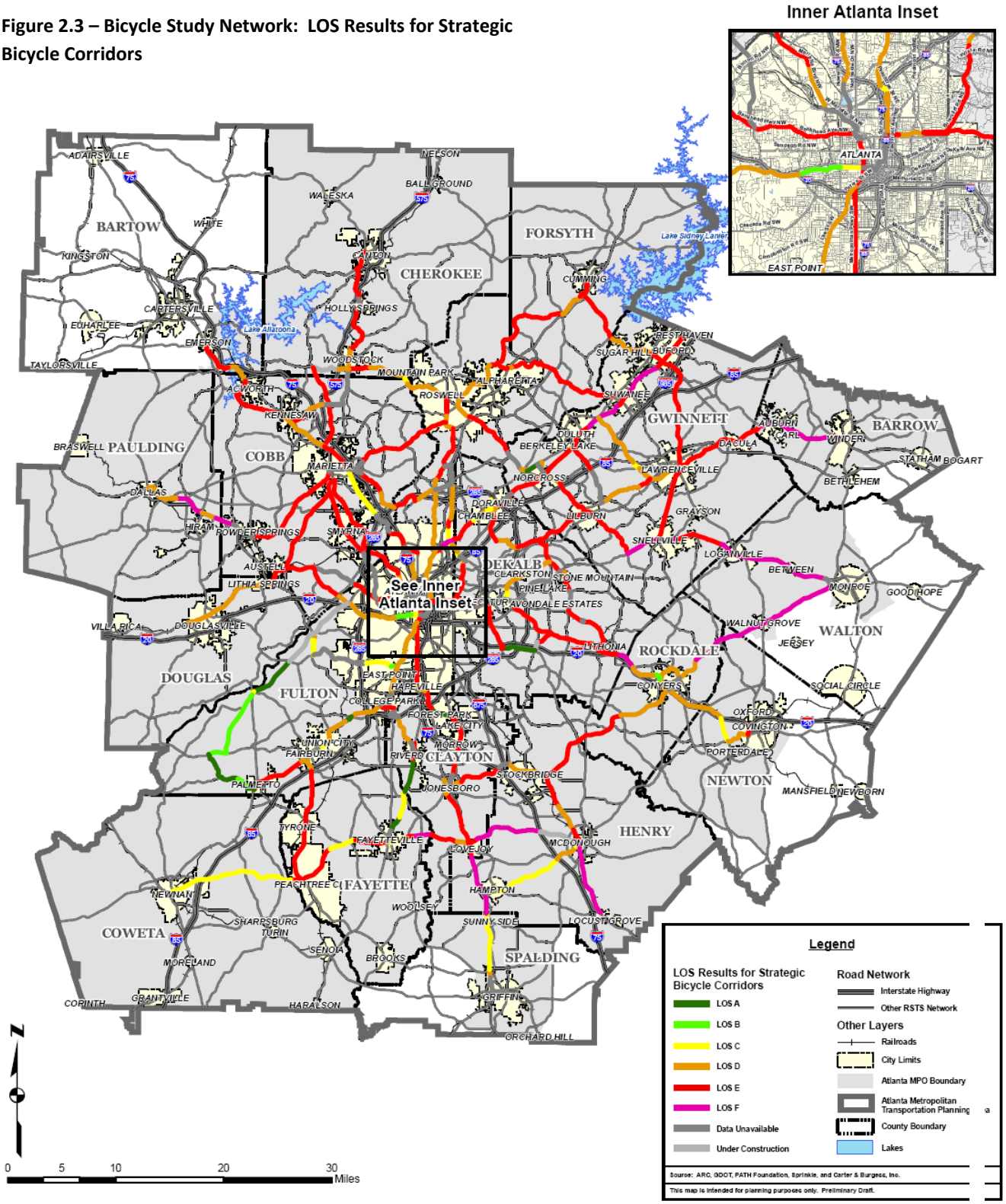
4.54= Bicycle LOS "E"



11 Field-obtained data were verified and updated based on input received at the Community Open House Workshops held in October 2006, and traffic volume data was reviewed by ARC staff and members of the ARC Bike/Ped Task Force, who provided alternate sources for certain segments.

12 Just over 690 miles were surveyed. Of these, 642 miles were given Bicycle LOS results. Of the balance, 34 miles were unable to be completely evaluated due to some insufficient data (usually traffic volume) and another 14.75 miles were under construction at the time of the survey, thus obscuring their cross sections and lane widths.

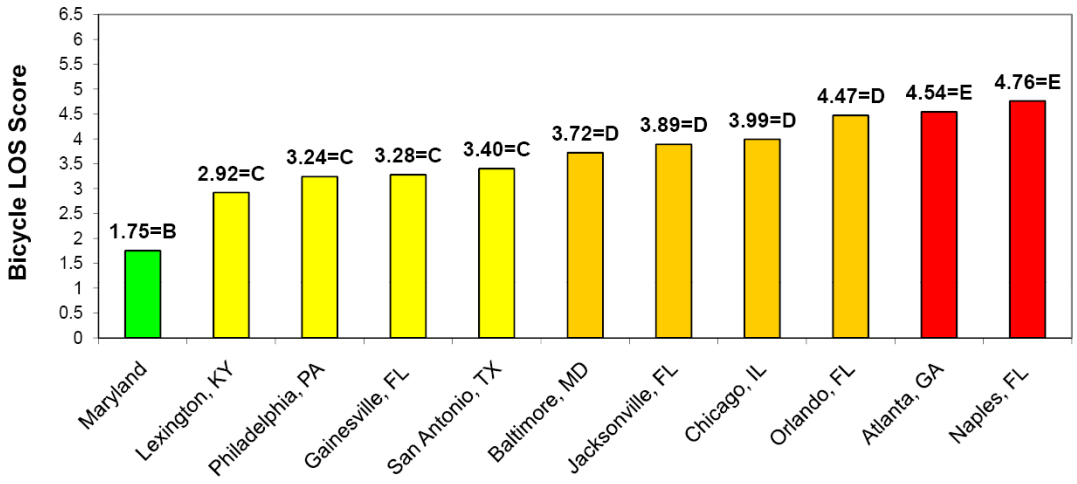
Figure 2.3 – Bicycle Study Network: LOS Results for Strategic Bicycle Corridors



In comparison with other major metropolitan areas, the average level of bicycle accommodation for the Atlanta Region's study network is relatively poor. For example, Bicycle Level of Service assessments conducted across the State of Maryland (2001) yielded an average score of "B", while studies of street networks in areas such as Lexington, KY (1999), Philadelphia, PA (1996), Gainesville, FL (2000), and San Antonio, TX (2000) yielded average Bicycle LOS scores of "C." Studies of other cities, including Baltimore, MD (1998), Jacksonville, FL (2004), Chicago, IL (2001), and Orlando, FL (2001) have yielded average scores of "D." Like the Atlanta Region, a 2004 study in Collier County, FL(Naples metropolitan area) yielded an overall Bicycle LOS score of "E."

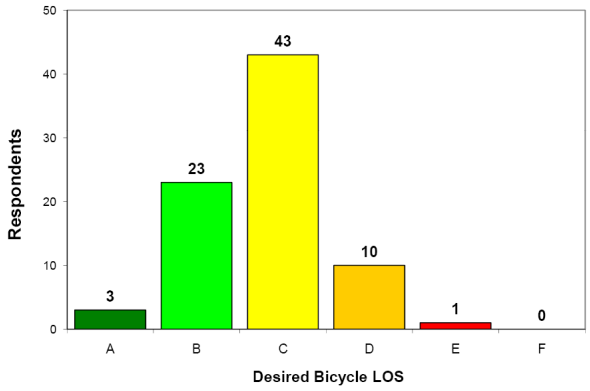
The Bicycle Level of Service scores for these cities and metropolitan areas are compared graphically in Figure 2.4 below. While each of these cities' study networks are of different scales and comprised of different types of roadway segments, they have been examined with a common method of analysis. The clear conclusion is that conditions for bicycling on Atlanta Region's strategic roadways are very challenging.

FIGURE 2.4 Bicycle LOS Results for U.S. Cities: Distance-Weighted Averages
Source: Sprinkle Consulting Archives



While the results of the Atlanta Region's Bicycle LOS assessment show a general need for improvement, they also show need for improvement when gauged against the expectations of local residents. In the course of the Community Open House Workshops held around the Atlanta Region in October 2006, participants were shown the preliminary results of the Bicycle LOS assessment of the *Plan*'s study network and were introduced to the factors that contribute into a Bicycle LOS score. These same participants were also asked what level of bicycle accommodation they felt should be the standard for general bicycling conditions on the Region's roadways. The most frequently occurring response was Bicycle LOS "C," which was identified by over half of the workshop participants who answered this question; full response rates to this question are shown graphically in Figure 2.5.[13]

FIGURE 2.5 Desired General Bicycle LOS Among Atlanta Region Workshop Participants, October 2006



While the database can be used to analyze the characteristics of individual roadways, there are a few identified general characteristics that contribute to this overall level of bicycle accommodation. First, the study network roadways were selected from the RSTS, which is comprised of roads designated by ARC as being significant to overall regional mobility. By definition, then, the roadways studied for this assessment should be expected to have high traffic volumes. Given this initial constraint, any bicycle accommodation would have to come from another contributing factor, such as speed, vehicle mix, lane width, or the presence of a rideable shoulder. Again, given the study network, the segments are more likely to have higher speeds because of their 'regionally significant' motor-vehicle traffic flows; these roads are also likely to have a higher percentage of trucks in their traffic flows. This leaves the physical characteristics of the roadways as the critical factors for bicycle accommodation. A tally of surveyed conditions shows that most segments surveyed do not have the physical characteristics that are associated with creating safe and comfortable conditions for bicycling. For example, of the 381 segments[14] for which a Bicycle LOS score was calculated, only 59 segments have a combined width of outside lane and shoulder equal to or over 14 feet, a dimension that would allow for 11-foot motor

13 The workshop survey forms and a summary of selected responses are included as Appendix C.

14 The 381 segments for which Bicycle LOS scores were calculated are all of varying lengths.

vehicle lanes and three-foot shoulders. Similarly, of the same 381 segments surveyed, only 35 have a width of paved shoulder or designated bike lane equal to or greater than three feet, a dimension which research and experience have shown contributes significantly to cyclists' sense of comfort and safety. Again, these data points are drawn from a large and diverse set of roadways in the study network, but the overall condition for bicyclists on these regionally significant roads is highly challenging.

ASSESSMENT OF POTENTIAL BICYCLE AND PEDESTRIAN TRIP ACTIVITY

The level of service results described above address the "supply" issue of non-motorized transportation. An additional measure is needed to examine the "demand" of bicycle and walking facilities and thereby evaluate the relative amount of potential bicycle and pedestrian travel along a road (or off-road) corridor. In other words, such a measure estimates the relative amount of bicycle and pedestrian activity that would occur along a corridor if facilities were constructed and conditions were excellent. The demand criterion and the level of service criterion are complementary. When coupled, they provide a balanced picture of user need and perceived safety. For example, a particular corridor segment may have relatively poor walking conditions but relatively high pedestrian activity potential, perhaps because it is adjacent to an elementary school. Conversely, another segment may have relatively good cycling conditions but relatively low potential bicyclist activity levels (low demand).

The process of identifying and quantifying potential bicycle and pedestrian trip activity is known as a travel demand analysis. To perform a travel demand analysis for the bicycle and pedestrian modes, a methodology must be employed that recognizes the unique impediments to that mode. Unlike automobile travel, bicycle and pedestrian travel often does not occur due to a number of impediments, one of which is the relatively poor accommodation of bicyclists and pedestrians within the existing transportation network. This is generally the case throughout the study network. Consequently, existing bicycle and pedestrian counts generally do not indicate the level of potential bicycle trip activity within a roadway network. Therefore, alternative or surrogate measures of assessing bicycle and pedestrian trip activity are needed.

The method employed for this study, which quantifies both ends of the bicycling and walking trip and considers all generators and attractors (i.e., parks, schools, colleges/universities, transit routes, offices, residences, and commercial developments) in the study area for both existing and potential trips is the Latent Demand Method. The Latent Demand Method is essentially a gravity model, based upon a theory similar to that used in the prevailing four-step

Urban Transportation Planning System-based travel demand models throughout the United States.[15] The model provides a relative score for each segment. This score represents the segment's propensity to generate bicycling and walking trips relative to the other segments in the study area.

A latent demand analysis was carried out for the study network for the bicycling mode and for the pedestrian mode. The results of the analyses are contained both graphically (Figures 2.6 & 2.7) and in tabular format (Appendix E). The maps show that bicycle and pedestrian latent demand tends to be highest in urban areas, where the proximity of population centers to attractions is greatest. High demand areas are also largely coincident with ARC-identified Environmental Justice communities (areas with relatively high concentrations of minority populations and poverty incidence). The latent demand results were used as a basis for determining sample segments for which pedestrian conditions were analyzed, as discussed below.

15 The Latent Demand Method is described in detail in Appendix D.

Figure 2.6 – Bicycle Study Network: Latent Demand Results for Strategic Bicycle Corridors

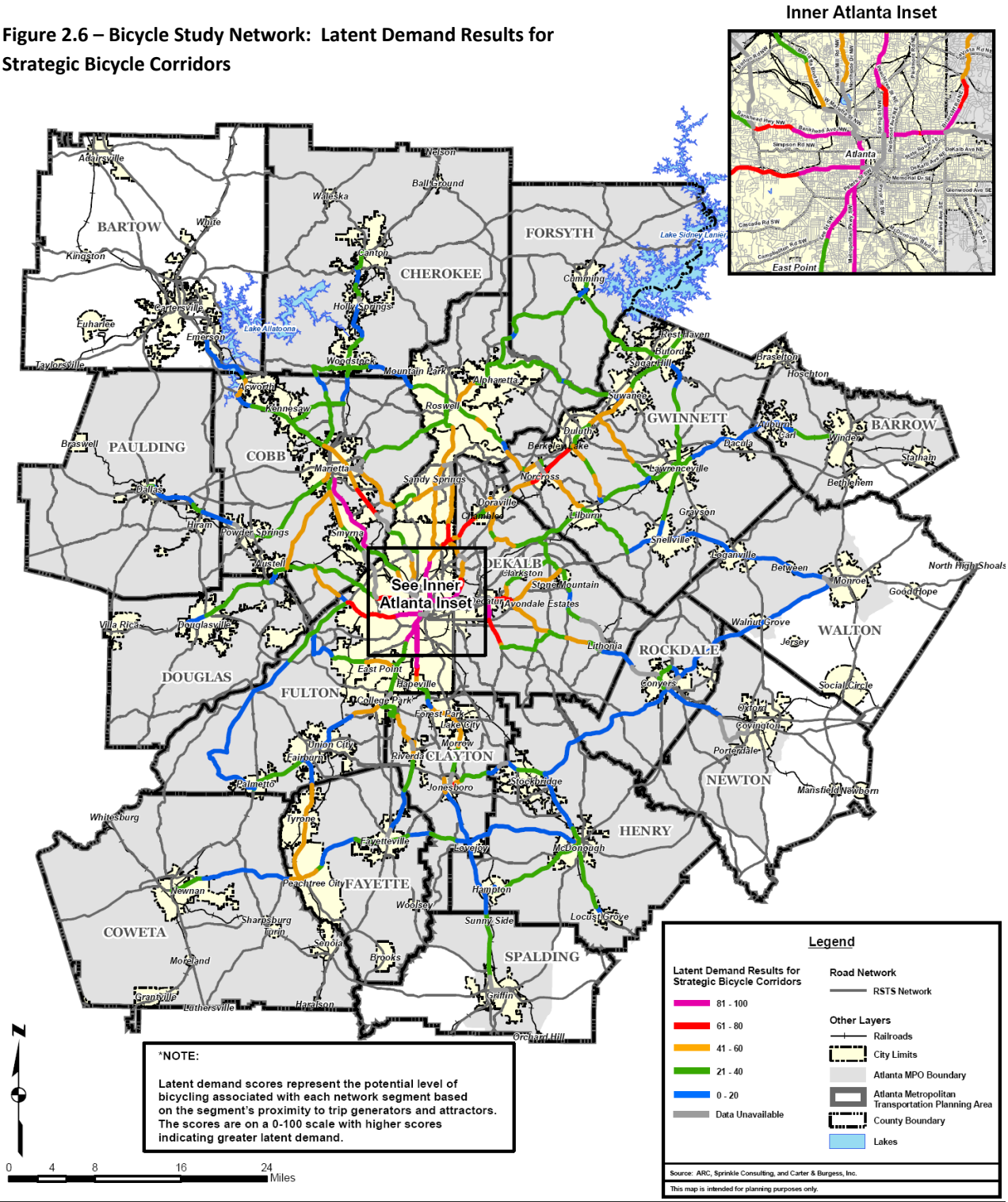
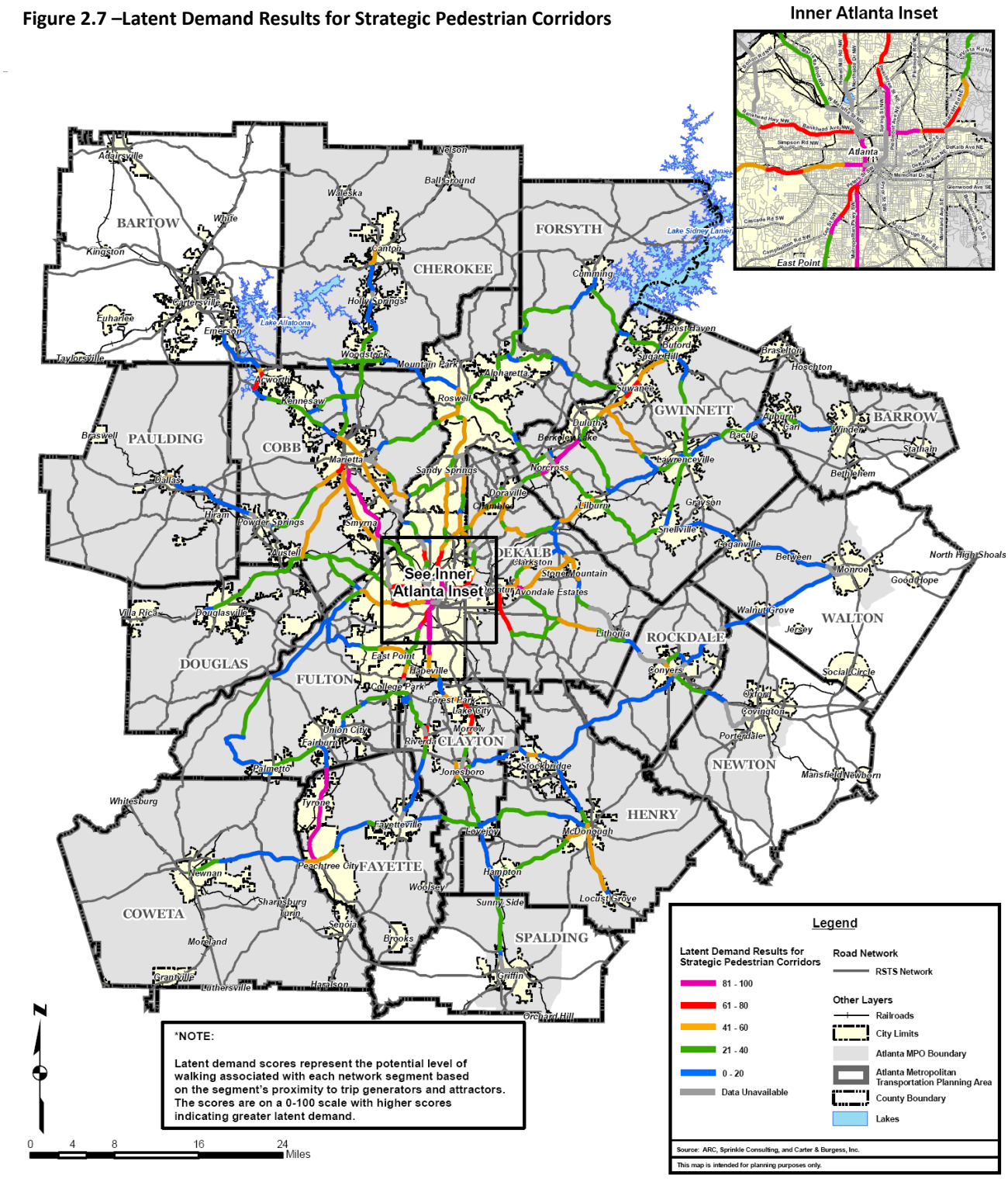


Figure 2.7 –Latent Demand Results for Strategic Pedestrian Corridors



PEDESTRIAN CONDITIONS IN THE ATLANTA REGION

For a profile of general walking conditions along the regionally-significant roadways, a sampling of roadway segments was analyzed. These were selected due to their high potential for pedestrian activity, as indicated by the results of analysis of the study network using the Latent Demand Method. Those study network segments that scored in the highest category of the latent demand analysis (overall score of 81-100) were a part of the sampling; these and other study network segments that intersected them were then studied for their generalized walking conditions.

Walking conditions can be described by three distinct components: the experience of walking along the roadside (the longitudinal walking condition), the experience of crossing at intersections (the intersection condition) and the experience of crossing between intersections (the mid-block crossing condition). The longitudinal walking condition on these sample segments was analyzed using the Pedestrian Level of Service Model (described in Appendix F) which, like the Bicycle Level of Service Model, predicts a typical pedestrian's feeling of safety and comfort due to a number of measurable components of the roadside walking environment (e.g. speed, volume and mix of traffic, presence and width of a sidewalk, level of separation of pedestrians from traffic due to buffer strips, parked cars, trees, or shrubs, etc.). During the data collection process for the evaluation of the longitudinal walking condition, observations on the two crossing-oriented components were also made.

Parallel to these three general descriptions or components of the walking environment are the conditions of accommodations for persons with disabilities. While it is beyond the scope of this Plan to evaluate the level of accommodation of persons with disabilities using the federally promulgated "guidelines" and/or standards, potentially applicable Federal court decisions, and/or U.S. Department of Justice rulings, it is important nonetheless to underscore the importance of the state and local jurisdictions ensuring that new facilities are being built to accommodate all persons, regardless of ability. Further, it is important that this plan encourage the implementing jurisdictions' development of their ADA Transition Plans further aiding the mobility of all people in compliance with the federal mandate.

THE LONGITUDINAL WALKING CONDITION

The analysis of longitudinal walking conditions along the sample segments confirmed what many residents of the Atlanta Region know intuitively: that walking along the Region's roadways, especially the regionally significant roadways that are the focus of this *Plan*, is seldom comfortable and is quite often very challenging. The Pedestrian LOS analysis yielded great number of lower-range scores which can be

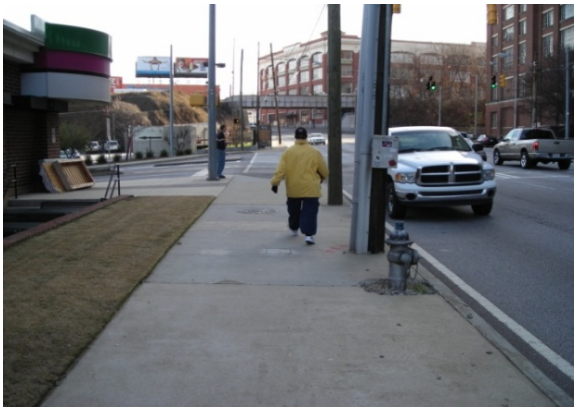
seen as the result of several consistent and general factors.[16] First, the roadways that make up the study network are, by their very definition as "regionally significant roadways," carrying high traffic volumes. This is an important factor in the Pedestrian LOS Model. The majority of segments analyzed carry over 10,000 vehicles a day, according to GDOT statistics, with the highest recorded example being in excess of 34,000 vehicles a day. Frequently, on these busiest roadways, there are no sidewalks whatsoever, leaving pedestrians to choose between walking at the edge of the roadway itself, close to the heavy flow of traffic, or along improvised and unpaved trails along the roadside (Figure 2.8).

FIGURE 2.8 - Pedestrians often use improvised, unpaved trails when no sidewalk is provided

16 The full results of the analysis are shown in the Appendix G, the spreadsheet entitled "Atlanta Region Pedestrian Level of Service Evaluation," and selected segments are shown in detail in Appendix H, the photo-illustrated supplement entitled "Walking Conditions Along Regionally Significant Roadways, evaluated with Pedestrian LOS."

Along those segments which do have sidewalks, there is often little separation of the sidewalk from the traffic flow by means of a buffer strip, on-street parking, trees, or shrubs. While pedestrians are provided with a facility of their own, their perceptions of safety or comfort are still heavily influenced by the volume and speed of the motor vehicles in the roadway, because there is very little distance between them and vehicles that are traveling in the outermost lane (Figure 2.9).

FIGURE 2.9 - Many sidewalks in the region have little or no effective separation between pedestrians and the outer lane of traffic



Improving walking conditions by improving lateral separation, or the perception thereof, can be accomplished in a number of ways, either horizontally by increasing the width of a buffer strip between the sidewalk and the roadway, or vertically by planting trees in the buffer strip, or by the presence of on-street parking. Very few of the regionally significant roadways that make up the study network allow for on-street parking because

they are designed to handle large volumes of through traffic. However, a small number of the analyzed segments do allow on-street parking, but they are isolated to Midtown Atlanta or the centers of smaller towns, as in Figure 2.10.

FIGURE 2.10 - Sidewalks buffered by trees, shrubs, or on-street parking are found infrequently on the regionally significant roadways of the study network

THE CROSSING CONDITION AT INTERSECTIONS

There are a number of factors that affect pedestrians' perception of safety and comfort as they cross roadways at signalized intersections. As discussed with regard to the longitudinal walking condition, the higher speed and higher volume roadways that are the subject of this study are particularly prone to the factors that diminish the level of pedestrian accommodation. Both the *Highway Capacity Manual* and contemporary research show that intersection geometry, traffic control, and traffic characteristics influence the pedestrian environment at intersections. Recent research[17] now shows clearly that the traffic volume and number of roadway lanes being crossed have significant bearing on pedestrians' feelings of exposure, as does the potential for conflicts with vehicles coming from the intersecting roadway, especially those vehicles coming from a permissive left-turn lane or from a lane where a right-turn-on-red is allowed (Figure 2.11). Pedestrians' feeling of accommodation at intersections is also affected by the amount of delay they encounter while waiting for a signal.

FIGURE 2.11 - Conflicts with turning vehicles can affect pedestrians' perceptions of safety and comfort

17 Petritsch, Landis, Huang, McLeod, Challa, Guttenplan. "Level-of-Service Model for Pedestrians at Signalized Intersections", 84th Annual Meeting Compendium of Papers, Transportation Research Record 1939, Transportation Research Board, Washington, DC 2005.

THE MID-BLOCK CROSSING CONDITION

Many of the segments of this *Plan*'s study network terminate in activity centers in the City of Atlanta or at nodal points in suburban or small-town communities. These same segments, however, lead away from these more densely settled areas into areas where the intervals between signalized intersections grow longer and longer. Even near their terminating points, these regionally significant roadway segments have been designed to accommodate high volumes of motor vehicle traffic, and so will seldom be interrupted by signalized intersections. As a result, pedestrians often find themselves wanting to cross a roadway at points away from major intersections and their accompanying traffic control systems. Like most travelers on the Region's roadway network, pedestrians do not have high tolerances for delay or detours. Thus, pedestrians are faced with daunting choices between risky crossings or considerable detours; they often choose the first option (Figure 2.12). The accommodation of pedestrians who need to cross at uncontrolled crossing locations is a growing concern for transportation agencies nationwide. There is anecdotal evidence from this *Plan*'s data collection efforts and public involvement processes that this issue needs to be addressed in the Atlanta Region as well. Certain conditions that affect pedestrians' perception of safety for crossing at uncontrolled locations are similar to those that affect crossing at signalized intersections: speed of traffic, volume of traffic, and the width of the roadway being crossed. Other factors particular uncontrolled crossings include the presence or absence of a raised median (which can offer a refuge) and the distance of the desired crossing point from a controlled crossing point. Strategies for deciding when and how to accommodate pedestrians at uncontrolled crossing points are included in Appendix L.

FIGURE 2.12 - Pedestrians often choose to cross at mid-block to avoid the delay of finding the nearest controlled crossing.

EXISTING LOCAL POLICY INITIATIVES

While these on-street analyses illustrate bicycling and walking conditions on specific roadway segments, it was also important to explore the existence of jurisdictional policies related to bicycling and walking in order to get a full sense of existing conditions. Accordingly, research was conducted to profile local government policies regarding the accommodation of bicycle and pedestrian facilities on roadways around the Atlanta Region. The research indicates a generalized interest in making improvements but few firm policies requiring their inclusion in new development or roadway widening or reconstruction projects.

POLICIES REGARDING PEDESTRIAN FACILITIES

Sidewalk requirements are beginning to emerge as a trend around the Atlanta Region. A 2006 report prepared by PEDS, a pedestrian advocacy group, found that only six of thirteen counties surveyed had standard sidewalk requirements in place. The report found that the requirements in the remaining seven counties were highly variable, in that they were tied to the size of a development or its location in a special overlay district. Some counties reported a standard practice of sidewalk inclusion in roadway widening projects, such as in Gwinnett County, but this is dependent upon staff vigilance rather than a firm policy directive. Coweta County, reports that both development standards requiring sidewalks and encouraging bicycle facilities have been included in the updated county Zoning and Development Code, approved in April 2007. Further local adoption of such comprehensive standards is recommended as a prioritization factor in future ARC planning processes.

POLICIES REGARDING ON-STREET BICYCLING FACILITIES

There are isolated examples of very comprehensive bicycle accommodation policies, such as in the Chattahoochee Hill Country Overlay District, which has written into its zoning code a requirement for five-foot wide bike lanes on its three largest classes of roadway as they are constructed. Other communities and jurisdictions take advantage of development opportunities for bicycle improvements, but on a more case-by-case basis. Coweta County, for example, has bicycle lanes included within several new roadway and roadway widening projects, but these are on roadways targeted by their bicycle plan and not a standard feature of their roadway cross-section. Additional projects may be included within new roadway construction projects upon recommendation by staff, but again, these are not a policy requirement or a standard. Other jurisdictions report similar situations of projects being considered on a case-by-case basis in response to staff initiatives. Several LCI study sites have expressed desires toward development of bicycle facilities in their action plans, but few have enacted bona fide standards. While these communities and conscientious local staff are to be

commended for their efforts to make their streets more accommodating to bikes, the Region as a whole is a long way from having bike facilities as a standard expectation its roadways.

POLICIES REGARDING OFF-STREET BICYCLING FACILITIES

Some local jurisdictions have also made efforts to include off-street multi-use pathway facilities in development projects, but as with most of the on-street efforts, these are targeted to specific corridors and not a standard policy. The City of Covington, in Newton County, for example, has a requirement for the construction of a shared-use path as part of the development of parcels along the Covington Bypass Corridor, and has identified public access easements that are to be maintained as development occurs along certain corridors identified in the Newton County trails plan. Gwinnett County also requires developers to create greenway easements when developing land that includes designated riparian and utility corridors.

SUMMARY AND CONCLUSIONS

The results of the Bicycle Level of Service assessment on the study network show that the overall level of accommodation for bicyclists on regionally significant roadways is very poor. The calculated average Bicycle LOS grade of "E" for the region is below the average grade of many other U.S. metropolitan regions that have undergone similar assessments; the average grade also falls well below the expectation of general bicycling accommodation expressed by the public participating in this *Plan*'s public involvement process.

The evaluation of pedestrian conditions on selected segments also revealed that conditions for walking alongside and for crossing regionally significant roadways can be very challenging due to the general characteristics of the study network, which include higher speeds and volumes for motor vehicle traffic, the inconsistent presence of sidewalks, and the lack of separation between the sidewalks that do exist and the traffic on the roadways they parallel.

A review of local policies shows that, while there are examples of bicycle-and-pedestrian-friendly initiatives to be found around the Atlanta Region, these initiatives are often narrowly focused and dependent upon the efforts of conscientious staff for implementation. If the roadways of the Atlanta Region are to become more accommodating to bicyclists and pedestrians, it is essential to have more consistent and comprehensive local government policies in place so that opportunities for making roadway-cross sections more multi-modal are realized with greater frequency. Policy recommendations for local governments are a significant component of this *Plan*; these recommendations comprise Chapter 4.

CHAPTER 3: NEEDS ASSESSMENT REPORT—PROJECT EVALUATION AND PRIORITIZATION

This Needs Assessment chapter proposes methodologies for evaluating projects submitted to ARC for funding assistance; the methodologies described herein will help ARC and member agencies alike clarify the relative "need" for various projects by providing an objective framework that quantifies the contribution of a given bicycle or pedestrian improvement project to the regional goals identified in this *Plan*. The needs described in this chapter were identified with significant input from residents of the Atlanta Region, most directly through participation in the Community Open House Workshops, in which members of the public helped determine the Region's expected levels of accommodation for bicycling and walking. This chapter first describes how those contributions toward regional goals can be measured for the various types of projects likely to be submitted as candidates for ARC funding assistance, using specific applications of previously identified and approved performance measures. Such measures are defined for improvements to on-road bicycling conditions, roadside walking conditions, pedestrian crossing conditions at signalized intersections, and pedestrian crossing conditions at uncontrolled locations (which include both unsignalized intersections and mid-block locations). After these various performance measures of contributions toward goals are described, methodologies for tabulating an overall priority score are proposed for each of these aspects of both bicycling and walking conditions. This priority score considers both the benefits from a given project and the costs of the improvement, thus providing a comparative framework to assist regional decision-makers in allocating funding requests and scheduling projects. Finally, after describing the methodologies for tabulating priority scores for various facility types for both bicycles and pedestrians, a potential prioritization process for bicycle projects is demonstrated using the data compiled about the roadways of the Bicycle Study Network and a set of preliminary improvement strategies identified for the roadways of the Study Network. [18]

18 The proposed prioritization processes use data from the evaluation of existing conditions performed in the course of this Plan project; agencies submitting improvement projects for funding assistance are advised to check and, if necessary, update the data relevant to their projects at the time they are submitted.

EVALUATION OF PROJECTS' CONTRIBUTIONS TOWARD REGIONAL GOALS

The following methodologies are ways to evaluate requests for bicycle and pedestrian project funding assistance based on how the projects contribute to meeting the goals and objectives of this *Plan*. This section details, goal-by-goal, how projects' contributions toward the identified regional goals are measured by the proposed prioritization factors; a subsequent section details the methods by which those factors are tabulated for their comparison and prioritization. The first goal of providing "safe and effective networks" for bicycle and pedestrian transportation deals most explicitly with technical analyses of facility geometry and performance, and the portions that follow describe detailed measures of improvement for the various aspects of the bicycle and pedestrian networks. The other goals deal with improving conditions in proximity to specific destinations or areas of special social or environmental concern; the portions describing the methods of verifying progress towards these goals are more succinct, but are of equal importance.

CONTRIBUTIONS TO THE GOAL OF "PROVIDING A SAFE AND EFFECTIVE NETWORKS" FOR BICYCLE TRANSPORTATION AND PEDESTRIAN WALKWAYS

An individual project's contribution toward the Region's most general goal, providing safe and effective networks of bicycle transportation and pedestrian walkways for the entire Atlanta Region, is measured by quantifying the changes to the level of bicycle and/or pedestrian accommodation expected to be brought about by the project. Those projects which achieve greater degrees of improvement are likewise considered to be contributing more towards meeting this goal. As was described in the Existing Conditions chapter of this *Plan*, the Bicycle Level of Service Model provides a measure of how safe and comfortable typical cyclists feel riding on a given roadway, based on various measurable factors of the roadway environment. As was also discussed in the Existing Conditions report, there are three distinct components that contribute to the overall walking condition of a roadway segment: the roadside walking condition, the crossing condition at signalized intersections, and the crossing condition at uncontrolled locations (unsignalized intersections and mid-block locations). Improvements to any of these aspects of the bicycling and walking networks can be quantified by evaluating the existing condition *vis-á-vis* these components and comparing the results to the condition expected to result from the

proposed project; the difference between the two is the measure of how well a project contributes to the goal of providing a safe and effective network.[19]

Quantifying Bicycling Conditions

One of the principal ways of defining a need for, and subsequently quantifying a benefit to be derived from improved bicycling conditions is to determine how the existing condition compares with a regional target condition and, if applicable, to measure the level of disparity between the two. The existing conditions for bicycling were measured using the Bicycle Level of Service Model; the methodology and results of this evaluation were presented to the Steering Committee, the Bike/Ped Task Force, and members of the public who attended the Community Open House Workshops or viewed the workshop materials on the ARC website[20]. Each of these groups was asked to offer input regarding what level of accommodation—as measured by the Bicycle Level of Service Model—they felt was a reasonable expectation for the Atlanta Region's roadways. Input received from the participants in the Public Open House Workshops as well as meetings with the Steering Committee and the Bike/Ped Task Force indicated a preference for a general regional target level of bicycle accommodation equivalent to a Bicycle Level of Service score of "C" or better. Feedback from these sources also indicated that a better level of accommodation should be targeted for certain types of areas in the Region. ARC staff recommended using the area classifications found on ARC's Unified Growth Policy Map (UGPM) as the framework for assigning where the target level of accommodation should be higher. The most popular type of response from workshop participants indicated that a higher level of accommodation should be expected in areas of "high activity" such as commercial centers of various types, very densely populated areas, and areas close to transit. Such areas coincide very well with the "Regional Places" layer of the UGPM, which shows areas designated City Centers, Town Centers, Regional Centers, and Station Communities; LCI study sites, shown on a separate layer of the UGPM, are also places where

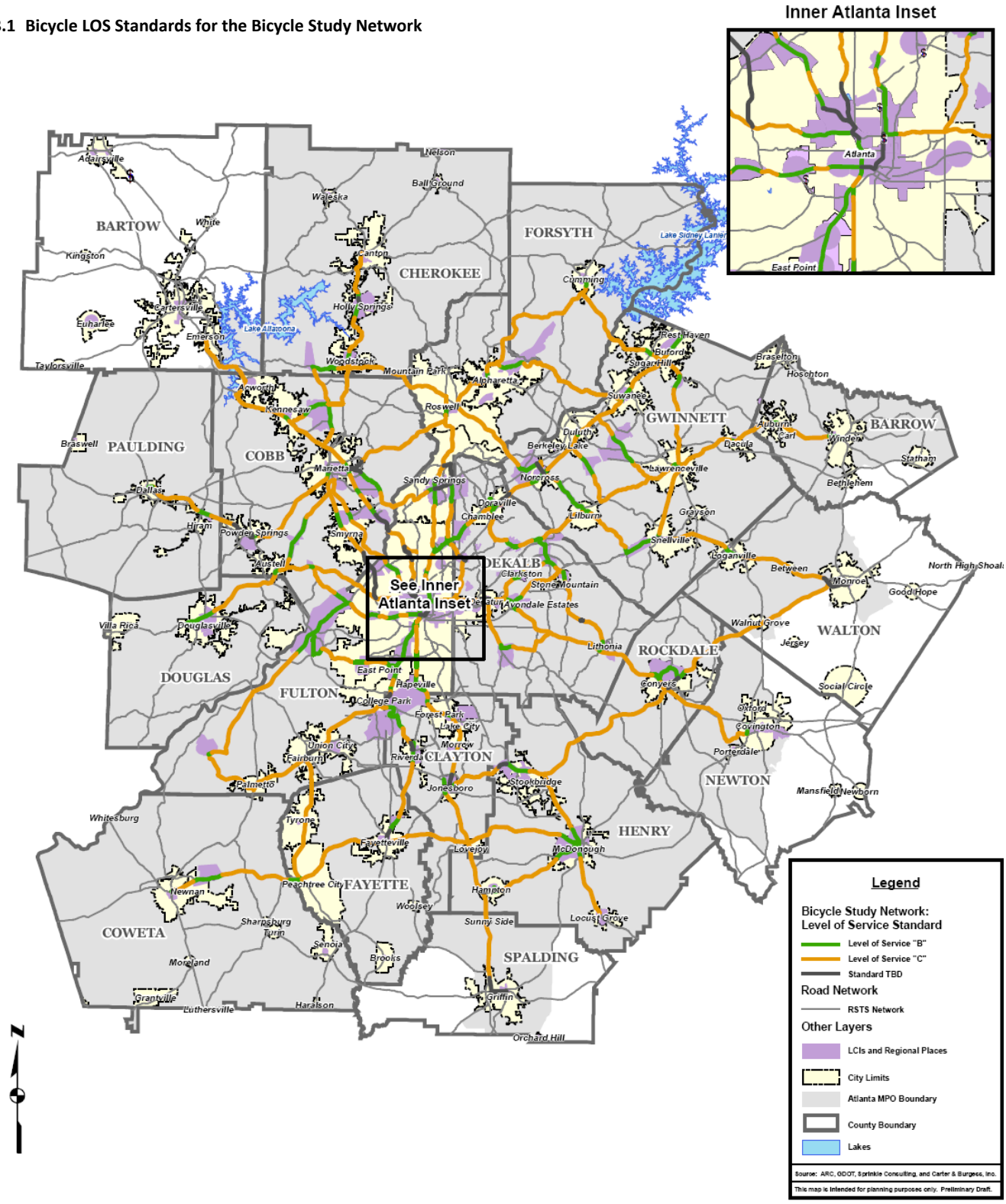
19 It is important to note that crash statistics were considered for use as a prioritization factor, but ultimately were not applied because the vast majority of crashes involving bicycles and pedestrians are the result of behaviors—riding the wrong way, failure to yield by the proper party at intersections or crossings, etc.—that are most effectively addressed by education and enforcement rather than facility improvements; for example, national statistics estimate that fewer than 15% of crashes involving bicyclists are the result of bicyclists being overtaken by motor vehicles along a roadway, and of those a significant number can be attributed to the cyclist swerving into traffic or riding at night without lights. Further, crash statistics are not necessarily indicators of dangerous conditions, but rather of exposure—which is to say that, to a certain extent, crashes will occur only where bicyclists or pedestrians feel safe enough to be present in the first place, and, conversely, locations which experience few or no crashes are not necessarily safe, for it may that their obvious danger is keeping bicyclists and pedestrians away.

20 For a detailed explanation of the Bicycle Level of Service Model and the results of this evaluation, see Appendices A and B.

the higher standard is desired. As a result, a level of accommodation equivalent to a Bicycle LOS of "B" or better for segments of the Study Network which fall inside areas shown as "Regional Places" or "LCI Areas" on the UGPM was proposed.[21] These areas are shown on the map in Figure 3.1.

21 Most LCI study sites are contained within the boundaries of the "Regional Places" layer of the UGPM GIS files. A visual check was made of the UGPM for any LCI boundaries that fell outside the Regional Places boundary, and the Bicycle LOS "B" standard was applied to these outliers as well.

Figure 3.1 Bicycle LOS Standards for the Bicycle Study Network



Quantifying Roadside Walking Conditions

The roadside walking condition can be measured using the Pedestrian Level of Service Model, which uses various factors of the roadside environment—presence and width of a sidewalk, presence and degree of buffering effects, traffic volume and speed, to name a few—to evaluate how safe and comfortable pedestrians will typically feel while walking along a given roadway. Input from the workshop participants, the Bike/Ped Task Force, and the project steering committee established a target level of accommodation of Pedestrian LOS "C" for the region in general, and Pedestrian LOS "B" for LCI Study sites and "Regional Places" on the UGPM. The existing Pedestrian LOS result (expressed as a numeric score) of the site for a proposed sidewalk improvement project can be compared to the targeted level of accommodation (2.5 for Pedestrian LOS "B," 3.5 for Pedestrian LOS "C") for the site, with the difference representing the improvement to be realized; this is the same calculation used to quantify the need for bicycle facilities.

Quantifying Pedestrian Conditions at Signalized Intersections

How well intersections accommodate pedestrians is an important part of a safe and effective regional transportation network. Conditions at intersections can be measured to evaluate a typical pedestrian's perception of safety and comfort as he or she attempts to cross. A Pedestrian Level of Service Model for Signalized Intersections[22] has been developed that includes statistically relevant factors such as number of lanes crossed, vehicular turning movements that conflict with pedestrians' crossing, the presence or absence of channelization islands, volume and speed of the traffic on the street being crossed, and the average delay experienced by pedestrians at the intersection. While the scope of this project did not allow collection and analysis of data describing individual intersections' conditions, the general findings from the aforementioned research can be used by agencies to evaluate intersection crossing conditions at project sites as part of the application process. Applicant agencies can employ the full Pedestrian LOS for Signalized Intersections model, which uses turning counts as well some intersection-specific geometric and operational data. As was the case with bicycling conditions and roadside walking conditions, the score derived by the existing conditions can be compared to a score calculated based on the proposed changes, with the difference between the two measuring the tangible improvement to walking conditions within an intersection environment. For a pre-design or planning-level application, potential projects could be evaluated according to what

22Petritsch, Landis, Huang, McLeod, Challa, Guttenplan. "Level-of-Service Model for Pedestrians at Signalized Intersections", 84th Annual Meeting Compendium of Papers, Transportation Research Record 1939, Transportation Research Board, Washington, DC 2005.

degree they address the significant factors that research and the model have shown to affect pedestrian perceptions of safety and comfort. A simple planning checklist could be used that tallies improvements offered by proposed projects according to how they affect the significant factors (i.e., terms of the model). For example:

- Does the project reduce speeds on the street being crossed?
- Does the project reduce the number of lanes that pedestrians must cross?
- Does the project reduce the number of turning conflicts by reducing right turns on red from the street being crossed and/or reducing permissive left turns from the parallel street?
- Does the project introduce right turn channelization islands that can offer refuge for crossing pedestrians?

It was not possible within the scope of this plan to collect data about walking conditions at intersection crossings; consequently, a targeted level of accommodation for pedestrian crossings at intersections has not been adopted for the region. If data for the full model is collected in the future, or if the planning checklist is used, change to conditions at intersections is measured as the difference between the before- and after-results of the method used. This change represents an intersection crossing project's contribution toward the goal of providing a safe and effective pedestrian network.

Quantifying Crossing Conditions at Uncontrolled Locations (Unsignalized Intersections and Mid-Block Locations)

This section proposes a method for evaluating the conditions confronting pedestrians crossing roadways at locations away from signalized intersections, either at unsignalized intersections or at mid-block locations. The proposed method for evaluating pedestrian crossings at uncontrolled locations reflects stress induced by three aspects of the roadway environment: the volume of traffic on the roadway being crossed, the speed of that traffic, and the width of the crossing to the other side of the road.

The volume of traffic on the roadway is the most significant factor to the stress measure proposed by this method. Gaps in the traffic flow create opportunities for pedestrians to cross the road. Research has determined that probable frequency of gaps is closely related to traffic volume, with the probability of an adequate gap decreasing as traffic volume increases. As the probability of a gap decreases, pedestrians waiting to cross experience longer average delays[23]. The *Highway Capacity Manual (HCM)* states that for pedestrians waiting to cross at signalized intersections, 60 seconds is the threshold delay for Level of Service F; therefore in this method, outlined in Table 3.1, delays of 60 seconds or greater are equated with the maximum baseline stress score (6 points), and stress scores are calibrated downward from this maximum delay, using increments also based on those used in the HCM; daily traffic volumes that will likely incur these delays on crossing pedestrians are shown in the first column (threshold volumes are greater for divided highways because the *Manual on Uniform Traffic Control Devices* (MUTCD) treats divided highways as two separate crossings).

Table 3.1 Pedestrian Stress Measure for Crossing at Uncontrolled Locations (Unsignalized Intersections or Mid-Block Locations)

Roadway Volume		=Pedestrian delay (wait time for gaps)	Baseline Stress Score	Lanes crossed including 2-way left turn lanes	Lane Adjustment *add an additional .25 per side with on-street parking	Posted Speed Limit	Speed Adjustment
DIVIDED	UNDIVIDED						
<11,400	< 6,400	10 sec delay or less	1	3	+0.5	<35 mph	-0.5
11,400–13,700	6,400 – 7,600	11-20 sec delay	2	4	+1.0	35-45 mph	+0.0
13,701-15,000	7,601 – 8,200	20-30 sec delay	3	5	+1.5	>45 mph	+0.5
15,001-15,800	8,201 – 8,600	30-40 sec delay	4	6	+2.0		
15,801-16,800	8,601 – 9,200	40-60 sec delay	5	7	+2.5		
>16,800	> 9,200	60 sec delay or greater	6	8	+3.0		

23 Probable delays associated with traffic volumes were calculated in preparation a protocol for Midblock crossings, see: Theodore A. Petritsch, Bruce W. Landis, and Herman F. Huang. "Midblock Pedestrian and Pathway Crossings of Roadways: A Protocol for Traffic Control Devices", 86th Annual Meeting Compendium of Papers, Transportation Research Board, Washington, DC 2007.

The baseline stress measure can then be adjusted to account for the distance pedestrians have to cross (measured in number of lanes), with crossings more than two lanes wide increasing the baseline stress measure at a rate of a half-point per lane. The stress measure is then also adjusted for the posted speed limit, with the baseline stress reduced on roadways with a posted speed limit below 35 mph, and increased for those roadways with a posted speed limit over 45 mph.

NOTE: For the purposes of this analysis:

A dedicated area for on-street parking shall be counted as one-half of a lane to be crossed and contribute one-quarter of a point to the stress score;

- A two-way left turn lane shall be counted as lane to be crossed and shall not be considered a median;
- Divided highways are considered two crossings, and so "lanes crossed" for such roadways are only counted in one direction at a time.

For the purposes of measuring how a pedestrian crossing improvement project contributes to the regional goal of providing a safe and effective network of pedestrian walkways, change is measured as the difference between the stress measure score of the existing condition and the stress measure score of the proposed condition. For example, Sample Crossing "A" (Table 3.2) is on a four–lane undivided roadway with a two-way left turn lane and a speed limit of 45 mph. The roadway has an ADT of 14,140 and, consequently, an expected delay exceeding 60 seconds; a proposed improvement will add a median refuge, effectively cutting the single crossing delay in half, and reducing the total number of lanes crossed by converting the space of the two-way left turn lane into a refuge.

Table 3.2 Example Crossing Improvement Measurement

Sample Crossing "A"				
Existing Condition	Stress Score	Proposed Improvement (median refuge)	Stress Score	Stress Measure Change
ADT= 14,140 60+ second delay	6	ADT= 7,070 11-20 second delay	2	
5 lanes	+1.5	2 lanes	+0	
45 mph	+0.0	45 mph	+0.0	
Total	7.5		2	= 5.5

It should be noted that the threshold volume at which the highest stress score is induced in this analysis (9,200 ADT for an undivided roadway) is above the volume indicated in the *MUTCD* as being the minimum traffic volume (900 vehicles in the peak hour) needed to warrant a signalized crossing. This threshold is also below the volume (12,000 ADT) which research has shown to be the threshold at which providing only marked crosswalks "without other substantial improvements" was associated with higher pedestrian crash rates.[24] Given the higher volume roadways of the RSTS network, it is likely that various types of controlled crossings will be needed to make appreciable changes in the stress measure at unsignalized or mid-block crossings. If a controlled crossing (i.e., one that actually achieves motorist compliance with the law to stop for pedestrians in the crosswalk) is installed, the crossing essentially becomes a signalized intersection and the proposed condition can be evaluated with the Pedestrian Level of Service Model for Signalized Intersections.

24 Charles V. Zegeer, J. Richard Stewart, Herman F. Huang, Peter A. Lagerwey, John Feaganes, and B.J. Campbell. "Safety Effects of Marked versus Unmarked Crosswalks at Uncontrolled Locations: Final Reprt and Recommended Guidelines." FHWA Report No. FHWA-HRT-04-100. McLean, Virginia, 2005.

CONTRIBUTIONS TOWARD OTHER REGIONAL GOALS

Each of the tools described above can be used to quantify the change in the level of accommodation expected to be provided by a proposed project and, by extension, that project's contribution toward the regional goal of generally improved walking conditions. There are other regional goals more targeted to improving access to specific types of destinations or to addressing concerns about congestion or air quality. Contributions towards these goals are more effectively evaluated by the proximity of a project's location to areas of special concern. The following paragraphs identify how contributions towards these other goals are established and measured.

The contribution of a project towards the Region's goal of providing safe and convenient pedestrian access to schools is measured by establishing whether a given project's improvements will improve access to any schools. Proximity to schools is a contributing factor in the Latent Demand Analysis[25], the results of which are applied in calculating the

25 The Latent Demand Method and the results of the analysis for bicycling and walking are found in Appendix D.

priority score. Projects which benefit access to schools can also be identified by checking them against local plans filed with the GDOT Safe Routes to School (SR2S) program. If a submitted project is identified in an adopted Safe Routes to School Plan on file with the GDOT SR2S program (plan adoption is the first phase of the GDOT program - project grants will be based on these plans), then that project will be given funding priority. This approach will serve to encourage participation in the GDOT SR2S program and also allow ARC to "piggyback" on GDOT's criteria determining which projects are truly beneficial to school access.

The contribution of a project towards the goal of providing safe and convenient pedestrian conditions around high activity areas consistent with ARC land use policies is measured by establishing whether a project is within the boundary of an LCI study site or a Regional Place as defined by the UGPM. The results of the latent demand analysis also take "activity" levels into consideration, by predicting potential for short work- and shopping-related trips due to the proximate location of residences and businesses.

The contribution of a project towards the goal of providing transportation options for residents who do not have cars and reducing trips by those who do (thereby improving air quality and reducing congestion) is measured by the degree to which a project can provide bicycle access along a congested corridor or improve pedestrian access to transit. The spatial queries of the Latent Demand Method determined the potential for biking and walking trips to transit access points. ARC's Travel Time Index (TTI) data can be applied to the roadway along or across which a project is proposed, determining the potential for alternative modes along those roadways; those roadways which are more severely congested could derive a greater benefit from a bicycle facility or improved pedestrian access to transit than those which are less congested.[26] The *Plan* has a stated objective of improving transportation options for people who do not own or cannot operate cars; this objective is also served by this application of transit and congestion results. It is

26 Because the types of walking trips which will have the most impact on congestion are those trips to and from transit stops, the approach to quantifying a potential congestion benefit to be derived from a pedestrian project is calculated somewhat differently than for bicycle projects. The result of the transit query in the latent demand analysis (which considered proximity of segments to transit routes as well as those routes' headways) will be applied as a percentage to the measure of congestion (TTI score), ultimately giving greater priority consideration (within the congestion term of the formula) to those congested routes which are in close proximity to transit.

assumed that transit routes and headways are developed in accordance with demand, and so by extension the latent demand results for transit account for such demographic data. The prioritization formulae also consider whether or not a project is within the boundaries of a "Station Community," as indicated on the UGPM, and thereby factor transit in another way as well.

Finally, contribution of a project towards the goal of enhancing the health, fitness and quality of life of the residents of the Atlanta Region is measured by applying the results of the latent demand analysis, which considered proximity of network segments to parks and recreation facilities.

RECOMMENDED STRATEGIES FOR IMPROVEMENT

Using data collected on the roadways of the Bicycle Study Network for the Bicycle LOS evaluation, three preliminary strategies for improving the level of accommodation for bicyclists on the segments of the Bicycle Study Network have been identified: re-striping for a bicycle lane or shoulder, adding or widening paved shoulders, and, where both of those first two solutions are unlikely, conducting future detailed corridor-specific studies to determine any other opportunities for improving bicycle accommodation.

The roadway segments of the Bicycle Study Network have been divided into four strategic categories. The first category includes those roadways on which the present characteristics provide the desired level of cycling accommodation (Bicycle LOS "B" or "C" depending on its designation as described above); these segments labeled in the accompanying database as "LOS Met." The second category consists of those segments for which the relatively simple and inexpensive strategy of re-striping the existing roadway to allow more designated space for bicyclists could bring them into compliance with the desired level of accommodation; these are labeled as "Re-stripe Candidate" in the accompanying database. The third category consists of roadways which do not have sufficient space within their current pavement cross-section for re-striping to accommodate a bike lane or shoulder, but have an open shoulder beyond their pavement edge; these are labeled as "Add Paved Shoulder." These shoulders could be expanded or paved to allow space usable by cyclists. Finally, the fourth category consists of strategies for which no recommendation could be made at this point which

would cost-effectively bring the roadways up to the desired level of accommodation, but for which individual detailed corridor design-level studies may reveal potential solutions such as construction of a separated sidepath or some other relatively expensive intervention; these segments are labeled in the database as "DCSN" (for Detailed Corridor Study Needed). These four categories are described in detail below.

LOS Met

Of the over 700 miles of roadway surveyed for this study, almost 80 miles already meet or exceed the target level of bicycle accommodation (Bicycle Level of Service Score of "B" or "C" as appropriate) recommended after input from the Steering Committee, the Bike/Ped Task Force and Community Open House Workshop participants. On the map shown in Figure 3.2, these segments are identified as "LOS Met." These segments do not "drop out" of the plan, however, because their level of accommodation will likely be degraded over time, especially as the Atlanta Region grows and motor vehicle traffic volumes increase. The level of accommodation of these segments will need to be protected by a region-wide performance target, so that they may be improved as needed, especially if opportunities arise in conjunction with adjacent land development, roadway reconstruction, or roadway widening projects. Adherence to objectives and policies described elsewhere in this *Plan* will ensure that these roadway segments continue to serve the needs of bicycle transportation in the Atlanta Region for years to come. These streets could also be considered as "anchor segments" in a subordinate planning strategy that is focused on connectivity; in such a strategy priority could be given to improving segments that are close or connect to segments that already meet the desired level of bicycle accommodation.

Re-Stripe Candidate

Due to the nature of the Study Network roadways—many high-volume, high-speed roadways with significant truck traffic—there are very few segments for which re-striping is recommended; the consultant team identified only four distinct segments, covering less than five miles of roadway, whose existing cross-sections could accommodate bicyclists at the desired levels with a relatively simple reconfiguration of their lane marking stripes. Segments identified in this category have outside lane widths[27] that suggest the possibility of re-striping for at least a three-foot wide shoulder[28] and either an eleven-foot or twelve-foot wide travel lane on the roadway, depending on the posted speed limit: eleven feet for speeds 45 mph or

27 The Wt dimension recorded in the data for the Bicycle LOS evaluation, which combines the width of the outside travel lane with any paved shoulder surface outside the lane marking stripe.

28 In locations with granite curbs without gutter pans, four feet of width between the curb face and the outside lane edge should be maintained.

lower, twelve feet for those higher. However, even though there are very few Study Network segments for which this recommendation can be made, it is important to describe the rationale for determining where re-striping is feasible, for application by ARC to other candidate roadways in the future.

It is anticipated that there are a number of roadways in the Atlanta Region which will be able to better accommodate bicycling via the re-striping strategy while maintaining their existing level of accommodation for motor vehicles. These minimum recommended widths for motor vehicle travel lanes are based on the 2004 AASHTO *Policy on Geometric Design of Highways and Streets*. For a detailed discussion of recommended re-striping dimensions, see the policy recommendations portion of this *Plan*.

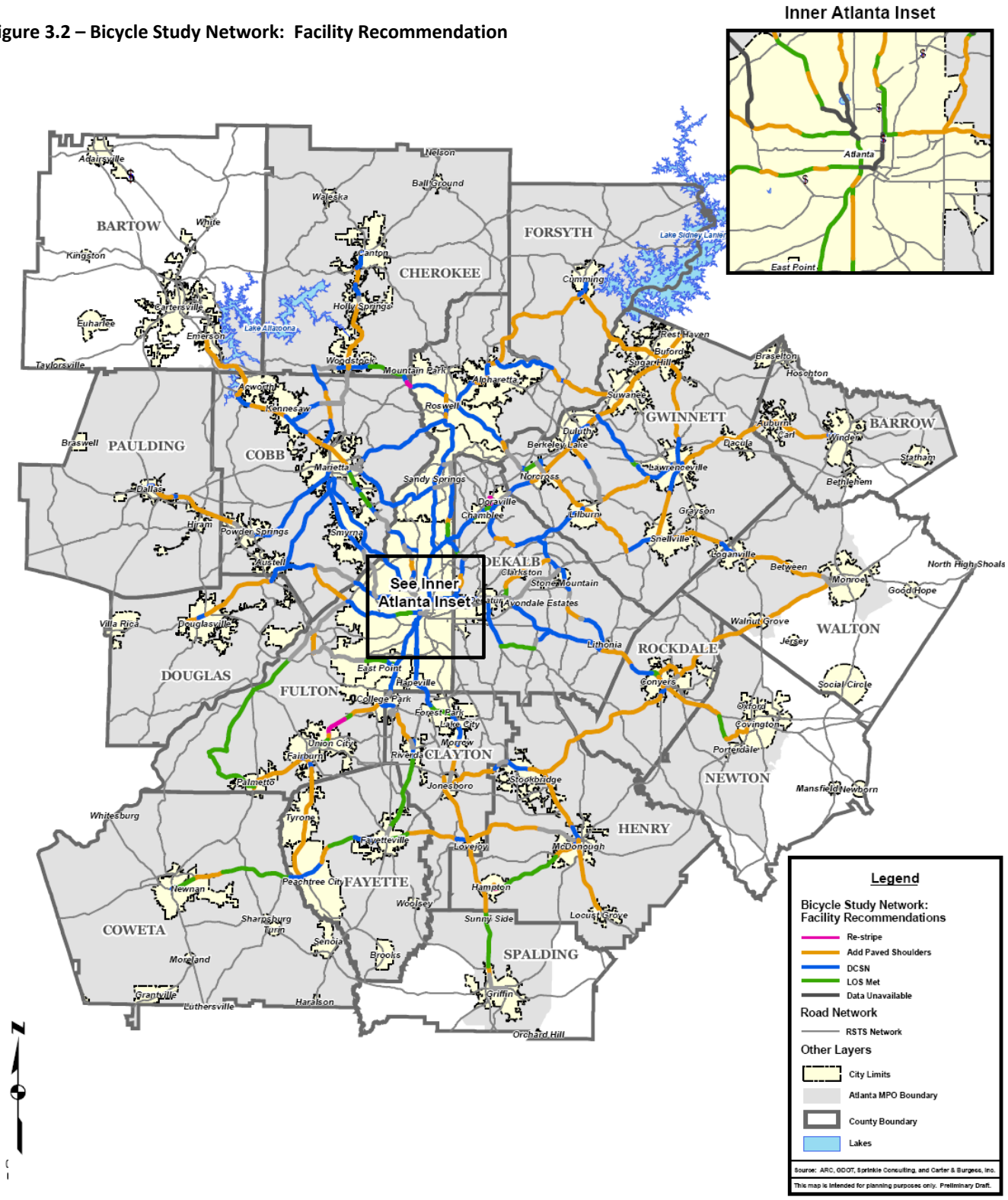
Add Paved Shoulder

There are many miles of roadway in the Atlanta region which are not presently equipped with curbs and gutters. Some of these roadways presently have low traffic volumes and are therefore already well suited for bicycling. Two open-shouldered segments have been named as "re-stripe candidates" because there is available width in the existing cross-section to re-position the edge line and offer more room to bicyclists.[29] Unfortunately, there are still more of these open-shoulder roads that have no more room to give from the travel lane to the shoulder. Bicycling conditions on these roads might be improved, however, by the widening of their shoulders. If shoulders are developed on these segments they should extend to a minimum of 6.5 feet beyond the existing edge stripe. While only four feet of space is generally recommended, the possibility of the inclusion of rumble strips necessitates this wider shoulder. The 6.5-foot shoulder has recently been proposed by GDOT to ensure bicycle accommodation in locations with rumble strips. The proposed GDOT cross-section would leave 4'2" outside of the rumble strips, meeting the 4-foot clear zone recommended by AASHTO.[30] Due to high traffic volumes, speeds, or truck traffic, certain segments may require wider shoulders to meet the desired level of bicycling accommodation; final dimensions for widened shoulders will need to be determined in preliminary engineering for individual projects.

29 Re-striping should be investigated as the first option for open-shouldered roads in future evaluations as well, because of the lower associated cost.

30 AASHTO Guide for the Development of Bicycle Facilities, p. 17, AASHTO, Washington, D.C.,1999.

Figure 3.2 – Bicycle Study Network: Facility Recommendation



Segment-specific determinations will also need to be made regarding the right-of-way adjacent to the each roadway, as many roadsides in the Atlanta Region fall off into ditches almost immediately; widening of shoulders on such roadways will require re-grading of rights-of-way to support a wider shoulder.[31] There are approximately 300 miles of roadway on the Study Network for which adding to the shoulder is the recommended strategy.

As many of these open-shouldered roads lie along undeveloped parcels (either at the margin of present development patterns or in in-fill situations), it is very important that the ARC and local jurisdictions pay close attention to these segments over time. Given the continuous strong growth expected in the Atlanta Region over the next few decades, it is very likely that these roadway segments will be widened and lined with curbs as parcels along them are developed. When these roadways are expanded they will, perhaps, be the first generation of roadways in the Atlanta Region designed to accommodate all modes of travel. These new roads will serve, in a way, as demonstration projects for the objectives and policies described elsewhere in this *Plan*. Until that time, however, improved bicycle accommodation through the relatively simple modification of broadening their shoulders will give the residents of and visitors to the Atlanta Region the opportunity to reveal the demand for more complete streets in the future.

Detailed Corridor Study Needed (DCSN)

Many segments of the Study Network presented minimal opportunity for improving bicycling conditions to targeted Bicycle LOS by either of the retrofitting strategies mentioned above. Any tangible improvement to these segments, which cover just over 275 miles of roadway, will require extensive and detailed operational-level investigations of the constraints and opportunities along these corridors. There are a range of possible solutions for these segments which could be revealed by more detailed individual corridor studies, which are well beyond the scope of this region-wide plan. For example, if corridor studies verify available rights-of-way, it may be feasible to investigate developing sidepath

31 It is not within the scope of this study to assess the right-of-way boundaries for Study Network segments. Widening shoulders may require acquisition of additional rights-of-way for certain segments, which could significantly increase the cost of implementing this recommendation of those segments.

facilities[32] along certain of these segments. Other corridors in this category may not have sufficient available right-of-way for sidepath construction. Finding solutions that improve cyclists' perceptions of safety and comfort as they ride these segments will be very challenging due to the constraints to which these roadways are subject, but detailed study will allow for closer inspection of a broader range of possibilities. Such studies might also consider the identification of alternate facilities that closely parallel (within ¼ mile) these RSTS-based segments, but such studies should include operational-level analysis of any proposed alternate routes, because such routes are often associated with frequent stop signs and other conditions that many cyclists find inconvenient. A process for evaluating alternate routes is described in Appendix I. While the identification of local alternate facilities can improve bicycle access to the destinations along the Study Network, policies outlined in the following chapter recommend that accommodation for bicyclists and pedestrians be included as a standard feature of all roadway reconstruction projects. Identification of a local alternate facility will not negate the expectation of bicycle and pedestrian accommodation in conjunction with future improvement projects on RSTS routes.

As with all other categories in this report, it will be very important to seize opportunities that arise for improvement of bicycling conditions along these segments in association with adjacent land development and roadway reconstruction or widening projects. Furthermore, if detailed operational and design-option studies are undertaken on any segments, it may be wise to aggregate several aligned segments into one study, as they may be subject to similar constraints and may benefit from the same ultimate strategy.

PROJECT PRIORITIZATION METHODOLOGY

Using criteria linked to the regional goals and objectives, proposed project prioritization processes, which are described in greater detail in Appendix J, will allow ARC to target its limited Federal funding resources towards those projects which will make the most significant contributions to the regional goals and objectives; final prioritization formulae will be established with the assistance of stakeholder involvement after adoption of this *Plan*. The full application of the recommended process, including preliminary strategies for better accommodating

32 While sidepaths appear to many to be appropriate bicycle facility alternatives, crash statistics and operational challenges from across the United States and around the world provide ample warning that, in many settings, they are not (see AASHTO *Guide for the Development of Bicycle Facilities*, pp.33-35). Preliminary corridor-specific design is needed for each to determine their feasibility from an operational/safety standpoint. For more information on the design requirements of sidepaths see Petritsch, T.A., B.W. Landis, H.F. Huang, and S. Challa, "Sidepath Safety Model: Bicycle Sidepath Design Factors Affecting Crash Rates." Presented at the 85th Annual Meeting of the Transportation Research Board, Washington, DC, January 26, 2006. Accepted for publication in Transportation Research Record: Journal of the Transportation Research Board.

bicyclists, is shown for the roadway segments of the bicycle Study Network, with the results listed in the accompanying prioritization database (Appendix K). The processes for calculating priority scores for bicycle projects off the Study Network and for various types of pedestrian processes are described, although the scope of this project did not allow for the collection and analysis of the project-specific data needed to calculate and compare priority score results for pedestrian projects.

Drawing on the previously established goals and objectives of this *Plan*, the criteria used to prioritize the Bicycle Study Network segments are: existing bicycling conditions; potential bicycle travel demand; public input; severity of congestion; relative level of bicycle-friendly policies enacted by jurisdictions requesting assistance with a given project; whether or not a segment passes through an LCI site or a Station Community, and (unit) facility construction cost. Based on these criteria, a priority score calculation was performed to prioritize potential improvements to the Bicycle Study Network. If submitted by a local jurisdiction, projects on RSTS routes[33] that were not part of the Study Network will be considered on the same level as Study Network projects, with several adaptations to the prioritization calculation terms. When a study network or other RSTS corridor has been found to be severely constrained, it may be possible for alternatively routed facilities to be considered as substitute projects for funding.

The procedures for calculating Priority Scores for pedestrian projects are similar to the process described for bicycle projects, with modifications shown in Appendix J.

33 As the strategic focus of this *Plan* is to improve bicycling and walking conditions on regionally strategic roadways, projects away form RSTS routes will generally not be considered for funding assistance by ARC.

CHAPTER 4: POLICY AND PROGRAM RECOMMENDATIONS

The goals and objectives of this *Plan* will provide ARC and its member jurisdictions with ideals and attainable milestones as the Atlanta Region seeks to improve its bicycling and walking conditions. To achieve the identified goals and objectives, governing policies must be adopted by state regional and local jurisdictions alike. Policies and programs that encourage non-motorized transportation are numerous and varied. This chapter describes some of these policies/programs and how they work in a general sense, and provides examples of local best practices, where applicable. These best practices can serve as a guide for other communities that are interested in implementing similar programs. Adoption of these and other bicycle friendly policies by local jurisdictions will be used as a factor by ARC when considering requests for project funding assistance (see Appendix J for the proposed prioritization methodology).

STRATEGICALLY TARGET BICYCLE AND PEDESTRIAN INVESTMENTS

Policy Recommendation:

Strategically target investments for on-street bicycle and pedestrian projects by focusing on those corridors and areas best suited to mode shift and to those jurisdictions which have demonstrated a commitment to developing and funding local-scale bicycle and pedestrian projects and to enacting bicycle- and pedestrian-friendly policies.

Recent research now shows conclusively the settings in which the investment in bicycle facilities brings about a mode shift and induces recreation and exercise activity[34, 35]. The corresponding energy

34 *National Cooperative Highway Research Program Report 552: Guidelines for Analysis of Investments in Bicycle Facilities*, Transportation Research Board of the National Academies, Washington DC, 2006.

savings and community health benefits are now quantifiable to assist in bicycle facility type investment and funding decisions[36]. Led by ARC, state and local jurisdictions should use these tools in developing both regional and local transportation systems to bring about energy savings and better public health throughout the Region.

Building on this research, ARC will establish procedures for funding bicycle and pedestrian projects that focus on facilities that are well-suited to producing a mode-shift and to those jurisdictions that have demonstrated their commitment to bicycle and pedestrian transportation. In practice, most improvements to bicycle and pedestrian accommodation will be realized practices of "routine accommodation" (see next policy statement) during roadway re-construction or rehabilitation projects, because this is a more cost-effective approach than independently retro-fitting bicycle and pedestrian facilities onto existing roadway configurations; this approach is especially warranted due to the limited availability of Federal funding assistance. Given the highly competitive nature of the Federal funds ARC is charged with distributing, it is important that a dedicated funding source for bicycle and pedestrian projects be established at a Federal, State or Regional level.

Until such time as routine accommodation becomes standard regional practice and/or a dedicated bicycle and pedestrian funding source is established, ARC will continue to support the funding of "plan compatible" projects and programs from existing federal sources, particularly STP Urban (L230), CMAQ (L400) and Enhancement (L220). "Plan compatible" projects are those which improve bicycle accommodation along a RSTS roadway or link key destinations within a "Regional Place" to the minimum prescribed level of accommodation defined in this plan. "Plan compatible" programs directly support the policy and goals statements of this plan. Programs may be "package" of specific infrastructure projects enhancing mobility and accessibility in a subarea. Other projects and programs of a localized and/or recreational nature must be funded from non-federal sources. Additionally, Federal funding priority will be given to those sponsoring jurisdictions which adopt planning, zoning and procedural practices which align with policy and goal statements of this plan.

35 *Corridor Level Mode Shift and Induced Recreational Travel Models – Phase II Report,* Florida DOT District Seven, Tampa, FL, March 2007.

36 *Conserve by Bicycle Study Phase I Draft Final Report*, Florida DOT Central Office, Tallahassee FL, May 2007.

IMPLEMENT THE PRACTICES OF ROUTINE ACCOMMODATION AND COMPLETE STREETS

Policy Recommendation: Incorporate the concepts of routine accommodation and complete streets into planning, design, and construction of all future roadways and adopt development review regulations requiring developers to build bicycle and pedestrian facilities as integral components of their transportation infrastructure.

One of the most important ways to improve region-wide bicycling and walking conditions is for agencies to develop policies that implement the concepts of routine accommodation and complete streets. Routine accommodation effectively states that, just as with motorists, bicyclists and pedestrians must be provided for when new roadways are constructed. For non-motorized users, accommodation can be achieved by making the bicycling and walking environment safe and comfortable. The steps needed to attain accommodation are dependent upon the type of roadway being constructed. For high-speed, high-volume arterials with heavy truck traffic, a relatively wide designated (signed and striped) bike lane might be needed, whereas lower-volume collector streets may only require a striped paved shoulder (bicyclists are usually considered to be "accommodated" on local streets, even without such facilities, because of low traffic volumes, low operating speeds, relatively few trucks, etc.). The same concept holds true for the pedestrian mode.

Accommodation for pedestrians is generally achieved through the existence of sidewalks. However, additional elements such as wider sidewalks, buffer areas between the sidewalk and the roadway, and tree planting in the buffer may be necessary to accomplish the same degree of accommodation on higher classifications of roadways.

In addition to accommodating bicyclists and pedestrians on new roadways, the concept can also be applied to retrofitting existing roadways. Jurisdictions can adopt minimum performance or accommodation measures for their street network. If roadways fail to meet the adopted standard and no current bicycle/pedestrian facilities exist, such roads would be brought up to standards through retrofitting.

Routine accommodation and roadway retrofitting both support the broader objective of complete streets. Complete streets are said to provide safe access for all users, including bicyclists, pedestrians, transit users, and motorists. While policies supporting routine bicycle and pedestrian accommodation and retrofitting for bicycle and pedestrian facilities only deal with one part of the complete streets equation, they nonetheless help overcome one of the most significant obstacles to "active" personal transportation in the Atlanta Region.

Training of jurisdiction roadway designers would greatly assist efforts to achieve the objectives of this *Plan*. Regular training sessions that cover level of service evaluation techniques for all four major transportation modes should be offered through ARC. In addition, bicycle and pedestrian facility design courses that teach AASHTO-based design techniques and solutions are currently available through several outlets, including the National Highway Institute (http://www.nhi.fhwa.dot.gov/downloads/catalog/NHIcourseCatalog.pdf) and Northwestern University (http://nucps.northwestern.edu/division/te.asp).

IDENTIFY RE-STRIPE CANDIDATES

Policy Recommendation: Develop and adopt a protocol for roadway re-striping to better accommodate bicyclists on roadway segments where excess pavement width is available.

Roadway re-striping is a relatively simple and inexpensive way to better accommodate bicyclists. Re-striping is frequently performed coincidentally with resurfacing projects, which present a window of opportunity to re-allocate pavement for bicyclists. The Needs Assessment Report of this plan includes recommendations on re-striping roadways where certain conditions are met. Segments identified as re-stripe candidates have outside lane widths that suggest the possibility of re-striping for at least a three-foot wide shoulder and either an eleven-foot

or twelve-foot wide travel lane on the roadway, depending on the posted speed limit: eleven feet for speeds 45 mph or lower, twelve feet for those higher. In specific locations where the posted speed is lower than 35 mph and the target bicycle level of service is "B," outside lane widths of 10 feet should also be considered to help reach the desired accommodation level, assuming a small amount of truck traffic exists.

These minimum recommended widths for motor vehicle travel lanes are based on the 2004 AASHTO *Policy on Geometric Design of Highways and Streets*. The AASHTO *Policy* states in its foreword that its intent is to recommend "range of values for critical dimensions." These ranges allow for flexibility, as the *Policy* describes:

> *Minimum values are either given or implied by the lower value in a given range of values. The larger values within the ranges will normally be used where the social, economic, and environmental impacts are not critical.*[37]

With regard to the width of lanes on Urban Arterials, the *Policy* states:

> *Lane widths may vary from 10 to 12 ft. Lane widths of 10 ft. may be used in highly restricted areas having little or no truck traffic. Lane widths of 11ft. are used quite extensively for urban arterial street designs. The 12 ft. lane widths are most desirable and should be used where practical, on higher speed, free flowing, principal arterials.*[38]

The *Policy* clarifies further,

> *Under interrupted-flow operating conditions at low speeds (45mph or less), narrower lane widths are normally adequate and have some advantages.*[39]

Additional research performed for the National Cooperative Highway Research Program concludes that the "preferred lane width for urban arterial streets under most circumstances is 11 ft. or 12 ft." and finds that the use of narrower lanes can lead to "traffic operational benefits, traffic safety benefits, or both."[40]

Because the segments of the study network are derived form ARC's RSTS routes, which will have relatively more truck traffic than other roads in the region, it is not recommended that re-striping to travel lane widths narrower than 12 feet be attempted on roadways with posted speed limits over 45 miles per hour. It is recommended, however, that motor vehicle lanes 11 feet wide be considered

37 AASHTO Policy, 2004. xliii

38 ibid., p. 472

39 ibid., p.473

40 Harwood, Douglas H. National Cooperative Highway Research Program Report 330: Effective Utilization of Street Width on Urban Arterials, TRB, National Research Council, Washington, D.C., 1990, p. 35.

on roadways with posted speed limits of 45 mile per hour or less, if re-striping to these dimensions creates adequate room for bicyclists, as defined below, and brings the segment into compliance with the target level of accommodation.

When designating dimensions for the re-striping of existing pavement cross-sections to include rideable shoulders, a minimum width of three feet to the outside of the repositioned edge stripe is recommended. Where more than three feet are available, it is recommended that the extra space be provided, but three-foot shoulders have been shown by research and practice to provide a tangible sense of comfort to cyclists[41]. While the AASHTO *Guide for the Design of Bicycle Facilities* (1999) expresses a preference for four-foot wide shoulders for the purposes of signing and marking the facility as a bike lane, it also states, "However, where 4-foot width cannot be achieved, any additional shoulder width is better than none at all."

These re-striping strategies represent opportunities for quickly improving bicycling conditions on a number of roadways in the Atlanta region by retro-fitting existing roadways, a relatively inexpensive solution. However, re-stripe candidate roadways should always remain under consideration for further improvement in conjunction with new land development, and roadway reconstruction or widening projects that may come to fruition over time.

Agencies throughout the Atlanta Region, including the City of Atlanta, are actively re-striping roadways in this fashion.

IMPROVE CROSSINGS AT UN-SIGNALIZED INTERSECTIONS AND MID-BLOCK LOCATIONS

<u>Policy Recommendation</u>: Adopt guidelines or standards that recommend appropriate crossing facilities and treatments for pathways (sidewalks and shared use paths) as they cross streets at uncontrolled locations (midblock or two-way stop controlled intersections).

The residents of the Atlanta Region have access to a growing network of sidewalks and shared use paths

41 Landis, Bruce W., Venkat R. Vattikuti, and Michael T. Brannick "Real-Time Human Perceptions: Toward a Bicycle Level of Service" Transportation Research Record 1578, Transportation Research Board, Washington DC 1997.

(collectively referred to herein as "pathways"). These facilities provide both recreational and transportation opportunities for the region's workers, students, families, and visitors. Many of these pathways parallel long roadway blocks and consequently, there may be numerous locations where users would wish to cross the roadway at midblock locations or other intersections where the crossing is uncontrolled because the traffic on the main street is not required to stop for side street traffic. These crossings, if not safe and convenient, create significant barriers to the usefulness of the sidewalk and pathway network. The region-wide prevalence of this problem has been made evident during the development of this *Plan*. At numerous public workshops and stakeholder meetings held throughout the Region, concerns about uncontrolled crossings have been abundant.

Where pathways cross roadways at grade at an uncontrolled location, a designated crossing may be appropriate. At midblock locations, a crosswalk must be striped if it is to be a legal crosswalk (Section 40-1-1(10), Georgia Code). Appropriate traffic control devices for the pathway users and the traffic on the roadway are critical if the safety and mobility of all users is to be maintained. However, simply marking a crosswalk does not ensure a safe crossing, especially of multilane roadways.[42] A consistent approach to signing, marking, signalizing, and grade-separating these crossing locations is important to ensure the expectations, and hence the safety, of drivers and pathway users.

It is important to recognize that pathway users are not tolerant of delays or detours in their routes. Given a choice between an inconvenient safe route and a convenient route that may be less safe, pathway users will often select the less safe route. Given a choice, most traffic engineers would prefer for pathway users to use the facilities at signalized intersections to cross the roadways; however, since this "safe" route may represent a significant increase in walking distance (and therefore, the users' delay) over the convenient route, the users may chose to cross at the uncontrolled location. There are two

42 Zegeer, Charles V., J. Richard Stewart, Herman F. Huang, Peter A. Lagerwey, John Feaganes, and B.J. Campbell. Safety Effects of Marked vs. Unmarked Crosswalks at Uncontrolled Locations – Final Report and Recommended Guidelines. Report No. FHWA-HRT-04-100. Federal Highway Administration, McLean, VA, February 2005.

ways to address this problem: make the convenient route safe or make the safe route convenient.

To help agencies address this challenge, a set of crossing treatment guidelines for uncontrolled crossings has been developed and included as Appendix L of this *Plan*. It is recommended that jurisdictions across the Region evaluate and adopt these or similar guidelines. Widespread acceptance of these standards will create a greater degree of uniformity for crossings at un-signalized intersections and mid-block locations and will make the Atlanta Region a safer place to walk. Adoption of such standards will provide other benefits as well, including better access to public transit, reduced congestion, and healthier lifestyles.

INCREASE AVAILABILITY OF END-OF-TRIP BICYCLE FACILITIES

Policy Recommendation: Require end-of-trip bicycle facilities (e.g., parking, lockers, and showers) at all new commercial developments or implement developer incentives to construct such facilities.

Many bicycle-related policies advance the accommodation of bicycling in the transportation network's public right-of-way. However advanced these initiatives may be, they will fall short of their investment goals unless coupled with improvements to "end-of-trip" provisions within the destinations of bicycling trips. Nationwide research, opinion, and behavioral surveys, and the Atlanta Region's very own experience underscore this fact.

The two most common "end-of-trip" provisions cited in nationally prominent opinion surveys as influencing the choice to bicycle for transportation are bicycle parking and the workplace provision of locker/showers. Observation of codes in many metropolitan areas in the United States confirms that bicycle parking being required along with land development is increasingly prevalent. Frequently, such bike parking requirements state that bicycle parking should represent a percentage of the required automobile parking (e.g., 3-5%) for the development. Specifications regarding the location of required parking facilities should also be made in consideration of building access, security, user maneuverability, and shelter.

In contrast to the provision of bicycle parking, workplace bicycle lockers, changing rooms, and/or shower facilities are generally not being required or constructed. There are two options to change this situation: adopt incentives to entice developers to

build them or mandate the facilities. Several approaches to the first option are outlined below.

The continued investment in bicycle transportation infrastructure by ARC jurisdictions can be significantly leveraged by offering compelling incentives to developers. There are a number of incentives that can be offered to the (private) sector developing and managing land use; many of these incentives can be offered at little or no actual expense to the jurisdictions. There are phases in which they can be effective: upon initial land development or during tenant build-out and/or maintenance.

Among the compelling incentives for the construction of bicycle locker/changing/shower facilities that can be effective at initial land development are the following:

- Trip generation (hence traffic impacts) reduction during traffic impact assessments (e.g., up to five percent of total trip generation, depending on land use)
- Floor Area Ratio (FAR) bonus/bump-up (e.g., up to five percent for office development), and
- Reductions[43] to required yard/setbacks (e.g., up to 20 percent for facilities with capacity of serving up to five percent of employees)
- Variance for parking lot dimension(s)
- Greenspace (for vehicle utilization area (VUA)) requirement reduction, (e.g., up to twenty times the building square footage dedicated to the bicycle commuters' shower or locker facility)

Incentives for conditions subsequent to initial development (i.e., tenant build-outs and building maintenance) include ad valorem tax exclusion of at least two times the square footage of the building dedicated to the locker/changing/shower facility. This exclusion could be increased if the tenant businesses participated in additional transportation demand management programs.

IMPROVE NEIGHBORHOOD CONNECTIVITY FOR BICYCLES AND PEDESTRIANS

Policy Recommendation: Establish guidelines for ensuring bicycle and pedestrian connectivity between neighborhoods and among adjacent land uses.

Bicycle and pedestrian connectivity is a significant aspect in the development of an effective

43 or internal (transfer) flexibility of required land use buffer yards

nonmotorized transportation system. Current residential development patterns in the region frequently are a barrier to bicycling and walking. Neighborhoods are often isolated due to cul-de-sacs, privacy gates and walls. Street patterns typically found in outlying suburbs of the Atlanta Region often preclude needed short transportation connections. These very short missing connections significantly prohibit active transportation because they remove the possibility of making many shorter trips that could easily be made by bike or on foot. Widespread changes are needed in designing the street patterns of tomorrow's neighborhoods.

Providing adequate transportation network connectivity will also:

- Provide children with routes to school that reduce their dependency on parents' automobile and government-provided buses;
- Reduce roadway congestion, thereby saving energy and improving air quality;
- Provide more direct and safer travel routes for bicyclists and pedestrians;
- Increase residents' (and visitors') ability walk or bicycle to restaurants, shopping, entertainment, recreational facilities, and places of employment;
- Increase opportunities for recreation and exercise, thereby reducing the trend toward obesity;
- Sustain development and property values; and
- Improve the quality of life in the Atlanta Region.

Accordingly, to help bring about the above-listed benefits, the following land development and transportation network policy is recommended for adoption at the local level in the Atlanta Region: "provide both physical and legal (through easements and/or land platting) non-motorized circulation and access;" recommended intervals for access spacing as shown in Table 4.1.

Table 4.1 - Recommended Intervals for Non-motorized Access Spacing

Residential Density	Minimum Non-motorized Connection Spacing
12 dwelling units/acre (or greater)	330 feet
6 dwelling units/acre	660 feet
2 dwelling units/acre	1320 feet
1 dwelling unit/acre	2640 feet

A residential development in the greater Atlanta area shown in Figure 4.1 consists of miles of disconnected streets and houses. In some places, houses lots are adjacent to one another, but in order to get between them, residents must make lengthy trips out to and

back from busier arterial and collector roads; neighborhood connector pathways could minimize this distance. Benefits of such connectors include increased safety, increased recreation and physical activity, greater accessibility to other residences, retail establishments, and schools, and reduced fuel consumption.

Overall accommodation for pedestrian and bicycle travel is improved by minimizing travel on busier main roads when traveling between residences and other destinations. Pathway connections can also provide recreational opportunities to residents by connecting the many miles of highly accommodating local and residential streets, making it possible to walk, jog, or bike for miles without ever actually leaving the neighborhood. Children could access their friends' homes easily and more easily bike or walk to schools nearby. This would reduce fuel consumption and also increase opportunities for physical activity by children.

The figure illustrates possible places for connections and the possible distances saved. The largest benefit

Figure 4.1 – Sample Atlanta Region Neighborhood with Potential Connecting Pathways

comes from traveling from "C" to "D". The trip from "C" to "D" is 4.65 miles without connections.

Table 4.2 – Comparative Trip Lengths With and Without Connecting Pathways

Path	Distance with connectors (ft)	Distance without connectors (ft)
A-B	5,000	11,800
A-C	4,500	12,500
B-C	7,300	20,000
D-E	300	19,300
C-D	4,500	24,500

However, with the connections, the trip is reduced to less than a mile. The trip from "D" to "E" is also a good example of the benefit of such connections (See Table 4.2). The distance without connections is 3.66 miles. The trip is reduced to 300 feet with the connectors.

The example above illustrates how residential subdivisions can be designed better to accommodate bicycling and walking for both transportation and active living. The connections must be designed from the beginning: preliminary plats, construction plans, and final plats must execute this design approach—with the provision public rights-of-way or easements for the connections—to ensure ultimate success. There should be few exceptions to providing the necessary connection spacing along developments' boundaries with vacant land. However, there are many cases where new subdivisions are being designed adjacent to existing subdivisions and abutting connections do not exist. Accordingly, some design discretion will be necessary for those cases, as retrofitting the existing established neighborhoods is very difficult.

Additionally, there are many cases where small developments may have property limits in one or two dimensions that fall below the recommended non-motorized connection spacing for the development's density. In those cases, it is suggested that non-motorized connection provisions for the development's perimeter be made considering the surrounding properties' existing connection spacing patterns. Two goals should guide the discretion: preserve adequate travel path spacing for bicycling and walking and prevent the development's isolation from surrounding compatible land development.

PROMOTE BICYCLE AND PEDESTRIAN PLANNING AND IMPLEMENT BICYCLE AND PEDESTRIAN PROGRAMS

Policy Recommendation: Emphasize the importance of bicycle and pedestrian planning at the local level; Develop and promote programs that promote

bicycling and walking through education, encouragement, enforcement, and awareness.

While many of the preceding policy recommendations focus on specific issues, jurisdictions should also strive toward elevating the overall importance of bicycle and pedestrian planning within their communities. By changing (if necessary) the general mindset of the local staff and the general public, and by extension elected officials, many of the above policies stand a better chance of implementation. There are several steps that can be taken by local jurisdictions to elevate the significance of non-motorized transportation planning: creating a full-time bicycle/pedestrian coordinator staff position, supporting bicycle/pedestrian facility design training for all appropriate staff, and incorporating an analysis of bicycle and pedestrian issues/impacts into the review process for all roadway and development projects. Regarding this last recommendation, all projects should be required to provide a statement of adherence to this *Plan*'s identified performance measures so that projects can be evaluated in a consistent manner. Furthermore, ARC should develop a checklist to determine the relative level of bicycle/pedestrian friendliness of local jurisdictions based on the criteria set forth in the Needs Assessment Report. ARC's own planning processes should be reviewed to ensure that bicycle and pedestrian accommodations and needs are addressed in significant ways during all transportation planning projects.

Programs to support and promote biking and walking can be implemented by ARC and by local jurisdictions and agencies. An example of a program that ARC might organize and coordinate is a periodic "peer exchange" to be attended by facility design engineers from agencies around the region.

A common hindrance to safe and comfortable bicycle and pedestrian travel is lack of appropriate nonmotorized facility design training and experience on the part of local jurisdictions' public works staff. Numerous design elements related to bicycle facilities and sidewalks, both major and subtle, are often overlooked or unknown by those who design such facilities. To counteract this imbalance, ARC should organize and facilitate a periodic peer exchange that would ideally include design representatives from each of the Region's jurisdictions and perhaps feature a key speaker or other headline event. At this gathering, design and

planning staff from jurisdictions around the region would share experiences from their community and either describe how particular design-related problems have been solved or ask for potential solutions from the others in attendance. Such an event would broaden the regional knowledge base and foster cooperation between agencies.

One deterrent to active transportation is a lack of awareness of the viability of bicycling and walking as effective modes of transportation among certain segments of the population. To improve this situation, local jurisdictions and other groups/agencies in the Atlanta Region should encourage programs and activities that showcase the importance of the non-motorized modes. Such programs can take a myriad of forms, including safety programs (Safe Routes to School), education (effective cycling courses), general awareness events (multi-faceted bike months and/or walk months, bike rodeos, etc.), incentive-based programs (commuter assistance), and enforcement programs (directed at motorists, bicyclists/pedestrians, or both). Some programs of this general nature are ongoing in the Atlanta Region and provide good examples for other communities. Brief descriptions of these programs are contained below.

Local Best Practices

The Downtown Transportation Management Association offers downtown area workers incentives and rewards for commuting using alternative modes of transportation to commute to work. Incentives include cash rewards and gas cards. According to Central Atlanta Progress, program participants saved over $44,000 over a two month period in 2005.[44]

The Atlanta Bicycle Campaign, a regional bicycle advocacy group, sponsors Effective Cycling classes with funding from ARC. These classes, which are taught by instructors certified through League of American Bicyclists, teach safe methods of riding on the road and in traffic and are offered to a variety of user types and skill levels. Over the past decade, over 1,000 adults and 2,000 children have gone through the program.

PEDS, a pedestrian advocacy group, is among those leading the enforcement aspect. The following is taken from the PEDS website (www.peds.org):

"PEDS recently sponsored a pedestrian safety law enforcement workshop attended by police officers from 20 jurisdictions. Now they're putting their training into practice, so the next pedestrian you see in a crosswalk just might be a cop!
Every few months, PEDS organizes a multi-jurisdictional sting operation. Unlike previous stings, where PEDS staff members served as decoys, City of Atlanta, Decatur, and Georgia State University police

44 http://www.atlantadowntown.com/TransParking _TMA_Rewards.asp. Accessed April 17, 2007.

officers actually go undercover as pedestrians to target drivers who violate crosswalk laws."

The Metro Atlanta Demonstration Safe Routes to School Project was recently completed. Safe Routes to School project funds are now awarded through state departments of transportation using funds from the Federal Highway Administration. The demonstration project was carried out by the Atlanta Bicycle Campaign at four schools in the Atlanta metropolitan area, and included engineering, encouragement, education, and enforcement components. The Safe Routes to School effort in the Region is still in its infancy and results are limited, but this demonstration project can provide guidance to new programs now that funding is more readily available.

In a related effort, ARC and PEDS sponsor the KidsWalk program, which promotes walking to school among the region's schoolchildren. Currently, 15 area elementary schools are participating in the program. KidsWalk helps schools participate in International Walk to School Day, an annual event usually held on a Wednesday in October, which frequently serves as a good first step for schools interesting in encouraging walking as a form of school transportation.

The City of Decatur, which has conducted a model Safe Routes to School program, is currently working on a state handbook to help other Georgia communities implement their own programs.

The PEDS website currently has a mechanism for facilitating the reporting of pedestrian hazards by concerned citizens. Through the online form, citizens can report many issues including the following: broken sidewalks, non-functioning pedestrian signals, faded crosswalks, blocked sidewalks (vegetation, construction, parked vehicles, etc.), inaccessible facilities, and street light outages. Currently the system is available for the City of Atlanta, the City of Decatur, Fulton County, and DeKalb County. ARC could run a system such as this one, which should eventually include as many jurisdictions in the region as possible.